CITY OF SHREVEPORT
P.O. BOX 31109 SHREVEPORT, LA 71130 ● 505 TRAVIS STREET SHREVEPORT, LA 71101
Website: www.shreveportla.gov

August 15, 2019

Mayor Adrian Perkins
Councilman, Willie Bradford
Councilwoman LeVette Fuller,
Councilman John Nickelson, Vice-Chairman
Councilman Grayson Boucher
Councilman James Flurry
Councilman James Green
Councilman Jerry Bowman, Jr., Chairman

Dear Mayor and Council:

Attached is the 2019 Mid Year report detailing the "State of the Municipal Infrastructure." This report provides capital project expenditures for water, sewer, streets and drainage by year as well as discussion of priority projects and funding issues. From this report, it is apparent that previous funding will not be enough to close the gap on what is needed on a yearly basis to maintain our infrastructure.

The attached report has been sufficient in years past. The report rarely had any significant change excluding the graphs in the back that show dollars spent. Since it is imperative to keep improving and evolving, the content and format of the report is currently getting a complete overhaul. The next report will be more visually pleasing and the data will be easier to understand. The renewal rates and replacement values will be reviewed. Recommendations for capital improvement strategies and potential revenue sources will be made.

The Department would like to work with the City Council to revise Section 2-33 of the Code of Ordinances to better reflect current practices.

If you have any questions, or would like more information related to this report, please let me know.

Sincerely,

Patrick K. Furlong, P.E., City Engineer

xc: Sherricka Jones, CAO
Barbara Featherston, P.E., BCEE, Director of Water and Sewerage
Gary Norman, Interim Director of Public Works
David B. Smith, P.E., Assistant City Engineer
Matthew Redmon, P.E., Assistant City Engineer
Sathanathan Thileepan, P.E., Assistant City Engineer

Attachment

State of the Municipal Infrastructure

Summary Status Through

Mid Year 2019

City of Shreveport
Department of Engineering and
Environmental Services

August 2019

HISTORY, PURPOSE, AND ASSUMPTIONS RELATED TO INFRASTRUCTURE ASSETS VALUATION AND CONDITION

HISTORY

The Shreveport Code of Ordinances, Article II, Section 2-30, establishes the City Council Planning and Infrastructure Committee to oversee and make policy and budget recommendations to the City Council, the Mayor and the community concerning all city owned infrastructure including streets, storm water drainage systems, water and sewer systems, buildings, and the geographic information system; to insure continuity in infrastructure planning and project implementation; to insure that increases in the water and sewer rates are used for the intended purposes, and that the water and sewer systems comply with state and federal regulations; and to gather information regarding GIS technology and its potential application as a management tool by the city; to oversee and make recommendations to the City Council, the Mayor, and the community concerning the development of the system, and to work with the administrators and citizens to identify outside sources of funding.

In the Code of Ordinances, Article II, Section 2-32, the Department of Engineering and Environmental services shall submit at least two reports each year which compare the needed

capital project investment in the water supply, treatment and distribution system and the wastewater collection and treatment system, with the actual investments made in each of the systems each year. The report for the prior fiscal year shall be due on or before February 15, and a mid-year report shall be due on or before August 15. In 2003, the Infrastructure Committee of the City Council requested that streets and drainage be added to the monitoring of infrastructure status.

PURPOSE

As a City government, it is our business to design, construct, operate and maintain the infrastructure (roads, bridges, pipes and pumps, etc.) to facilitate the development of our City. As a practical matter, all of the facilities we install have a life cycle. Within that life cycle, it is implied that resources for the expected maintenance, future growth demands, and the eventual replacement are required. Some facilities have different life expectancies and different maintenance requirements. Calculated annual renewal rates are used to determine what should be spent annually to replace and repair infrastructure in order to continually renew the life cycle. This is what we should be spending yearly on planned replacements. This does not include additional dollars now needed to address failure and neglected facilities that have not been replaced on this recommended schedule. This creates a spending "gap" which is the amount needed above what we are currently spending.

ASSUMPTIONS

This report represents a summary of the current methodology and approach used by the Department of Engineering and Environmental Services to provide a basic level of infrastructure asset management. This asset management program involves development and analyses of data related to infrastructure assets inventory, condition, and valuation parameters.

Over time these parameters change due to inflation, construction cost increases, deteriorating physical assets, etc. Since it is not possible with existing programs and tools to monitor and adjust all the parameters due to these changes, the information reflected in this report should be viewed as the best available data resulting from a reasonable amount of data development and analysis.

Annual renewal rates for water, wastewater and roadways were adjusted for the 2009 End of Year report and again for water and wastewater in the End of Year 2016 Report. These increases can be seen as the sharp spikes in the annual renewal amounts on the graphs in the report. These increases are substantial and reflect many years of increases in construction costs and the increase in physical size of the infrastructure, but also a more accurate representation of the true renewal and life cycle costs of the different types of infrastructure in the City.

The data provided in this document should be considered as representative of trends in infrastructure assets renewal and expenditures.

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PROJECTS OF SPECIAL CONCERN

The following are special or high priority infrastructure projects or concerns which are identified here to highlight their unique characteristics and to emphasize the importance in timing for addressing these projects.

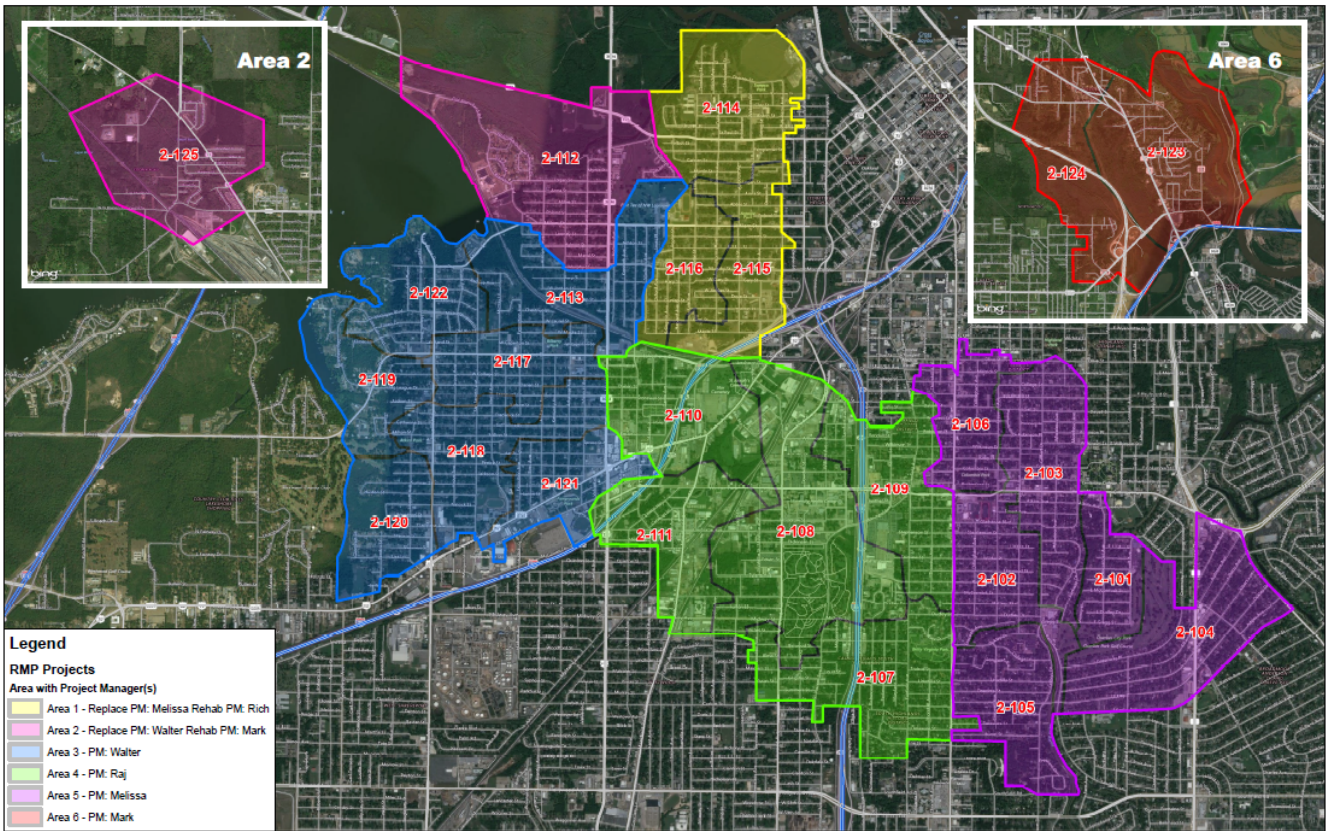
While these specific projects are identified as high priority, other projects identified by the Department of Engineering and Environmental Services in the "Capital Projects and Proposed Infrastructure Improvement Programs" must also be addressed to prevent deterioration of the infrastructure to levels which will affect the City's ability to meet customer expectations.

Consent Decree – Sanitary Sewer Assessment and Upgrades

In 2009 the U.S. Environmental Protection Agency (EPA) reported Shreveport to the Department of Justice (DOJ) for the hundreds of sanitary sewer overflows (SSOs) that occur each year. Immediate action had to be taken to prevent further deterioration of Shreveport's sewer and water infrastructure and avoid litigation. In May of 2014, the City entered into a Consent Decree with the EPA and DOJ to correct the negative environmental impact that the aging sewer system has had for decades. This Consent Decree requires the City to fully characterize and assess the physical condition of the sewer infrastructure and to make repairs as necessary. Funding is required for on-going assessments, repairs, and rehabilitation to the sewer system with an estimated total around $1.1 billion within a twelve year period. The benefits of the project will be a significant reduction in sanitary sewer overflows (SSOs) achieved with an aggressive schedule. Work in Phases I-V falls within the following basins:

- Phase I – Cedar Grove Basin
- Phase II – Southside, Queensborough, North Highlands, Westside and Choctaw Bayou Basins
- Phase III – Cooper Road, Wallace, and Broadmoor Basins
- Phase IV – Stoner, North Pierre, Bickham Bayou, Country Club and LSU Basins
- Phase V – Princess Park, Texas Pierre, Boggy Bayou, Cross Bayou, Lower Cross Lake and Lakeview Basins

With incremental deadlines for completion of the remediation measure plan in each sanitary sewer assessment phase, construction for the Phase V must be complete by 11/13/2023.



(Phase 2 of Consent Decree - Southside, Queensborough, North Highlands, Westside and Choctaw Bayou Basins)

The City is currently towards the end of Phase 2 construction of the Consent Decree, with Phase 3 projects currently being designed and set to begin construction in Winter 2019/2020.

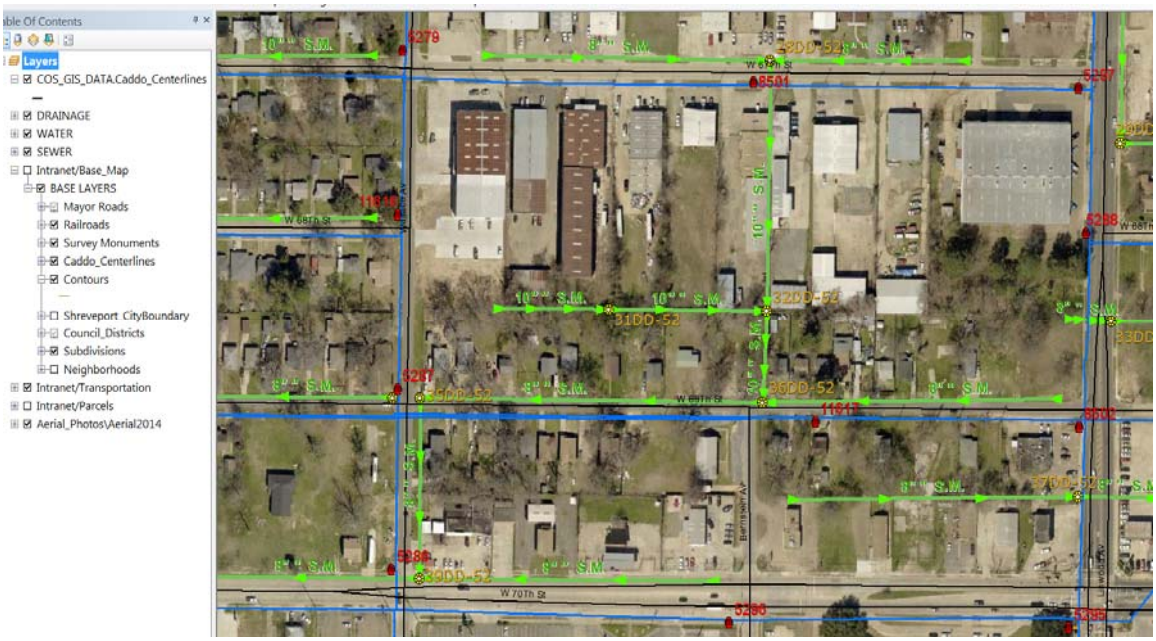
Comprehensive City-Wide GIS and Asset Management System

The Department is taking steps towards implementing an Asset Management Program. The City requested proposals in early 2013 and chose NTB Associates, Inc. for the installation of City Works; and Transmap Corporation to perform the inventory and condition rate of our roadways. The Department of Engineering and Environmental Services has received street inventory data in the first half of 2015, and City Works was installed in the beginning of 2016.

The City has also taken steps to change the GIS Oracle data backup from a virtual server to a physical server; purchased Golden Gate to supply continuous data backup; and invested in buying more storage to house street data. Thus, this setup provides better stability to the overall system for Asset Management. A GIS Portal has been implemented to improve the City's intranet GIS services. The domain indicates different maps based on department specific GIS needs.

Currently, the City has hired two Consultants to provide an inventory of the water distribution system and wastewater collection system assets throughout the City. These Consultants are charged with updating the current City GIS data features for water and sewer assets. However, the City has not yet acquired the funding or personnel needed to bring all features of Asset Management and GIS data up-to-date. It has been evaluated the City would need a full-time City Works Manager and GIS Analyst for each department to meet project requirements, as well as generating more accurate Governmental Accounting Standards Board (GASB) reports. Formation of a Steering Committee is recommended to create a GIS Master program to implement asset management for infrastructure planning activities. Until this committee is established, an increasing range of expenditures will be needed rather than allowing for more efficient management and spending. With proper planning and contributions of all City Departments, other service areas of the City (permits, code enforcement, building maintenance) can be added to the program in an efficient, cost effective manner as funding is identified.

CityWorks Asset Management System implementation, GIS maintenance, and acquiring an Enterprise License Agreement with ESRI are immediate projects with long term durations requiring continuous funding that will lead towards financial accountability and good management of assets. Thus, a project of this magnitude will take several years and $15 to $20 million dollars to implement. While this seems like a large amount of capital to spend, the savings for asset renewal projects will be used to calculate the *return on investment* (ROI) and ultimately demonstrating the value of GIS to the City.



(ArcMap GIS - Screenshot)

Increased Water Treatment Capacity

The T. L. Amiss Water Purification Facility (WPF), originally built in the early 1930's, is aging and requires significant investment to maintain its original treatment capacity of 90 million gallons per day (MGD). This plant takes water from Cross Lake and is the City's primary source of drinking water.

(T.L. Amiss WPF)

The T. L. Amiss WPF provides an average of 36 MGD of drinking water on a daily basis. The plant, as currently in place, can treat 78 MGD based on the most current design parameters and regulations. While the plant expansion was originally designed for 90 MGD, this capacity has been reduced over the years due to more stringent regulations. The 78 MGD treatment capacity is also the total treatment capacity of the plant. This means that if one of the redundant treatment processes are out of service for cleaning or repair, this total capacity is likewise reduced. While it appears on average that there is adequate capacity to provide drinking water to the citizens of Shreveport, this capacity is stretched considerably during the summer months when the demands can, and have, risen to the total capacity of the plant. The summer of 2011 was a testament to our reliance on the typically abundant rainfall that we experience in this region. That year was one of the driest on record. With the dry weather came an increase in water consumption. As a comparison, the peak day in 2010 was 61 MGD, while the peak day in 2011 was 77 MGD. Overall the water pumped from the T. L. Amiss WPF during the summer months of 2011 was a 19% increase over the same months in 2010. If one of the main treatment processes had failed during this time, the City might not have been able to provide the customers with all of their drinking water needs.

One alternative for assuring that the City has adequate water treatment capacity for the next 20 to 50 years would be to build additional capacity between 30 MGD and 60 MGD. The intent would be to construct this additional capacity at the existing plant site. The City has hired an Engineering Consultant to develop a Capital Improvements Plan for water treatment and water distribution and will build upon recently completed work as well as previous Master Plans. This Consultant is charged with generating an engineering report recommending alternatives for replacement and upgrades of the distribution system including alternatives and recommendations for expansion and optimization of our existing water treatment facilities. A project to upgrade the supplementary water source, pumping raw water from 12-Mile Bayou, is nearly complete.

Cross Lake

Cross Lake was built back in the late 1920's for the purpose of supplying water to the City of Shreveport. The T. L. Amiss Water Purification Facility was built on the shores of the lake and designed for a capacity of 8 MGD. Since that time the City has expanded and grown and development around the lake has increased. The lake now serves the dual purpose of water supply and recreation. There are two areas of concern for the lake, one is the slow silting in from creeks, streams and surface runoff which reduces the depth and water supply capacity and the other is non-native vegetation which not only speeds up the silting-in process and reduces recreation, but also contributes to water treatment issues including taste and odor.

(T.L. Amiss WPF)

The cost to dredge the lake back to the original depth and capacity is approximately $200 million. The costs for reducing the non-native vegetation are smaller at $1 million, but require

yearly expenditures of several hundred thousand dollars to maintain. The Engineering Consultant for the Capital Improvements Plan project is also charged with completing a bathymetric study and report of Cross Lake.

Cross Lake Dam

The Cross Lake Dam was built in the late 1920's. At the time the dam was built, the existing embankment was used as a railroad bridge over Cross Bayou. The spillway was constructed in 1928 to replace this embankment structure and form Cross Lake. The combined usage of the Cross Lake Dam as both a containment structure for raw water supply to the City of Shreveport's only water treatment facility and as structural support for two existing rail lines for Kansas City Southern Railroad provide an unusual situation requiring a unique balance of responsibilities and accountability related to caretaking of the dam structure and surrounding area.

Studies have recently been conducted to determine maintenance, repair and replacement costs of various parts of the dam and spillway. The cost for providing additional structural support for the dam is approximately $3 million. As discussed above, the spillway, or gate portion of the dam, was constructed over 80 years ago and is in need of replacement. Parts of the spillway are gates that are operated to provide for flood control when rains substantially increase the lake levels. This equipment is past its design life, replacement parts are not available and repairs are expensive. Replacement of the spillway structure is $10 to $15 million. The City has recently contracted with an Engineering Consultant to perform an underwater acoustic survey of the dam and to provide design for erosion control and dam repairs on the Cross Lake Dam as recommended in a report dated November 2011. This project will address the following items: repair and fill existing sinkholes and longitudinal stone toe protection on downstream banks; underwater inspection of existing dam structure; cleaning and sealing cracks and removal/replacement of concrete revetment extending the full length of the dam. The first phase of construction was completed in late 2017, with sequential phases being developed and designed.

Street Rehabilitation and Replacement Program

Over the years the City has spent considerable dollars constructing the vast network of streets and highways that allow citizens quick and easy access to all parts of the City. As funding for maintenance of the streets has typically been underfunded, so has the condition of the streets. However, with the establishment of the Streets Special Revenue Fund, the City has made great strides with roadway repairs spearheaded by aggressive roadway improvement action plans since

2015. In 2012, The City initiated a program to rate the City's roadway network. In addition, the contract will include collection of roadside asset information. A committee was recommended and a system to inventory and rate our streets was proposed to organize and optimize this process. The roadway network has been analyzed and a pavement condition index has been assigned to all streets. This system is currently being used to identify our most pressing needs. A pavement management system is to be implemented with the implementation of the City Works Program.

Intelligent Traffic System

Early in 2009, the main-frame computer that managed the Traffic Signal System in Shreveport took heavy damage from a fire. This thirty year old central system is now completely off line and has no option for repair. Unfortunately, the back up system for this equipment is even older. Signals within the city are now operating on equipment that is, in some cases, over sixty years old.

This turn of events is causing congestion, increased driver frustration, and an overall drop in motorist's safety throughout the City. Small projects, such as Youree Drive and the signals along I-20 have updated roughly fifteen percent of the system utilizing the seven million dollars in federal grant monies obtained from 2001-2005. Further improvement is expected with the Kings Highway Signal System project and the Traffic Signal Emergency Power Backup Generator project. To completely utilize the capabilities these improvements represent, more work is needed. In addition, the estimated total cost to rehabilitate the entire system is approximately $60 million dollars.

Water Distribution System Issues

While the City has expended considerable funds to rectify pressure issues in Southeast Shreveport, city-wide issues of aged and undersized water mains remain. These issues present the City with continual repairs when these mains fail. Not only do water main breaks provide an inconvenience to customers, but they cost the City millions per year in emergency repairs as well as lost water. The Department of Engineering and Environmental Services has estimated that approximately $150 million is needed to bring the water distribution system up to current standards and levels of reliable service.

In late summer of 2013 the Department of Water and Sewerage proposed, and the Council subsequently approved, a significant water and sewer rate increase to be implemented over a 10-

year period to fund approximately $350 million in sewer projects related to the Consent Decree as well as $180 million in water projects. These increases will allow the water and sewer system to play "catch up" for many years of inadequate funding. In 2014, 2015, 2016, 2017, and again in 2018, the Department of Water and Sewerage sold nearly $500 million, combined, in Revenue Bonds. As a result of the increases and bond sale, future water and sewer bond issues will reduce the areas of concern addressed in this report.

Drainage and Floodplain Management

The historic Red River flood of 2015 produced some uncertainty with the effective flood maps for the Red River and its impacted tributaries. The City has been serving on a local Flood Technical Committee. This committee was formed to study the events of the 2015 Red River flood and to make plans to reduce future Red River flood risk. This committee helped the local governing bodies prompt the Army Corps of Engineers to perform a study of the current conditions of the Red River. This study will show how the river is changing and will allow for more accurate predictions in the future. The study can also be used by FEMA to update their Flood Insurance Study and Flood Insurance Rate Maps.

The city's drainage infrastructure is aging similar to the water, sewer and road systems. The current mapped system shows approximately 172 miles of channel and 270 miles of drainage pipe. Some of the systems were installed before the 1950s. There is partial asset inventory data, such as age, length, diameter or size, and pipe/channel material, for most of the drainage infrastructure on record. However, there are some areas that have little to no information. Task 300 (GIS Management and Updates) of the Master Drainage Plan Update will update the GIS system with new drainage improvements. It will also update and organize our existing data to provide the basic information needed to develop a comprehensive asset management and condition assessment program. This program will identify drainage areas that need improvements due to condition or capacity of the system.

(E. Crockett & Clyde Fant Mem. Pkwy. - June, 2015)

EXECUTIVE SUMMARY

The state of our infrastructure is a very important issue that has a significant impact on our citizen's daily lives. As a City government, it is our business to design, construct, operate and maintain the infrastructure (roads, bridges, pipes and pumps, etc.) to facilitate the development of our City. As a practical matter, all of the facilities we install have a life cycle. Within that life cycle, it is implied that resources for the expected maintenance, future growth demands, and the eventual replacement are required. Some facilities have different life expectancies and different maintenance requirements.

For planning purposes, we have to take into account the capital cost of a project, its life expectancy and the years between preventive maintenance and replacement. The problem is when our aging facilities were designed and built; an implied covenant was made to expend the capital to provide for preventive maintenance and replacement when the service life comes to an end. What we are witnessing today symptomatically is the advanced and sometimes premature decay of our infrastructure and the breaking of that implied covenant made many years ago.

With issues today that include water management, energy efficiency, funding and environmental concerns, infrastructure should be viewed in a different manner, and sustainability is key. This includes not only the physical asset and how it is installed, but the affect of that asset on its surrounding environment. Elements of sustainability include conservation and efficiency, energy management, security, environmental stewardship, public outreach and information, funding transparency and realistic life-cycle costing, and regulatory optimization.[1] With all of these issues comes a cost of not only money, but time, both of which are in short supply.

Historically, municipalities have lagged in infrastructure spending as compared to their needs. An example is the 2002 US Environmental Protection Agency report, The Clean Water and Drinking Water Infrastructure Gap Analysis. This report concluded that the current national spending "gap" for water and wastewater capital needs is $225 billion. This is the amount needed above current spending, and does not include the Operations and Maintenance spending gap of over $300 billion.

Nationally, in 2014, public spending on transportation and water infrastructure totaled $416 billion.[2] That total includes spending by federal, state, and local governments for capital

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1 American Water Works Association, Sustainable Water Systems, Opflow February 2010.

2 Congressional Budget Office – Public Spending on Transportation and Water Infrastructure, 1956 to 2014.

(structures and equipment) as well as their spending for operation and maintenance. At $109 billion, spending on water utilities (water supply and wastewater treatment facilities) was second only to highways as a share of total public infrastructure spending. The majority of these funds are derived from local sources as minimal federal monies are typically available to municipalities, other than through the State Revolving Loan programs. As the name suggests, these are loans and not grants, and local revenues must ultimately pay back principal and interest on these loans. The Department of Engineering and Environmental Services is currently pursuing an application with LADEQ for a State Revolving Loan of $20 million to be dispersed each year for five years to complete sewer construction related to the Consent Decree.

The emphasis on infrastructure sustainability is being driven by the widely accepted fact that cities historically have managed their infrastructure poorly. We know that investing in infrastructure is essential to support healthy, vibrant communities. Infrastructure is also critical for long-term economic growth, increasing the gross domestic product (GDP), employment, household income, and exports. The reverse is also true – without prioritizing our nation's infrastructure needs, deteriorating conditions can become a drag on the economy.[3] This has resulted in a national concern for municipal infrastructure, which is in poor condition and is continuing to deteriorate to the point of negatively impacting the economic strength of cities, as well as health concerns of citizens. [4] [5]

Minimization of expenditures on municipal infrastructure is not the least cost alternative to infrastructure management—it only defers needed expenditures until infrastructure assets' failure require their replacement—always at a much greater cost due to parts, labor, method of repair and collateral damages. These increased costs are often hidden but are real costs that unnecessarily increase the amount that citizens pay and can negatively affect the quality of services provided.

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[3] 2013 Report Card for America's Infrastructure, American Society of Civil Engineers.

[4] Report Card for America's Infrastructure, 2003 Progress Report: An Update to the 2001 Report Card, American Society of Civil Engineers.

[5] Report Card for America's Infrastructure, 2005 Progress Report. An update to the 2003 Report Card, American Society of Civil Engineers.

The Department of Engineering and Environmental Services has, until recently, utilized a general form of infrastructure asset management which dates back to 1997. [6] Since that time, changes in asset management include the rating of roadways and the advent of locating and analyzing our facilities. Numerous reports on the status of the water and sewer infrastructure have been produced for the U. S. Environmental Protection Agency (EPA) and the Louisiana Department of Environmental Quality (DEQ), and for internal City use.

In 2003, the Infrastructure Committee of the City Council requested that streets and drainage be added to the monitoring of infrastructure status. It is one of the Department Engineering and Environmental Services highest priorities to implement a comprehensive infrastructure asset management program for water, sewer, streets, and drainage infrastructure that will build on what was initiated in 1997.

As detailed in the annual report "Capital Projects and Proposed Infrastructure Improvement Programs" the City has great needs. Those needs as compared to the actual annual spending provided in this report show that the City's spending gap is comparable to that of other municipalities around the country. While the City has expended millions since 2007 for capital improvements, this has not been enough to keep up with the infrastructure needs.

This document summarizes the general asset management approach used by the Department of Engineering and Environmental Services to report the current infrastructure expenditures and estimated renewal rates for the City's municipal infrastructure and to make recommendations about the most cost effective actions which will continue to improve that infrastructure.

[6] 'State of the Water and Sewer Infrastructure Report: City of Shreveport, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014'.

STATE OF THE MUNICIPAL INFRASTRUCTURE

The following sections summarize the status of investment in the water, sewer, streets, and stormwater drainage infrastructure in the City of Shreveport. The information has been updated through December 31, 2018. As indicated previously in this report, annual renewal costs were revised at the end of 2009 from previous reports for water, wastewater and roadways, and again for water and wastewater as of the 2016 End of Year Report.

TOTAL MUNICIPAL INFRASTRUCTURE

For the purposes of this report, the total municipal infrastructure consists of (1) water and sewer infrastructure assets; (2) roadway infrastructure assets; and (3) stormwater drainage infrastructure assets.

The following are brief discussions and explanations of these specific assets with graphs comparing actual annual capital expenditures vs. target annual investment expenditures or asset renewal rates.

The information described below was utilized to develop the recommended annual investment or annual renewal requirement amounts shown on the graphs:

1) The annual infrastructure asset renewal rate is intended to represent a best estimate of the percentage of infrastructure assets which will become inoperable or unusable each year and therefore will need to be replaced. For most assets, an economic life is typically 50 years. For assets that include equipment, an economic life of 20 years is utilized. A 50 year economic life corresponds to an estimated infrastructure asset annual renewal rate of 2% (50/100) and 20 years corresponds to a renewal rate of 5% (20/100). This means that the City should budget for replacing between 2% or 5% of its infrastructure every year.

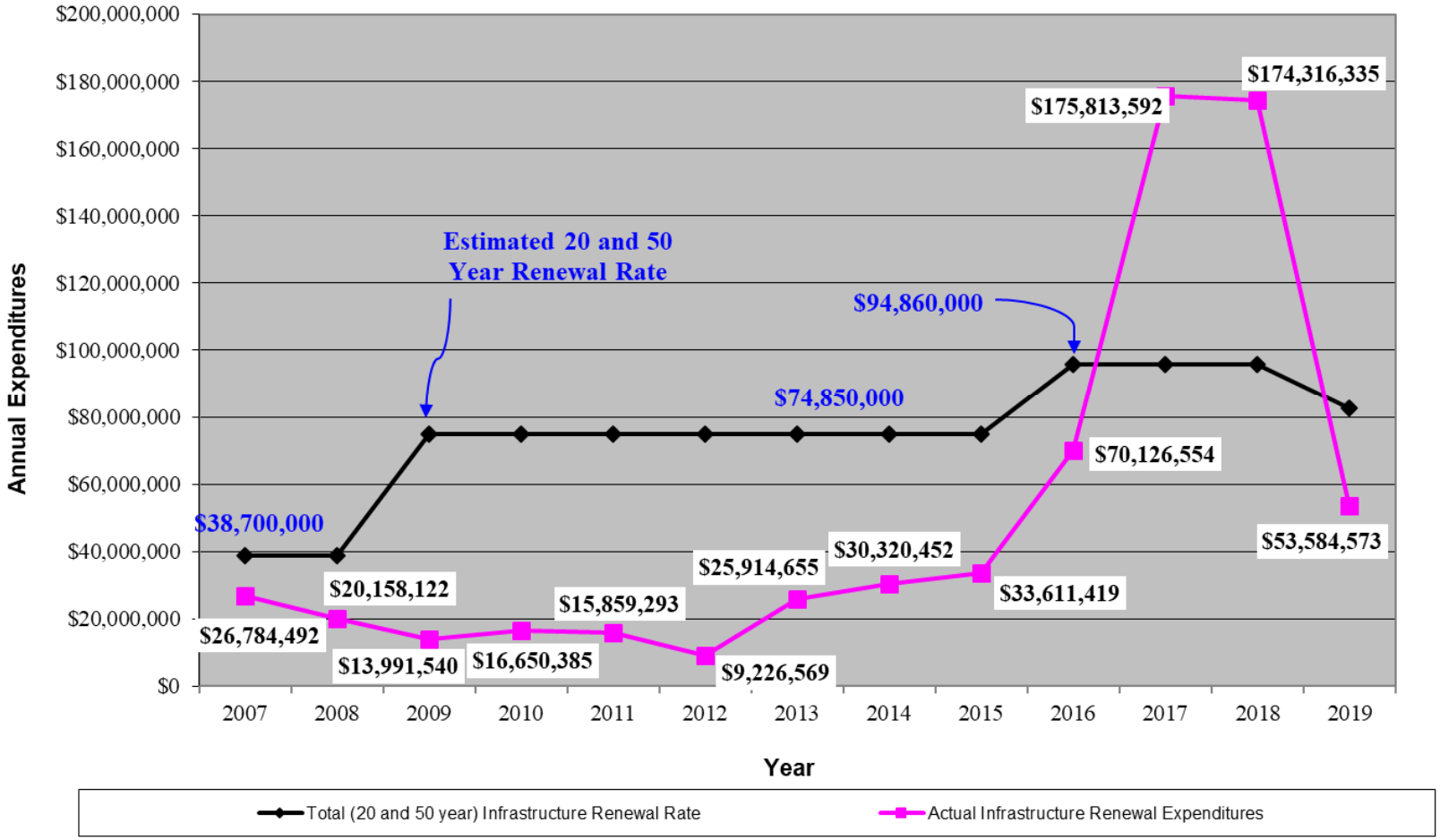
2) Conservative replacement values have been used to calculate an estimated annual replacement rate of $94,860,000 for the total municipal infrastructure. These costs are based on a total infrastructure value of $5.2 billion. The value of the infrastructure is based on current construction costs for each type of infrastructure, whether that is an asphalt roadway, a 12-inch water main or a concrete drainage channel.

As stated above, the total estimated value of the City's infrastructure is $5.2 billion. This is a very rough estimation based on miles of pipe and roadway, pumping and treatment facilities,

inlets and channels. Some infrastructure is less expensive to replace than another of the exact same size. For instance, a 12-inch sewer line is less expensive to replace when located in a dedicated right-of-way without other utility conflicts, as compared to a 12-inch sewer main located underneath pavement near other utilities.

Being able to accurately assess the value and condition of existing infrastructure allows for better planning and utilization of capital infrastructure funding. The better the infrastructure asset management system implemented by the City, the more appropriate the City's annual renewal expenditures can be used to improve and maintain its infrastructure at planned operability levels. A more detailed, comprehensive asset management system coupled with an accurate, up-to-date GIS Database will rely more heavily on actual values of existing infrastructure, rather than gross estimations. A comprehensive system will also result in more accurate estimations of infrastructure renewal rates, which in turn will provide for realistic budgeting of capital improvements as well as future financing plans. Currently, the City is working towards updating and refining the asset management system is has, but a continued investment is required to get the system into a position where it can simply be maintained.

The following graph shows the total annual municipal infrastructure spending and the forecasted renewal rate cost for the past decade (2007 through June 30, 2019):



TOTAL MUNICIPAL ANNUAL INFRASTRUCTURE RENEWAL

WATER AND SEWER INFRASTRUCTURE

Water and sewer infrastructure assets are physical structures with related equipment, piping, and appurtenances which treat and transport water and wastewater.

The level of water and sewer service is highly dependent upon the condition and functional capability of the water and sewer infrastructure assets.

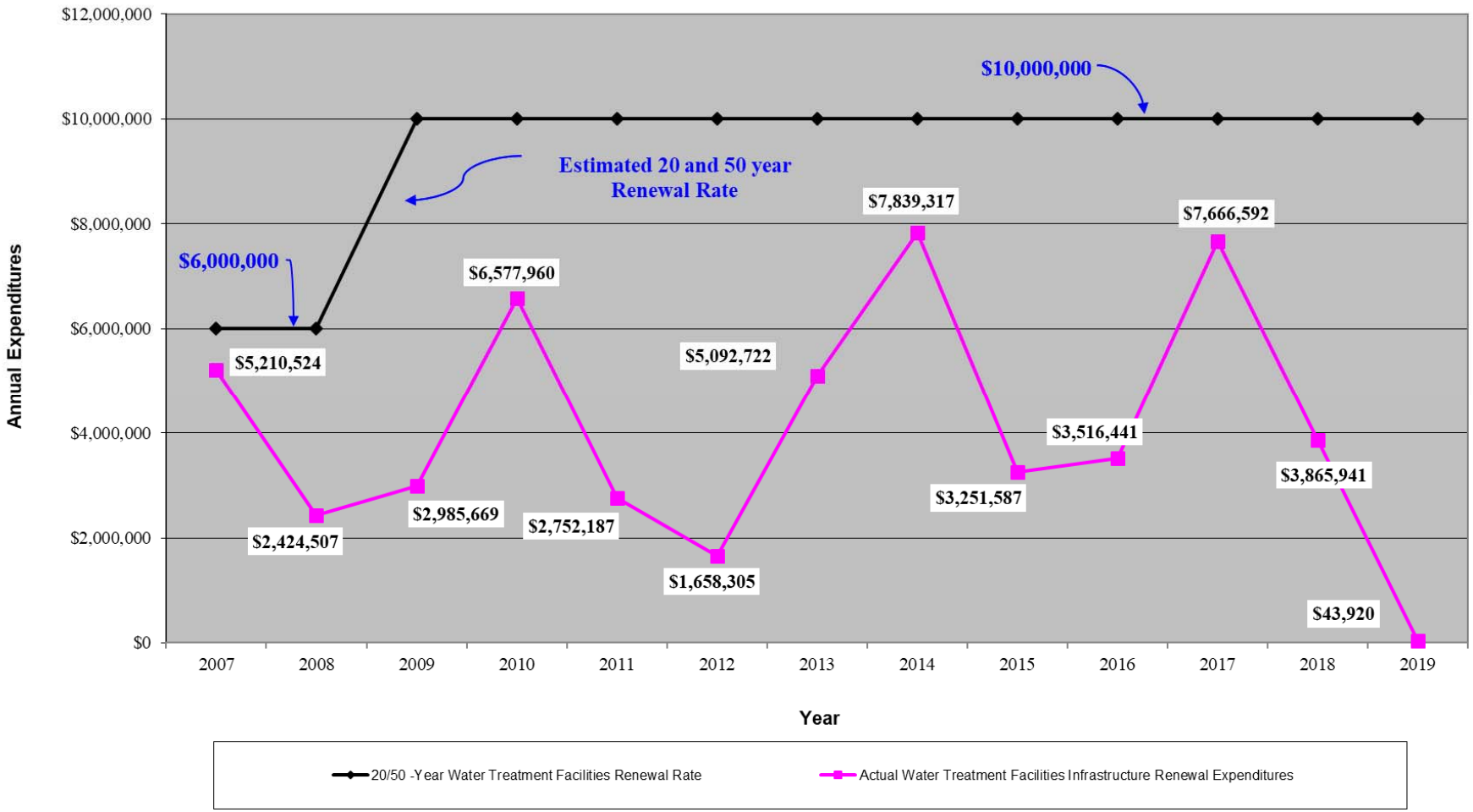
(Lucas WWTP)

Categories of Water and Sewer Infrastructure Assets

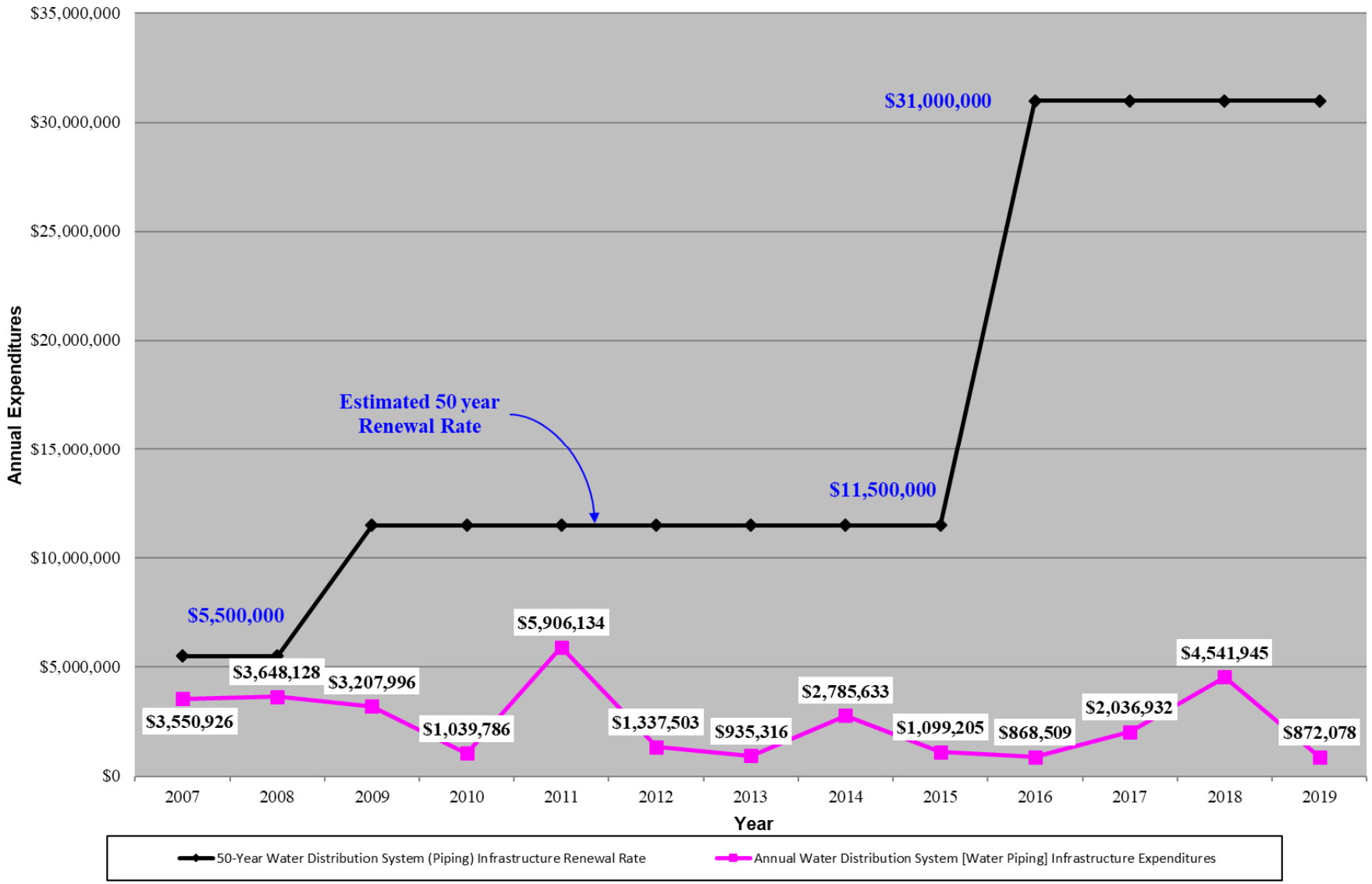
The four major categories of water and wastewater infrastructure assets are:

1) Water Supply, Treatment and Pumping Facilities.
2) Water Distribution System (Piping).
3) Wastewater Treatment and Pumping Facilities.
4) Wastewater Collection System (Piping).

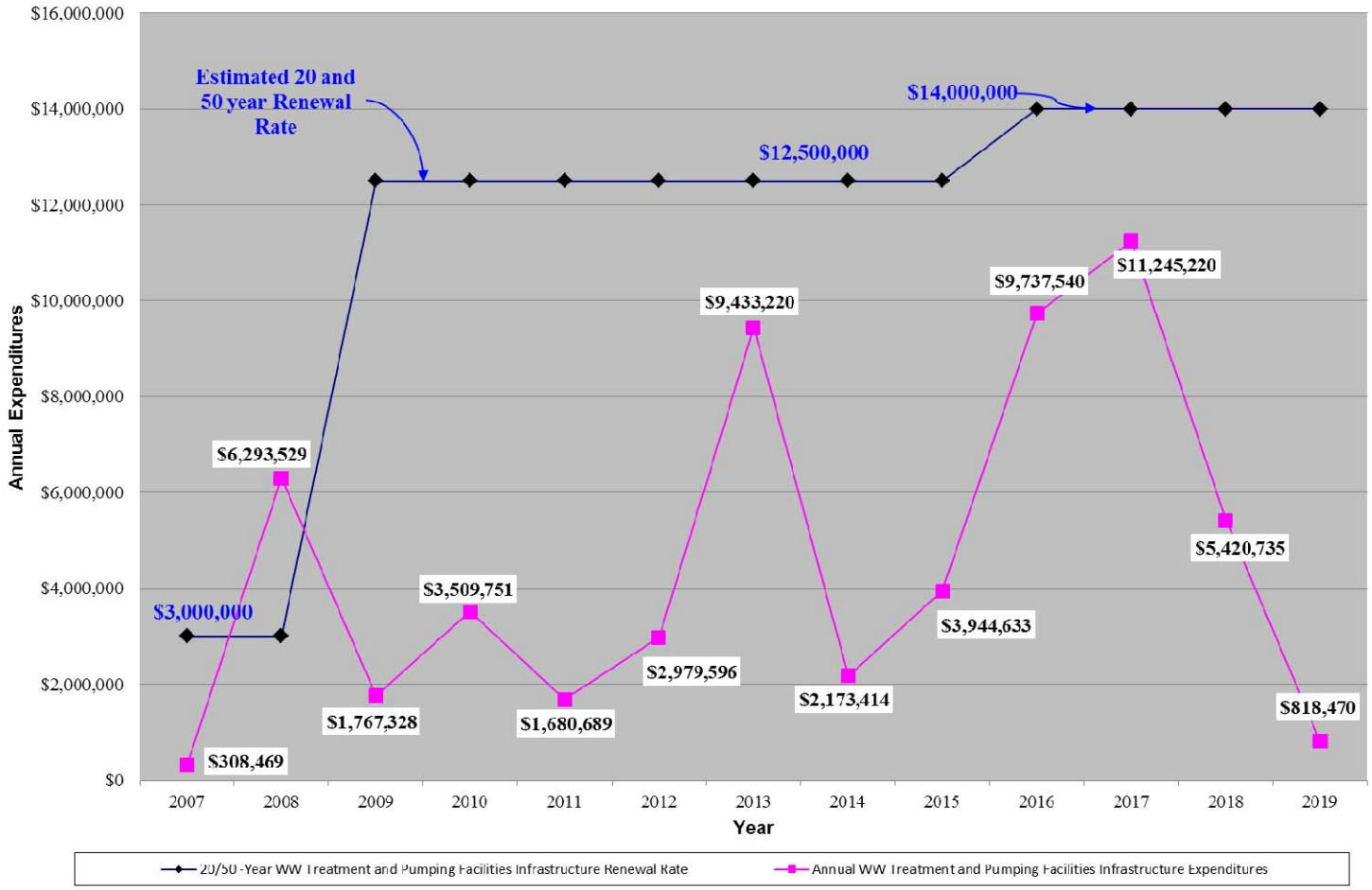
The following graphs indicate the historical investment in infrastructure for each of the above water and wastewater infrastructure asset categories.



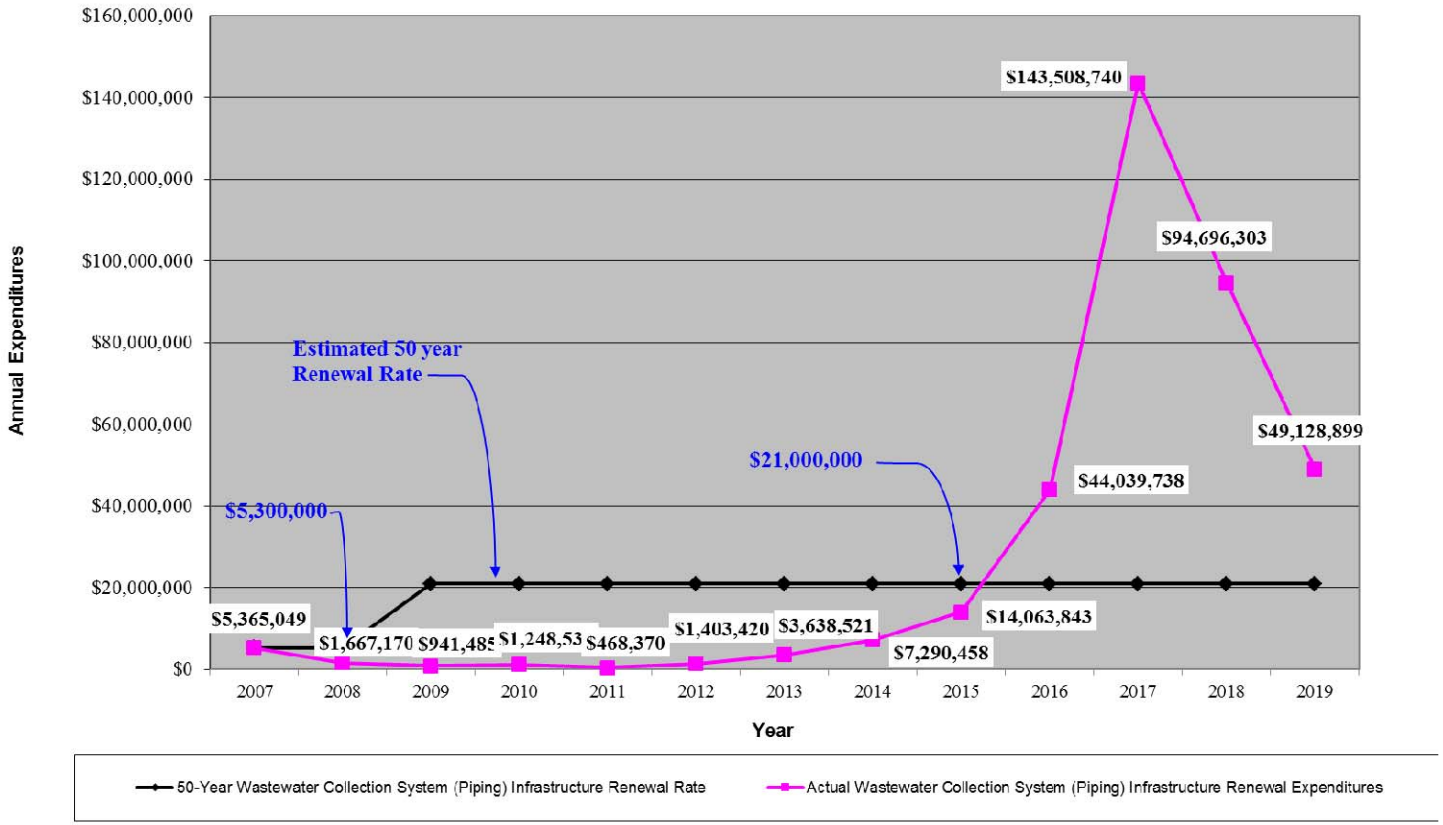
WATER SUPPLY, TREATMENT, AND PUMPING FACILITIES
ANNUAL INFRASTRUCTURE RENEWAL



WATER DISTRIBUTION SYSTEM ANNUAL INFRASTRUCTURE RENEWAL



WASTEWATER TREATMENT AND PUMPING FACILITIES
ANNUAL INFRASTRUCTURE RENEWAL



WASTEWATER COLLECTION SYSTEM
ANNUAL INFRASTRUCTURE RENEWAL

ROADWAY INFRASTRUCTURE

Roadway infrastructure assets are the physical road structures and related bridges, overpasses, and appurtenances which are used by vehicular traffic.

The level of operability, as reflected by such parameters as lost time due to alternative routing for detours, is highly dependent upon the condition and functional capability of the roadway infrastructure assets.

Overall Roadway Infrastructure Assets

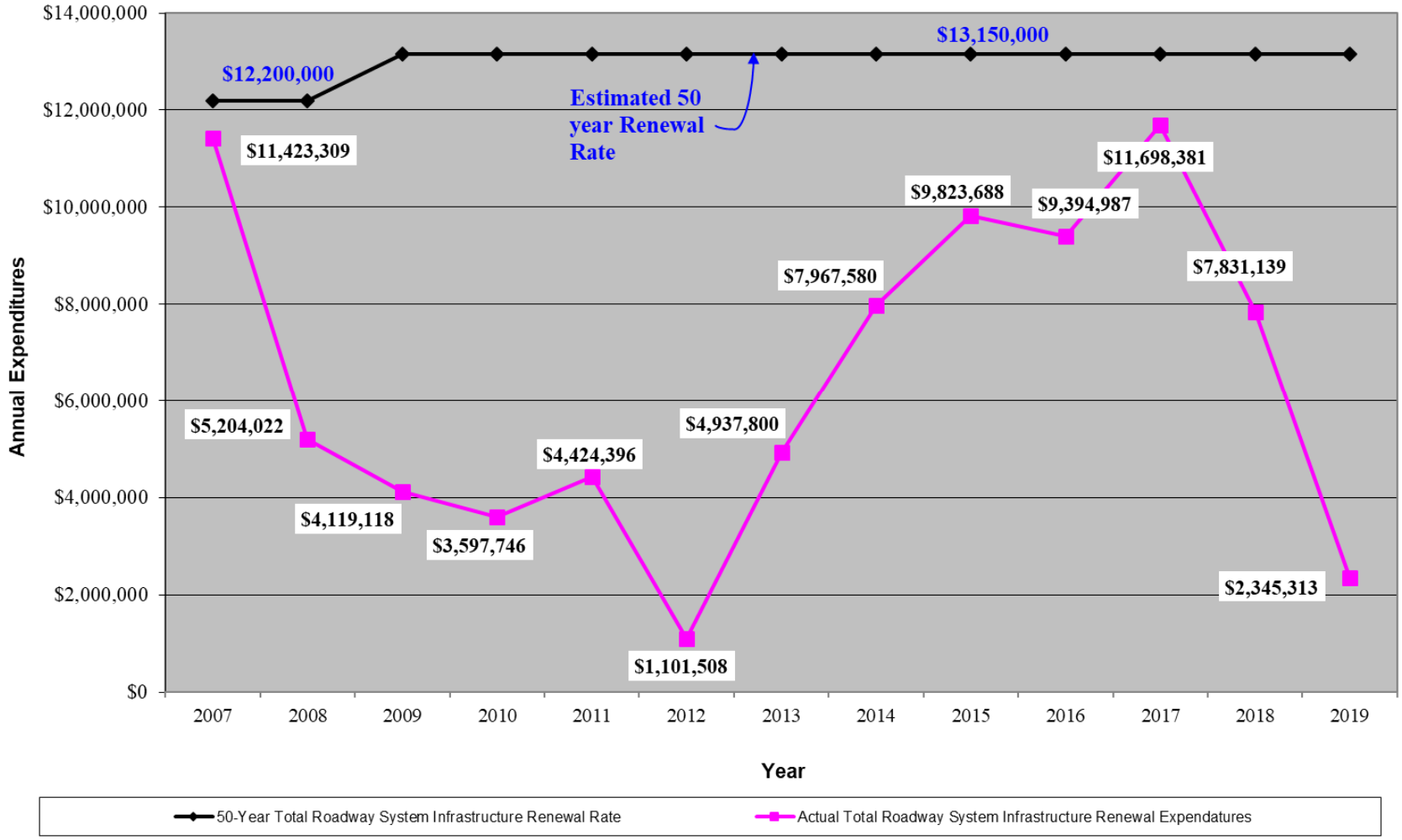
For many years the City of Shreveport was very aggressive in procuring funding for their roadway system. While driving around the City, the investments are apparent in the many loops and overpasses that efficiently move vehicles around. In the 1990's, the normal yearly expenditures for roadway improvement was $13.5 million. Since that time, funding has dwindled to minimal levels of $4.5 million. The creation of the special revenue fund, which is funded by increased franchise fees for use of the right of way and other City property by utility owners, has seen an uptick in the budget for asphalt and concrete roadway maintenance. Along with this additional funding source and a pavement management program, the City will be better prepared to address the future needs for its roadway systems. In the last three years, the City has initiated one of the most aggressive citywide street improvement efforts in Shreveport's history.

Categories of Roadway Infrastructure Assets

The two major categories of roadway infrastructure assets are (1) concrete roadways and appurtenances and (2) asphalt roadways and appurtenances.

(Milam St.)

The following is a graph of roadway annual investment and renewal rates.



ROADWAY SYSTEM ANNUAL INFRASTRUCTURE RENEWAL

STORMWATER DRAINAGE INFRASTRUCTURE

Stormwater drainage infrastructure assets are the physical structures which convey stormwater to waterways.

The level of operability, as reflected by such parameters as annual liability costs due to flooding, is highly dependent upon the condition and functional capability of the stormwater system.

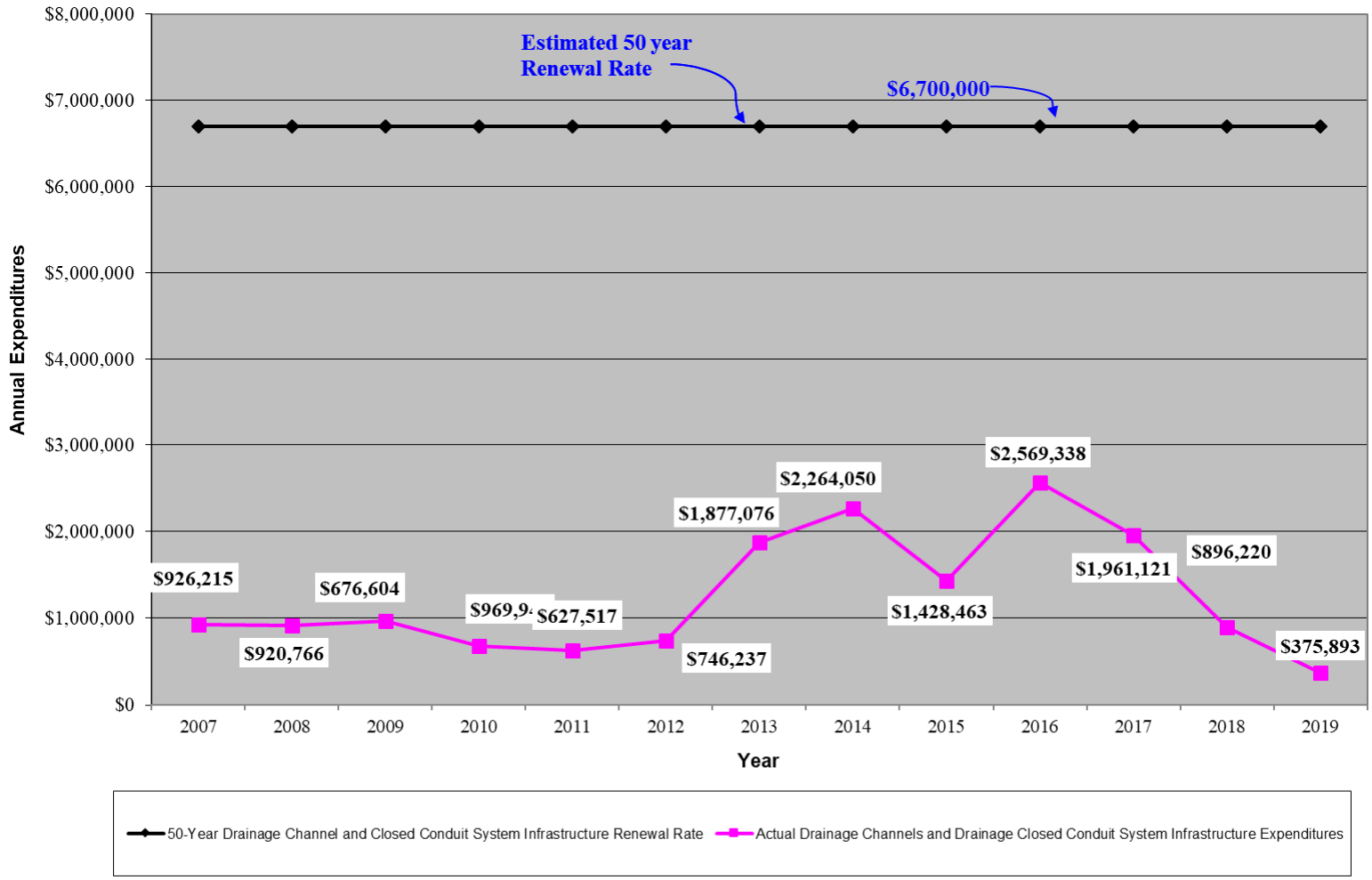
(Red River, Shreveport-Bossier Area)

Categories of Stormwater Infrastructure Assets

The major categories of stormwater infrastructure assets are (1) open ditches and channels and (2) closed conduit, pumping, and piping systems.

Major maintenance of the drainage system infrastructure (underground pipe system, paved drainage channels, storm drainage structures) is dependant on the availability of GOB funds.

The following is a graph of stormwater infrastructure annual investment.



DRAINAGE SYSTEM ANNUAL INFRASTRUCTURE RENEWAL

CONCLUSIONS AND RECOMMENDATIONS

As the infrastructure system has aged without benefit of the appropriate level of annual maintenance and replacement, the City is challenged with keeping up with the projects at hand and ensuring that these deteriorations do not jeopardize public safety. On average, the cost of "band-aid"/emergency projects is double the cost of a planned repair or replacement. In some cases the cost can be 3 to 5 times as much. A past example is a collapse of a 12-inch sewer main in an alley downtown. The cost to replace 50 feet of sewer main was $96,000. If a project for rehabilitation had been planned and completed prior to the collapse, the main could have been rehabilitated for $15,000.

To reach a sustainable level of infrastructure condition, the City needs to:

1) Finalize implementation of City-Wide GIS and asset management tools and systems to allow systematic management of the infrastructure (integrated management of operations, maintenance, and capital improvements). The costs of this program range from $15 to $20 million.

2) Assure that operations/maintenance management of assets as well as ongoing evaluation of operability (i.e., adequate service level) of assets is included as integral parts of the decision process in the determination of capital improvements.

3) Provide funding for infrastructure improvements to essentially "catch up" to current expected levels of service. While the City has spent millions since 2007 for capital improvements, this figure is only a third of the nearly $1.5 billion identified in the "Capital Projects and Proposed Infrastructure Improvement Programs" that is needed.

4) As provided previously and as reflected in this document, it is estimated that approximately $94,860,000 annually is needed to replace water, sewer, streets and drainage infrastructure assets which become operationally obsolete. This is in addition to the funding needed to "catch up" on the current state of infrastructure disrepair.

5) Implement a budget which reflects a water, sewer, streets and drainage rate/tax structure which supports all of the above aspects of cost-effective, systematic infrastructure asset management.

POTENTIAL FUNDING SOURCES

- Impact fees for water, sewerage, and roadway infrastructure.
- Implementation of a storm water utility enterprise fund.
- Implementation of a dedicated sales tax for infrastructure.
- Implementation of a dedicated property tax for infrastructure.
- Implementation of a taxing authority around Cross Lake for upkeep of the lake.

"What you do today can improve all your tomorrows." – Ralph Marston