City of Decatur, Illinois

Sanitary Sewer Master Plan

EXECUTIVE SUMMARY

September 9, 2010

Prepared by

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I. EXECUTIVE SUMMARY

A. SCOPE OF STUDY

The scope of this report is to review and document the sanitary sewer system in terms of its operation, maintenance and physical condition. The report outlines sewer systems improvement programs currently being implemented and some that are under development. The new and existing programs are designed to improve the operation of the system. The condition of critical large and small diameter sewers is summarized and remedial actions to repair the system are recommended. Based on the recommended programs and system repairs or improvements, a projection of the financial needs is made with a discussion of financing alternatives.

The City's goals for the sanitary sewer collection system is to convey wastewater to the Sanitary District of Decatur interceptors or treatment plant, protect the public's health and safety, protect the environment, and maintain the system cost effectively. In addition, a way should be found to provide sanitary sewer service to every property in Decatur. These basic goals can be attained by achieving the following eight objectives:

1. Eliminate sewer backups and sanitary sewer overflows.
2. Assess the physical condition of the system to maintain and rehabilitate as needed.
3. Optimize operation and maintenance costs.
4. Budget for expenses.
5. Adequately fund the system.
6. Keep, maintain and consolidate the sewer system records.
7. Plan for the future.
8. Expand the system to serve all property in Decatur.

B. DEFINING THE PROBLEM

There are four priorities that need to be address to meet the City's goals.

1. Critical Large Diameter Sewer Rehabilitation.
2. Sanitary Sewer Overflows due to Inflow and Infiltration.
3. System Operation and Maintenance.
4. Small Diameter Sewer Rehabilitation.

1. Critical Large Diameter Sewers

The Critical Large Diameter Sewers are those sewers where failure would have dire consequences, such as loss of service for a large number of customers, pollution of the lake, very high repair costs, or significant property damage. These sewers have large diameters ranging from 3 feet to 7 feet. Many were constructed very deep, are located in highly developed areas, or have some other characteristic that would make traditional open excavation impossible or would require extensive planning and contingency arrangements prior to excavation. The Critical Large Diameter Sewers (Figure 1 below) have been identified as the 7th Ward Sewer (blue), Broadway Sewer (gold), Lake Shore Drive Sewer (red), McKinley Avenue Sewer (purple), and Union Street Sewer (green). The Critical Sewers total approximately 91,530 feet of sewer main. The Cost to rehabilitate the Critical Sewers is estimated to be $12 Million. This cost would be financed using IEPA Loans or Bonds and paid back over 10 to 20 years depending on the size of the project.

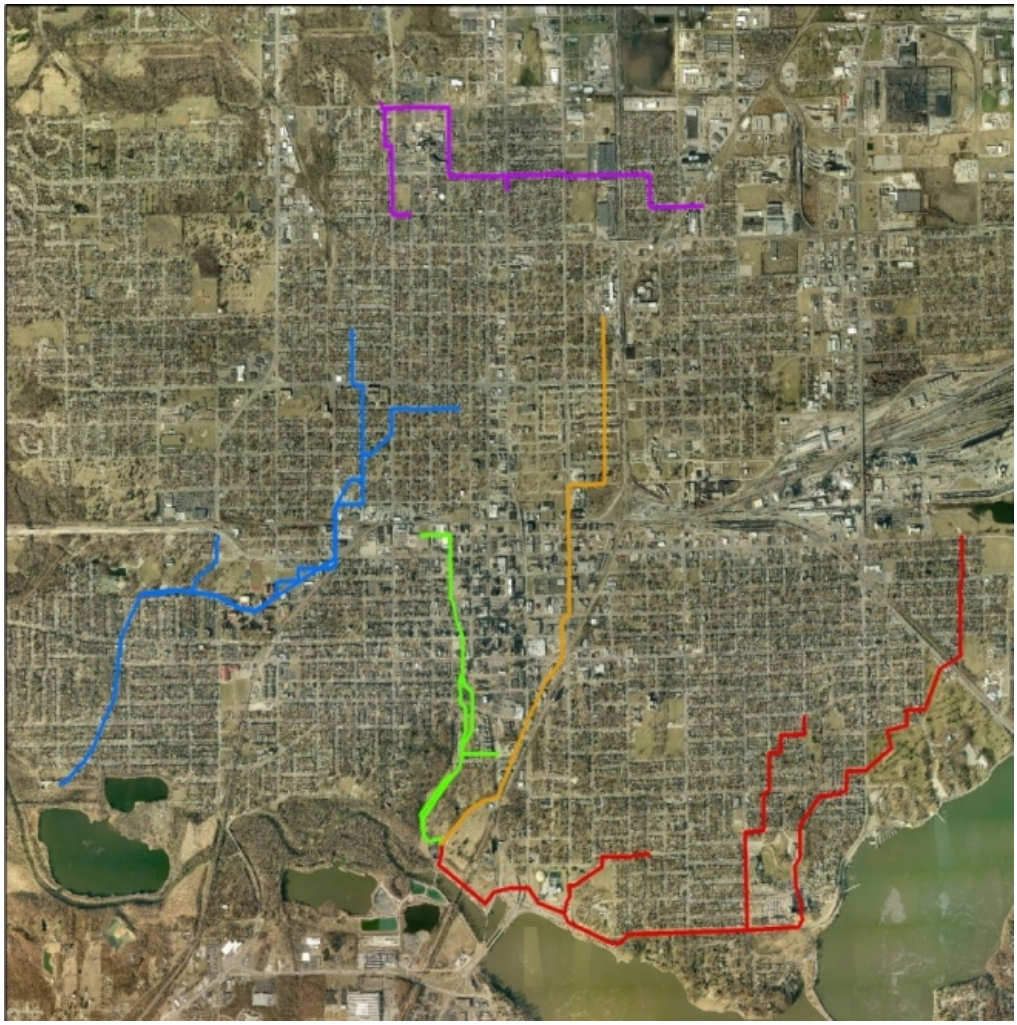

Figure 1: Critical Large Diameter Sewers

2. Sanitary Sewer Overflows (SSOs) Due to Inflow and Infiltration (I&I)

Sanitary Sewer Overflows (SSOs) violate USEPA and IEPA Regulations, pollute the lake and streams and expose the public to serious health risks. Most of the SSOs in Decatur are due to Inflow and Infiltration (I&I) resulting from large storm events. An I&I program should be established reduce the number of SSOs. There are several areas in the separate sanitary sewer collection system were I&I causes surcharging of the sewer which causes basement backups and SSOs. See figure 2 for the high I&I areas. The extraneous flow from I&I consumes capacity in the collection system and increase the volume of sewage that must be treated at the Sanitary District of Decatur. In response to the USEPA and IEPA, the Sanitary District is requesting the City to report all SSOs to the District. The Sanitary District has also requested the City investigate I&I problems to find and implement corrections.

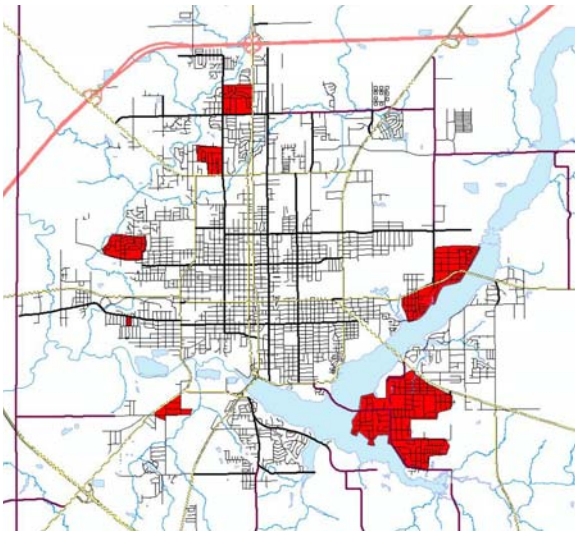

Figure 2: High I&I Areas

The I&I program should start in the shaded areas shown in figure 2. Selected areas should be further screened by flow monitoring and the following existing and proposed programs as discussed here-in the Master Plan:

1. TV Inspection Program
2. Smoke Testing Program
3. Illegal Sump Pump Removal Program
4. Asset Management Program
5. Manhole Inspection Program
6. Sanitary Sewer Backup Prevention Program (Overhead Sewer Program)

The results of these site specific investigations will be used to formulate reduction plans for the study area and provide the basis for a cost-effective analysis to be performed. The analysis will determine if I&I reduction measures are an economical alternative compared to increasing the system capacity in the study area. The cost to begin and I&I reduction program is initially $300,000 per year. After two or three years of preliminary studies and engineering design, the approximate cost to begin physical improvement to reduce I&I is estimated to be $500,000 per year. The I&I program is expected to be and on-going work effort for the foreseeable future.

3. System Operation and Maintenance

The City should change the operation and maintenance program from reactive to proactive. Currently, the City has an annual emergency sanitary sewer repair program to repair failed sewers and manholes thought the year. Repairing sewers after they have failed is costly and disruptive to the public. The failures can also cause basement backups or sanitary sewer overflows (SSO's). With an asset management approach to identify, plan, and rehabilitate the small diameter sewers, the number of the emergency sanitary sewer repairs should be reduced in the future.

Sanitary sewer cleaning is one of the most cost effective ways to prevent basement backups and sanitary sewer overflows. If roots, grease and debris is not cleaned from the sewers it will reduce the capacity of the pipe and cause backups and SSO's. The following programs as described in the report are designed to maintain the system and provide maximum capacity in the system:

1. Contract Cleaning Program.
2. Herbicide Program.
3. TV Inspection Program. (continued program)
4. Sanitary Sewer Emergency Repair Program. (continued program)

The annual increased cost for system maintenance and operation is initially $350,000 with an annual increase of 3% to match inflation rates. Increased maintenance will be necessary for the foreseeable future.

4. Small Diameter Sewers

Small diameter sewers comprise 96% of the entire sanitary sewer collection system, roughly 2.2 million feet of sewers and 8,000 manholes. Repairs and upgrades to the small diameter sewer system should be analyzed on an asset management basis. An asset management approach will give a calculated rating to the pipe or manhole based on condition, service area, depth, size, and location. This rating will provide the City with the criticality or consequence of failure for each pipe segment. The repairs to the pipes and manholes will be prioritized by the highest rating. The rating can be calculated from the GIS mapping software and TV inspections that have been performed over the past ten years. The sewers and manholes will be repaired by lining, point repairing, open cut excavation, or pipe bursting. The method of repair will depend on the type of defect and will be analyzed on a case by case basis. The total estimated cost of repairing the small diameter sewers is approximately $17 million dollars. The small diameter sewers should be rehabilitated though smaller annual projects rather than a large capital improvement project that is financed. The cost to rehabilitate the small diameter over a 20 year timeline is about $850,000 per year. This project will continue to be needed after the 20 year timeline because sewers will need to be rehabilitated in the future as new defects in the pipes form.

C. CURRENT COLLECTION SYSTEM FUNDING

The City of Decatur has a sewer user fee that was established in April 1998. The sewer user fee was set at a rate of $0.34 per one hundred cubic feet of water used for residential, commercial, and light industrial users. The City also has a rate of $0.45 per one hundred cubic feet for water that is discharged into the system from one large industrial user. The sewer user fee is included in the City's utility bill for all but one industrial customer. The Sanitary District of Decatur measures the volume of wastewater discharged from the one large industrial customer and bills them directly. The Sanitary District also has a sewer use fee that is included in the City's utility bill at a rate of $0.85 per one hundred cubic feet of water used. The Sanitary District of Decatur has increased their rates gradually over the last 12 years while the City's sewer rates have never been increased. Figure 3 shows the comparative sewer use fee beginning when the City's sewer use fee was established in 1998.

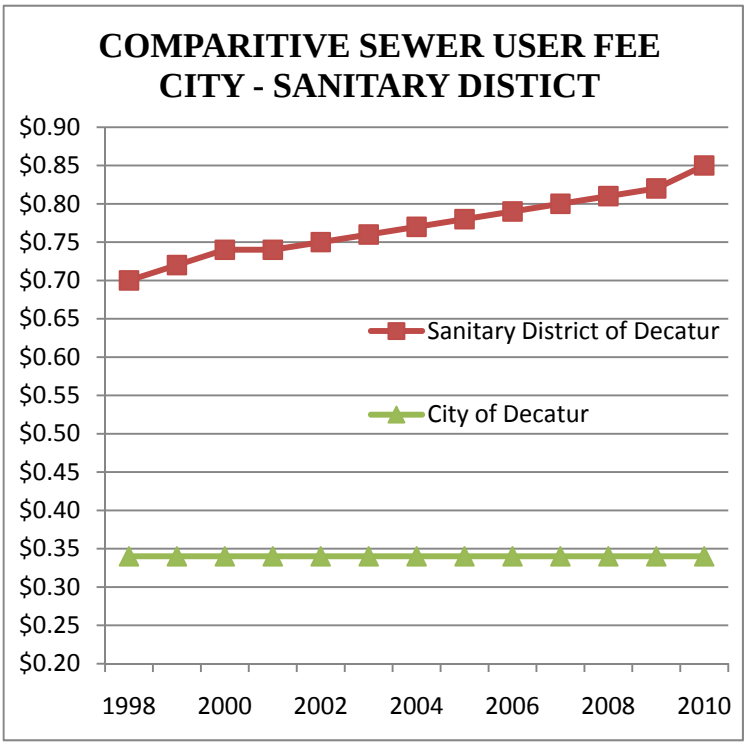

Figure 3: Comparative Sewer User Fee

The sewer use fee has approximately 27,700 users and generated approximately $2,000,000 in Fiscal Year 2010. Residential households in the City have an average water usage of 725 cubic feet (5,424 gallons) per month and pay a monthly fee of $2.47 to the City of Decatur for the Sewer User Fee (cost does not include any fees from the Sanitary District of Decatur). Figure 4 shows the breakdown of the fee base and revenue generated for the type of users.

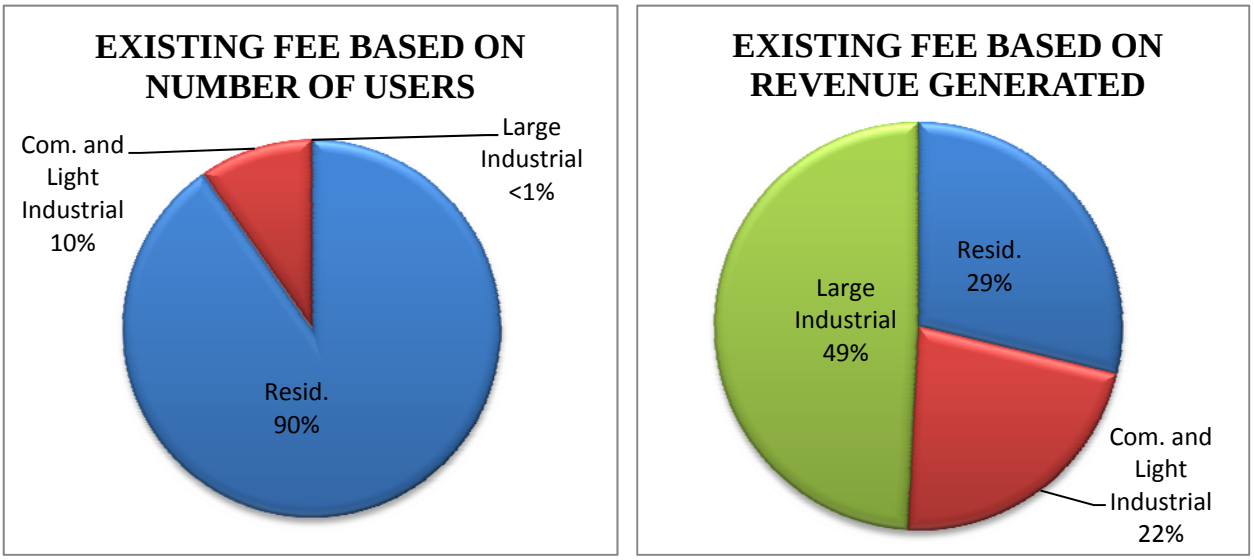

Figure 4: Existing Fee Base

D. PROPOSED COLLECTION SYSTEM FUNDING

The existing Sanitary Sewer User Fee is not sufficient to meet the proposed cash flow model to properly fund the collection system and to meet the City's four priorities. The Administration proposes a $0.12 increase per year for all sanitary sewer users connected to the City's sewers for each of the next five years until it reaches $0.94 per one hundred cubic feet of water used or discharged into the collection system. The rate of $0.94 is the estimated rate for the Sanitary District of Decatur's user fee in fiscal year (FY) 2016. After FY 2016 the rates should be adjusted annually to match the proposed rate of the Sanitary District of Decatur. Table 1 shows the proposed rate, monthly fee for average residential household, and revenue generated. Future small annual increases are recommended to reduce the impact of large infrequent rate changes to provide sufficient revenue to support operation, maintenance, inflation rates, rehabilitation, and replacement of the City's aging sanitary collection system.

Table 1: Proposed Sanitary Sewer User Fee

Fiscal Year	Proposed Sanitary Sewer User Fee	Monthly Sewer User Fee for Average Residential Household	Proposed Revenue
2011	$0.34	$2.47	$1,950,000
2012	$0.46	$3.34	$2,280,000
2013	$0.58	$4.21	$2,874,000
2014	$0.70	$5.08	$3,469,000
2015	$0.82	$5.95	$4,063,000
2016	$0.94	$6.82	$4,658,000
2017	$0.95*	$6.88	$4,705,000*
2018	$0.96*	$6.95	$4,752,000*

* Rates adjusted annually to match the Sanitary District of Decatur

City of Decatur
Sanitary Sewer Master Plan Cash Flow Model
Prepared by Paul E. Caswell, P.E.
September 2010

Line	Item	Description	Approved FY2011	Proposed FY2012	Proposed FY2013	Proposed FY2014	Proposed FY2015	Proposed FY2016	Proposed FY2017	Proposed FY2018	Proposed FY2019	Proposed FY2020	Proposed FY2021	Proposed FY2022	Proposed FY2023	Proposed FY2024	Proposed FY2025	Proposed FY2026	Proposed FY2027	Proposed FY2028	Proposed FY2029	Proposed FY2030	Proposed FY2031	Additional Notes
1	**Operation**																							
2	Transfer to General Fund	Engineering & Municipal Services	$499,474	$499,474	$504,469	$509,513	$514,609	$519,755	$535,347	$551,408	$567,950	$584,988	$602,538	$620,614	$639,233	$658,410	$678,162	$698,507	$719,462	$741,046	$763,277	$786,176	$809,761	
3	Pump Station Maintenance	SDD Intergovernmental Agreement	$97,450	$98,425	$99,409	$100,403	$101,407	$102,421	$105,494	$108,658	$111,918	$115,276	$118,734	$122,296	$125,965	$129,744	$133,636	$137,645	$141,775	$146,028	$150,409	$154,921	$159,568	
4	Debt Service	Payment of existing loans or bonds, See Note 3 below	$146,804	$146,804	$146,804	$98,306	$98,306	$24,278	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Existing loans paid for after FY 2016
5	Pump Station Communication sys.	Alerts SDD if pump station fails.	$1,387	$1,401	$1,415	$1,429	$1,443	$1,458	$1,501	$1,547	$1,593	$1,641	$1,690	$1,741	$1,793	$1,847	$1,902	$1,959	$2,018	$2,078	$2,141	$2,205	$2,271	
6	MSD Sewer Materials	Maintenance materials.	$11,667	$11,784	$11,902	$12,021	$12,141	$12,262	$12,630	$13,009	$13,399	$13,801	$14,215	$14,642	$15,081	$15,533	$15,999	$16,479	$16,974	$17,483	$18,007	$18,548	$19,104	
7	Professional Services	Julie locating services, consultant cost	$53,398	$53,932	$54,471	$55,016	$55,566	$56,122	$57,805	$59,540	$61,326	$63,166	$65,061	$67,012	$69,023	$71,093	$73,226	$75,423	$77,686	$80,016	$82,417	$84,889	$87,436	
8		**Subtotal**	**$810,180**	**$811,819**	**$818,469**	**$776,688**	**$783,472**	**$716,296**	**$712,778**	**$734,161**	**$756,186**	**$778,872**	**$802,238**	**$826,305**	**$851,094**	**$876,627**	**$902,926**	**$930,013**	**$957,914**	**$986,651**	**$1,016,251**	**$1,046,738**	**$1,078,140**	
9																								
10	Item	Description	Approved FY2011	Proposed FY2012	Proposed FY2013	Proposed FY2014	Proposed FY2015	Proposed FY2016	Proposed FY2017	Proposed FY2018	Proposed FY2019	Proposed FY2020	Proposed FY2021	Proposed FY2022	Proposed FY2023	Proposed FY2024	Proposed FY2025	Proposed FY2026	Proposed FY2027	Proposed FY2028	Proposed FY2029	Proposed FY2030	Proposed FY2031	Additional Notes
11	**Maintenance**																							
12	Contract Cleaning Program	Sanitary sewer cleaning	$0	$100,000	$100,000	$100,000	$250,000	$252,500	$260,075	$267,877	$275,914	$284,191	$292,717	$301,498	$310,543	$319,859	$329,455	$339,339	$349,519	$360,005	$370,805	$381,929	$393,387	
13	Herbicide Program	Root removal	$75,000	$0	$0	$100,000	$101,000	$102,010	$105,070	$108,222	$111,469	$114,813	$118,258	$121,805	$125,459	$129,223	$133,100	$137,093	$141,206	$145,442	$149,805	$154,299	$158,928	
14	TV Inspection Program	Sewer inspection	$350,000	$250,000	$250,000	$250,000	$252,500	$255,025	$262,676	$270,556	$278,673	$287,033	$295,644	$304,513	$313,649	$323,058	$332,750	$342,732	$353,014	$363,605	$374,513	$385,748	$397,321	
15	San. Sewer Emergency and Maint. Repair	Emergency sewer replacement from sewer failures	$500,000	$505,000	$510,050	$515,151	$520,302	$525,505	$541,270	$557,508	$574,234	$591,461	$609,204	$627,480	$646,305	$665,694	$685,665	$706,235	$727,422	$749,245	$771,722	$794,874	$818,720	
16		**Subtotal**	**$925,000**	**$855,000**	**$860,050**	**$965,151**	**$1,123,802**	**$1,135,040**	**$1,169,091**	**$1,204,164**	**$1,240,289**	**$1,277,498**	**$1,315,822**	**$1,355,297**	**$1,395,956**	**$1,437,835**	**$1,480,970**	**$1,525,399**	**$1,571,161**	**$1,618,296**	**$1,666,845**	**$1,716,850**	**$1,768,355**	
17																								
18	Item	Description	Approved FY2011	Proposed FY2012	Proposed FY2013	Proposed FY2014	Proposed FY2015	Proposed FY2016	Proposed FY2017	Proposed FY2018	Proposed FY2019	Proposed FY2020	Proposed FY2021	Proposed FY2022	Proposed FY2023	Proposed FY2024	Proposed FY2025	Proposed FY2026	Proposed FY2027	Proposed FY2028	Proposed FY2029	Proposed FY2030	Proposed FY2031	Additional Notes
19	**Capital Improvement Projects**																							
20	Critical Sewer Rehabilitation	Rehabilitate 36" sewers and larger.	$0	$115,000	$308,000	$461,000	$256,000	$736,924	$451,751	$801,290	$801,290	$801,290	$801,290	$801,290	$801,290	$801,290	$801,290	$801,291	$801,292	$801,293	$801,294	$801,295	$801,296	
21	Small Diameter Sewer Rehabilitation	Lining or replacement of sewers less than 36" dia.	$500,000	$300,000	$500,000	$850,000	$858,500	$867,085	$893,098	$919,890	$947,487	$975,912	$1,005,189	$1,035,345	$1,066,405	$1,098,397	$1,131,349	$1,165,290	$1,200,248	$1,236,256	$1,273,344	$1,311,544	$1,350,890	Rehabilitation and I&I reduction of small diameter sewers
22	I&I Reduction Program	Focuses on service laterals.	$0	$0	$0	$0	$500,000	$505,000	$520,150	$535,755	$551,827	$568,382	$585,433	$400,000	$412,000	$200,000	$206,000	$212,180	$100,000	$103,000	$106,090	$109,273	$112,551	
23	Overhead Sewer Program	Cost share to eliminate basement backups.	$50,000	$75,000	$75,750	$76,508	$77,273	$78,045	$80,387	$82,798	$85,282	$87,841	$90,476	$93,190	$95,986	$98,865	$101,831	$104,886	$108,033	$111,274	$114,612	$118,051	$121,592	
24	Sanitary Sewer Extension Program	See Note 1, below.	$0	$0	$0	$0	$75,000	$75,750	$78,023	$80,363	$82,774	$85,257	$87,815	$90,449	$93,163	$95,958	$98,837	$101,802	$104,856	$108,001	$111,241	$114,579	$118,016	
25	Manhole Inspection Project	Inspect City's manhole on a 10 year cycle.	$110,000	$110,000	$110,000	$5,000	$5,050	$5,101	$5,254	$5,411	$5,573	$5,741	$5,913	$6,090	$6,273	$6,500	$6,695	$6,896	$7,103	$7,316	$7,535	$7,761	$7,994	Project completed in 2012, rate new MH's after 2012. Repeat project in 2021
26		**Subtotal**	**$660,000**	**$600,000**	**$993,750**	**$1,392,508**	**$1,771,823**	**$2,267,905**	**$2,028,661**	**$2,425,508**	**$2,474,234**	**$2,524,422**	**$2,576,116**	**$2,426,365**	**$2,475,117**	**$2,301,011**	**$2,346,002**	**$2,392,345**	**$2,321,532**	**$2,367,140**	**$2,414,116**	**$2,462,502**	**$2,512,339**	
27																								

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29	**Engineering, Education, and Record Keeping**																							
30	Grease Removal Program	Public outreach and enforcement	$0	$0	$0	$25,000	$25,250	$25,503	$26,268	$27,056	$27,867	$28,703	$29,564	$30,451	$31,365	$32,306	$33,275	$34,273	$35,301	$36,360	$37,451	$38,575	$39,732	Debt Service FY2018 onwards
31	Illegal Sump Pump Removal Program	Public outreach and enforcement	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$12,500	$12,875	$13,261	$13,659	$14,069	$14,491	$14,926	$15,373	$15,835	$16,310	$150,000	$150,000	$150,000	$150,000	Project to be completed in 4 years, repeat every 15 to 20 years
32	Smoke Testing Program	See Note 2, below.	$30,000	$0	$0	$30,000	$30,000	$30,000	$10,000	$10,300	$10,609	$10,927	$11,255	$11,593	$11,941	$12,299	$12,668	$13,048	$13,439	$13,842	$14,258	$14,685	$15,126	
33	Asset Management Program	Acquire and maintain asset management plan	$0	$0	$125,000	$125,000	$125,000	$15,000	$15,450	$15,914	$16,391	$16,883	$17,389	$17,911	$18,448	$19,002	$19,572	$20,159	$20,764	$21,386	$22,028	$22,689	$23,370	2010 to 2012 is for plan, 2013 on is for updating of plan
34	I&I Reduction Program	I&I studies, flow metering and education	$0	$0	$75,000	$75,000	$75,000	$150,000	$150,000	$150,000	$25,000	$25,750	$26,523	$27,318	$28,138	$28,982	$29,851	$30,747	$31,669	$32,619	$33,598	$34,606	$35,644	Large Flow studies to be completed in 6 years, small isolated areas after
35	GIS Mapping Program	Maintain GIS system and map updates	$0	$0	$0	$0	$25,000	$25,250	$26,008	$26,788	$27,591	$28,419	$29,272	$30,150	$31,054	$31,986	$32,946	$33,934	$34,952	$36,000	$37,080	$38,193	$39,339	
36		**Subtotal**	**$30,000**	**$0**	**$200,000**	**$305,000**	**$330,250**	**$295,753**	**$277,725**	**$242,557**	**$120,334**	**$123,944**	**$127,662**	**$131,492**	**$135,436**	**$139,500**	**$143,685**	**$147,995**	**$152,435**	**$290,209**	**$294,415**	**$298,748**	**$303,210**	
37		**Grand Total Expenditures**	**$2,425,180**	**$2,266,819**	**$2,872,269**	**$3,439,346**	**$4,009,347**	**$4,414,993**	**$4,188,255**	**$4,606,389**	**$4,591,042**	**$4,704,735**	**$4,821,838**	**$4,739,458**	**$4,857,603**	**$4,754,972**	**$4,873,582**	**$4,995,752**	**$5,003,041**	**$5,262,296**	**$5,391,627**	**$5,524,838**	**$5,662,045**	
38																								
39			Approved FY2011	Proposed FY2012	Proposed FY2013	Proposed FY2014	Proposed FY2015	Proposed FY2016	Proposed FY2017	Proposed FY2018	Proposed FY2019	Proposed FY2020	Proposed FY2021	Proposed FY2022	Proposed FY2023	Proposed FY2024	Proposed FY2025	Proposed FY2026	Proposed FY2027	Proposed FY2028	Proposed FY2029	Proposed FY2030	Proposed FY2031	Additional Notes
40																								
41		**Existing Sanitary User Fee**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	
42		**Difference between Sewer User Fee Revenue and proposed sewer improvement program.**	**$425,180**	**$266,819**	**$872,269**	**$1,439,346**	**$2,009,347**	**$2,414,993**	**$2,188,255**	**$2,606,389**	**$2,591,042**	**$2,704,735**	**$2,821,838**	**$2,739,458**	**$2,857,603**	**$2,754,972**	**$2,873,582**	**$2,995,752**	**$3,003,041**	**$3,262,296**	**$3,391,627**	**$3,524,838**	**$3,662,045**	
43		**FY 2011 difference is funded by reducing the fund balance.**																						
44		**Sewage Billing Units (100 CF)**	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	4,955,460	
45		**Proposed Sanitary Sewer User Fee**	$0.34	$0.46	$0.58	$0.70	$0.82	$0.94	$ 0.95	$ 0.96	$ 0.97	$ 0.98	$ 0.99	$ 1.00	$ 1.01	$ 1.02	$ 1.03	$ 1.04	$ 1.05	$ 1.06	$ 1.07	$ 1.08	$ 1.09	
46		**Proposed Revenue**	$1,950,000	$2,279,512	$2,874,167	$3,468,822	$4,063,477	$4,658,133	$4,704,714	$4,751,761	$4,799,279	$4,847,272	$4,895,744	$4,944,702	$4,994,149	$5,044,090	$5,094,531	$5,145,476	$5,196,931	$5,248,900	$5,301,389	$5,354,403	$5,407,947	
47																								
48		Average Residential Water Usage (See Note 6)	725	Cubic Feet per Month	or	5,424	Gallons per month																	
49																								
50		**Monthly Sewer User Fee for Average Residential Household**	**$2.47**	**$3.34**	**$4.21**	**$5.08**	**$5.95**	**$6.82**	**$6.88**	**$6.95**	**$7.02**	**$7.09**	**$7.16**	**$7.23**	**$7.31**	**$7.38**	**$7.45**	**$7.53**	**$7.60**	**$7.68**	**$7.76**	**$7.83**	**$7.91**	
51																								
52	Note 1:	Funds are proposed annually to pay the City's share of the cost to extend sanitary sewers into existing neighborhoods without sanitary sewers. Funds may be saved for several years to provide cost share on larger projects.																						
53	Note 2:	Plan to conduct initial smoke testing from FY 2011, FY 2014 FY 2015, and FY 2016 then test problem areas to find defects.																						
54	Note 3:	Current IEPA Revolving loan payments include West Mound Road Sewer Extension ($15,269 per year until FY 2016), Spring Creek SE Trunk Sewer ($35,769 per year until FY 2016), Broadway Cantrell Sewer Rehabilitation ($48,497 per year until FY 2013), Staley Sewer Replacement ($47,269 per year until FY 2015).																						
55	Note 4:	Inflation Escalator (FY 2011-2016)	1%																					
56	Note 5:	Inflation Escalator (FY 2017-2031)	3%																					
52	Note 6:	Usage based on City of Decatur average water usage for residential properties.																						