

Stormwater Master Plan

Volume 1



Volume 1

Stormwater Master Plan

Client:

**City of Hannibal, Missouri
320 Broadway
Hannibal, Missouri 63401**

Project No. 38204

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EXECUTIVE SUMMARY

ES.1 History of Stormwater in Hannibal

1. Flooding has historically been a significant problem in Hannibal along the banks of the Mississippi River, along the low-lying areas beside Bear Creek and along creeks upstream of these areas. Many residents have responded by moving away from flood-prone areas.
2. Bear Creek and parts of Minnow Branch and other creeks are subject to flash flooding. The steep watersheds in the Bear Creek watershed can send water into the Creek within a matter of hours, causing water to rise quickly and without much warning.
3. The dam on Bear Creek west of Highway 61 controls drainage across the upper 28 square miles of the Bear Creek watershed and reduces flash flooding through Hannibal. However, 23 square miles of the watershed enters Bear Creek downstream of this dam and runoff from these areas cannot be uncontrolled.

ES.2 Watersheds in Hannibal

1. There are 35 watersheds in Hannibal that drain to the Mississippi River, Bear Creek, Minnow Branch or Mills Creek. Fifteen of these watersheds (43 percent) are less than 100 acres in size. Thirty (86 percent) have times-of-concentration under 1 hour.
2. Fifteen of these watersheds are steep and have average channel slopes exceeding 3 percent. These watersheds are particularly susceptible to the rapid rise in stormwater (flash flooding) after rain storms. These watersheds cover 4,079 acres or 47 percent of the total area in the 35 watersheds. Prime examples are Fulton Avenue (M-2), Grace Street (MB-4) and Bird Street (MB-6).
3. Eight watersheds have shallow slopes, with average channel slopes less than 1.5 percent. Stormwater flows slower across these watersheds, so there is increased potential for ponding and flooding. Prime examples of these watersheds include Highway 61 Northwest (MB-10) and Upper Minnow Branch (Lake Apollo) (MB-11).

ES.3 Public Opinion Survey

1. A public opinion survey was sent to all customers (about 10,000 accounts) of the Hannibal Board of Public Works in January and February 2005. A total of 952 responses were received, which is considered to be an excellent response.
2. About half of the responders to the survey have lived at their current address for 10 years.
3. A total of 278 responders answered "Yes" to Question 1 asking if they had experienced problems with stormwater at this address. This was about 30 percent of the surveys. A total of 322 responders (34 percent) said they had stormwater problems in their neighborhood.

4. The 952 surveys came from 285 streets around Hannibal. A total of 150 streets reported having problems with stormwater.
5. A total of 191 surveys (20 percent) reported spending their own money and time trying to fix stormwater problems at their address.
6. The highest ranked priority among all responders for stormwater management in Hannibal was "maintain/repair existing stormwater systems". "Minimize street flooding" was the second highest priority and "preserving natural channels" was third overall.
7. A total of 569 responders (60 percent) expressed some opinion on new ways to fund stormwater improvements in Hannibal. The other 40 percent had no opinion.
8. A total of 340 responders (36 percent) felt that User Fees for each property's demands on stormwater systems was a good mechanism for funding future stormwater needs. The survey asked the responder to check two choices. The second most popular choice was "increased fees for new development" drawing 322 responses (34 percent) and the third most popular was a "stormwater sales tax" with 165 responses.
9. The 35 watersheds in Hannibal generated 894 responses during the survey. The rest of the surveys did not give their street address. A total of 32 watersheds had at least one response (some watersheds have few to no residents living in them).
10. The Upper Minnow Branch watershed, which includes the Lake Apollo subdivision, had 138 responders, more than any other watershed. The watershed with the second highest response was the Oakwood watershed, with 93 responses. Both of these areas have an above average frequency of stormwater problems. The third highest number of responses came from the State Route MM watershed, which is just west of U.S. 61. This watershed had 84 responses.
11. People who live uphill in Hannibal are just as likely to have stormwater problems as those who live downhill.
12. Stormwater problems are widespread in Hannibal and are found in practically every watershed.

ES.4 Stormwater Issues and Problems in Hannibal

1. Flooding or temporary ponding on property was reported by 192 responders to the stormwater survey. Residents in 25 watersheds identified this as a problem. The worst watersheds (in terms of the greatest number of residents) were Upper Minnow Branch (MB-11), Oakland (B-8), State Route MM (MB-5) and Fulton Avenue (M-2).
2. Local Street flooding was a problem cited by 219 responders in the survey, located in 31 of the 35 watersheds. The worst watersheds were Oakland (B-8), Upper Minnow Branch (MB-11), State Route MM (MB-5), Fulton Avenue (M-2) and Grand Avenue (B-4).

3. Basement Flooding (other than sanitary sewer) was reported by 144 surveys, located in 27 of the 35 watersheds. The worst watersheds were Oakwood (B-8), State Route MM (MB-5), Upper Minnow Branch (MB-11), Mark Twain Avenue (M-6), Magnolia-Carroll (MB-3) and Fulton Avenue (M-2).
4. Basement flooding due to sanitary sewer backup was reported on 56 surveys in 21 watersheds. The worst watersheds were State Route MM (MB-5), Bird Street (MB-6), Earl Street (MB-8) and Highway 61 Northwest (MB-10).
5. Complaints about water pollution associated with stormwater were cited by 56 residents in 19 watersheds. Upper Minnow Branch (MB-11) and Oakwood (B-8) were by far the worst watersheds with the greatest number of complaints.
6. Property damage from erosion or sedimentation was cited by 112 surveys in 25 watersheds. Upper Minnow Branch (MB-11), Oakland (B-8), Fulton Avenue (M-2) and State Route MM (MB-5) were the worst watersheds.
7. Danger to life and limb due to flowing or flooded stormwater was cited by 11 residents in 8 watersheds.
8. Damage to home or business or other buildings was cited by 61 surveys in 23 watersheds.
9. Damage to contents of structure was cited by 44 responders in 20 watersheds. These generally corresponded to the same problem areas with flooding.
10. Disruption of vehicle or pedestrian mobility due to flooding was checked in 67 surveys. These corresponded with the areas with flooding.

ES.5 Storm Drainage Design Criteria and Easements

1. The City of Hannibal needs a consistent set of stormwater drainage criteria for the redial design of stormwater improvements. These same criteria should be mandatory for the design of new developments.
2. The City should strive to develop an integrated stormwater drainage system within each watershed for the adequate disposal of stormwater runoff. The use of detention basins, inlets, storm sewers, culverts and other measures should reduce the amount of overland flow passing near buildings and over streets.
3. The City of Hannibal should require drainage easements across all properties on which stormwater improvements are constructed.

ES.6 Condition/Capacity Assessment of Stormwater System

1. The City should undertake a program to map the stormwater drainage system and to assess the condition of all principal storm sewers and channels. This mapping should include an inventory of pipe locations, pipe sizes, pipe elevations and channel bank conditions.
2. The City should undertake the hydraulic analysis of the capacity of its stormwater system. Computer modeling would be the most efficient way to perform this analysis. The capacity of each pipe and channel segment should be determined and compared against storm drainage design criteria. Segments that are under-sized should be prioritized for replacement and/or relief projects, whichever is most economical. The model calibrated to Hannibal could then be used in conceptual design, alternatives formulation and establishing the basis of design for remedial projects.

ES.7 Capital Improvements Program

1. A capital improvements program in the range of \$9.5 to \$16 million is estimated to address stormwater needs around the Hannibal community.
2. This capital improvements program should include projects in almost every one of the 35 watersheds.
3. Projects should be prioritized where the greatest benefit occurs to the greatest number of people and to the greatest number of properties. In addition, projects that can remedy multiple problems at once deserve early consideration.
4. Funding for a stormwater improvements program does not appear to be easily available. Residents are not interested in higher taxes. The willingness to sacrifice other City programs to start stormwater projects can only be determined through open discussion with community leaders, stakeholders and interested residents. New funding mechanisms appear to be needed, perhaps based upon user service fees (storm water utility).

ES.8 Federal Stormwater Phase 2 Compliance Program

1. The City of Hannibal has undertaken its compliance program for the new Federal Stormwater Phase 2 regulations, which are intended to protect water quality.
2. The City's compliance program is administered by the Department of Public Works. Public information and public participation is one key element of the federal requirements.
3. The City should combine its consideration of a stormwater improvements program with its on-going Phase 2 program, so that public participation activities count towards the City's compliance with the federal requirements.

1. INTRODUCTION

1.1 Overview

The City of Hannibal is a historic community that has grown since the early 1800s on the west bank of the Mississippi River in northeast Missouri. Stormwater runoff was not given much consideration in the early years, although more recently some people perceive it to be a community problem. Flooding on the Mississippi River has been with Hannibal since its founding and there is plenty of high ground away from the river in Hannibal to avoid floods. Bear Creek flows into the Mississippi River at downtown Hannibal through a valley that crosses the southern part of the City. The flat, low-lying lands along the Mississippi River and Bear Creek have been attractive for development, compared with the sloping hillsides in many other parts of the community. Over the years, the community has experienced severe flooding on the Mississippi River and these same floods back up into Bear Creek and the low-lying areas nearby. In addition, the community has come to understand that Bear Creek is subject to rapid rises in water levels (flash flooding) following rain storms. At times, these flash floods have caused loss of life and significant property damage in Hannibal. In the early 1960s, a dam across Bear Creek was built at the western side of the City to hold back flood waters and reduce the risk to the community.

Hannibal experienced much growth in the 1800s before modern design standards for stormwater evolved. Hannibal has never had a consistent set of standards covering the construction or upgrade of stormwater systems. This *Stormwater Master Plan* is a "first" and was authorized by the City in the fall of 2004 to promote the improved management of stormwater across the entire community.

1.2 Purpose

The City of Hannibal wishes to (1) develop a comprehensive plan for the management of stormwater within its jurisdiction and (2) identify financing strategies to implement a stormwater improvements program.

1.3 Scope of Project

This report is Volume 1 of a two part analysis of stormwater issues facing the City of Hannibal. The companion Volume 2 is entitled *Options for Stormwater Financing, The Case for a Stormwater Utility* and is presented in a separate section.

Volume 1 provides a guide for the City's efforts to remedy stormwater conveyance, erosion and flooding problems. The major components of Volume 1 include:

1. Survey the opinions and experiences of residents throughout the City to determine their views regarding stormwater problems and the need for remedial measures.
2. Conduct field inspections of the current stormwater drainage system, including channels, inlets, storm sewers and outfalls to view the condition of the system, the stability of channels and the suitability for satisfactorily conveying stormwater.

3. Prepare an inventory of stormwater problem areas, based upon interviews with City staff, resident responses to the survey and field inspections. Develop a conceptual list of stormwater improvement program needs with an opinion of capital improvement costs.

Volume 2 identifies alternatives for financing a stormwater management program in the City. The major steps in this effort shall include the following:

1. Review of the Hannibal City Charter to examine the current roles and responsibilities for stormwater management within the City Government.
2. Interview the staff in the City's Department of Public Works (DPW) and Board of Public Works (BPW) to understand recent actions for stormwater management.
3. Identify the City's options for financing stormwater improvements, including the creation of a stormwater utility.
4. Develop a conceptual plan for the implementation of a Stormwater Utility, identifying issues and potential strategies for discussion by key stakeholders.

2. OVERVIEW OF STORMWATER IN HANNIBAL

2.1 *Summary of Watersheds*

The City of Hannibal is located on the west bank of the Mississippi River in northeast Missouri. Bear Creek is a major waterway that empties into the Mississippi at downtown Hannibal. The majority of Hannibal is north of Bear Creek, although parts of the City are on the south bank. Figure 1 shows the major watersheds in the Hannibal area.

The riverfront in downtown Hannibal lies at around elevation 460 feet above mean sea level (MSL). The terrain in the Hannibal vicinity is hilly, with hilltops in several parts of the City exceeding 700 feet MSL. Figure 2 shows the relative elevations around the Hannibal area. With differences in elevation from hilltops to valley bottoms exceeding 240 feet, the land surface is relatively steep and contributes to rapid stormwater runoff.

For the purposes of this analysis, the City of Hannibal can be divided into four main drainage areas:

- 1) the Mississippi River,
- 2) Bear Creek
- 3) Minnow Branch and
- 4) Mills Creek.

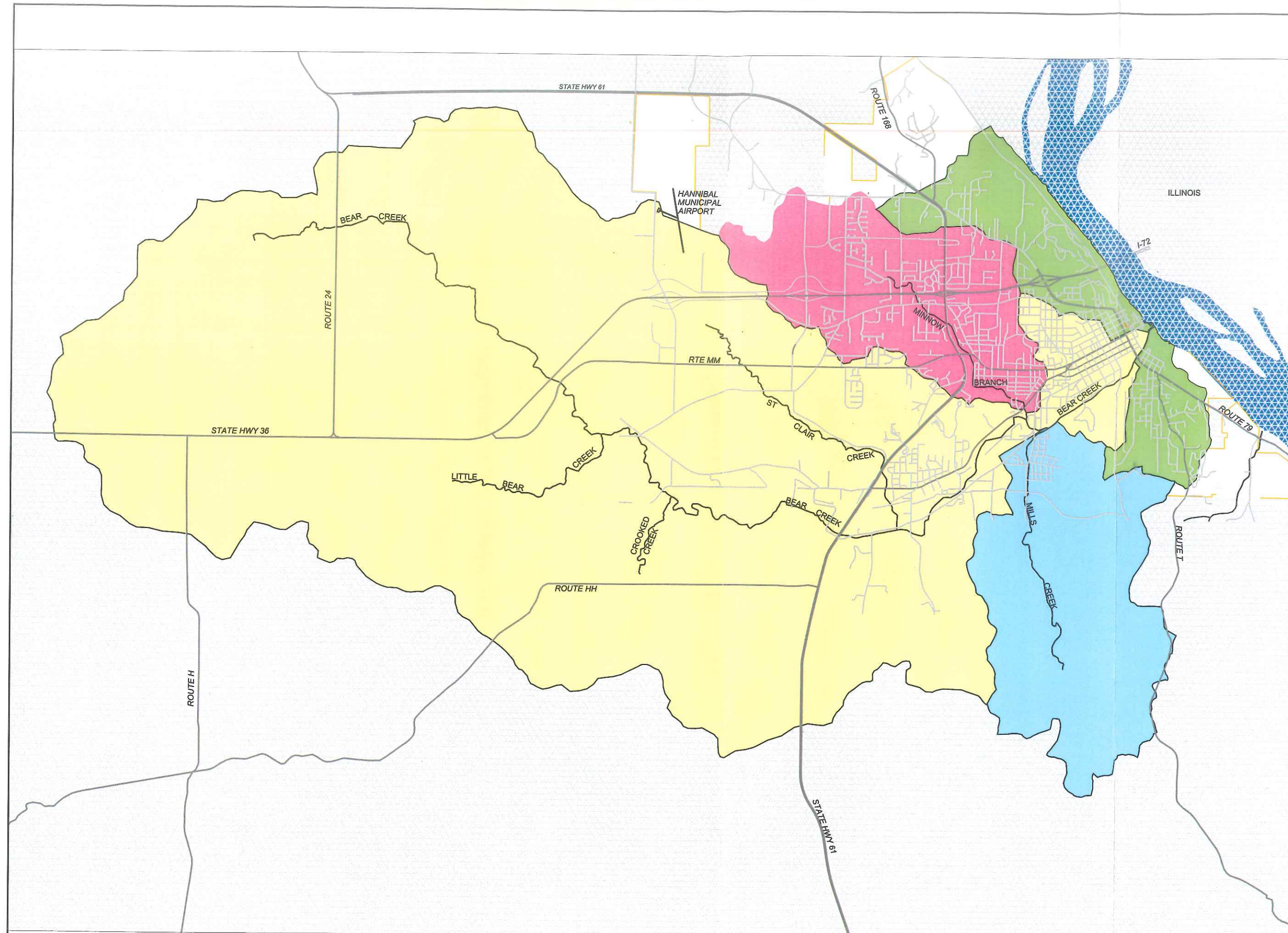
These are shown on the map in Figure 1. Each of these drainage areas has several independent watersheds, each of which drains to a single creek channel (or storm sewer if it has been enclosed). There are a total of 35 watersheds across the City of Hannibal that make up most of the storm water drainage system.

The Mississippi River receives flow from 9 small watersheds that will be discussed further in the sections below. The Bear Creek Drainage Area has 13 watersheds in Hannibal that are of interest. Minnow Branch flows into Bear Creek in the southern part of the City, but drains a large portion of the western part of Hannibal and therefore warrants being considered separately. Minnow Branch has 11 watersheds in Hannibal. Mills Creek has 2 watersheds in Hannibal. A larger map, which has been designated Figure A, shows all 35 watersheds in Hannibal and is contained in the map pocket at Appendix A.

2.2 *Watersheds to the Mississippi River*

There are nine watersheds in Hannibal that drain directly to the Mississippi River. These watersheds, listed in order proceeding upstream along the river, include the following:

| | | | |
|-----|--------------------|-----|---------------------------|
| M-1 | Adams Street | M-6 | Mark Twain Avenue |
| M-2 | Fulton Avenue | M-7 | Riverview Park |
| M-3 | Valley Street | M-8 | Hannibal North |
| M-4 | Center Street | M-9 | Hannibal-LaGrange College |
| M-5 | Hill Street – East | | |



- LEGEND**
- BEAR CREEK WATERSHED
 - MISSISSIPPI WATERSHED
 - MINNOW BRANCH WATERSHED
 - MILLS CREEK WATERSHED
 - OUTSIDE CITY LIMITS
 - MISSISSIPPI RIVER

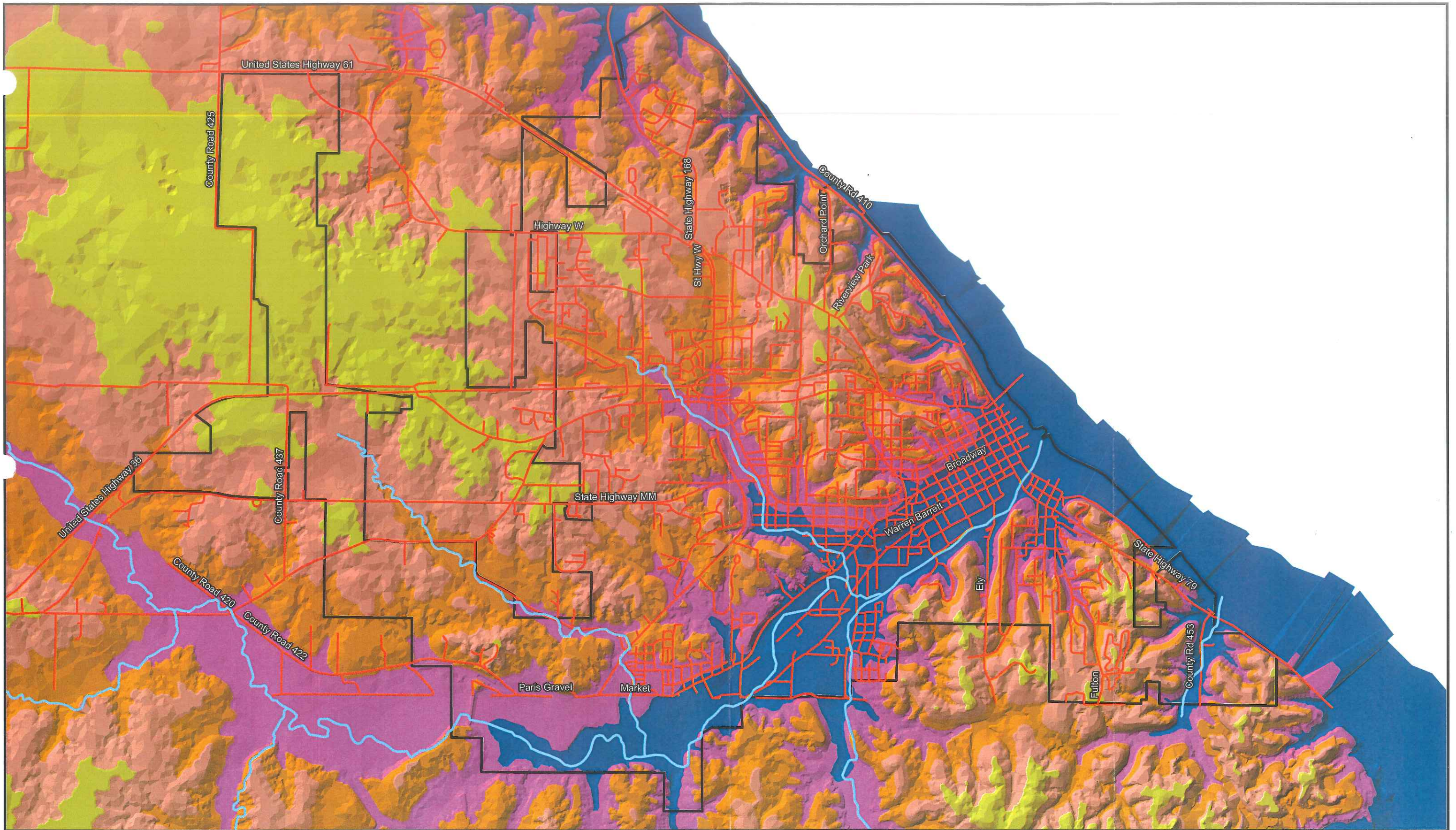


0 5000' 10000'
SCALE IN FEET
1 Inch = 10,000 Feet

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 1
MAJOR WATERSHEDS
IN THE HANNIBAL AREA



Legend

Elevation

| | |
|-----------|-----------|
| 716 - 778 | 528 - 591 |
| 653 - 716 | 467 - 529 |
| 591 - 653 | |

| |
|----------------|
| Stream Network |
| City Limits |
| Roads |

Each of these watersheds has different characteristics, but there are also some similarities. A general description of each watershed is presented below. A map of the nine watersheds draining to the Mississippi River is shown in Figure 3.

2.2.1 M-1 Adams Street

The Adams Street watershed is located south of Bear Creek along the Mississippi River and drains approximately 156 acres. Main Street (Highway 79 South) runs through this watershed. The highest elevations in this watershed are around 475 feet MSL and the lowest elevations are along the bank of the Mississippi River, around 460 feet MSL. This watershed is relatively flat, has 15-inch up to 30-inch diameter storm sewers with minor slopes (about 1 percent). The lower parts of the Adams Street watershed are subject to flooding on the Mississippi River.

2.2.2 M-2 Fulton Avenue

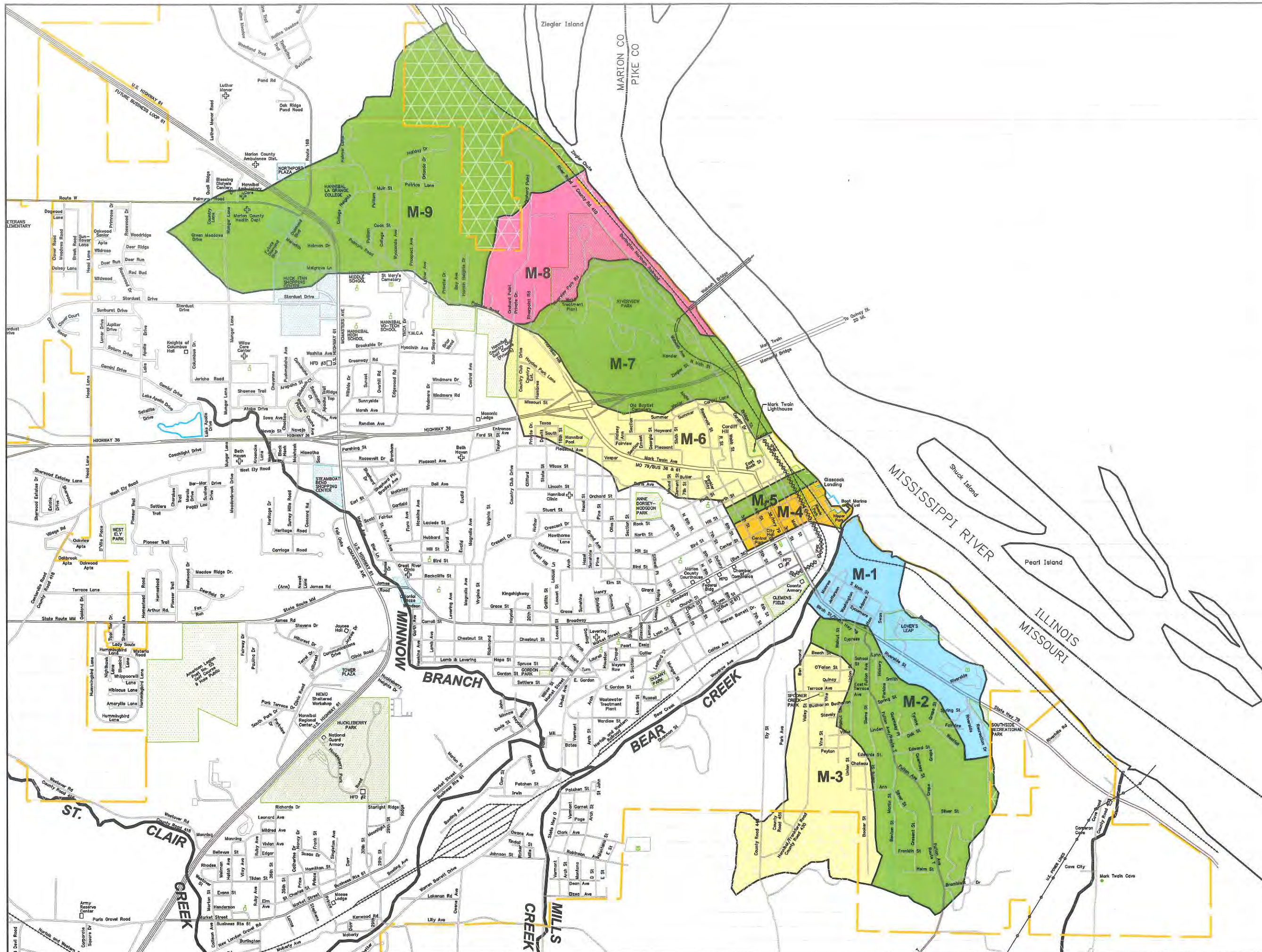
The Fulton Avenue watershed covers 287 acres south of Bear Creek in the southeastern part of Hannibal. This watershed is about 6,000 feet long and 2,000 feet wide with maximum elevations around 740 feet MSL. The main channel serving this watershed is about 5,000 feet long with an average slope of 3.4 percent. The valley that makes up the Fulton Avenue watershed has steeply sloping sides and a steeply sloping channel bottom. The valley was extensively developed with homes in the early 1900s. Fulton Avenue itself was built over parts of the main channel serving this valley and the channel was enclosed in a storm culvert to accomplish this. Many homes were built close to this channel/culvert.

2.2.3 M-3 Valley Street

The Valley Street watershed covers 219 acres and lies just west of the Fulton Avenue watershed. The Valley Street channel and the Fulton Avenue channel merge into one channel just above the Adams Street M-1 watershed described above. This watershed is about 6,000 feet long and 2,000 feet wide with maximum elevations around 740 feet MSL. The main channel serving this watershed is about 5,400 feet long with an average slope of 3.1 percent. This valley is like Fulton Avenue with steeply sloping sides and a steeply sloping channel and has been extensively developed. Many homes in the Valley Avenue watershed are built close to the channel/culvert, although the lot sizes are somewhat bigger and there are fewer structures close to the channel.

2.2.4 M-4 Center Street

The Center Street watershed drains 39 acres of downtown Hannibal around Kiwanis Park and points uphill along Center Street to Fourth Street (to the vicinity of Central Park). The high points in the watershed lie around 500 feet MSL. Storm sewers in this area range from 12 to 24-inches diameter and average about 2.4 percent slope toward the river.



LEGEND

- OUTSIDE CITY LIMITS
- SCHOOL
- HOSPITAL, CLINIC AND AMBULANCE
- CEMETERY
- POINT OF INTEREST
- CITY LIMITS
- CREEK

North Arrow

0 1000' 2000'

SCALE IN FEET
1 Inch = 2,000 Feet

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 3
WATERSHEDS DRAINING TO THE MISSISSIPPI RIVER



2.2.5 M-5 Hill Street - East

The Hill Street-East watershed drains 19 acres of downtown Hannibal along the eastern end of Hill Street to Fourth Street. The high points in the watershed lie around 550 feet MSL. Storm sewers in this area range from 12 to 27-inches in diameter and average about 5 percent slope toward the river.

2.2.6 M-6 Mark Twain Avenue

The Mark Twain Avenue watershed drains 27 acres of downtown Hannibal along the eastern end of Bird Street to Fourth Street. The high points in the watershed lie around 520 feet MSL. Storm sewers in this area range up to 24-inches in diameter and average about 4 percent slope toward the river.

2.2.7 M-7 Riverview Park

The Riverview Park watershed drains a broad area along the Mississippi River generally north of the Interstate 72 Bridge. This watershed covers 238 acres and is surrounded by hilltops approaching 730 feet MSL. Harrison Hill Avenue runs along the western side of this watershed. Stormwater drainage in this area is through open channels to the Mississippi River. Channel slopes in this watershed typically exceed 5 percent.

2.2.8 M-8 Hannibal North

The Hannibal North watershed includes one channel on the north side of Riverview Park. This area contains 166 acres and is surrounded by hilltops approaching 730 feet MSL. Much of this area is undeveloped. Channel slopes in this watershed typically exceed 5 percent.

2.2.9 M-9 Hannibal-LaGrange College

The Hannibal-LaGrange College watershed includes two channels on the north side of Hannibal. This area includes roughly 618 acres and is surrounded by hilltops approaching 730 feet MSL. About half of this area is undeveloped. Channel slopes in this watershed typically exceed 5 percent.

2.3 Watersheds to Bear Creek

There are thirteen watersheds in Hannibal that drain directly to Bear Creek. These watersheds include the following:

| | |
|------|-------------------------------|
| B-1 | Church– Lyon – Warren Barrett |
| B-2 | Seventh Street |
| B-3 | Ninth – Tenth – Eleventh |
| B-4 | Grand Avenue |
| B-5 | Lemon Street |
| B-6 | Arch Street |
| B-7 | Huckleberry Park |
| B-8 | Oakwood |
| B-9 | St. Clair Creek |
| B-10 | Ely Street |
| B-11 | Shannon Street |
| B-12 | Marion Street |
| B-13 | Bowling Avenue |

A map showing these watersheds is presented in Figure 4.

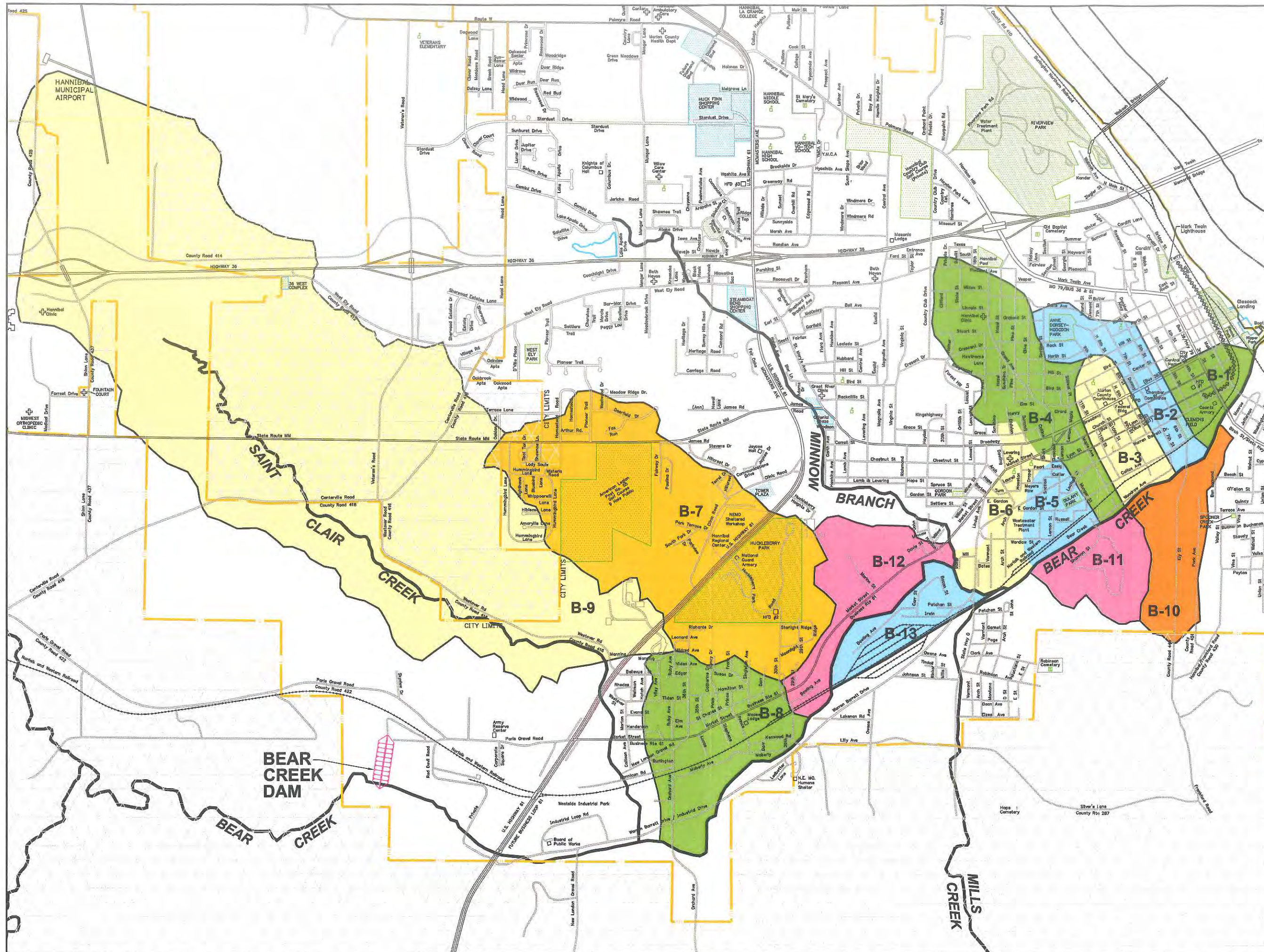
2.3.1 B-1 Church – Lyon – Warren Barrett

This small watershed is in downtown Hannibal adjacent to the Mississippi River and Bear Creek. It is south of Broadway and east of Sixth Street. Stormwater is collected in a series of storm sewers beneath Church, Lyon and Collier Streets and empties into Bear Creek just east of the Main Street Bridge (Highway 79). The largest storm sewers in the watershed are 30-inches in diameter. This watershed includes about 60 acres, has a high elevation around 510 feet MSL, and has storm sewers averaging about 1.4 percent slope. Parts of this area are protected by the Floodwall along the Mississippi River (see Section 2.7 on page 22 for more discussion of the floodwall).

2.3.2 B-2 Seventh Street

The Seventh Street watershed is the first one west of the central area of the City draining southward into Bear Creek. The upper end of this 102 acre watershed is around elevation 700 feet MSL while the low end at Bear Creek is around 470 feet MSL. This watershed is about 5,100 feet long and only about 1,000 feet wide, making it long and narrow.

The Seventh Street watershed has a pipe network ranging from 12-inch diameter to a 48 inch square culvert that empties into Bear Creek at the south end of Seventh Street. The average slope of storm sewers in this watershed is about 1.8 percent.



LEGEND

- OUTSIDE CITY LIMITS
- SCHOOL
- HOSPITAL, CLINIC AND AMBULANCE
- CEMETERY
- POINT OF INTEREST
- CITY LIMITS
- CREEK

SCALE IN FEET
1 inch = 2,000 Feet

NORTH

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 4
WATERSHEDS DRAINING TO BEAR CREEK

2.3.3 B-3 Ninth – Tenth – Eleventh

The Ninth-Tenth-Eleventh Street watershed covers about 88 acres in the downtown part of the City. This watershed is about 4,000 feet long and 900 feet wide with maximum elevations around 730 feet MSL. The main channel serving this watershed is about 3,600 feet long with an average slope of about 1.6 percent.

Much of this watershed was developed in the 1800s and many property owners experienced the creek channel in their yards. Creek banks were built up with stones to reduce erosion and then stone arch culverts were built so that more usable land could be had. Each property owner was free to enclose the creek to whatever width and height he wanted, so that today the culvert that encloses the channel varies in size every 100 feet or so. Inspections by the Board of Public Works in past years have noted culverts that range from 6 feet wide by 6 feet high down to 3 feet wide by 4 feet high. The smaller cross-sections of culvert are inadequate to carry peak storm flows and become totally filled with water during big storm events, causing water to back up into streets.

2.3.4 B-4 Grand Avenue

The Grand Avenue watershed covers 217 acres in the central part of the City. This watershed is about 6,800 feet long and 1,500 feet wide with maximum elevations around 740 feet MSL. The main channel serving this watershed is about 5,400 feet long with an average slope of 1.9 percent. Grand Avenue itself was built over several sections of the main channel and the channel has been enclosed in a series of culverts and storm sewers that range up to 6 feet wide by 6 feet high. There are street inlets along Grand Avenue that collect stormwater runoff and put it into the storm sewer.

The Grand Avenue watershed is one of the larger watersheds in the central part of Hannibal and collects more stormwater than many of its smaller counterparts. Flooding has been a significant problem along this storm drainage system for many years. The City has recognized the problem and as street improvements to Grand Avenue are made, parts of the storm sewer have been enlarged. Based upon reports of continued flooding, it appears that the unimproved sections of the storm sewer system are still inadequate to carry even modest storm flows.

2.3.5 B-5 Lemon Street

The Lemon Street watershed covers 58 acres west of Grand Avenue watershed. This watershed is about 1,900 feet long and 800 feet wide with maximum elevations around 500 feet MSL. The main channel serving this watershed is about 1,550 feet long with an average slope of 1.3 percent. Sections of channel are within underground storm sewers ranging in size up to 42 inches round.

2.3.6 B-6 Arch Street

The Arch Street watershed covers 80 acres. This watershed is about 3,600 feet long and 900 feet wide with maximum elevations around 570 feet MSL. The main channel serving this watershed is about

3,200 feet long with an average slope of 2.3 percent. The storm sewer system in this watershed ranges up to 42 inch diameter pipe.

2.3.7 B-7 Huckleberry Park

The Huckleberry Park watershed covers about 580 acres (about one square mile) in the western part of the City. This watershed is about 9,000 feet long and 3,000 feet wide with maximum elevations around 730 feet MSL. The main channel serving this watershed is about 8,500 feet long with an average slope of about 1.9 percent. All flows in the watershed are in open channels. There is some development in this watershed, although Huckleberry Park, undeveloped woodlands and homes on larger lots make up most of the watershed. This watershed discharges into Bear Creek between watersheds B-8 and B-12.

2.3.8 B-8 Oakwood

The Oakwood area is located in the southwestern part of Hannibal and sits on a wide hillside above Bear Creek. For the purposes of this study it is termed a "watershed", although stormwater drainage in this area follows several pathways down this hillside. This area is about 4,100 feet long and 2,000 feet wide, covering 232 acres. A ridgeline across the northern part of the Oakwood area has maximum elevations around 620 feet MSL. Drainage pathways through this neighborhood are mostly by overland flow and can be up to 3,900 feet long before reaching Bear Creek to the south. There are several storm sewers built to carry this flow beneath Market Street and other roadways. Slopes in the northern part of the Oakwood area average about 2.1 percent, although slopes are much less than this in the Bear Creek floodplain south of Market Street. A portion of Market Street in the Oakwood area suffers from frequent flooding because of the inadequate drainage system.

2.3.9 B-9 St Clair Creek

St. Clair Creek is the western-most watershed in Hannibal that drains into Bear Creek. This watershed has the Hannibal Municipal Airport at the upper end of its drainage area. This watershed covers about 1,800 acres (almost 3 square miles) and is 23,000 feet (4.2 miles) long. This watershed averages 4,500 feet wide with maximum elevations at the airport around 770 feet MSL. The main channel serving this watershed is about 20,000 feet long and has an average slope of about 1.2 percent. The channel serving this watershed is through open channels throughout its entire length.

2.3.10 B-10 Ely Street

The watershed draining the Ely Street area is a steep valley with the bottom swale of the valley roughly following Ely Street. This watershed covers 118 acres and is roughly 3,100 feet long. The highest elevation is 720 feet MSL while the lowest elevation is 470 feet MSL. The main channel serving this watershed is about 3,000 feet long, with an average slope of about 4.4 percent. The stormwater runoff is primarily conveyed by open channel flow. At two points within the basin, the flow is diverted into a storm water collection system that drains into Bear Creek.

2.3.11 B-11 Shannon Street

The Shannon Street watershed is a very steep uninhabited area located along the southern edge of Hannibal. This watershed is approximately 93 acres and is roughly 2,100 feet long. Its width is about the same as its length. The watershed drains directly into Bear Creek. The highest elevation is 650 MSL and the main drainage channel is roughly 1,950 feet long with an average slope of 9.2 percent. This watershed is too steep for economical development.

2.3.12 B-12 Marion Street

The Marion Street watershed is a valley that drains across Market Street. This watershed is about 148 acres and is located in the southwest area of the City. The valley bottom follows Marion Street, crosses Market Street and terminates into Bear Creek. The high point within the watershed is 635 feet MSL, while the low point is at 540 feet MSL. The drainage channel is 2,400 feet long, with an average slope of 4.1 percent.

2.3.13 B-13 Bowling Avenue

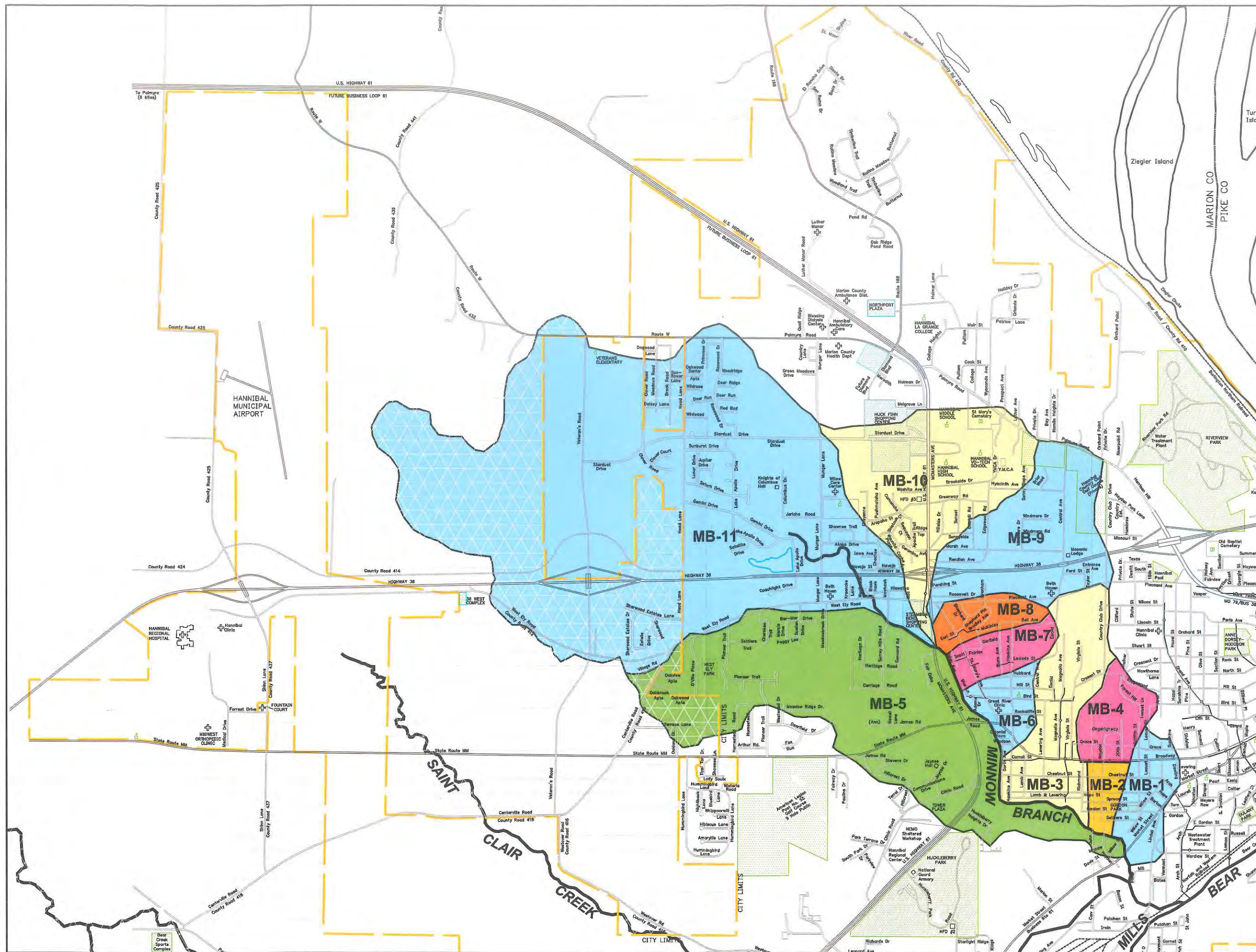
The Bowling Avenue watershed drains a portion of the Bear Creek/Mills Creek floodplain. This watershed is located in the southern edge of the City. This flat watershed measures 77 acres. The high point of the watershed is at 550 feet MSL and the low point is at 530 feet MSL. The main channel is about 1,700 feet long with an average slope of about 0.9 percent. This watershed is very flat, and the few defined channels that the watershed does have are full of sediment and debris.

2.4 Watersheds to Minnow Branch

There are eleven watersheds in Hannibal that drain to Minnow Branch of Bear Creek. These watersheds include the following:

| | |
|-------|--|
| MB-1 | Willow Street |
| MB-2 | Hayden Street |
| MB-3 | Magnolia – Carroll |
| MB-4 | Grace Street |
| MB-5 | State Route MM |
| MB-6 | Bird Street |
| MB-7 | Scott Street |
| MB-8 | Earl Street |
| MB-9 | Central Avenue – Mark Twain Expressway |
| MB-10 | Highway 61 – Northwest |
| MB-11 | Upper Minnow Branch |

A map showing the watersheds draining to Minnow Branch of Bear Creek is shown in Figure 5.



LEGEND

- OUTSIDE CITY LIMITS
- SCHOOL
- HOSPITAL, CLINIC AND AMBULANCE
- CEMETERY
- POINT OF INTEREST
- CITY LIMITS
- CREEK

SCALE IN FEET
1 inch = 2,000 Feet

NORTH

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 5
WATERSHEDS DRAINING TO MINNOW BRANCH



2.4.1 MB-1 Willow Street

The Willow Street watershed covers 66 acres in the central part of the City. This watershed is about 2,800 feet long and 700 feet wide, with maximum elevations around 570 feet MSL. The main channel serving this watershed is about 2,200 feet long with an average slope of about 5 percent.

2.4.2 MB-2 Hayden Street

The Hayden Street watershed covers another 30 acres in the central part of the City. This watershed is about 1,600 feet long and 800 feet wide with maximum elevations around 570 feet MSL. The main channel serving this watershed is about 1,400 feet long with an average slope of about 5 percent.

2.4.3 MB-3 Magnolia – Carroll

The Magnolia-Carroll watershed covers 158 acres in the west-central part of the City. This watershed is about 4,500 feet long and 1,000 feet wide with maximum elevations around 670 feet MSL. The main channel serving this watershed is about 4,400 feet long with an average slope of about 1.8 percent.

2.4.4 MB-4 Grace Street

The Grace Street watershed covers 61 acres in the north-central part of the City. This watershed is about 1,600 feet long and 1,000 feet wide, with maximum elevations around 645 feet MSL. The main channel serving this watershed is about 1,400 feet long with an average slope of about 5 percent.

2.4.5 MB-5 State Route MM

The State Route MM watershed extends west of Minnow Branch up Highway MM west of U.S. Route 61. The watershed covers 530 acres in the western part of the City. It is about 5,500 feet long and 2,200 feet wide, with maximum elevations around 720 feet MSL. The main channel serving this watershed is about 5,200 feet long with an average slope of about 2.2 percent.

2.4.6 MB-6 Bird Street

The Bird Street watershed covers 20 acres along in the west-central part of the City. This watershed is about 1,700 feet long and 500 feet wide with maximum elevations around 620 feet MSL. The main channel serving this watershed is about 1,500 feet long with an average slope of about 3.4 percent.

2.4.7 MB-7 Scott Street

The Scott Street watershed covers 49 acres in the west-central part of the City. This watershed is about 2,500 feet long, 800 feet wide with maximum elevations around 700 feet MSL. The main channel serving this watershed is about 2,300 feet long with an average slope of about 2.2 percent.

2.4.8 MB-8 Earl Street

The Earl Street watershed covers 45 acres in the west-central part of the City. This watershed is about 2,800 feet long and 500 feet wide with maximum elevations around 725 feet MSL. The main channel serving this watershed is about 2,400 feet long with an average slope of about 2.9 percent.

2.4.9 MB-9 Central Avenue – Mark Twain Expressway

The Central Avenue-Mark Twain Expressway watershed covers 210 acres along Central Avenue and Route 36 in the northwest part of the City. This watershed is about 6,700 feet long and 2,500 feet wide with maximum elevations around 720 feet MSL. The main channel serving this watershed is about 6,300 feet long with an average slope of about 2.1 percent.

2.4.10 MB-10 Highway 61 – Northwest

The Highway 61-Northwest watershed covers 263 acres along U.S. Highway 61 in the northwest part of the City. This watershed is about 5,000 feet long and 3,000 feet wide with maximum elevations around 720 feet MSL. The main channel serving this watershed is about 4,700 feet long with an average slope of about 0.6 percent.

2.4.11 MB-11 Upper Minnow Branch

The Upper Minnow Branch watershed covers 1,300 acres from the Lake Apollo subdivision upstream to the vicinity of the east side of Hannibal Municipal Airport. This watershed is about 14,000 feet long and 5,000 feet wide, with maximum elevations around 770 feet MSL near the airport. The main channel serving this watershed is about 12,000 feet long with an average slope of about 0.9 percent.

2.5 *Watersheds to Mills Creek*

There are two watersheds in the southern part of Hannibal that drain into Mills Creek. These watersheds are shown in Figure 6.

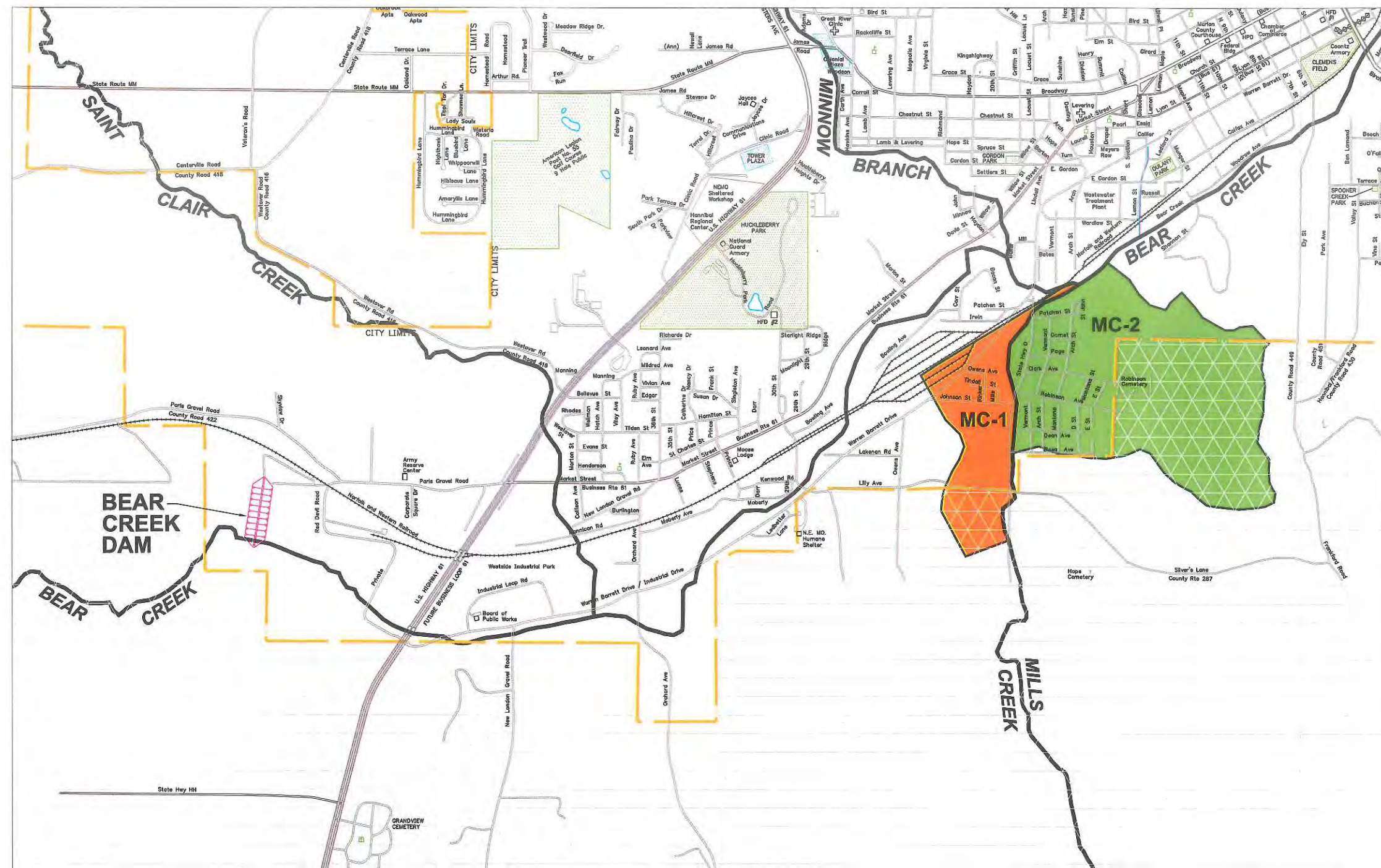
- MC-1 Johnson Street
- MC-2 Robinson Avenue

2.5.1 MC-1 Johnson Street

The Johnson Street watershed covers 93 acres in the southern part of the City. This watershed is about 2,800 feet long and 700 feet wide, with maximum elevations around 625 feet MSL. The main channel serving this watershed is about 1,200 feet long with an average slope of about 5 percent.


2.5.2 MC-2 Robinson Avenue

The Robinson Avenue watershed covers 278 acres in the southern Hannibal. This watershed is about 5,000 feet long and 800 feet wide with maximum elevations around 728 feet MSL. The main channel serving this watershed is about 4,900 feet long with an average slope of about 3.6 percent.



LEGEND

- OUTSIDE CITY LIMITS
- SCHOOL
- HOSPITAL, CLINIC AND AMBULANCE
- CEMETERY
- POINT OF INTEREST
- CITY LIMITS
- CREEK


 NORTH

0 1000' 2000'
 SCALE IN FEET
 1 Inch = 2,000 Feet

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 6
WATERSHEDS DRAINING TO MILLS CREEK

2.6 Summary of Watershed Characteristics

A summary of the watershed characteristics discussed in the sections above is presented in Table 1 on page 19. Hannibal has many small watersheds and 15 of those listed in Table 1 are less than 100 acres in size. Each watershed must have its own stormwater drainage system.

2.6.1 Watershed Slope

The slope of the land surface within the watershed affects the way stormwater travels across it. Eight watersheds can be classified as shallow-slope watersheds, having slopes less than 1.5 percent (15 feet fall over 1,000 feet distance). These watersheds are listed in Table 2. In general, stormwater flows more slowly across these watersheds. Parts of shallow watersheds can be more susceptible to ponding and standing water after heavy rains.

Table 2
Watersheds with Shallow Slopes in Hannibal
Slopes < 1.5 %

| Number | Name |
|--------|--------------------------------|
| B-1 | Church - Lyon - Warren Barrett |
| B-5 | Lemon Street |
| B-9 | Airport |
| B-13 | Bowling Avenue |
| M-1 | Adams Street |
| M-6 | Mark Twain Expressway |
| MB-10 | Highway 61 Northwest |
| MB-11 | Upper Minnow Branch |

Table 3
Watersheds with Medium Slopes in Hannibal
1.5 % < Slopes < 3.0 %

| Number | Name |
|--------|-------------------------------|
| B-2 | Seventh Street |
| B-3 | Ninth - Tenth - Eleventh |
| B-4 | Grand Avenue |
| B-6 | Arch Street |
| B-7 | Huckleberry Park |
| B-8 | Oakwood |
| M-4 | Center Street |
| MB-3 | Magnolia Ave - Carroll Street |
| MB-5 | State Route MM |
| MB-7 | Scott Street |
| MB-8 | Earl Street |
| MB-9 | Central Ave - Mark Twain Exp. |

Twelve watersheds across Hannibal have average slopes between 1.5 and 3.0 percent and can be considered medium slope watersheds (Table 3). In general, these watersheds will have stormwater runoff traveling at higher speeds, because water is accelerated by the steeper slopes. With water traveling faster, there is more potential for erosion.

Table 1
Watersheds in the City of Hannibal
Stormwater Master Plan



| Watershed | | | | | Basin | | Channel | | | | | | | Rank (Largest to Smallest) | | | |
|-----------|-----------------------------------|---------------------------|-------------------|---------------|---------------------|--------------|----------------------|-----------------------|-----------|--------------------------|-------------|-----------------|---------------------------------|----------------------------|----------------|-------|-----------------------|
| Number | Name | Storm Sewer Size (inches) | Discharges to | Location | High Elevation (ft) | Area (acres) | Upper Elevation (ft) | Lowest Elevation (ft) | Fall (ft) | Est Runoff Coefficient C | Length (ft) | Slope (Percent) | Time of Concentration (minutes) | Area | Channel Length | Slope | Time of Concentration |
| B-01 | Church - Lyon - Warren Barrett | 30 | Bear Creek | Downtown | 510 | 60 | 495 | 460 | 35 | 0.7 | 2,435 | 1.4 | 31.5 | 28 | 21 | 28 | 13 |
| B-02 | Seventh Street | 4'x4' Conc Box | Bear Creek | Central | 700 | 102 | 560 | 470 | 90 | 0.7 | 5,119 | 1.8 | 42.7 | 20 | 10 | 26 | 22 |
| B-03 | Ninth - Tenth - Eleventh | 42 | Bear Creek | Central | 730 | 88 | 530 | 470 | 60 | 0.7 | 3,644 | 1.6 | 36.8 | 23 | 18 | 27 | 19 |
| B-04 | Grand Avenue | 6 x6' Conc Box | Bear Creek | Central | 740 | 217 | 600 | 470 | 130 | 0.7 | 6,819 | 1.9 | 47.9 | 13 | 5 | 23 | 25 |
| B-05 | Lemon Street | 42 | Bear Creek | Central | 500 | 58 | 500 | 480 | 20 | 0.7 | 1,550 | 1.3 | 26 | 29 | 31 | 30 | 9 |
| B-06 | Arch Street | 42 | Bear Creek | Central | 570 | 80 | 560 | 485 | 75 | 0.7 | 3,204 | 2.3 | 30.7 | 24 | 19 | 17 | 12 |
| B-07 | Huckleberry Park Tributary | - | Bear Creek | West | 730 | 582 | 650 | 490 | 160 | 0.3 | 8,556 | 1.9 | 108.1 | 4 | 3 | 24 | 33 |
| B-08 | Oakwood | - | Bear Creek | Southwest | 620 | 232 | 580 | 500 | 80 | 0.7 | 3,902 | 2.1 | 35.4 | 11 | 17 | 21 | 16 |
| B-09 | St. Clair Creek | - | Bear Creek | West | 770 | 1,781 | 740 | 495 | 245 | 0.2 | 19,835 | 1.2 | 212.6 | 1 | 1 | 31 | 35 |
| B-10 | Ely Street | - | Bear Creek | Southeast | 722 | 118 | 600 | 470 | 130 | 0.5 | 2,927 | 4.4 | 35.5 | 19 | 20 | 7 | 17 |
| B-11 | Shannon Street | - | Bear Creek | South | 728 | 93 | 650 | 470 | 180 | 0.5 | 1,952 | 9.2 | 22.8 | 21 | 28 | 1 | 7 |
| B-12 | Marion Street | 24 | Bear Creek | Southwest | 635 | 148 | 638 | 540 | 98 | 0.5 | 2,382 | 4.1 | 32.9 | 18 | 22 | 8 | 14 |
| B-13 | Bowling Avenue | - | Bear Creek | South | 548 | 77 | 545 | 530 | 15 | 0.5 | 1,695 | 0.9 | 46.3 | 25 | 29 | 33 | 24 |
| M-01 | Adams Street | 30 | Mississippi River | East | 480 | 156 | 475 | 460 | 15 | 0.7 | 5,456 | 0.3 | 81.8 | 17 | 7 | 35 | 32 |
| M-02 | Fulton Avenue | - | Watershed M-1 | Southeast | 740 | 287 | 650 | 480 | 170 | 0.7 | 5,452 | 3.1 | 36.4 | 6 | 8 | 15 | 18 |
| M-03 | Valley Street | 2 - 6'x6' Conc Box | Watershed M-1 | Southeast | 740 | 219 | 645 | 480 | 165 | 0.7 | 5,055 | 3.3 | 34.5 | 12 | 11 | 14 | 15 |
| M-04 | Center Street | 24 | Mississippi River | Downtown | 540 | 39 | 500 | 460 | 40 | 0.9 | 2,033 | 2.0 | 13 | 33 | 27 | 22 | 2 |
| M-05 | Hill Street | 30 | Mississippi River | Downtown | 540 | 19 | 520 | 460 | 60 | 0.9 | 1,606 | 3.7 | 9.3 | 35 | 30 | 9 | 1 |
| M-06 | Mark Twain Avenue | 27 | Mississippi River | Downtown | 600 | 251 | 550 | 460 | 90 | 0.7 | 6,855 | 1.3 | 54.4 | 9 | 4 | 29 | 28 |
| M-07 | Riverview Park Tributary | 48 | Mississippi River | Northeast | 730 | 238 | 615 | 460 | 155 | 0.3 | 4,366 | 3.6 | 62.4 | 10 | 16 | 11 | 31 |
| M-08 | Hannibal North Tributary | - | Mississippi River | North | 730 | 166 | 580 | 460 | 120 | 0.3 | 2,260 | 5.3 | 39.2 | 15 | 25 | 2 | 21 |
| M-09 | Hannibal-LaGrange College | - | Mississippi River | North | 720 | 618 | 620 | 460 | 160 | 0.5 | 4,892 | 3.3 | 50.9 | 3 | 12 | 13 | 27 |
| MB-01 | Willow Street | 24 | Minnow Branch | Central | 570 | 66 | 600 | 490 | 110 | 0.7 | 2,180 | 5.0 | 19.6 | 26 | 26 | 4 | 6 |
| MB-02 | Hayden Street | 24 | Minnow Branch | Central | 570 | 27 | 555 | 490 | 65 | 0.7 | 1,358 | 4.8 | 15.7 | 34 | 34 | 6 | 3 |
| MB-03 | Magnolia Ave - Carroll Street | 5'x7' Conc Box | Minnow Branch | West Central | 670 | 158 | 620 | 540 | 80 | 0.7 | 4,388 | 1.8 | 39 | 16 | 15 | 25 | 20 |
| MB-04 | Grace Street | 42 | Watershed MB-3 | North Central | 645 | 61 | 610 | 540 | 70 | 0.7 | 1,422 | 4.9 | 16 | 27 | 33 | 5 | 4 |
| MB-05 | State Route MM | - | Minnow Branch | West | 720 | 530 | 690 | 575 | 115 | 0.5 | 5,185 | 2.2 | 59.6 | 5 | 9 | 18 | 30 |
| MB-06 | Bird Street | 15 | Minnow Branch | West Central | 620 | 46 | 590 | 540 | 50 | 0.7 | 1,485 | 3.4 | 18.5 | 31 | 32 | 12 | 5 |
| MB-07 | Scott Street | 18 | Minnow Branch | West Central | 700 | 49 | 600 | 550 | 50 | 0.7 | 2,289 | 2.2 | 26.5 | 30 | 24 | 19 | 10 |
| MB-08 | Earl Street | 24 | Minnow Branch | West Central | 725 | 45 | 620 | 550 | 70 | 0.7 | 2,375 | 2.9 | 24.5 | 32 | 23 | 16 | 8 |
| MB-09 | Central Avenue - Mark Twain Expwy | 60 | Minnow Branch | Northwest | 720 | 210 | 700 | 570 | 130 | 0.7 | 6,330 | 2.1 | 45.1 | 14 | 6 | 20 | 23 |
| MB-10 | Highway 61 Northwest | - | Minnow Branch | Northwest | 720 | 263 | 600 | 570 | 30 | 0.7 | 4,730 | 0.6 | 57.6 | 8 | 14 | 34 | 29 |
| MB-11 | Upper Minnow Branch | - | Minnow Branch | Northwest | 770 | 1,278 | 680 | 570 | 110 | 0.5 | 12,360 | 0.9 | 124.8 | 2 | 2 | 32 | 34 |
| MC-01 | Johnson Street | - | Mills Creek | South | 625 | 93 | 560 | 498 | 62 | 0.3 | 1,187 | 5.2 | 28.6 | 22 | 35 | 3 | 11 |
| MC-02 | Robinson Avenue | - | Mills Creek | South | 728 | 277 | 660 | 485 | 175 | 0.5 | 4,845 | 3.6 | 49 | 7 | 13 | 10 | 26 |



Table 1 here
Summary of watershed characteristics

Finally, another fifteen watersheds in Hannibal have slopes exceeding 3.0 percent and can be considered steep watersheds (Table 4). These watersheds accelerate the runoff more than shallower watersheds, so that water travels with high velocities and reaches the lower parts of the watershed more quickly. In general there will be less ponding in these watersheds, because there are fewer level places for water to accumulate.

However, steepness in a watershed can cause the water to reach the channel quickly after the start of rainfall and can cause the water levels in the gullies, channels and streams to rise quickly. The fast rise in stream discharge and the rapid rise in water surface elevation comes with little warning, giving rise to what is known as “flash flooding”.

Another characteristic of steep watersheds is the increased potential for erosion. Since the water is moving faster and carries more energy, it is capable of eroding soils in its path, not only across yards and streets, but also along creek bottoms and creek banks. With this increased energy, the storm water can carry leaves, limbs, trash, toys and other objects in its path downhill. Such objects can block parts of channels downstream and cause water to backup as well as slow down.

Fast velocities in stormwater can erode and suspend soil, sand and even gravel, keeping them in suspension while the velocity remains high. If the watershed slope should flatten out, as is typical at the bottom of watersheds in Hannibal, the velocity of the water slows down, dropping out the gravel and sand and even some of the soil. This is known as sedimentation, which over time can fill stream channels and storm sewers, thereby reducing their capacity to carry water.

2.6.2 Time-of-Concentration

Another measure of watershed conditions is the “time-of-concentration”, which is the time of travel for runoff from the farthest, upper-most point in the watershed down to the watershed outlet. Small watersheds have shorter times of concentration, as do steeper watersheds. Another influence on time-of-concentration is the land surface characteristics. Urbanized watersheds with many streets, parking lots and other hard, smooth, impervious surfaces exhibit shorter times-of-concentration, compared with similar watersheds containing fields and forests. Watersheds having short times-of-concentration exhibit rapid rises in stream and creek levels following heavy periods of rainfall.

An estimate of the time-of-concentration for each watershed was presented in Table 1. In Hannibal, the times-of-concentration range from 9 minutes to over 3 ½ hours. Another summary of watershed

Table 4
Watersheds with Steep Slopes in Hannibal
Slopes > 3.0%

| Number | Name |
|--------|---------------------------|
| B-10 | Ely Street |
| B-11 | Shannon Street |
| B-12 | Marion Street |
| M-2 | Fulton Avenue |
| M-3 | Valley Street |
| M-5 | Hill Street |
| M-7 | Riverview Park |
| M-8 | Hannibal North |
| M-9 | Hannibal-LaGrange College |
| MB-1 | Willow Street |
| MB-2 | Hayden Street |
| MB-4 | Grace Street |
| MB-6 | Bird Street |
| MC-1 | Johnson Street |
| MC-2 | Robinson Avenue |

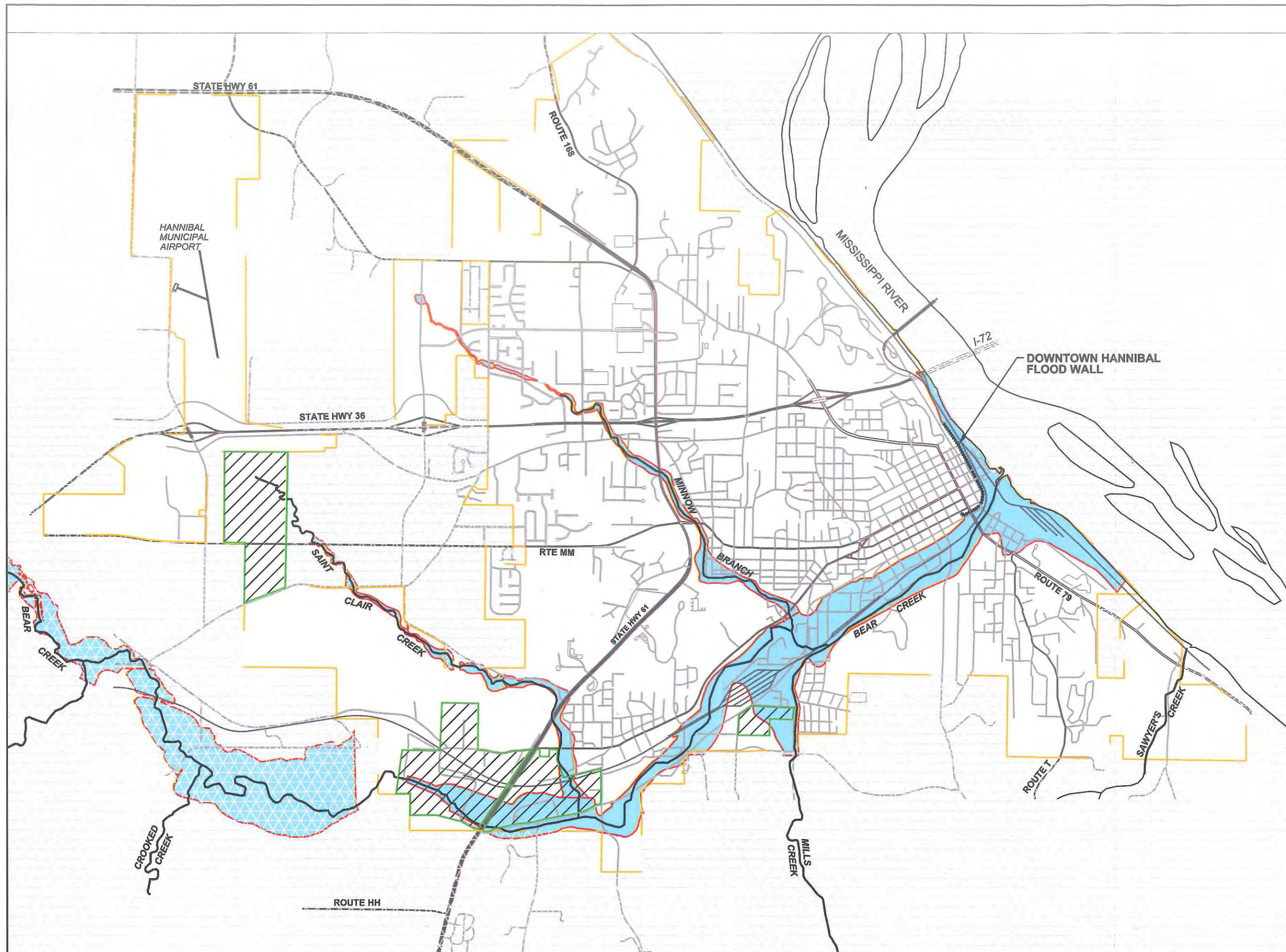
Times-of-concentration is presented in Table 5. There are 11 watersheds in Hannibal that have short times-of-concentration less than 30 minutes. Another 19 watersheds have times-of-concentration less than 1 hour. Five watersheds have times-of-concentration over 1 hour, up to the maximum 3 ½ hours (213 minutes) calculated for the St. Clair Creek (B-9) in the northwest part of the city.

Table 5
Watershed Times-of-Concentration (TC) in Hannibal

| Short TC TC < 30 minutes | | Medium TC 30 min < TC < 1 hour | | Long TC TC > 1 hour | |
|-----------------------------|----------------|-----------------------------------|-------------------------------|------------------------|---------------------|
| B-5 | Lemon Street | B-1 | Church–Lyon–Warren Barrett | B-7 | Huckleberry Park |
| B-11 | Shannon Street | B-2 | Seventh Street | B-9 | St. Clair Creek |
| M-4 | Center Street | B-3 | Ninth – Tenth – Eleventh | M-1 | Adams Street |
| M-5 | Hill Street | B-4 | Grand Avenue | M-7 | Riverview Park |
| MB-1 | Willow Street | B-6 | Arch Street | MB-11 | Upper Minnow Branch |
| MB-2 | Hayden Street | B-8 | Oakwood | | |
| MB-4 | Grace Street | B-10 | Ely Street | | |
| MB-6 | Bird Street | B-12 | Marion Street | | |
| MB-7 | Scott Street | B-13 | Bowling Avenue | | |
| MB-8 | Earl Street | M-2 | Fulton Avenue | | |
| MC-1 | Johnson Street | M-3 | Valley Street | | |
| | | M-6 | Mark Twain Avenue | | |
| | | M-8 | Hannibal North | | |
| | | M-9 | Hannibal-LaGrange College | | |
| | | MB-3 | Magnolia Ave – Carroll Street | | |
| | | MB-5 | State Route MM | | |
| | | MB-9 | Central Ave – Mark Twain Exp | | |
| | | MB-10 | Highway 61 Northwest | | |
| | | MC-2 | Robinson Avenue | | |


2.7 100-Year Floodplain/Floodway in Hannibal

The Federal Emergency Management Agency (FEMA) has the responsibility for the designation of 100-Year floodplains/floodways nationwide. A hydraulic analysis within each watershed is performed to predict the 100-year flood elevation and designate areas expected to undergo inundation by floods at least once every 100 years. The floodplains or floodways that have been designated around Hannibal are shown in Figure 7. The low-lying areas along Bear Creek through southern Hannibal are within the 100-year floodplain. Parts of the valleys along Minnow Branch, Mills Creek and St. Clair Creek all experience enough flooding to have narrow areas designated as below the 100-year flood elevation. The 100-year floodway extends upstream to the Lake Apollo subdivision in the Upper Minnow Branch watershed (MB-11).

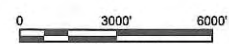


LEGEND

- 100 YEAR FLOOD ZONE
- OUTSIDE CITY LIMITS
- INDUSTRIAL SITE ZONE
- CITY LIMITS
- CREEK
- 100 YEAR FLOOD BOUNDARY
- INDUSTRIAL SITE LIMITS



NORTH



SCALE IN FEET
1 Inch = 6,000 Feet

Hannibal, Missouri
America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 7
100-YEAR FLOODPLAINS
IN HANNIBAL

2.8 Flood Controls on the Mississippi River

In the late 1980s, the City of Hannibal was able to receive federal aid to construct a floodwall protecting the historic downtown area. This floodwall system was constructed in the early 1990s to prevent flooding for up to a 500-year flood. The flood wall runs parallel to First Street and turns westward to follow Warren Barrett Street. Three flood gates were built to allow the existing streets to have access to the Mississippi River. These flood gates are located at Main Street, Broadway and Center Street.

During times when the floodwall and gates are closed, the additional runoff is collected behind the wall and piped into a holding pond located in the southeast corner of the downtown area. From this holding area the water is pumped over the wall and into the Mississippi River. A system of valves was constructed in order to prevent any backwater from seeping underneath the wall.

Floods on the Mississippi River back up water into the Bear Creek valley as much as 4 miles upstream from the river. These floods have severely impacted homes and businesses built in the valley, prompting residents to move to higher ground, or look for ways to protect their properties. The U.S. Army Corps of Engineers has examined options for installing floodwalls or levees to hold back the waters in the Bear Creek valley but has found the cost always exceeds the benefits of flood protection. For this reason, floodwall or levee improvements in the Bear Creek valley have not qualified for federal financial assistance and the City of Hannibal does not have the necessary funds to construct such a project.

2.9 Flood Controls on Bear Creek

2.9.1 History of Flooding

Bear Creek has a total drainage area of 51 square miles, all of which drains through the valley that crosses the southern part of Hannibal. Since the 1800s, Hannibal has been plagued by flash flooding along Bear Creek. During rainstorms, water rushes down steep slopes and into streams leading to Bear Creek. This results in rapid rises in water levels in the lower part of the watershed, which coincides with the creek valley inside of the City limits. Historically, these floods have caused extensive damage to residential, commercial and industrial property. Flooding on Bear Creek can be made worse by flooding from the Mississippi River, which can back water up several miles into Bear Creek within the City.

2.9.2 Bear Creek Dam Project

In response to the flooding problem, the Federal Government, in cooperation with the City, developed a plan in the early 1960s for the construction of a reservoir west of the city to intercept some of the flood waters. A dam was constructed 5.3 miles upstream of the confluence with the Mississippi River and placed into operation in 1961. This dam controls runoff from 28 square miles (55 percent of the entire watershed). The dam is 65 feet high, 1,250 feet long and has capacity to store the entire runoff from a storm expected to occur once every 100 years across the 28 square miles. During normal

weather, Bear Creek flows through the outlet works in the dam, without creating any pool. During wet weather, gates in the dam can be closed, halting all flows from the 28 square miles. The capacity of the reservoir behind the dam is 560 million cubic feet of water (12,860 acre-feet) based on the U.S. Army Corps of Engineers design for the "Standard Project Flood". This is enough volume to contain 5.83 inches of runoff across the entire 28 square mile watershed.

An agreement between the U.S. Army Corps of Engineers and the City of Hannibal provides for the City's Board of Public Works to operate the dam gates, closing them before storms and opening them after the threat of flooding has subsided.

2.9.3 Bear Creek Watersheds Downstream of Bear Creek Dam

A total of 23 square miles in the Bear Creek Watershed drains into the Creek below the flood control dam (see Figure 8). One major watershed is Minnow Branch, which collects drainage from approximately 4.8 square miles in the western part of Hannibal (see Section 2.4 above) and feeds into Bear Creek near the south end of Willow Street. Another major watershed is Mills Creek, covering 5.3 square miles south of Hannibal which enters Bear Creek just downstream of the Minnow Branch outfall. Minnow Branch and Mills Creek make up almost half of the uncontrolled part of the Bear Creek watershed below the Dam.

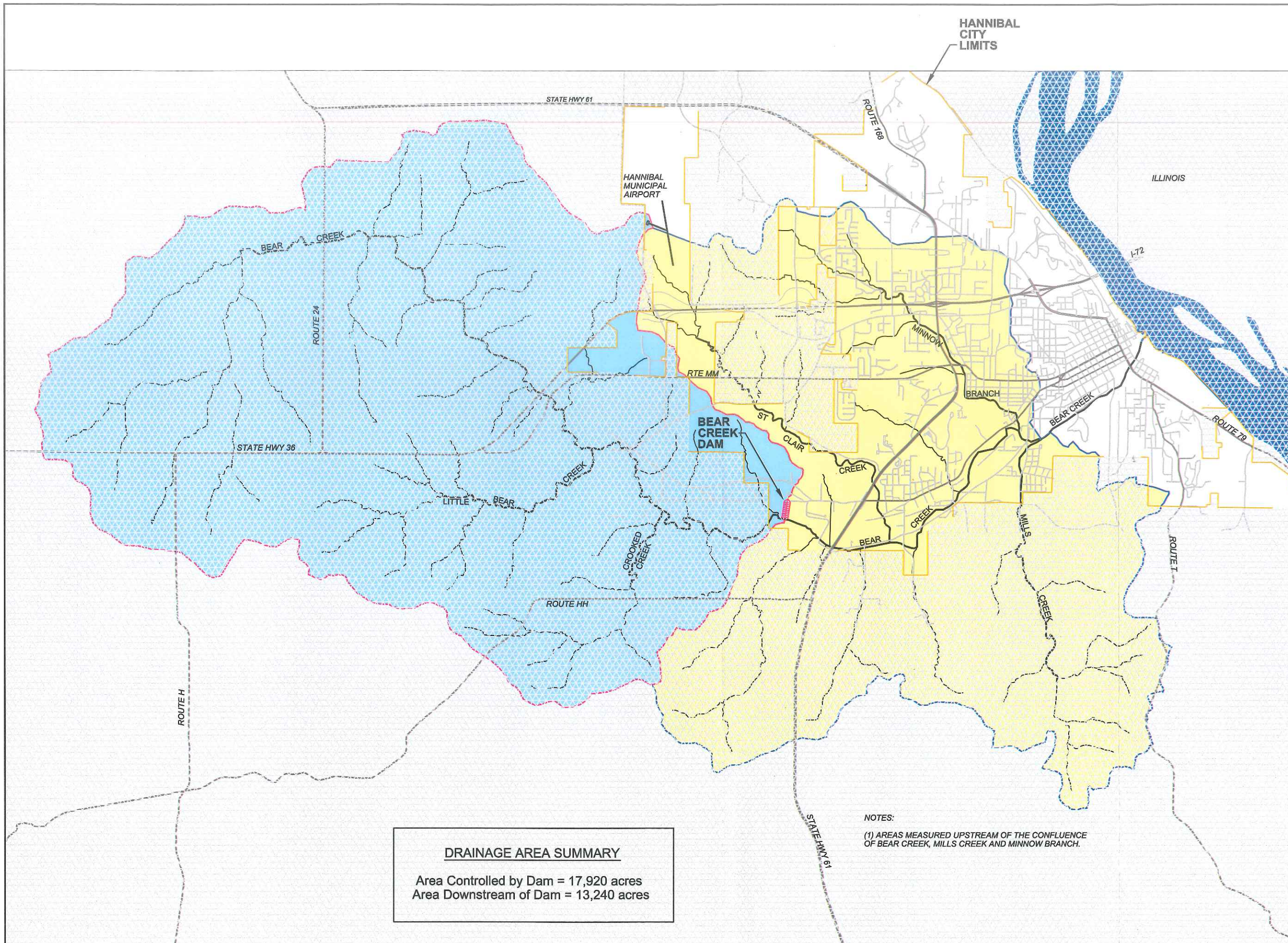
2.9.4 Effectiveness of the Bear Creek Dam

The Bear Creek Dam reduces stormwater flows in the lower sections of Bear Creek if the rainfall occurs in the 28 square miles upstream of the dam. The dam is unable to control runoff from the lower 23 square miles in the watershed.

Spring and summertime thunderstorms, which have the greatest potential to dump heavy rains on the Bear Creek Watershed, are usually 10 to 30 square miles in size, which is smaller than the 51 square miles covered by the entire watershed. Other factors, such as the speed of the storm, can affect how much rain individual areas receive.

The U.S. Army Corps of Engineers has studied runoff and creek flows of several large storms since the dam was built and has documented the dam's effectiveness in a series of reports, some of which are on file at the City's Board of Public Works. The dam has the potential to reduce peak flows in the lower part of Bear Creek by 5,000 cubic feet per second (cfs), generally from 15,000 cfs before the dam was built to 10,000 cfs afterwards. This reduction in flows corresponds to a reduction in creek levels of 3 to 5 feet.

Since the dam was built, it appears to be a great asset in reducing storm water in the lowest 5 miles of Bear Creek. However, the dam is unable to control all of the water in this section, because there is 23 square miles that drain into the Creek downstream of the Dam.



DRAINAGE AREA SUMMARY

Area Controlled by Dam = 17,920 acres
 Area Downstream of Dam = 13,240 acres

NOTES:
 (1) AREAS MEASURED UPSTREAM OF THE CONFLUENCE
 OF BEAR CREEK, MILLS CREEK AND MINNOW BRANCH.

LEGEND

- AREA CONTROLLED BY DAM
- AREA DOWNSTREAM OF DAM
- OUTSIDE CITY LIMITS
- MISSISSIPPI RIVER

North Arrow

Scale
 0' 5000' 10000'
 SCALE IN FEET
 1 Inch = 10,000 Feet

Hannibal, Missouri
 America's Hometown

HANNIBAL STORMWATER MASTER PLAN

FIGURE 8
DRAINAGE AREA
CONTROLLED BY THE
BEAR CREEK DAM

Burns & McDonnell
 SINCE 1998

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3. PUBLIC OPINION SURVEY

3.1 Survey Description

A public opinion survey was conducted during January, February and March 2005 to identify stormwater problems in the vicinity of residents homes and businesses, to characterize the types of problems and the perceived severity/frequency of problems, as well as to gauge attitudes and opinions about future community priorities regarding stormwater management.

About 10,000 survey forms were sent out with city utility bills between January 20 and February 20, 2005. Forms were due back to City Hall by March 20. A total of 952 responses were received from residents and businesses. With nearly 10 percent of the forms returned, the survey can be considered a definite success. A copy of the survey form as well as a tabulation of the survey results is contained in Appendix B of this report.

3.2 Basic Resident Information

The survey form requested name, address, number of years at this address, and phone number. Permission was sought to call if there were questions about stormwater issues described on the form. Over 90 percent of the people who responded to the survey provided their names, addresses and phone numbers (Table 6). Over 80 percent of the respondents were willing to receive a call to discuss their problems or opinions regarding stormwater issues.

Table 6

Basic Information about Survey Responders

| Information sought | Number of Responses | Percentage Overall Survey |
|-----------------------|---------------------|---------------------------|
| Name of respondent | 935 | 98.2% |
| Address of respondent | 928 | 97.5 |
| Phone number | 868 | 91.2 |
| OK to call? | 763 | 80.1 |
| Total Survey | 952 | 100.0% |

Table 7

Years of Residency at this Address

| Years at this address | Number of Responses | Percentage Overall Survey |
|-----------------------|---------------------|---------------------------|
| Less than 3 years | 168 | 17.6% |
| Less than 5 years | 259 | 27.2 |
| Less than 10 years | 457 | 48.0 |
| Less than 20 years | 659 | 69.2 |
| Less than 50 years | 870 | 91.4 |
| Total Survey | 952 | 100.0% |

The survey form also asked how long the respondent had lived at this particular address. As shown in Table 7, a total of 168 residents (17.6 percent) have lived at their current address less than 3 years. Almost half of the respondents have lived at their current address for 10 years or less. Almost 9 percent of the respondents have been at their current location for over 50 years. Several of these included businesses and other institutions within the community.

3.3 Question 1 – Stormwater Problems at this Address?

Question 1 – Have you been affected by flooding, erosion, sedimentation or water pollution at this location?

A total of 278 respondents (29.2 percent) said “Yes” that they had experienced problems. Another 632 respondents (66.4 percent) said they had not experienced problems from stormwater and 42 respondents did not respond to this question. Of those who had experienced problems with stormwater, the survey asked how many times problems had occurred in the past 5 years, in an effort to determine frequency of occurrence. A summary of these statistics is presented in Table 8. Of those with stormwater problems, 32 (3.4 percent) experienced one problem in 5 years, 78 (8.2 percent) experienced 2 to 4 problems and 160 (16.8 percent) experienced problems with stormwater 5 or more times.

Table 8

Stormwater Problems at this address

| Stormwater Problems this address? | Number of Responses | Number of times in the past 5 years | | |
|--------------------------------------|------------------------|-------------------------------------|--------------|--------------------|
| | | Once | 2-4 times | 5 or More times |
| Yes | 278 | 32 | 78 | 160 |
| No | 632 | | | 8 |
| No response | 42 | | | |
| Total | 952 | | | |

A list of the “Top-Ten Streets,” in terms of the total number of responses and the total number of residents reporting stormwater problems, is presented in Table 9. Responses were received from 285 different streets and at least one resident had a stormwater problem on 149 of those streets.

Table 9

Top-Ten Streets with Responses and Stormwater Problems

| Rank | Entire Survey | | Experienced Stormwater Problems | |
|------|---------------------|---------------------|---------------------------------|---------------------|
| | Street Name | No. of responses | Street Name | No. of responses |
| 1 | Market Street | 27 | Market Street | 11 |
| 2 | Ely Road, West | 18 | Fulton Avenue | 9 |
| 3 | Broadway | 16 | Clover Road | 6 |
| 4 | Fulton Avenue | 16 | Moberly Avenue | 6 |
| 5 | Chestnut Street | 15 | St Charles Street | 6 |
| 6 | Pleasant Street | 15 | Tilden Street | 6 |
| 7 | Lake Apollo Drive | 14 | Heritage Drive | 5 |
| 8 | Clover Road | 13 | New London Gravel Rd | 5 |
| 9 | Homestead Road | 13 | Rosewood | 5 |
| 10 | Huckleberry Heights | 13 | Ruby Avenue | 5 |
| | | | St. Mary | 5 |

3.4 Question 2 – Stormwater Problems in Your Neighborhood?*Question 2 – Is your neighborhood impacted by drainage problems?*

A total of 550 residents (57.8 percent) answered “No”, while 322 (33.8 percent) said “Yes” and 80 (8.4 percent) left this question blank.

3.5 Question 3 – Stormwater Problems in other parts of town?*Question 3 – Are you aware of drainage problems that impact other areas of Hannibal?*

A total of 525 residents (55.1 percent) answered “No”, while 284 (29.8 percent) said “Yes” and 143 (15.0 percent) left this question blank.

3.6 Question 4 – Stormwater Problems Past 5 Years*Question 4 – Check stormwater drainage problems that you have experienced in the past five years*

The responses to this question (see Table 10) revealed that “local street flooding” was the most frequent problem, being experienced by 240 respondents (25 percent of the entire survey). Flooding on their property (212 surveys or 22 percent) ranked second, while basement flooding not due to sanitary sewers (153 or 16 percent) ranked third.

Table 10
Types of Stormwater Problems Experienced by Residents

| Type of Stormwater Problem | Entire Survey | % all Responses | Rank |
|---|---------------|-----------------|------|
| A. Flooding or temporary ponding on your property | 212 | 22% | 2 |
| B. Local street flooding | 240 | 25 | 1 |
| C. Basement flooding (other than sanitary sewer) | 153 | 16 | 3 |
| D. Basement flooding (due to sanitary sewer backup) | 59 | 6 | 8 |
| E. Water pollution of ditches, ponds, lakes, streams, or the River | 61 | 6 | 7 |
| F. Property damage from erosion or sedimentation | 120 | 13 | 4 |
| G. Danger to my life and/or others in my family | 12 | 1 | 11 |
| H. Damage to my home, business or other buildings | 70 | 7 | 6 |
| I. Damage to contents of the structure | 51 | 5 | 9 |
| J. Disruption of vehicle or pedestrian mobility due to flooding/erosion | 81 | 9 | 5 |
| K. Other (please describe) | 15 | 2 | 10 |
| Total Number of Surveys | 952 | 100% | |

There were 278 respondents who answered “Yes” in Question 1 to being impacted by stormwater. The types of stormwater problems experienced by these people are shown in Table 11. The results revealed that flooding on their property (169 people or 18 percent) ranked 1, local street flooding (129 people or 14 percent) ranked 2 and property damage from erosion or sedimentation (108 people or 11 percent) ranked 3.

Table 11

Stormwater Problems Experienced by Residents Impacted by Stormwater – Question 1

| Type of Stormwater Problem | Entire Survey | % all Responses | Rank |
|---|---------------|-----------------|----------|
| A. Flooding or temporary ponding on your property | 169 | 18% | 1 |
| B. Local street flooding | 129 | 14 | 2 |
| C. Basement flooding (other than sanitary sewer) | 92 | 10 | 4 |
| D. Basement flooding (due to sanitary sewer backup) | 34 | 4 | 9 |
| E. Water pollution of ditches, ponds, lakes, streams, or the River | 40 | 4 | 8 |
| F. Property damage from erosion or sedimentation | 108 | 11 | 3 |
| G. Danger to my life and/or others in my family | 9 | 1 | 11 |
| H. Damage to my home, business or other buildings | 56 | 6 | 5 |
| I. Damage to contents of the structure | 43 | 5 | 7 |
| J. Disruption of vehicle or pedestrian mobility due to flooding/erosion | 51 | 5 | 6 |
| K. Other (please describe) | 10 | 1 | 10 |
| Total Number of Surveys | 278 | | |

There were 632 respondents who answered “No” in Question 1 as not being impacted by stormwater. However, these people experienced stormwater problems, presumably elsewhere around Hannibal. The types of stormwater problems experienced by these people are shown in Table 12. The results revealed that local street flooding (105 people or 11 percent) ranked 1, due to people seeing the problem while they were driving around the community. Basement flooding due to other than sanitary sewer backup (56 people or 6 percent) ranked 2 and flooding on their property (36 people or 4 percent) ranked 3. It is clear that some of the people who said “No” to question 1 were indeed affected by stormwater problems at their homes or businesses.

Table 12

Stormwater Problems Experienced by Residents NOT Impacted by Stormwater – Question 1

| Type of Stormwater Problem | Entire Survey | % all Responses | Rank |
|---|---------------|-----------------|----------|
| A. Flooding or temporary ponding on your property | 36 | 4 | 3 |
| B. Local street flooding | 105 | 11 | 1 |
| C. Basement flooding (other than sanitary sewer) | 56 | 6 | 2 |
| D. Basement flooding (due to sanitary sewer backup) | 23 | 2 | 5 |
| E. Water pollution of ditches, ponds, lakes, streams, or the River | 17 | 2 | 6 |
| F. Property damage from erosion or sedimentation | 10 | 1 | 8 |
| G. Danger to my life and/or others in my family | 3 | 0 | 11 |
| H. Damage to my home, business or other buildings | 13 | 1 | 7 |
| I. Damage to contents of the structure | 7 | 1 | 9 |
| J. Disruption of vehicle or pedestrian mobility due to flooding/erosion | 27 | 3 | 4 |
| K. Other (please describe) | 5 | 1 | 10 |
| Total Number of Surveys | 632 | | |

3.7 Question 5 – Efforts to fix drainage problems?*Question 5 – Have you done anything to fix drainage problems on your property?*

A total of 191 people said “Yes” to this question. This amounts to 20 percent of the survey respondents. Many of these were people who installed sump pumps in basements or fixed downspouts on their home. Some people had done landscaping in attempts to improve stormwater flow across their properties.

3.8 Question 6 – Preferences for Community Management of Stormwater*Question 6 – What should the priorities be for the City's stormwater program? From the list below, indicate what Hannibal should make its top 3 priorities by marking 1, 2 and 3.*

A total of 12 choices were provided (Table 13) and respondents were asked to rate their first, second and third choices. The first choice for the #1 priority among residents was “Minimize street flooding” cited on 126 surveys. “Maintain/repair existing stormwater systems” received 107 first priority votes and “protect water quality by reducing stormwater pollution” received 102 first priority votes.

Looking at all votes for first, second and third priorities showed that “Maintain/repair existing stormwater systems” received the overall highest number of residents. “Minimize street flooding” was the second highest overall ranking action, cited and “Preserving natural channels” was the third overall highest ranking action.

Table 13**Community Preferences for Management of Stormwater Issues**

| Community Management Strategy | Priority for Future (Rank) | | | Total Votes | Overall Rank |
|---|----------------------------|----------------|----------------|-------------|--------------|
| | First | Second | Third | | |
| A. Minimize ponding on private property | 63 | 19 | 25 | 107 | |
| B. Protect water quality by reducing stormwater pollution | 102 (3) | 39 | 24 | 165 | |
| C. Increase land use controls regarding stormwater | 20 | 19 | 31 | 70 | |
| D. Minimize street flooding | 126 (1) | 88 (3) | 50 | 264 | 2 |
| E. Preserve natural drainage channels | 76 | 97 (2) | 81 (2) | 254 | 3 |
| F. Regulate development practices more rigorously | 46 | 53 | 29 | 128 | |
| G. Build new stormwater improvements | 33 | 55 | 52 | 140 | |
| H. Minimize damage to structures | 24 | 39 | 38 | 101 | |
| I. Maintain/repair existing stormwater systems | 107 (2) | 101 (1) | 102 (1) | 310 | 1 |
| J. Limit environmental damage to natural systems | 13 | 30 | 39 | 82 | |
| K. Public access to greenways along streams | 2 | 7 | 16 | 25 | |
| L. Reduce erosion along channels & streams | 15 | 38 | 59 (3) | 112 | |

3.9 Question 7 – Preferences for Stormwater Financing

Question 7 – Improving Stormwater management will cost money. To help fund stormwater projects and activities, there are several potential funding options. Please check two that you would most prefer to see used in Hannibal if an improved stormwater program is adopted.

There were four choices listed and respondents could check as many choices as they wanted. The choices were A) Stormwater sales tax, B) Increased property tax, C) User fees based on each property's demands on stormwater systems/programs and D) Increased fees for new development. A total of 569 responses indicated an opinion (60 percent of all surveys received), while 383 residents (40 percent) expressed no opinion. The preferences for stormwater financing expressed in the survey are summarized in Table 14.

Table 14
Opinions for Financing of Stormwater Improvements

| Mechanism for Stormwater Financing | No. of Responses | % all surveys |
|---|-------------------------|----------------------|
| Stormwater sales tax | 165 | 17% |
| Increased property tax | 72 | 8 |
| User fees for each property's demands on stormwater systems | 340 | 36 |
| Increased fees for new development | 322 | 34 |

People who are impacted by stormwater could hold different opinions on financing from those not impacted by stormwater. Therefore those who answered Question 1 "Yes" were tabulated to see how they answered Question 7. These results (Table 15) show that (D) Increased fees for new development was preferred by 113 residents (38 percent of those answering Yes). Choice (C) Stormwater User Fees for property impacts received 80 votes (27 percent) while (A) Stormwater sales tax received 77 votes (26 percent). The fourth choice, (D) increased property taxes, was preferred by only 8 percent of the respondents.

Table 15
Opinions for Financing of Stormwater Improvements – People Impacted by Stormwater

| Mechanism for Stormwater Financing | No. of Responses | % IMPACTED surveys |
|--|-------------------------|---------------------------|
| A. Stormwater sales tax | 77 | 26% |
| B. Increased property tax | 24 | 8 |
| C. User fees for each property's demands on stormwater systems | 80 | 27 |
| D. Increased fees for new development | 113 | 38 |
| Total "Yes" Surveys (Question 1) | 294 | 100% |

Those who answered “No” to Question 1 exhibited some surprisingly different opinions about ways to fund stormwater programs. These results (Table 16) show that (C) Stormwater User Fees for property impacts was preferred by 253 residents (43 percent). Choice (D) Increased fees for new development received 201 votes (35 percent). The other choices, (A) stormwater sales tax and (D) increased property taxes received much less support among those not impacted by stormwater.

Table 16

Opinions for Financing of Stormwater Improvements – People NOT Impacted by Stormwater

| Mechanism for Stormwater Financing | No. of Responses | % all surveys |
|--|-------------------------|----------------------|
| A. Stormwater sales tax | 83 | 14% |
| B. Increased property tax | 45 | 8 |
| C. User fees for each property's demands on stormwater systems | 253 | 43 |
| D. Increased fees for new development | 201 | 35 |
| Total “No” Surveys (Question 1) | 582 | 100% |

Residents had no other information about choices in Question 7 beyond the few words presented on the survey form. Several of those who did not respond to Question 7 wrote in comments expressing opposition to more taxes. The respondents who favored “increased fees for new development” may not have known what the current fees are.

3.10 Responses by Watershed

As outlined in Section 2, there are 35 watersheds across the City of Hannibal, each with different characteristics. Of the 952 responses to the survey, 894 gave their address and lived within one of the 35 watersheds.

The number of surveys returned from each watershed is presented in Table 17 (next page). Some watersheds are small and have few residents and therefore would likely have fewer responses, regardless of the severity of the stormwater problems there. Participation in the survey was entirely voluntary and a motivated resident would be more likely to respond. There were 11 watersheds with 17 or more responses (shown as **Bold** in the table).

It should be pointed out there were limitations in the accuracy of the mapping, both in terms of locating each address, as well as locating some addresses relative to watershed divides. Some interpretation was required to place responses in one watershed or another. So the totals in each watershed may be off by one or two.

About 29 percent of the surveys responded “Yes” to Question 1 (*Have you been affected by flooding, erosion, sedimentation or water pollution at this location?*). The last column in Table 17 shows the percentage of residents who answered “Yes” within each watershed.

Table 17
Number of Responses by Watershed

| Number | Watershed Name | Number of Survey Responses | Answered YES to Q-1 | Percent "Yes" |
|--------------|--|----------------------------------|------------------------|------------------|
| B-1 | Church - Lyon - Warren Barrett | 10 | 3 | 30% |
| B-2 | Seventh Street | 12 | 3 | 25% |
| B-3 | Ninth - Tenth - Eleventh | 15 | 3 | 20% |
| B-4 | Grand Avenue | 53 | 11 | 21% |
| B-5 | Lemon Street | 2 | 0 | 0% |
| B-6 | Arch Street | 17 | 5 | 29% |
| B-7 | Huckleberry Park | 44 | 10 | 23% |
| B-8 | Oakwood | 93 | 39 | 42% |
| B-9 | St. Clair Creek | 17 | 6 | 35% |
| B-10 | Ely Street | 28 | 5 | 18% |
| B-11 | Shannon Street | 0 | 0 | 0% |
| B-12 | Marion Street | 17 | 7 | 41% |
| B-13 | Bowling Avenue | 1 | 1 | 100% |
| M-1 | Adams Street | 7 | 2 | 29% |
| M-2 | Fulton Avenue | 37 | 16 | 43% |
| M-3 | Valley Street | 16 | 4 | 25% |
| M-4 | Center Street | 9 | 1 | 11% |
| M-5 | Hill Street | 4 | 0 | 0% |
| M-6 | Mark Twain Avenue | 33 | 11 | 33% |
| M-7 | Riverview Park | 0 | 0 | 0% |
| M-8 | Hannibal North | 7 | 0 | 0% |
| M-9 | Hannibal-LaGrange College | 40 | 5 | 13% |
| MB-1 | Willow Street | 28 | 3 | 11% |
| MB-2 | Hayden Street | 0 | 0 | 0% |
| MB-3 | Magnolia Ave - Carroll Street | 43 | 7 | 16% |
| MB-4 | Grace Street | 16 | 2 | 13% |
| MB-5 | State Route MM | 84 | 29 | 35% |
| MB-6 | Bird Street | 22 | 7 | 32% |
| MB-7 | Scott Street | 9 | 2 | 22% |
| MB-8 | Earl Street | 27 | 7 | 26% |
| MB-9 | Central Avenue - Mark Twain Expwy | 18 | 6 | 33% |
| MB-10 | Highway 61 Northwest | 27 | 9 | 33% |
| MB-11 | Upper Minnow Branch | 138 | 44 | 32% |
| MC-1 | Johnson Street | 7 | 5 | 71% |
| MC-2 | Robinson Avenue | 13 | 8 | 62% |
| Totals | | 894 | 261 | 29% |

said "Yes" to Question 1. This could be taken as one indicator of areas having stormwater problems. Close examination of the "Yes" responses to Question 1 reveals some unexpected results.

- 1) People who live uphill within watersheds seemed just as likely to have stormwater problems as those living downhill, closer to creeks that might experience flooding. They seem to have problems with excessive overland flow and ponding near their homes and businesses and with erosion.
- 2) Several sections of the survey gave people the opportunity to write about stormwater problems; and there were a lot of complaints from people who checked "No" to Question 1. The question was worded "at this location", meaning the exact home or business location of the respondent. Perhaps many residents who checked "No" were aware of stormwater problems in their neighborhood or other parts of town and were motivated to respond to the survey.

3.11 Selections from Resident's Written Comments

Over half of the 952 surveys that were returned had some type of written comment. Blanks were provided after Questions 2, 3, 5 and 7 which allowed responders to elaborate on any places they had checked YES or NO, or provided another response. Many of these comments provide insights to stormwater conditions or resident viewpoints. A cross-section of comments is presented below:

- The overall drainage in Hannibal has become so bad that the City should check into some type of emergency funding from the State or Federal government.
- There is no storm sewer at the intersection of Third and Broadway. Any time it rains hard I have to wade to work.
- We are paying for the sins of the past. Unregulated development and careless land development is now taking its toll. I feel the City and the developers are both responsible.
- At the intersection of Munger Lane and Coachlight, water runs across the road in winter and forms a big sheet of ice. This is very dangerous.
- During heavy rain, runoff is washing away the dirt from beneath the curb on the entire length of Carriage Road. It causes holes to appear next to curb in yards. It comes up in holes in the street and washes out areas next to driveways in several places.
- The area around Eighth and Broadway is like a river when it rains hard. At the bottom of Ninth and Broadway, water will stand for days.
- Creek through Lake Apollo runs excessively high after heavy rain, with banks eroding and trees falling.
- You have a huge drainage problem between the Golden Corral and Highway 36.
- Water is constantly in front of my building (Market Street in Oakwood area), they say it is a spring. It's a big mess that gets tracked inside my business constantly! I can't keep the floors clean.

- Too many taxes already for this town. We don't need any more.
- My basement was flooded by raw sewage two weeks ago. It also greatly affected my neighbor's basement.
- The ditch behind my house has a sewer pipe exposed. It has washed away about 2 feet of dirt in four years.
- In the downtown area, the older system needs major upgrading and that is the responsibility of all of Hannibal's citizens.
- Since apartment buildings have so much runoff from roofs and driveways with no vegetation to hold excess water, these owners should be more accountable to channel the water into storm drainage ditches rather than onto private property.
- There is a potential danger of children being swept away in the creek during heavy rains on the left side of Fulton Avenue going up the street.
- McMasters southbound of Hwy 36 has standing water during rains which leads to hydroplaning.
- When high water floods Fulton Avenue, it backs up through a floor drain in our basement and floods. If we are not home, we have to pump it out later. We had 12-inches of water in our basement in August 2004.
- The drainage through the backyards between Hibiscus and Amaryllis goes straight through our yard, leaving us with a muddy mess that won't dry, is a health hazard and no room to put a playset for our 5-year old boys. We are very disappointed with the drainage that the developer did not address.
- All of Hannibal's valleys have creeks of various sizes. Most of these receive little or no maintenance and have been allowed to fill with sediment and/or debris. The problem is great enough to demand a solution (although I don't know what it is).
- When new properties are developed drainage should also be added! I guess no one cares about the people below. I live in Hannibal and pay my taxes here. I work in Quincy and wonder why I haven't moved there!
- Fix some of the things that affect the rest of the City and forget about the tourist area for a while. The rest of the City has deteriorated very badly and there are a lot of people that feel this way. Please listen.
- Our basement drain and toilet (St Mary's Ave) are affected only during a heavy rain backing up and out onto the basement floor. This makes me believe that stormwater is entering the sanitary sewer system. Fine heavily any property allowing this condition to exist!
- I would like the City to provide some public education about stormwater in several formats such as face to face information sessions, information on the Web, etc.
- When road was opened for new Wal Mart all the water from rain and snow "pools" in front of our driveway. When heavy, we cannot get out of our driveway as water is up to our car doors. Make Wal Mart pay for the mess made.

- House at the bottom of Benton drains a pipe onto the road. In winter this freezes and becomes impassible. This is VERY DANGEROUS! Why are they allowed to do this??
- At intersection of Lunar and Saturn, there is always water sitting in the roadway and when it freezes, it is dangerous.
- Streets such as Moberly have no drainage on either side of the road, causing yards to flood during normal rainfall and especially bad during hard rainfall. Such streets should be provided with drainage BEFORE labor and money are spent on existing drainage. Second priority should be unclogging and maintenance on existing drainage.
- People who do not see improvements shouldn't have to pay for someone else's gain. Drainage is a major problem all over Oakwood and I don't see the City doing anything about it.
- Taxing people who don't live in problem areas isn't fair. Taxing people more who need it more is also not fair. The City paying for ignoring this problem for 40 years, priceless.
- Water runs down Bird Street during a rain. It is supposed to go down Delany to the storm drain on Center Street, but it flows onto my property, creating a pond. Boys love to throw glass bottles in the water and break them.
- The creek beside my property on Spruce Street is taking away my yard and the City's street. If nothing gets done, it will keep taking land and streets and maybe homes.
- Runoff by Grand and Douglas Community Center freezes instead of running off.
- The low spot at the southeast corner of Heritage and Surrey Hills collects large volumes of water and forms a stagnant pool.
- I've been told that you have to start (fixing stormwater problems at Clover Creek Road and other places) out west first and that leaves us Market Street people out again down here. Money talks and if you would close the dam doors this would not happen.
- New development is where the money is at. Those building expensive new homes and business developments on the west side of town. Let those with more, pay more. Keep it fair for those who can't afford to move or build new just to escape a drainage problem that should have been addressed when streets and subdivisions were first built.
- Thanks for the Questionnaire. This is an important issue that concerns us all. I would be glad to help in anyway I can.
- The previous homeowner wasn't honest about flooding problems; home inspection remedies were ineffective.
- Don't raise taxes on those already on this system! Maintain and repair what we already have. Protect, preserve and rehabilitate. Thanks.
- The sewer charge on our water bill is supposed to go for fixing our sewer lines long ago. Nothing has ever been done with them. We did get a new sewer plant that stinks up the town in hot weather. What happened to all the money that they found in the budget mistake? They hired another City office employee we didn't need. If a home owner has sewer problems, they

pay out of their own pockets. So the City needs to see that this money is taken out of the General Revenue Fund, not the tax payers! We pay too much now.

- They need underground storm sewer systems instead of letting water run over others properties to get to a drainage ditch.
- During heavy rains, water going down Reservoir Street bypasses the storm drains at the bottom of the hill and flows onto Mark Twain Avenue.
- If proper maintenance and property use controls had been practiced years ago, we would not have this problem. Storm sewers and gutters work from wedge to river when I moved to Fifth Street – now flood almost every rain. If I let my property deteriorate like the City has the drainage system –it would fine me and drag me into court. I am not happy!
- Do you have any idea what this will cost? I think a fee that would involve all would be fair. You see this will not affect me for hopefully the Lord will call me home before this project is a reality.
- On my property, stormwater drainage breeches the concrete drainage channel and has eroded soil on its edges. I am willing to help place riprap if it is provided.
- We are paying for a stinking treatment plant built on a seep. Do you even know where our storm sewers are? Have they been checked out?
- The 61-36 intersection where the ramp is to take the bridge to Illinois. When we have rain, there is a lot of standing water (I work in Quincy).
- Maintenance, repair, design and planning are key to successful programming. Nature needs help in maintaining natural drainage opportunities, repair to older systems is daily not based on crisis situations and new developers are not being held accountable. The entire west side of new Hannibal is proof of poor water management planning.

4. FIELD INSPECTIONS OF WATERSHED CONDITIONS

4.1 Introduction

Field inspections were conducted around Hannibal to observe the condition of creek channels, storm sewers and other drainage features. These surveys were conducted in April 2005, after the resident surveys had been received and tabulated. About 30 of the locations were specifically visited to see the conditions described. Actual contact with property owners was generally not necessary to see or clarify the conditions described. All watersheds across the City were visited and many notes and photographs were recorded.

Prior to performing field inspections, meetings were held with key City staff, including the City Engineer (Jim Burns) and his assistant in the Department of Public Works (Chuck Anderson). Their knowledge and assistance proved quite valuable, including accompanying team members to the field to visit several problem areas. The project team visited with key people at the Hannibal Board of Public Works, including the General Manager (Robert Chriscinske) right before his retirement and Jack Herring, his replacement. Gene Majors at the Board of Public Works also proved to be a tremendous resource, by virtue of his extensive field investigations of sanitary sewers and storm sewers over the past many years around Hannibal. Mr. Majors has first-hand knowledge of the inside of several storm sewers in downtown Hannibal (and other areas as well) and he shared his mapping notes collected over the years. He also pointed out several problem areas to show team members.

Mapping of sanitary sewers around Hannibal was first developed by Crane and Fleming in the 1950's and 1960's. This mapping showed many of the city's storm sewers that existed at that time and is now in custody of the City's Board of Public Works.

4.2 Field Inspections

Field inspections were conducted in all of the 35 watersheds around Hannibal, with the objective of viewing the lower, middle and upper parts of each watershed. Since many sites were to be visited and much data collected, a hand-held computer was programmed to receive notes during the process. This unit was selected with a global positioning system (GPS) unit, so that coordinates could be recorded at each site. These coordinates were recorded in the Missouri State Plane Coordinate System. A simplified GPS system was used to save costs, so that coordinates are only accurate to within a few feet. This was deemed sufficient for the initial reconnaissance being done during this project.

An appendix has been prepared containing the notes collected by the computer/GPS system. Color photos were taken at every site and were linked into the field notes. These notes and photographs are presented in Appendix D. The appendix is divided into five separate sections: 1) overland flow, 2) drainage basin channels, 3) culverts, 4) inlets and 5) outfalls. The contents of each section are summarized in the following paragraphs.

4.2.1 Watersheds and Key Locations

Inspections of watersheds were conducted to see the lower, middle and upper parts of each watershed. Photographs were taken in many areas to note the local conditions. Many stormwater issues around the City were noted during these inspections.

4.2.2 Channels

Every watershed has at least one channel that conveys stormwater down hill to the nearby creek. Channels in many parts of the City were visited and notes were made on the condition of channel banks, channel floors, channel widths and bank heights. Erosion or sedimentation conditions were also noted during these inspections.

4.2.3 Culverts

Drainage culverts occur where streets or roads pass over channels and can also be used where buildings or other structural improvements are placed near or over a channel. Culverts provide a cross-sectional area that needs to be large enough to convey moderate and large sized rainstorms. The culvert type, size and condition were recorded at each location. Any problems or deficiencies were noted. A wide range of culvert types and locations were identified.

4.2.4 Inlets

Inlets are constructed to collect stormwater and transfer it into storm sewers or channels in a controlled fashion in order to minimize erosion. Inlets can be located in street gutters, or they can be associated with yards or drainage swales. The type, material, size and condition were noted for each inlet. A wide range of inlets are used around the City. A wide variety of custom inlets were observed around Hannibal. Since the use of standard types of inlets promotes easy and efficient maintenance, the wide variety of inlet types makes maintenance more difficult.

4.2.5 Outfalls

Outfalls are pipes or long sections of culverts that empty stormwater runoff into creeks or rivers. Only limited effort was expended to locate outfalls during this field investigation. Locating outfalls can require a considerable amount of reconnaissance. The City has previously completed an inventory of the outfalls along Bear Creek.

5. SUMMARY OF STORMWATER ISSUES AND PROBLEMS

5.1 Stormwater Problems Revealed by Resident's Survey

Question 4 of the questionnaire provided several choices about stormwater problems. It is useful to look at the pattern of watersheds across Hannibal that generated the highest frequency and/or most responses in each problem category.

5.1.1 Flooding or Temporary Ponding on Property

As shown in Table 18, there were 192 surveys that reported some form of flooding or ponding, which was about 20 percent of all surveys. This is considered a high incidence for this type of problem.

The Upper Minnow Branch watershed (MB-11), which includes the Lake Apollo area, had 38 surveys reporting flooding or ponding, which at 28 percent of the 138 surveys returned, exceeded the average incidence of this problem.

The Oakwood watershed (B-8) generated 37 surveys reporting flooding or ponding. There are almost no storm sewers in the Oakwood area and with its low slope, water does not drain very fast.

Other watersheds with a significant number of reports of flooding or ponding are shown in **bold**.

Table 18
Residents Reporting Flooding or Temporary Ponding on their Property

| Number | Watershed Name | Responses |
|--------------|--------------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | 1 |
| B-2 | Seventh Street | 3 |
| B-3 | Ninth - Tenth - Eleventh | 2 |
| B-4 | Grand Avenue | 9 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | 4 |
| B-7 | Huckleberry Park | 9 |
| B-8 | Oakwood | 37 |
| B-9 | St. Clair Creek | 5 |
| B-10 | Ely Street | 2 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 6 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | 1 |
| M-2 | Fulton Avenue | 11 |
| M-3 | Valley Street | 1 |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 5 |
| M-7 | Riverview Park | |
| M-8 | Hannibal North | |
| M-9 | Hannibal-LaGrange College | 2 |
| MB-1 | Willow Street | 3 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 9 |
| MB-4 | Grace Street | |
| MB-5 | State Route MM | 16 |
| MB-6 | Bird Street | 4 |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | 4 |
| MB-9 | Central Ave - Mark Twain Expwy | 4 |
| MB-10 | Highway 61 Northwest | 5 |
| MB-11 | Upper Minnow Branch | 38 |
| MC-1 | Johnson Street | 5 |
| MC-2 | Robinson Avenue | 6 |
| Total | | 192 |

5.1.2 Local Street Flooding

The Oakwood area (B-8) had 33 surveys reporting street flooding, more than any other watershed (Table 19). This includes the segment of Market Street that seems to be legendary among Hannibal residents for its street flooding problems. A number of residents commented on the problems in winter, when standing water on the streets freezes, making driving treacherous.

The Upper Minnow Branch (MB-11) with the Lake Apollo Subdivision was second, with 25 responses for street flooding. The State Route MM watershed (MB-5), lying just west of McMasters (Highway 61), had 21 surveys with street flooding. Other significant areas with street flooding included Fulton Avenue (M-2) and Grand Avenue (B-4).

Many, many residents mentioned various street intersections that flood after rains in their survey responses. This can be attributed to excessive overland flow, inadequate storm sewer systems to take the water away from the land surface and inadequately sized culverts beneath roadways. It could also be caused by storm sewer systems that are partially clogged with debris or are suffering structural failure and partial collapse.

Table 19
Residents Reporting Local Street Flooding

| Number | Watershed Name | Responses |
|--------------|--------------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | 2 |
| B-2 | Seventh Street | 4 |
| B-3 | Ninth - Tenth - Eleventh | 6 |
| B-4 | Grand Avenue | 14 |
| B-5 | Lemon Street | 1 |
| B-6 | Arch Street | 3 |
| B-7 | Huckleberry Park | 7 |
| B-8 | Oakwood | 33 |
| B-9 | Airport | 3 |
| B-10 | Ely Street | 9 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 5 |
| B-13 | Bowling Avenue | 1 |
| M-1 | Adams Street | 2 |
| M-2 | Fulton Avenue | 16 |
| M-3 | Valley Street | 3 |
| M-4 | Center Street | 3 |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 9 |
| M-7 | Riverview Park | |
| M-8 | Hannibal North | 1 |
| M-9 | Hannibal-LaGrange College | 4 |
| MB-1 | Willow Street | 4 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 8 |
| MB-4 | Grace Street | 2 |
| MB-5 | State Route MM | 21 |
| MB-6 | Bird Street | 5 |
| MB-7 | Scott Street | 3 |
| MB-8 | Earl Street | 7 |
| MB-9 | Central Avenue - Mark Twain Expwy | 3 |
| MB-10 | Highway 61 Northwest | 8 |
| MB-11 | Upper Minnow Branch | 25 |
| MC-1 | Johnson Street | 2 |
| MC-2 | Robinson Avenue | 5 |
| Total | | 219 |

5.1.3 Basement Flooding (Other than Sanitary Sewer)

Basement flooding (other than sanitary sewer) means stormwater flooding due to water coming in window wells, basement doorways, or cracks in walls. When flowing water passes close enough to building foundations, or pools against building walls and stands for several hours, conditions are right for water entry.

There were a total of 144 surveys that reported basement flooding in this category (**Table 20**). A total of 20 responses came from the Oakwood (B-8) neighborhood alone. This area has flat slopes and very little in the way of storm sewers, so all stormwater drainage is over the land surface.

Two watersheds in the western part of Hannibal, State Route MM (MB-5) and Upper Minnow Branch (MB-11) have several newer subdivisions with apparently inadequate stormwater drainage systems. They each reported 11 responses of basement flooding.

Several other watersheds, including Fulton Avenue (M-2), Mark Twain Avenue (M-6), Bird Street (MB-6), Earl Street (MB-8) and Highway 61 Northwest (MB-10) all drew 9 responses in this category.

Given this high incidence of basement flooding, it is likely there are other residents with the same problem who did not respond to the survey.

Table 20
Residents Reporting Basement Flooding
(other than Sanitary Sewer)

| Number | Watershed Name | Responses |
|--------------|--------------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | 1 |
| B-2 | Seventh Street | 1 |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 6 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | 4 |
| B-7 | Huckleberry Park Tributary | 3 |
| B-8 | Oakwood | 20 |
| B-9 | Airport Tributary | 2 |
| B-10 | Ely Street | 1 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 2 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | |
| M-2 | Fulton Avenue | 9 |
| M-3 | Valley Street | 4 |
| M-4 | Center Street | 2 |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 9 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | 6 |
| MB-1 | Willow Street | 6 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 8 |
| MB-4 | Grace Street | 2 |
| MB-5 | State Route MM | 11 |
| MB-6 | Bird Street | 9 |
| MB-7 | Scott Street | 3 |
| MB-8 | Earl Street | 9 |
| MB-9 | Central Avenue - Mark Twain Expwy | 2 |
| MB-10 | Highway 61 Northwest | 6 |
| MB-11 | Upper Minnow Branch | 11 |
| MC-1 | Johnson Street | 1 |
| MC-2 | Robinson Avenue | 5 |
| Total | | 144 |

5.1.4 Basement Flooding (Due to Sanitary Sewer Backup)

Basement flooding due to sanitary sewer backup occurs when stormwater infiltrates into sanitary sewers and completely fills them up, causing hydraulic overloads (termed "surcharging"). Water may come up floor drains, toilets, or sink drains and spill out across the floor.

Another cause of sewer backups could be cross connections between storm drains and sanitary sewers, which allow stormwater to enter sanitary sewers. These connections have been prohibited for many decades, but many years ago were built usually without much documentation. Today it can be difficult to find these cross connections.

Sanitary sewer backups expose residents to raw sewage and bacteria. Cleanup and disinfection afterward is important to eliminate odors, mold and potential health problems. Properties that suffer repeated sanitary sewer backups experience reduced value.

There were a total of 56 responses from 21 of the watersheds across Hannibal (Table 21). Watersheds with several responses included State Route MM (MB-5), Bird Street (MB-6), Earl Street (MB-8) and Highway 61 Northwest (MB-10).

The Bird Street and Earl Street watersheds are both relatively small, with few residents, so the large number of responses on this list suggests a special problem there.

Table 21
Residents Reporting Basement Flooding
(due to Sanitary Sewer Backup)

| Number | Watershed Name | Responses |
|--------------|--------------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | 1 |
| B-2 | Seventh Street | |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 1 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | |
| B-7 | Huckleberry Park Tributary | 1 |
| B-8 | Oakwood | 4 |
| B-9 | Airport Tributary | |
| B-10 | Ely Street | 1 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 2 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | |
| M-2 | Fulton Avenue | 1 |
| M-3 | Valley Street | 1 |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 3 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | 3 |
| MB-1 | Willow Street | 2 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 3 |
| MB-4 | Grace Street | 1 |
| MB-5 | State Route MM | 8 |
| MB-6 | Bird Street | 6 |
| MB-7 | Scott Street | 2 |
| MB-8 | Earl Street | 5 |
| MB-9 | Central Avenue - Mark Twain Expwy | 1 |
| MB-10 | Highway 61 Northwest | 5 |
| MB-11 | Upper Minnow Branch | 4 |
| MC-1 | Johnson Street | |
| MC-2 | Robinson Avenue | |
| Total | | 56 |

5.1.5 Water Pollution of Ditches, Ponds, Lakes, or the River

Water pollution can mean various things to various people. Residents who see trash, debris, colored water, foam or floating films on the water surface may interpret the water as polluted. Water pollution to a chemist usually means the presence of chemicals not normally found in the natural environment. Water pollution can depend upon the surrounding land uses, since runoff from watersheds carries with it residues from human activity.

There were 56 surveys that flagged water pollution as a stormwater problem. Two watersheds, Oakwood (B-8) and Upper Minnow Branch (MB-11) accounted for 22 of these surveys. Other watersheds with more responses are shown in bold face in Table 22.

Actual sampling and analysis of stormwater runoff would be needed to determine what types of pollutants are present.

Table 22

Residents Reporting Water Pollution

| Number | Watershed Name | Responses |
|--------------|-----------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | |
| B-2 | Seventh Street | 1 |
| B-3 | Ninth - Tenth - Eleventh | |
| B-4 | Grand Avenue | 3 |
| B-5 | Lemon Street | 1 |
| B-6 | Arch Street | 2 |
| B-7 | Huckleberry Park Tributary | 5 |
| B-8 | Oakwood | 10 |
| B-9 | Airport Tributary | 1 |
| B-10 | Ely Street | 5 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 2 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | 1 |
| M-2 | Fulton Avenue | 4 |
| M-3 | Valley Street | 1 |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | |
| MB-1 | Willow Street | |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 1 |
| MB-4 | Grace Street | |
| MB-5 | State Route MM | 1 |
| MB-6 | Bird Street | |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | 1 |
| MB-9 | Central Avenue - Mark Twain Expwy | 1 |
| MB-10 | Highway 61 Northwest | |
| MB-11 | Upper Minnow Branch | 12 |
| MC-1 | Johnson Street | 2 |
| MC-2 | Robinson Avenue | 2 |
| Total | | 56 |

5.1.6 Property Damage from Erosion or Sedimentation

Erosion is caused by swiftly moving water. Generally, water moving faster than about 3 feet per second is able to erode soil from lawns, gullies, channels and stream banks. Watersheds typically have steeper slopes in the upper part of the drainage area, which is where erosion usually occurs during the overland flow phase.

The more water that is present in a channel, the faster it moves. Heavy rainstorms add more water into the channel and thus can cause more erosion. In the downstream parts of watersheds, water accumulates in channels, picks up speed and causes further erosion.

Therefore, erosion can be a problem in the upper parts of watersheds where water moves across the land surface and can also be a problem in the channels of the lower parts of watersheds.

The soil, sand and gravel that is eroded by moving water is carried until the water slows down, which occurs in pools and puddles. This is where sedimentation occurs. Sedimentation destroys aquatic habitat, smothering the small organisms and plants on the stream bottom.

Upper Minnow Branch (MB-11), Oakwood (B-8), Fulton Avenue (M-2) and Stet Route MM (MB-5) were the biggest problem areas for erosion and sedimentation (Table 23).

Table 23
Residents Reporting Property Damage from Erosion or Sedimentation

| Number | Watershed Name | Responses |
|--------------|-----------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | |
| B-2 | Seventh Street | 2 |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 5 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | 2 |
| B-7 | Huckleberry Park Tributary | 4 |
| B-8 | Oakwood | 11 |
| B-9 | Airport Tributary | 2 |
| B-10 | Ely Street | 2 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | 1 |
| M-2 | Fulton Avenue | 11 |
| M-3 | Valley Street | 3 |
| M-4 | Center Street | 2 |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 6 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | 3 |
| MB-1 | Willow Street | 2 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 2 |
| MB-4 | Grace Street | 2 |
| MB-5 | State Route MM | 10 |
| MB-6 | Bird Street | 2 |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | 2 |
| MB-9 | Central Avenue - Mark Twain Expwy | 3 |
| MB-10 | Highway 61 Northwest | 2 |
| MB-11 | Upper Minnow Branch | 28 |
| MC-1 | Johnson Street | 1 |
| MC-2 | Robinson Avenue | 3 |
| Total | | 112 |

5.1.7 Danger to Life and/or Others in my Family

Flooding in yards or on streets can create threats to personal safety. People walking through flowing water that is very deep can be swept off their feet. Cars driving through ponded water can become stalled and if the water is flowing cars can also be swept off the road.

This question normally does not receive very many responses during a community stormwater survey. A total of 11 responses out of 894 surveys in the 35 watersheds may not seem like very many people are concerned with safety around stormwater, but in fact it is.

Several people mentioned an awareness of street flooding at Third and Broadway downtown. One person who parks and works in the area expressed concern at needing to walk through the flooded intersection and having to disrupt a normal daily routine because of the safety issues.

Children playing in neighborhood settings can be unaware of the dangers of rapidly flowing water, even when it doesn't look very deep. Having to walk through high water during a rain storm can be threatening.

Table 24 summarizes the origin or surveys where residents were concerned with safety around stormwater.

Table 24
Residents Reporting Danger to Life and Limb

| Number | Watershed Name | Responses |
|--------------|-----------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | |
| B-2 | Seventh Street | |
| B-3 | Ninth – Tenth – Eleventh | 1 |
| B-4 | Grand Avenue | |
| B-5 | Lemon Street | |
| B-6 | Arch Street | |
| B-7 | Huckleberry Park Tributary | 1 |
| B-8 | Oakwood | |
| B-9 | Airport Tributary | 1 |
| B-10 | Ely Street | |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 1 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | |
| M-2 | Fulton Avenue | 2 |
| M-3 | Valley Street | |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | |
| MB-1 | Willow Street | |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave – Carroll Street | |
| MB-4 | Grace Street | |
| MB-5 | State Route MM | |
| MB-6 | Bird Street | |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | |
| MB-9 | Central Avenue - Mark Twain Expwy | |
| MB-10 | Highway 61 Northwest | 1 |
| MB-11 | Upper Minnow Branch | 3 |
| MC-1 | Johnson Street | |
| MC-2 | Robinson Avenue | 1 |
| Total | | 11 |

5.1.8 Damage to my Home, Business or other Buildings

Damage to buildings means water penetration into walls or other parts of the structure. Residents could confuse this to mean contents of buildings, but that is covered in another question (see next page).

This category is similar to basement flooding, where water passing near to structures, or ponding up against structures, can cause seepage and entry, which then leads to damage.

There were 61 residents who identified damage to buildings associated with their home or business due to stormwater (see **Table 25**). Watersheds with the greatest number of complaints included the Oakwood area (B-8), Fulton Avenue (M-2), Mark Twain Avenue (M-6) and Stet Route MM (MB-5). This was one of the few categories that the Upper Minnow Branch (MB-11) was not in the highest rated problem areas.

Table 25**Residents Reporting Damage to Home or Business**

| Number | Watershed Name | Responses |
|---------------|-----------------------------------|------------------|
| B-1 | Church - Lyon - Warren Barrett | 2 |
| B-2 | Seventh Street | 3 |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 2 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | 1 |
| B-7 | Huckleberry Park Tributary | 3 |
| B-8 | Oakwood | 7 |
| B-9 | Airport Tributary | 3 |
| B-10 | Ely Street | 1 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 1 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | |
| M-2 | Fulton Avenue | 7 |
| M-3 | Valley Street | 1 |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 6 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | 2 |
| MB-1 | Willow Street | |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 1 |
| MB-4 | Grace Street | 1 |
| MB-5 | State Route MM | 6 |
| MB-6 | Bird Street | 1 |
| MB-7 | Scott Street | 1 |
| MB-8 | Earl Street | 4 |
| MB-9 | Central Avenue - Mark Twain Expwy | |
| MB-10 | Highway 61 Northwest | 1 |
| MB-11 | Upper Minnow Branch | 3 |
| MC-1 | Johnson Street | |
| MC-2 | Robinson Avenue | 3 |
| Total | | 61 |

5.1.9 Damage to Contents of Structure

Damage to contents of structure means damage to furniture, clothing, carpet or other contents inside the building.

There were 44 surveys that identified this as a problem (Table 26). The watersheds with the most complaints included State Route MM (MB-5), Oakwood (B-8), Valley Street (M-3) and Upper Minnow Branch (MB-11). There were quite a number of other watersheds with one or two responses.

Table 26

Residents Reporting Damage to Contents of Structure

| Number | Watershed Name | Responses |
|--------------|-----------------------------------|-----------|
| B-1 | Church - Lyon - Warren Barrett | 2 |
| B-2 | Seventh Street | 1 |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 2 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | |
| B-7 | Huckleberry Park Tributary | 2 |
| B-8 | Oakwood | 5 |
| B-9 | Airport Tributary | |
| B-10 | Ely Street | |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 2 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | |
| M-2 | Fulton Avenue | 2 |
| M-3 | Valley Street | 3 |
| M-4 | Center Street | |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 2 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | 1 |
| M-9 | Hannibal-LaGrange College | |
| MB-1 | Willow Street | |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 1 |
| MB-4 | Grace Street | 1 |
| MB-5 | State Route MM | 7 |
| MB-6 | Bird Street | 2 |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | 2 |
| MB-9 | Central Avenue - Mark Twain Expwy | 1 |
| MB-10 | Highway 61 Northwest | 2 |
| MB-11 | Upper Minnow Branch | 3 |
| MC-1 | Johnson Street | |
| MC-2 | Robinson Avenue | 2 |
| Total | | 44 |

5.1.10 Disruption of Vehicle or Pedestrian Mobility due to Flooding

The disruption of vehicle or pedestrian mobility means the inconvenience of encountering impassible areas covered by floodwater.

There were 67 surveys that mentioned disruption of vehicle or pedestrian mobility (**Table 27**). The Upper Minnow Branch watershed (MB-11) had 10 surveys that felt flooding created limitations to vehicle or pedestrian mobility. This was more than any other area. The Oakwood watershed (B-8) was second with 8 surveys. Residents in both of these watersheds made several comments about this problem on their surveys.

Other watersheds where many residents felt inconvenienced by stormwater included Grand Avenue (B-4), Huckleberry Park (B-7), State Route MM (MB-5) and Earl Street (MB-8).

There were 18 other watersheds around Hannibal where at least one resident felt inconvenienced by stormwater in a pedestrian or vehicle mode.

Table 27**Residents Reporting Mobility Problems due to Flooding**

| Number | Watershed Name | Responses |
|---------------|-----------------------------------|------------------|
| B-1 | Church - Lyon - Warren Barrett | 1 |
| B-2 | Seventh Street | 3 |
| B-3 | Ninth - Tenth - Eleventh | 1 |
| B-4 | Grand Avenue | 5 |
| B-5 | Lemon Street | |
| B-6 | Arch Street | 3 |
| B-7 | Huckleberry Park Tributary | 5 |
| B-8 | Oakwood | 8 |
| B-9 | Airport Tributary | 2 |
| B-10 | Ely Street | 2 |
| B-11 | Shannon Street | |
| B-12 | Marion Street | 1 |
| B-13 | Bowling Avenue | |
| M-1 | Adams Street | 1 |
| M-2 | Fulton Avenue | 3 |
| M-3 | Valley Street | |
| M-4 | Center Street | 1 |
| M-5 | Hill Street | |
| M-6 | Mark Twain Avenue | 2 |
| M-7 | Riverview Park Tributary | |
| M-8 | Hannibal North Tributary | |
| M-9 | Hannibal-LaGrange College | |
| MB-1 | Willow Street | 1 |
| MB-2 | Hayden Street | |
| MB-3 | Magnolia Ave - Carroll Street | 1 |
| MB-4 | Grace Street | 2 |
| MB-5 | State Route MM | 6 |
| MB-6 | Bird Street | 1 |
| MB-7 | Scott Street | |
| MB-8 | Earl Street | 4 |
| MB-9 | Central Avenue - Mark Twain Expwy | 1 |
| MB-10 | Highway 61 Northwest | 1 |
| MB-11 | Upper Minnow Branch | 10 |
| MC-1 | Johnson Street | |
| MC-2 | Robinson Avenue | 2 |
| Total | | 67 |

5.2 Stormwater Problems Identified During Field Surveys

During field inspections, many problem areas were observed around the city. Many of these problems were pointed out by city employees and some were revealed by comments in the residents surveys. This section summarizes observations compiled from the field inspections conducted during April 2005. Appendix D, bound as a separate document to this report, contains notes and photographs of a number of stormwater problem areas around Hannibal.

5.2.1 Capacity of Stormwater Conveyance Systems

In a number of places around the City, the storm sewers get larger and then smaller as they proceed downstream. This can be attributed to individual property owners, who beginning back in the mid-1800s, had property on the banks of channels and installed stones on the banks to prevent erosion. Eventually many of these channels were enclosed with roofs, forming a make-shift stormwater culvert. Stormwater today continues to flow down these pathways to Bear Creek and Minnow Branch. Some owners enclosed bigger culverts while other owners built smaller ones. No engineering was done determine what size culvert was needed, because in most cases this construction was done before engineering practice had developed methods and standards.

Where culverts get smaller, it can be termed a "constriction". Some constrictions in Hannibal reduce the size of the culvert by nearly 50 percent. These constrictions cause back-ups and flooding upstream.

The storm sewers crossing the flat flood plain, adjacent to Bear Creek, have significant evidence of surcharging during storm events. Bear Creek backs up into these systems and has enough hydraulic pressure to force water out of the reinforced concrete pipe joints and push up the tops of concrete box culverts. When these systems are surcharged, flooding occurs at various inlets upstream of the surcharge (see **Table 28**). The water just has no where to go when these conditions persist. There are undoubtedly many other locations where this same phenomenon occurs.

Table 28
Stormwater Surge Locations

| Watershed | Location | Problem Description |
|------------------|---|---|
| B-03 | 9 th Street between Warren Barrett and Collier | Surcharge load has blown out reinforced concrete pipe joints causing cavities and voids underneath the road surface. The voids have sunken the road surface. |
| B-05 | Lemon Street between Colfax and Ledford St | Surcharge has lifted the concrete box culvert top up during significant storm events. The lift has caused significant damage to the roadway. |
| B-05 | Munger Street between Ledford and Colfax | Reinforced concrete pipe joints are blown out by water surcharge. The blown out joints have caused voids underneath the roadway. These voids have significantly sunken the roadway. |
| B-10 | West Side of Ely St (approx . 200 ft off of roadway) | Pipe is in very poor condition. Pipe is surcharged during storm events, pipe joints have been blown out by the surcharge. |

The City of Hannibal's newer subdivisions and commercial developments have been completed without the allowance of a standard design storm. These newer pieces have been built without an adequate number of drainage collection devices or none at all. For example, curb and gutters have been built without the inclusion of drop inlets at low points along the roadways. At these low points the water will rise above the curb and cause erosion of the adjacent property.

5.2.2 Stormwater Facility Deterioration

The City's stormwater system is in major disrepair due to the advanced age of the system. In almost every watershed there are signs of this deterioration. The disrepair presents a safety hazard to pedestrians and automobile traffic within the City. Significant areas of deterioration and concern are listed in the Table 29.

Table 29
Major Stormwater Facility Deterioration Problems

| Watershed No. | Location | Problem Description |
|----------------------|--|--|
| B-02 | 7 th Street between Warren Barrett and Colfax | A rectangular stone box culvert was constructed with a sidewalk on top. The box culvert is higher than 7 th Street. Large holes have developed in the side of the culvert, allowing water to flow out of the culvert into the street. |
| B-04 | Intersection of Broadway and Maple | A stormwater junction chamber roof was made of various wood materials. With the advanced age and use of wooden materials the junction chamber poses a risk of failure that needs to be examined. |
| MB-03 | Broadway Extension between Magnolia and Virginia | Junction chamber is built of various ad-hoc materials underneath the sidewalk. A large number of storm sewers are routed through this chamber. Structural capabilities of this chamber raise significant concerns. |
| MB-07 | Intersection of Helen and Scott | Storm drainage channel concrete is in very bad condition. Channel is full of debris, vegetative growth and broken pieces of concrete. |

General deterioration of stormwater inlet facilities was recorded in 25 out of the 35 existing watersheds. It was assumed if the inlets were in poor condition, the remainder of the facilities tied to those inlets would also be in poor condition. Table 17 lists the watersheds with deteriorated stormwater facilities.

5.2.3 City of Hannibal Stormwater Standards

The stormwater facilities within Hannibal lack consistent standards and were constructed of many different types of materials. These facilities were built in many sizes and shapes. With a large number of devices used on a city wide basis, maintenance will be a large challenge. A different maintenance or rehabilitation method would be required for each type of facility, which would be difficult. Maintaining these various structures is difficult. Full replacement, the most costly option for the City, would standardize the maintenance.

The project team observed newly constructed inlets that were in poor condition. For example, new inlets on West Ely Road appeared to be about two years old; however, erosion or corrosion of the inlet concrete walls was extensive. The lack of standard construction standards for these inlets was very evident. Standard construction methods and materials for stormwater items in the City would improve the quality and efficiency of the drainage systems.

5.3 *Flooding Areas*

5.3.1 Introduction

The City of Hannibal has flooding issues in several locations. The flooding was categorized into two types: Street Flooding and Channel/Creek Flooding.

5.3.2 Street Flooding

Overland flow takes place in streets during the early phase of stormwater runoff following a storm event. Rainfall collects on buildings, streets, parking lots, lawns and fields and moves downhill into shallow swales or gutters and curbs. This flow in the streets can occur anywhere across the street landscape, regardless of elevation.

In developed areas, overland flow should be carried away from buildings and streets to maintain public safety and prevent property damage. This flow is managed through a variety of measures that depend upon the land use. In commercial and residential areas, proper grading of the land surface to slope away from buildings is one important measure. Maintaining vegetative cover is a crucial measure to minimize soil erosion. In heavily developed areas that have mostly impervious area (such as parking lots, sidewalks and roofs), overland flow can produce large quantities of runoff that can cause deep or swiftly moving waters. The increased flow from these areas can upset the balance of water depth, velocity and street stability in channels down the hill sides. In unimproved natural environments with fields and forest, the abundant vegetation acts to reduce channel velocities, intercept rainfall onto leaf and plant surfaces and encourage infiltration into the soil.

Conveyance of storm water through the overland flow phase can be accomplished in a variety of ways. Proper grading to create roadway slopes that drain the ground adjacent to the road is very effective to keep building interiors dry. Separation of overland flow from streets, sidewalks and buildings is sometimes accomplished with street curbs, properly graded drainage swales or storm sewers buried below the surface.

The streets of Hannibal flood because the existing storm sewer system does not adequately handle a significant storm event. Two primary causes of Hannibal street flooding is the minimal number of drop inlets and pipe sizes. **Table 30** describes the location and potential causes of the major street flooding in Hannibal.

Table 30
Street Flooding Problem Areas

| Water shed | Location | Problem Description |
|------------|---|--|
| B-3 | Intersection 9 th Street & Collier | Drainage structures in area back-up and flood intersection. Flooding is caused by a constriction in culvert size for the trunk line running through the area. |
| B-8 | 3300 Block Market St | Street in area floods very often. Cause of street flooding is unknown without further study. |
| B-10 | Ely Street South of Bear Creek | Ditch overflows during heavy rain and overflows onto street. The overflow occurs because the storm sewer has inadequate capacity. |
| M-1 | Low Lying Area Bounded by Mound, S. Main Street, Adams & Sycamore | Storm sewer collection system in area is full of debris. There is only one functioning drop inlet in the area. This inlet is located along Mound Street and drains straight into Bear Creek. |
| M-9 | Holman Drive (Behind Country Kitchen Restaurant) | Roadway sags without any way to drain the area or adjacent low lying area. |

5.3.3 Channel/Creek Flooding

Overland flow contributes water into creek channels. During dry weather, these channels carry little or no flow and may have puddles in low places. Stream channels have sloping sides that end at the top of bank or edge of the channel. Water can fill the channel to the top of bank and in fact can rise over the top of bank and enter the floodplain, which are the low-lying lands adjacent to the channel. Any structures in the floodplain can experience periodic inundation.

Small storms that usually occur several times per year produce enough runoff to partially fill the channels. Larger storms, that occur on the average once every year or two, produce enough runoff to fill the channel and possibly overflow the channel in sections of the watershed. The rare storm events that produce large amounts of rainfall, that occur once every 10 years, 50 years, or 100 years serve as the basis for engineering analysis of channel capacity and floodway capacity. The Federal Emergency Management Agency (FEMA) designates all lands below the 100-year flood elevation as floodplain which should be preserved without development to the greatest extent possible to avoid flood damages.

Within Hannibal the greatest amount of flooding takes place in the flood plain of Bear Creek. Bear Creek has historically risen very quickly from normal flow to flood condition. The majority of structures impacted by this flooding have been removed from the flood plain.

Some other areas upstream of Bear Creek also flood from this condition. **Table 31** describes the location and extent of flooding at various City locations. Further study would be required to determine the precise reason for flooding at each location. The descriptions given were based upon interviews conducted with city employees and residents.

Table 31
Channel/Creek Flooding Locations

| Water shed | Location | Problem Description |
|-------------------|---|---|
| B-01 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-02 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-03 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-04 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-05 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-06 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-08 | Tilden near Viley St and Ruby Ave | Drainage channel overtops during heavy storm events. |
| B-08 | New London Gravel Rd | Ditches and channels fill up with sediment. As a result water fills up remaining ditches and floods onto roadways and private property. |
| B-10 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-11 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-12 | Bear Creek and Ditches along Market Street | Land adjacent to Bear Creek floods often (area within flood plain). |
| B-13 | Bear Creek | Land adjacent to Bear Creek floods often (area within flood plain). |
| M-02 | Fulton Avenue | Drainage channel overtops the bank. Residential structures are affected by the flooding. |
| MB-05 | West Ely Road – Centerville Rd to D'Ville Place | Detention basin outfall floods residential property downstream of existing detention basin. |
| MC-01 | Mills Creek | Mills Creek rises out of its banks and floods adjacent property. |
| MC-02 | Mills Creek | Mills Creek rises out of its banks and floods adjacent property. |

5.4 Erosion

Stormwater runoff moving at velocities exceeding 6 feet per second has a potential to erode soils that are not stabilized by plant roots or other means. The hillsides found around Hannibal can easily generate runoff velocities exceeding 6 feet per second. Trees and natural ground cover are good measures to stabilize soils and keep erosion to a minimum. Erosion is a natural process and occurs everywhere. One goal of effective watershed management is to keep soil erosion to a minimum through good stormwater management practices.

Stream channels are places in the natural environment that can be very susceptible to soil erosion. In natural, undeveloped areas, stream channels exhibit a balance between the amount of runoff flowing through the channel, the channel slope, the bank slopes and the soil erosion and deposition along the channel. Where development occurs, runoff is increased from the roofs, streets and other impervious surfaces. The increased runoff in channels moves at higher velocities, upsetting the natural balance between channel slope, bank slope and soil erosion and deposition along the channel.

Development in Hannibal has increased stormwater runoff and the stream velocities in channels. Detention basins have helped to reduce the flow but have not been used very often. **Table 32** lists these erosion problem watersheds.

Table 32
Channel/Creek Erosion Locations

| Watershed No. | Erosion | | | Erosion Description |
|---------------|---------------|---------|-------|---|
| | Street Gutter | Channel | Creek | |
| B-02 | ■ | | | Edge of street eroding. Erosion caused by swift overland velocities at edge of street. In most cases streets do not have curb and gutter. |
| B-03 | ■ | | | |
| B-04 | ■ | | | |
| B-06 | ■ | ■ | | Erosion deposits noted in drainage channels. |
| B-07 | | | ■ | Erosion at watershed outfall location along dry creek. |
| B-08 | ■ | ■ | ■ | Primary location of erosion is along Minnow Branch at the dead end of St. Charles Street. Creek is eroding major portions of street and private property. |
| B-09 | | | ■ | Saint Clair Creek eroding and filling with deposits from upstream development. |
| B-10 | ■ | ■ | | Erosion occurring in middle third of watershed. |
| B-12 | ■ | ■ | | Lack of curb and gutter along Marion Street leading to erosion along roadway. |
| M-02 | ■ | | | Edge of street eroding. Erosion caused by swift overland velocities at edge of street. In most cases streets do not have curb and gutter. |
| M-03 | ■ | | | Edge of street eroding. Erosion caused by swift overland velocities at edge of street. In most cases streets do not have curb and gutter... |
| MB-03 | | | ■ | Minnow Branch eroding cliffs. |
| MB-05 | | ■ | ■ | Minnow Branch and creek spurs are eroding banks. |
| MB-06 | | ■ | | Erosion noted in channel east of Route 61. |
| MB-07 | | ■ | | Channel adjacent to Route 61 eroding, upstream of Kentucky Fried Chicken restaurant. |
| MB-09 | ■ | | | Edge of street eroding. Erosion caused by swift overland velocities at edge of street. In most cases streets do not have curb and gutter. |
| MB-10 | | | ■ | Channel adjacent to Route 61 eroding. |
| MB-11 | | ■ | ■ | Minnow Branch eroding banks between Gemini Drive and Lake Apollo Drive. |
| MC-02 | ■ | ■ | | Curb and gutter eroding or does not exist in watershed along some streets. Man made drainage channels are in poor condition. |

6. TECHNICAL ASPECTS OF A STORMWATER MANAGEMENT PROGRAM

6.1 Storm Drainage Design Criteria

6.1.1 Introduction

The City of Hannibal should have a consistent set of stormwater drainage criteria to be used in the remedial design of stormwater improvements. These same criteria should be mandatory design standards for developers in the design of new developments, including residential, commercial and industrial projects. Chapter 9 of the Hannibal City Code outlines requirements for drainage and flood control. A detailed analysis of this chapter was not performed and further effort would be needed to identify if improvements could be made there to implement concepts outlined below.

Storm drainage improvements consist of either storm sewers or open drainage channels and should adequately drain the watershed areas being improved. The design of storm drainage improvements should be coordinated with both 1) the downstream drainage requirements and 2) the upstream drainage requirements, whether they are presently installed or considered probable future construction, so as to form an integrated drainage system. Adequate provisions are needed for the disposal of stormwater from each area of the City and should be subject to the review and approval by the Department of Streets, the Department of Public Works and the Board of Public Works. Engineering plans should show the appropriate calculations demonstrating compliance with the adopted design criteria and should be sealed by a registered professional engineer in the State of Missouri.

6.1.2 Drainage Facility

A drainage facility includes artificially constructed drain pipes, open channels and storm sewers used to convey storm water, surface water or ground water to natural water courses, either continuously or intermittently. A drainage facility should be regarded as a system of drainage structures, either natural or artificial, that function together to dispose of stormwater designed to the appropriate minimum criteria. Consideration should be given to how each drainage structure will function in the event that it becomes overloaded during an excessive storm event.

6.1.3 Prescribed Storm Conditions

Storm events are defined by the magnitude of rainfall, with runoff computed using accepted engineering methods. Storm events are described by their return periods, i.e. once in 2-years, once in 5-years, once in 10 years, etc. Drainage facilities should be sized to handle storm events of a prescribed return period, so as to represent a justifiable benefit for the cost involved. Larger drainage facilities carry larger costs and the benefits of larger stormwater facilities may not justify the greater expense. Various criteria and standards for determining a prescribed period have evolved among communities around the country and Hannibal would presumably want to employ criteria similar to those adopted elsewhere.

6.1.4 Surface Drainage

The sheet flow of stormwater across broad terraces should not be allowed. Berms and/or swales should be provided to collect flow of stormwater runoff and carry it to a drainage structure.

Engineering designs showing critical cross-sections, profiles and hydraulic computations for ditches and swales with flows in excess of one cubic foot per second (cfs) and for creeks with flows in excess of four cfs should be provided for review.

Street inlets should be designed to efficiently capture storm drainage and prevent excessive by-pass of flowing stormwater. A minimum pipe diameter for storm sewers should be 12 inches. Drainage pipes smaller than 36 inches in diameter should be designed to maintain a velocity of 3 feet per second (ft/sec) under the prescribed design storm conditions. Pipes larger than 36 inches may have lower velocities and they should be sized to prevent excessive surcharging upstream for the prescribed design storm conditions.

All drainage structures should be designed to withstand the loadings of the overlying fill, plus any loads imposed by temporary activity, such as the passage of traffic.

6.1.5 Erosion Control

Erosion control for drainage systems shall be required for swales, ditches, or creeks. For all permanent systems, erosion control is needed at the discharge points of all pipes where the velocity exceeds 5 ft/sec. During construction phases silt basins, silt control fences, straw bales and other erosion control devices should be required to insure that mud and other debris is not washed into natural water courses or new or previously constructed storm sewers.

6.1.6 Roadway Elevations

When a water course exists or is proposed approximately parallel to a roadway (whether existing or proposed), the low shoulder elevation of the roadway should be a minimum of 2 feet higher than the high water elevation under the prescribed storm conditions (called "freeboard"). In certain areas protected by levees or floodwalls, this requirement could be reduced at the discretion of reviewing authorities.

6.1.7 Culverts

Culverts not at low points that carry water courses beneath roadways should be sized to accommodate a 15-year storm event, with provisions for at least 2 feet of freeboard. Culverts at low points in or near flood plains, should be sized to accommodate a 100-year storm event, with provisions for at least 2 feet of freeboard. Culverts at low points that are not in or near flood plains, should be sized to accommodate a 50-year storm event, with provisions for at least 2 feet of freeboard.

6.1.8 Bridges

Bridges should be sized to accommodate a 100-year storm event and should provide a minimum 1-foot freeboard between the bottom of the superstructure and the high water elevation. The Missouri Department of Transportation (MoDOT) has prescribed standards for the design of bridges for its roadways and these should be followed.

6.2 Drainage Easements

A permanent drainage easement (or stormwater easement) is a grant by a property owner to the City, County or other responsible jurisdiction for the purpose of improving, constructing, repairing and maintaining drainage structures. The owner maintains beneficial use of his land, but is restricted from placing permanent obstructions to the passage of stormwater within the easement. The easement creates a basis for the common good of adjacent property owners and for the common benefit of the community within the watershed, all of whom share in the benefits of reduced flooding and reduced erosion. Individual property owners may regard an easement as a taking of some property value but easements are normally granted in exchange for a nominal monetary value. In the case of stormwater easements, the responsible jurisdiction is able to expend funds for the improvement of stormwater passage, thereby maintaining the beneficial use of the rest of the property, as well as the rest of the watershed, for all owners. From a community perspective, stormwater easements coupled with stormwater facilities can reduce risks associated with stormwater damage and enhance property values.

The City of Hannibal should require drainage easements from all private property owners from whom it proposes to obtain drainage easements for constructing stormwater improvements.

6.3 Engineering Programs

6.3.1 Surveying and Mapping

Hannibal should consider a program to map its stormwater system. As part of this *Stormwater Master Plan*, an effort was made to identify the principal storm channels and storm sewers around the Hannibal area. This map is presented with Figure C, contained in the map pocket in Appendix C. The channels and storm sewers are shown for each of the 35 watersheds on this figure.

The City needs detailed surveys of pipe locations, pipe sizes, pipe elevations and surveys of the associated open channels that make up the principal stormwater drainage system throughout the city. Documentation on the physical condition of all drainage structures is also necessary as part of this mapping. The functional condition, especially the capacity to convey flows, should be determined but cannot be fully assessed until blockages, collapsed sections, or other deficiencies are identified.

6.3.2 Hydraulic Modeling

Hydraulic modeling can be used to efficiently evaluate the quantity of stormwater discharges along the principal flow pathways. Knowing the quantity of stormwater expected to be flowing in a section of

channel or pipe for a given storm enables the prediction of how high the water will rise and what areas will be flooded.

The mapping project outlined above is an important step before modeling can be effectively completed. Modeling can predict when pipes and channel sections will become full of stormwater. It can also identify places where pipes and culverts are undersized. Furthermore, modeling can identify when roadways near creeks will become submerged by stormwater and can assess how long the submerged conditions will last. Modeling can predict when basement backups will occur and how often.

With a functional hydraulic model of a watershed, it is possible to evaluate how flooding would be different using larger pipes or improved channel geometry. Modeling is an effective tool for the conceptual design of remedial projects to correct stormwater problems.

6.3.3 Planning and Concept Design

The concept design step looks at the problem and identifies a range of possible solutions. Each solution will have a different impact on the human and natural environment and will have a different cost. Project formulation involves evaluating a range of alternatives, considering the range of costs as well as potential benefits and selecting the most favorable option meeting community preferences and budget. The concept design can be described with a series of simple design criteria for the project location, which can be communicated to the detailed design team.

6.3.4 Detailed Design

The detailed design is a series of engineering surveys, calculations and perhaps geotechnical investigations, leading to the development of plans and specifications so that a project can be bid for construction. A refined cost estimate can be developed during the detailed design step, since material quantities are better known. Because of the effort invested in completing the detailed design, it is important to have the concept design determine the right solution. Just as a community does not want to build the wrong solution, neither does it want to waste money to design the wrong solution. Therefore, concept design is the last step in the process where changes can be economically made.

6.3.5 Bidding and Construction

The detailed design results in plans and specifications that can be used in a bid process select a contractor to build the project. Construction oversight is needed to ensure that the plans and specifications are followed.

6.4 Stormwater Capital Improvement Program & Cost Estimates

Based upon the analysis of stormwater needs in Section 5, the City of Hannibal should consider embarking upon a capital improvements program to upgrade its stormwater infrastructure.

Opinions of budgetary cost depend upon many factors, including what is being constructed, quantities of materials and prevailing unit prices. The timing of project construction can also influence the cost, since inflation will affect future construction. A general guideline for the development of stormwater infrastructure in the context of Hannibal's needs is estimated to be \$2,000 per acre, taken on a watershed-wide basis. This value covers the installation of stormwater drainage facilities, including the creation of drainage swales, installation of inlets and storm sewers, creation of detention basins and erosion control measures. This value is insufficient in watersheds that already have substantial development, such as homes, businesses and street, since the disruption of existing streets and other utilities raises the cost. Specific improvements, especially those that require the purchase of lands, can raise the cost well above this value.

An estimate for a stormwater capital improvements program in Hannibal is presented in **Table 33** (next page). All 35 watersheds in the City are listed in this table, along with their acreage. Watersheds in the older parts of town, with significant deficiencies in the collection and conveyance of stormwater and with substantially full development would be expected to cost \$3,000 to \$4,000 per acre for stormwater improvements. Watersheds fitting this category include Grand Avenue (B-4), Fulton Avenue (M-2), Magnolia Carroll (MB-3), Earl Street (MB-8) and certainly Oakwood (B-8). There are numerous other watersheds in this same category based upon the resident's survey results discussed in Section 5. Specific engineering studies would be required to assess the hydraulic capacity of the existing drainage systems and recommend the appropriate improvements.

Several watersheds in the western and northwestern parts of town have been developed in the past few decades without the benefit of appropriate stormwater design criteria. There appear to be several subdivisions in the Highway 61 Northwest (MB-10), Upper Minnow Branch (MB-11), State Route MM (MB-5), Riverview Park (M-7) and adjacent watersheds that require significant remedial measures to upgrade their stormwater infrastructure. The estimated cost of these improvements recognizes that only some of the acreage of these watersheds needs upgrades.

Table 30 estimates a stormwater capital improvements program totaling about \$12.5 million. Depending upon Hannibal's preferences for the level of stormwater improvements, a budgetary range is appropriate. A lower limit to the estimated program could be 20 percent under the estimated value (about \$9.5 million), while an upper limit to the range could be \$16 million.

The financing of a stormwater capital improvements program in Hannibal is a major challenge facing the community. The issues involved with financing stormwater programs and the options available to Hannibal, are the topic of Volume 2 of this Study, entitled *Options for Stormwater Financing, The Case for a Stormwater Utility*.

Table 33

Budgetary Outline for a Stormwater Capital Improvements Program in Hannibal

| No. | Watershed Name | Area (acres) | Estimated Cost | Comments |
|---------------------------------|-----------------------------------|-----------------|-------------------|--------------------------------|
| B-1 | Church – Lyon – Warren Barrett | 60 | 150,000 | Inlets, Storm sewer relief |
| B-2 | Seventh Street | 102 | 300,000 | Inlets, Storm sewer relief |
| B-3 | Ninth – Tenth – Eleventh | 88 | 300,000 | Inlets, Storm sewer relief |
| B-4 | Grand Avenue | 217 | 550,000 | Inlets, Storm sewer relief |
| B-5 | Lemon Street | 58 | 120,000 | Inlets, Storm sewer relief |
| B-6 | Arch Street | 80 | 200,000 | Inlets, Storm sewer relief |
| B-7 | Huckleberry Park | 582 | 400,000 | Additional drainage facilities |
| B-8 | Oakwood | 232 | 700,000 | Additional drainage facilities |
| B-9 | St. Clair Creek | 1,780 | 300,000 | Additional drainage facilities |
| B-10 | Ely Street | 118 | 200,000 | Inlets, Storm sewer relief |
| B-11 | Shannon Street | 93 | 50,000 | Drainage improvements |
| B-12 | Marion Street | 148 | 200,000 | Inlets, Storm sewer relief |
| B-13 | Bowling Avenue | 77 | 100,000 | Drainage improvements |
| M-1 | Adams Street | 156 | 200,000 | Drainage improvements |
| M-2 | Fulton Avenue | 287 | 800,000 | Additional drainage facilities |
| M-3 | Valley Street | 219 | 600,000 | Additional drainage facilities |
| M-4 | Center Street | 39 | 80,000 | Inlets, Storm sewer relief |
| M-5 | Hill Street | 19 | 60,000 | Inlets, Storm sewer relief |
| M-6 | Mark Twain Avenue | 251 | 600,000 | Inlets, Storm sewer relief |
| M-7 | Riverview Park | 238 | 200,000 | Additional drainage facilities |
| M-8 | Hannibal North | 166 | 200,000 | Additional drainage facilities |
| M-9 | Hannibal-LaGrange College | 618 | 400,000 | Additional drainage facilities |
| MB-1 | Willow Street | 66 | 200,000 | Inlets, Storm sewer relief |
| MB-2 | Hayden Street | 27 | 100,000 | Inlets, Storm sewer relief |
| MB-3 | Magnolia Ave – Carroll Street | 158 | 500,000 | Inlets, Storm sewer relief |
| MB-4 | Grace Street | 61 | 180,000 | Inlets, Storm sewer relief |
| MB-5 | State Route MM | 530 | 900,000 | Additional drainage facilities |
| MB-6 | Bird Street | 46 | 200,000 | Inlets, Storm sewer relief |
| MB-7 | Scott Street | 49 | 200,000 | Inlets, Storm sewer relief |
| MB-8 | Earl Street | 45 | 200,000 | Inlets, Storm sewer relief |
| MB-9 | Central Avenue – Mark Twain Expwy | 210 | 600,000 | Additional drainage facilities |
| MB-10 | Highway 61 Northwest | 263 | 700,000 | Additional drainage facilities |
| MB-11 | Upper Minnow Branch | 1,278 | 1,600,000 | Additional drainage facilities |
| MC-1 | Johnson Street | 93 | 150,000 | Drainage improvements |
| MC-2 | Robinson Avenue | 277 | 250,000 | Drainage improvements |
| Total | | 8,731 | \$12,490,000 | |
| Rounded Total | | | \$12,500,000 | |
| Potential Minimum Program -20 % | | | 9,600,000 | |
| Potential Maximum Program +30 % | | | 16,000,000 | |

Hannibal's plan for further action on a stormwater improvements program could be any of the following approaches:

- 1) **Do Nothing** – Residents and their governing representatives could reach a consensus not to make any stormwater improvements as a result of this study. Residents who feel they do not have any stormwater problems will continue to feel that way and residents who feel that they do have stormwater problems will also continue to feel that way.
- 2) **Limited Improvements Program Year to Year** – Residents could choose to allocate some level of funding, perhaps \$200,000 to \$400,000 per year to have one or several stormwater projects designed and constructed around the community, with the long term objective of gradually upgrading stormwater infrastructure one watershed at a time. This funding would probably have to be taken from the existing General Fund, which would subtract from other city programs. This approach uses taxes to upgrade stormwater infrastructure. The City would achieve upgraded infrastructure over perhaps a 40 to 50 year period, depending on its ability to keep a steady pace of funding. Little or no changes to the City Charter would be needed to accomplish this program.
- 3) **Address only the Worst Problems** – Residents could choose to spend perhaps \$1 to 2 million on the most pressing stormwater problems around the city and continue putting up with everything else, on the basis that those problems are not so pressing as to warrant action. Funding could be taken from the City's General Fund over a several year period, again using taxes to correct stormwater problems. Little or no changes to the City Charter would be needed to accomplish this program.
- 4) **Embark on a Stormwater Improvements Program with New Funding** – If enough residents felt stormwater deserved action, a stormwater user fee program could be adopted, using a Stormwater Utility program. This would require changes to the City's Charter. User fees could be \$0.50 per residential property per month, they could be \$5.00 per month, or anything in between. This approach improves stormwater infrastructure with dedicated user fees that are not taxes, with fees that should be spent for stormwater purposes and not anything else and with a steady revenue stream that gives the City the option to use bonds to finance improvements.

The Notes Column of Table 33 provides only a brief description of what would be accomplished in each watershed. Here is a further explanation to these notes:

Inlets are needed where excessive stormwater is flowing across the land surface. The addition of more storm sewers and the installation of more curb and area inlets strategically placed will create pathways for stormwater to go underground, away from homes, yards, sidewalks and roadways.

Storm sewer relief is needed where existing sewers are under capacity and are overloaded by common storm events. Relief can be accomplished by replacing the existing storm sewers with larger pipes, or

by installing new pipes that take some of the flow, while keeping the existing pipes. Storm sewer relief could also employ measures such as detention basins, infiltration areas or other methods to better manage stormwater flow close to the source, while reducing the burdens on storm sewers during periods of peak flows.

Additional drainage facilities means significant upgrades to create better stormwater drainage infrastructure in subdivisions built over the past few decades where these improvements should have been installed. These could be storm sewers, inlets, culverts, detention basins, creek bank stabilization, or other measures.

Drainage improvements in the context of this report means remedial measures in some low-lying areas that are exposed to flooding already by virtue of their proximity to creeks. These measures are needed to correct localized problems with drainage, erosion or safety. These measures are not intended to correct the flooding problems within the 100-year floodplain.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

1. There are 35 watersheds in Hannibal that drain to the Mississippi River, Bear Creek, Minnow Branch or Mills Creek. Fifteen of these watersheds (43 percent) are less than 100 acres in size. Thirty (86 percent) have times-of-concentration under 1 hour.
2. The highest ranked priority among all responders for stormwater management in Hannibal was "maintain/repair existing stormwater systems". "Minimize street flooding" was the second highest priority and "preserving natural channels" was third overall.
3. A total of 340 responders (36 percent) felt that User Fees for each property's demands on stormwater systems was a good mechanism for funding future stormwater needs. The second most popular choice was "increased fees for new development" drawing 322 responses (34 percent).
4. The Upper Minnow Branch watershed, which includes the Lake Apollo subdivision, had 138 responders, more than any other watershed. The watershed with the second highest response was the Oakwood watershed, with 93 responses.
5. People who live uphill in Hannibal are just as likely to have stormwater problems as those who live downhill.
6. Stormwater problems are widespread in Hannibal and are found in practically every watershed.
7. Flooding or temporary ponding on property was reported by 192 responders to the stormwater survey. Residents in 25 watersheds identified this as a problem. The worst watersheds (in terms of the greatest number of residents) were Upper Minnow Branch (MB-11), Oakland (B-8), State Route MM (MB-5) and Fulton Avenue (M-2).
8. Local Street flooding was a problem cited by 219 responders in the survey, located in 31 of the 35 watersheds. The worst watersheds were Oakland (B-8), Upper Minnow Branch (MB-11), State Route MM (MB-5), Fulton Avenue (M-2) and Grand Avenue (B-4).
9. Basement Flooding (other than sanitary sewer) was reported by 144 surveys, located in 27 of the 35 watersheds. The worst watersheds were Oakwood (B-8), State Route MM (MB-5), Upper Minnow Branch (MB-11), Mark Twain Avenue (M-6), Magnolia-Carroll (MB-3) and Fulton Avenue (M-2).
10. Basement flooding due to sanitary sewer backup was reported on 56 surveys in 21 watersheds. The worst watersheds were State Route MM (MB-5), Bird Street (MB-6), Earl Street (MB-8) and Highway 61 Northwest (MB-10).

11. Complaints about water pollution associated with stormwater were cited by 56 residents in 19 watersheds. Upper Minnow Branch (MB-11) and Oakwood (B-8) were by far the worst watersheds with the greatest number of complaints.
12. Property damage from erosion or sedimentation was cited by 112 surveys in 25 watersheds. Upper Minnow Branch (MB-11), Oakland (B-8), Fulton Avenue (M-2) and State Route MM (MB-5) were the worst watersheds.
13. Danger to life and limb due to flowing or flooded stormwater was cited by 11 residents in 8 watersheds.
14. Damage to home or business or other buildings was cited by 61 surveys in 23 watersheds.
15. Damage to contents of structure was cited by 44 responders in 20 watersheds. These generally corresponded to the same problem areas with flooding.
16. Disruption of vehicle or pedestrian mobility due to flooding was checked in 67 surveys. These corresponded with the areas with flooding.

7.2 Recommendations

1. The City of Hannibal needs a consistent set of stormwater drainage criteria for the redial design of stormwater improvements. These same criteria should be mandatory for the design of new developments.
2. The City should strive to develop an integrated stormwater drainage system within each watershed for the adequate disposal of stormwater runoff. The use of detention basins, inlets, storm sewers, culverts and other measures should reduce the amount of overland flow passing near buildings and over streets.
3. The City of Hannibal should require drainage easements across all properties on which stormwater improvements are constructed.
4. The City should undertake a program to map the stormwater drainage system and to assess the condition of all principal storm sewers and channels. This mapping should include an inventory of pipe locations, pipe sizes, pipe elevations and channel bank conditions.
5. The City should undertake the hydraulic analysis of the capacity of its stormwater system. Computer modeling would be the most efficient way to perform this analysis. The capacity of each pipe and channel segment should be determined and compared against storm drainage design criteria. Segments that are under-sized should be prioritized for replacement and/or relief projects, whichever is most economical. The model calibrated to Hannibal could then be used in conceptual design, alternatives formulation and establishing the basis of design for remedial projects.

6. A capital improvements program in the range of \$9.5 to \$16 million is estimated to address stormwater needs around the Hannibal community.
7. This capital improvements program should include projects in almost every one of the 35 watersheds.
8. Projects should be prioritized where the greatest benefit occurs to the greatest number of people and to the greatest number of properties. In addition, projects that can remedy multiple problems at once deserve early consideration.
9. Funding for a stormwater improvements program does not appear to be easily available. Residents are not interested in higher taxes. The willingness to sacrifice other City programs to start stormwater projects can only be determined through open discussion with community leaders, stakeholders and interested residents. New funding mechanisms appear to be needed, perhaps based upon user service fees (storm water utility).
10. The City should combine its consideration of a stormwater improvements program with its on-going Stormwater Phase 2 program Federal, so that public participation activities count towards the City's compliance with the federal requirements.

Stormwater Utility

Volume 2

Options for Stormwater Financing The Case for a Stormwater Utility



Volume 2

Options for Stormwater Financing **The Case for a Stormwater Utility**

Client:

City of Hannibal, Missouri
320 Broadway
Hannibal, Missouri 63401

Project No. 38204

BURNS & McDONNELL

Engineers-Architects-Consultants
1630 Des Peres Road
St. Louis, Missouri 63131-1800

In association with:

Water Resource Associates, Inc.
Friday Harbor, Washington 98250

September 2005

VOLUME 2
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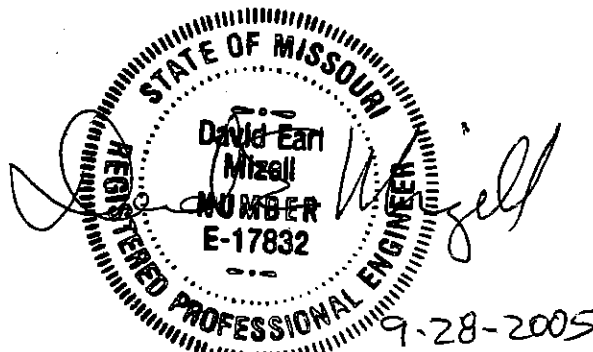
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CERTIFICATION



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Executive Summary

ES.1 Introduction

Stormwater runoff, flooding and bank erosion have been problems in the City of Hannibal for many years. The City is hilly, has many small watersheds, its drainage systems were not originally designed and built to modern standards, and many of them are aging and deteriorating. Hannibal has not had many resources to devote to stormwater management in the past, partly because of other competing priorities within the community, and partly because there has been a lack of focus on the issue. This report, *Options for Stormwater Financing, The Case for a Stormwater Utility*, is the second volume in a 2-part study of stormwater needs within Hannibal. The first volume is entitled *Stormwater Master Plan. It addresses engineering issues* and is presented in a separate section.

ES.2 Current Stormwater Management in Hannibal

1. Hannibal's Department of Public Works (DPW) is responsible for stormwater on the land surface and in open channels. This is a logical extension of DPW's responsibility for streets and parks.
2. Hannibal's Board of Public Works (BPW) is responsible for stormwater in enclosed storm sewers. This is a logical extension of BPW's responsibility for sanitary sewers and wastewater treatment.
3. DPW is responsible for Hannibal's compliance with the federal Stormwater National Pollutant Discharge Elimination System Phase II permitting program, which seeks to eliminate stormwater pollution discharge to streams, lakes, and rivers.
4. Occasional special stormwater projects are performed by DPW, but the overall level of funding for stormwater drainage improvements within DPW has generally been less than \$5,000 per year.
5. BPW collects service (user) fees for electric power, water supply and wastewater treatment, but is not currently authorized to collect fees for stormwater maintenance or improvements. BPW spends less than \$5,000 per year for investigating problems within the storm sewer system and maintaining that system. These expenditures are drawn from BPW's budget for wastewater operations because common issues and problems impact both wastewater and stormwater.
6. There are places in Hannibal where stormwater starts on the land surface, enters storm sewers through inlets in yards or along streets, flows through underground piping for some distance, discharges into an open channel, goes back into a storm sewer, reaches another open channel down hill, and enters a stream or creek. Stormwater has proven difficult to manage in Hannibal with one organization responsible for stormwater in open channels and another organization responsible for stormwater in sewers, especially when neither has adequate resources to address their components of the drainage systems.

ES.3 Funding Methods for Stormwater Management

1. The four primary funding mechanisms used by municipal governments are:
 - a. general taxes (e.g., property, income, and retail sales taxes);
 - b. *ad valorem* and *non-ad valorem* special assessments;
 - c. exactions (most commonly franchise rights, privileges, and development-related fees); and,
 - d. service fees (sometimes called User Fees or User Charges).
2. General governmental functions are usually funded primarily through taxes of various sorts (property, income, sales, etc). Until the 1970's stormwater programs were managed and funded by most cities and towns as a general governmental function.
3. Proprietary functions are normally funded wholly or primarily through service fees or charges. Since 1970 many cities and towns have begun managing their stormwater programs as a proprietary function comparable to water supply, wastewater treatment, and solid waste disposal.
4. Past funding for stormwater in Hannibal has primarily been taken from the City's General Fund. There are many other demands on the City's general revenue resources, and appropriations for stormwater management have been inadequate to repair and maintain the drainage systems or to fund much in the way of stormwater capital improvements. Stormwater impacts on water quality have been largely unfunded and ignored.
5. The City of Hannibal could choose to allocate adequate funds for stormwater from existing revenue sources, including property, sales or other taxes. However, doing so would either reduce the funding available for other community programs or require an increase in taxes.
6. Municipally owned and operated utilities commonly provide water supply, wastewater treatment, stormwater management, electricity, natural gas, and solid waste disposal. These utilities are usually operated as financially self-sufficient enterprise accounting units, and involve a business-like operation that provides commodities or services to customers.
7. Nationwide, many communities are turning to the concept of a "stormwater utility", funded primarily by service fees to support comprehensive operational and capital improvement programs. Stormwater utilities have been established by more than five hundred communities nationwide in the past thirty years, including several in Missouri. Typical residential service fees range between \$3.00 and \$5.00 per month, depending upon the level of stormwater service desired by the community.
8. The Hannibal Board of Public Works is successfully delivering electric power, water supply, and wastewater treatment to the citizens of Hannibal. All of these are classic municipal utility services to the community funded primarily through service fees. Offering stormwater utility services to the citizens of Hannibal through the existing Board of Public Works would be a logical extension

of BPW's existing utility service responsibilities, and a more effective program could be funded by service fees without diminishing the resources available for other governmental services.

ES.4 Functions of a Stormwater Management Program

The stormwater management practices of cities, counties, and special-purpose districts are changing rapidly as new trends emerge, technology improves, environmental laws become more rigorous and more strictly enforced, community expectations increase, and the risk and expense of failing to solve drainage problems grows. The functions typically included in such programs include:

- a) Administration
- b) Billing & Finance
- c) Public Involvement
- d) Engineering & Planning
- e) Operations & Maintenance
- f) Regulations & Enforcement
- g) Stormwater Quality Management
- h) Capital Improvement Programs

ES.5 Constitutional and Case-Law Considerations in Missouri

In Missouri, the Hancock Amendment to the Missouri State Constitution imposes certain requirements and standards on the process for implementing some forms of local government funding, including some service fees. This may influence any strategy for instituting stormwater management programs and associated funding. Under Hancock, some funding methods and decisions may be subject to a formalized political acceptance process involving voter approval of a ballot issue authorizing a tax, service fee, or other funding mechanism.

The possibility of adopting stormwater management service fees raises the issue of whether these fees would be subject to the Hancock Amendment. This issue is not clear cut, and recent case law suggests rate design concepts and procedural steps that may eliminate the requirement that a fee be subjected to a ballot approval. However, it may be desirable in a political sense to seek the public's acceptance of any new user fee through a vote. Hannibal's City Council must weigh both the legal and political aspects of the issue.

Five criteria (referred to as the "Keller factors") have been established by the Courts as "helpful" guidance in determining whether a charge constituted a tax or a fee.

- a) When is the fee paid? Fees subject to the Hancock Amendment are likely due to be paid on a periodic basis while fees not subject to the Hancock Amendment are likely due to be paid only on or after provision of a good or service to the individual paying the fee.

- b) Who pays the fee? A fee subject to the Hancock Amendment is likely to be blanket-billed to all or almost all of the residents of the political subdivisions, while a fee not subject to the Hancock Amendment is likely to be charged only to those who actually use the good or service for which the fee is charged.
- c) Is the amount of the fee to be paid affected by the level of the goods or services provided to the fee payer? Fees subject to the Hancock Amendment are less likely to be dependent on the level of goods or services provided to the fee payer while fees not subject to the Hancock Amendment are likely to be dependent on the level of goods or services provided to the fee payer.
- d) Is the government providing a service or good? If the government is providing a good or a service, or permission to use government property, the fee is less likely to be subject to the Hancock Amendment. If there is no good or service being provided, or someone unconnected with the government is providing the good or service, then any charge required by and paid to a local government is probably subject to the Hancock Amendment.
- e) Has the activity historically and exclusively been provided by the government? If the government has historically and exclusively provided the good, service, permission or activity, the fee is likely subject to the Hancock Amendment. If the government has not historically and exclusively provided the good, service, permission or activity, then any charge is probably not subject to the Hancock Amendment.

Whether a stormwater service fee is feasible in Hannibal involves several considerations:

- a) Does it result in a technically equitable allocation of costs that is understandable to the general public?
- b) Will it ensure that the revenue is dedicated solely and specifically to stormwater management? and,
- c) Is it packaged and presented in a way that makes sense to the voters who must approve a Hancock-mandated ballot issue?

For Hannibal, a service fee for stormwater funding appears to have several significant advantages over other funding options. It is highly flexible, offers the prospect of stable funding over time, allows restrictive dedication of the revenues to stormwater management only, and enables elected officials to craft an equitable distribution of costs through a service fee rate design. A stormwater service fee rate structure can allocate costs based on the demands placed on the drainage systems instead of property value or other factors unrelated to stormwater service needs. Equitable rate structures can be devised for institutional, industrial and commercial property classifications. Credits can be offered to encourage residents and businesses to perform good stormwater management practices that reduce the City's costs.

ES.6 Organizational Strategies for Stormwater Management in Hannibal

1. Changes to the City Charter should be made to better focus and clearly define responsibilities for stormwater management within the City's organizational structure. The City should consider the creation of a stormwater utility and adoption of a stormwater service fee to provide a stable base of funding for stormwater capital improvements, stormwater operations, and compliance with federal stormwater quality programs. Any changes to the Charter would require approval of the voters.
2. A stormwater utility, if created in Hannibal, should be set up organizationally and financially under the Board of Public Works, but the Department of Public Works should remain as an active participant in engineering, operational, and regulatory aspects of stormwater management:
 - a) BPW's existing utility status and management functions such as service account maintenance and billing/collections, plus its operational capabilities associated with the sanitary sewer collection and treatment system, are valuable resources for a stormwater utility. As an existing utility, BPW is already organized and accounted for in the manner that would be appropriate for a stormwater utility
 - b) DPW's strengths in engineering analysis and design, cost estimating, planning, public participation, and capital projects are also valuable resources.
3. To maximize the use of existing manpower and resources in the operation of a future stormwater utility, closer working relationships between the City's Department of Public Works and Board of Public Works appear desirable.

ES.7 Public Information & Public Involvement

1. During the preparation of this Stormwater Master Plan, over 950 of Hannibal's residents (and business owners) responded to a Stormwater Questionnaire that was distributed to all BPW customers. The substantial response indicates that stormwater drainage is an issue that generates a great deal of public opinion and interest.
2. The completion of this Stormwater Master Plan gives the City Administration and City Council an opportunity to consider the next steps for stormwater management in Hannibal, including how to involve the community in discussions and decisions.
3. A public information program for stormwater issues is needed in Hannibal to enable City residents to better understand many stormwater issues. Several basic issues include:
 - a) There are 35 watersheds within and around Hannibal, each with its own impacts upon stormwater. The homes and businesses within each watershed contribute in some small way to stormwater runoff, and many are affected by it.

- b) The Bear Creek Dam is a community asset to reducing flash flooding through the valley across southern Hannibal. However it only controls 28 square miles of watershed, and leaves another 23 square miles of watershed downstream uncontrolled. Localized flooding occurs when intense rainfalls occur in the portion of the watershed downstream from the dam.
- c) Many citizens are interested in the operation of the Dam. The City, through its Board of Public Works, should consider releasing a table showing the hourly status of the gates at the Bear Creek Dam for publication in the Courier-Post (perhaps with the daily weather statistics?). This release of information should be done every day for the previous 24 hours. The City's existing data regarding the dam should be augmented with rainfall gauging throughout the community so a better understanding can be gained of rainfall, runoff, and dam release relationships.
- d) Many problems in Hannibal are related to a simple lack of stormwater infrastructure. Overland flow must travel large distances in roadside gutters, ditches, and small channels, passing near homes and businesses, before reach a stream channel. This provides opportunities for excessive ponding, flooding and (in winter months) freezing on road surfaces that impacts many parts of the community.
- e) Much of Hannibal's stormwater infrastructure is old and deteriorated. Many storm sewers, where they exist, were built many years ago, and do not offer enough capacity to adequately convey peak stormwater flows into creeks and channels. Water from heavy rains backs up and causes flooding, basement backups and other problems. Stormwater also intrudes into the BPW sanitary sewer system, causing high wet weather flows that exceed the collection, conveyance, and treatment capacities of that system.
- f) Many channels around Hannibal do not have enough capacity to carry the runoff from moderate and large rains, and flow escapes out of banks periodically. Where homes and businesses are built nearby, they are exposed to flooding and/or erosion.
- g) Many people, including residents in both the older parts of town and newer subdivisions, feel the City's stormwater design standards for new development are inadequate. Perhaps a citizen's task force, with enough interest to meet several times, should be commissioned to review current practices and formulate recommendations for future community preferences. This task force should have access to the City Engineer or another engineer for guidance on stormwater issues.
- h) Hannibal's past funding for stormwater has been inadequate for the operation and maintenance of the City's aging storm drainage facilities, let alone following some type of stormwater capital improvements program. With better stormwater information, residents can understand the options available and the choices they face.

4. A public information program should utilize the city's web site, informational flyers sent with utility bills, and perhaps a series of articles in the Courier-Post. Other forms of public information could be used as well.
5. A series of community meetings should be held concerning stormwater problems and issues. These meetings should be held at places around the community that are convenient to residents (community centers, schools, churches, etc.). The agenda for these meetings should move beyond just airing grievances, and should provide information about the watersheds in the area, the known problems, and the possible solutions. Citizens who want to become actively involved in a stormwater campaign to amend the City Charter should have an opportunity to sign up at these meetings.

1. Introduction

1.1 Overview

The City of Hannibal is a historic community that has grown since the early 1800s on the west bank of the Mississippi River in northeast Missouri. Stormwater runoff was not given much consideration in the early years, although more recently it has come to be perceived by some as a community problem. Flooding on the Mississippi River has been with Hannibal since the beginning, and there is plenty of high ground away from the river in Hannibal to avoid floods. Bear Creek flows into the Mississippi River at downtown Hannibal, through a valley that crosses the southern part of the City. The flat, low-lying lands along the Mississippi River and Bear Creek have been attractive for development, compared with the sloping hill sides in many other parts of the community. Over the years, the community has experienced severe flooding along the Mississippi River, and these same floods back water up into Bear Creek in the low-lying areas. In addition, the community has come to understand that Bear Creek is subject to rapid rises in water levels (i.e. flash flooding) during and following rain storms. At times, these flash floods have caused loss of life and significant property damage in Hannibal. In the late 1950s, a dam across Bear Creek was built at the western side of the City to hold back flood waters from upstream areas of the watershed and reduce the risk to the community.

Hannibal experienced much of its growth in the 1800s before modern design standards for stormwater evolved, and has never had a consistent set of standards covering the construction or upgrade of stormwater systems. This Stormwater Master Plan is a "first", and was authorized by the City in the fall of 2004 to promote the improved management of stormwater across the entire community.

1.2 Purpose

The City of Hannibal wishes to: (1) develop a comprehensive plan for the improvement and management of stormwater systems within its jurisdiction, and (2) identify program and funding strategies to implement the plan.

1.3 Scope of Project

This is Volume 2 of a two part report of stormwater issues facing the City of Hannibal. The companion Volume 1 is entitled *Stormwater Master Plan* and is presented in a separate binder.

Volume 1 provides a guide for the City's efforts to remedy stormwater conveyance, erosion, and flooding problems. The major components of Volume 1 include:

1. Survey the opinions and experiences of residents throughout the City to identify problem locations, determine their views regarding the stormwater problems, and assess their sense of the need for corrective and remedial measures.

2. Conduct engineering field inspections of the current stormwater drainage system, including channels, inlets, storm sewers, and outfalls to view the condition of the system, the stability of channels, and the suitability for satisfactorily conveying stormwater.
3. Prepare an inventory of stormwater problem areas, based upon interviews with City staff, resident responses to the survey, and field inspections.
4. Develop a conceptual list of stormwater improvement program needs with an opinion of high priority capital improvement, operation and maintenance costs.

Volume 2 identifies alternatives for financing a stormwater management program in the City. The major steps in this effort include the following:

1. Review of the Hannibal City Charter to examine the current roles and responsibilities for stormwater management within the City Government.
2. Interview the staff in the City's Department of Public Works (DPW) and Board of Public Works (BPW) to understand recent actions for stormwater management.
3. Identify the City's options for funding stormwater improvements and operations, including but not limited to the creation of a stormwater utility.
4. Develop a conceptual plan for the implementation of a stormwater utility. Identify issues for discussion by key stakeholders and potential strategies for setting up a stormwater utility.

This portion of the report is organized into the following sections:

Section 1 provides an introduction.

Section 2 presents an overview of the current stormwater management program in Hannibal, and most notably how the responsibilities are split between the Department of Public Works and the Board of Public Works.

Section 3 examines the methods of funding commonly used for stormwater management programs.

Section 4 examines municipal stormwater programs and how they have evolved in recent decades to keep pace with issues, trends, and changing community expectations.

Section 5 proposes new organizational relationships to better handle Hannibal's needs for stormwater management.

Section 6 presents a summary of findings, conclusions, and recommendations.

2. Current Stormwater Management in Hannibal

2.1 City Charter Requirements

The Hannibal City Charter has been adopted to establish Home Rule and provide for the common welfare of the citizens of the City of Hannibal. The responsibility for oversight of stormwater management resides in two places of the City's organizational structure. Chapter 5 of the City Charter provides for a Department of Public Works, led by the Director of Public Works, to oversee streets, parks, building codes and other public issues. Chapter 11 of the City Charter provides for a Board of Public Works, led by a four-person board to provide electric power, water supply and wastewater treatment for the City. The BPW functions are generally viewed as financially self-sustaining enterprise or "utility" operations.

2.2 Department of Public Works

2.2.1 Current Duties and Responsibilities

Chapter 5 of the City Charter outlines the responsibilities and functions of the Department of Public Works (DPW), which reports to the Hannibal City Manager and the Mayor. The DPW is managed by the Director of Public Works. Several paragraphs under Section 5.02 of the City Charter outline the powers and duties of the DPW (**phrases in bold font could be interpreted as pertaining to stormwater drainage**):

Section 5.02 Director of Public Works: Powers and Duties

The director of public works shall serve as the city engineer and **ex officio sewer commissioner** and shall have the charge of:

- (1) The designing, construction, reconstruction, supervision of all municipal buildings, bridges, viaducts, **waterways, sewage disposal plants, incinerators, sewers, drains, levees, river front, airports, airport or river terminals, public market facilities, off street parking facilities, tunnels and structures** and all other physical properties and facilities which the city may hold or acquire under power conferred by this Charter, including alterations, replacements, additions and appurtenances thereto, and the operation, maintenance and repair of the same unless otherwise provided in this Charter or by ordinance.
- (2) The planting and care of all trees, shrubbery and other landscaping located on property owned by the city; the physical construction and improvement, and the physical maintenance and operation of all parks, parkways, golf courses, recreational centers, cemeteries, camps, swimming pools, and all other city owned lands and buildings to be used for recreational purposes, subject to such supervision, control, and direction by the park and recreation board as may be applicable under chapter 6 of this Charter.
- (3) The grading, construction, repair and improvement of all streets, alleys, highways, sidewalk spaces and other public ways and places, and keeping the same open and in a safe and clean condition.
- (4) The construction, reconstruction, repair and maintenance of all pavements, curbs and sidewalks.
- (5) The collection and disposal of garbage, ashes and refuse and **treatment and disposal of sewage.**

- (6) The lighting of public grounds, streets and other public ways, the laying of conduits, the location, erection and construction of poles and appurtenances, and all structures and facilities in, on or over public grounds, streets, alleys and other public ways, the granting of permits to excavate into or disturb any highway, street, alley, or other public property or way, or to make any special use thereof, provided, with respect to such functions, the scope of duties of this department shall be coordinated with the duties of the board of public works by the city manager.
- (7) The inspection of gas, plumbing, electrical wiring, boilers, elevators, fire escapes, smoke, sanitary and safety equipment of all buildings and structures within the city, the inspection of weights and measures, and such other inspectional duties as the council may prescribe by ordinance.
- (8) The supervision and control, as far as the city can exercise it, over all privately owned or operated public utilities in the city, and the enforcement of the terms of all franchise and ordinances relating to such utilities.
- (9) The administration of all building and zoning codes or ordinances, including the issuance and revocation of permits and the making of inspections required or authorized by law or ordinance.
- (10) The making and keeping of all records of plats, surveys, drawings, and estimates, and the furnishing of all information and reports relating to public works or the department of public works as may be required by the city manager or the council.
- (11) The making of surveys and the establishment of grades, boundaries, lines, comers, and descriptions of public and private property within the city and of streets, alleys, ways, thoroughfares, **sewers**, and other public places and improvements in the city.
- (12) The making and keeping of records of the location, direction, depth and connection of **all underground structures, pipes, conduits, and equipment of a public nature**.
- (13) The drafting of a building code, plumbing code, electrical code, and amendments thereto for adoption by the council.
- (14) The appointment of draftsmen, surveyors, engineers or other assistants, subject to the approval of the city manager and the council.

As outlined in this section, the DPW is responsible for stormwater on the land surface, which includes overland flow in curbs and gutters and in open channels and creeks. The Director of Public Works also supervises building inspection and the street department.

2.2.2 Recent DPW Funding Levels for Stormwater Improvements

The DPW operates with a staff of 3 people, including the Director of Public Works/City Engineer, an engineering assistant and an administrative assistant. The budget for the DPW in FY2004-05 was approximately \$347,000, which does not include building inspection or the street department. A special line-item in this budget included stormwater projects budgeted for \$150,000. Excluding these special items leaves \$197,000. All funds for the operation of the DPW come from the City's General Revenue Fund. Over the past several years, the levels of funding for stormwater management activities in the DPW have been generally less than \$5,000 per year.

A portion of the \$150,000 in the FY2004-05 budget has been used to fund this Stormwater Master Plan, and represents one of the first significant expenditures of City funds for stormwater planning in Hannibal's history.

Over the past decades, the City has relied upon federal assistance, primarily technical assistance from the U.S. Army Corps of Engineers for analysis of flooding along the Mississippi River and Bear Creek, and more recently the analysis of flooding along Minnow Branch. However, this assistance has not addressed the City's urban stormwater management systems, needs, program, or funding.

2.3 Board of Public Works

2.3.1 Current Duties and Responsibilities

Chapter 11 of the City Charter outlines the responsibilities and functions of the Board of Public Works (BPW), which provides traditional utility services to the community including electric power, drinking water supply and wastewater treatment. The BPW includes a technical and administrative staff reporting to a four-person board appointed by the Mayor and confirmed by the City Council. The utility functions are each accounted for independently and billed to City residents as part of BPW's services. Aspects of stormwater management are mentioned in several paragraphs of Section 11.07 of the City Charter (**phrases in bold font could be interpreted as relating to stormwater**):

Section 11.07. Powers and duties; establish rates.

The board of public works shall have the authority to construct, manage, supervise and control the municipal electric, water systems, and wastewater treatment and collection system, **artificial underground stormwater collection systems**, and any future additions and improvements thereto and of any other public facilities which the City of Hannibal may hereafter construct or otherwise operate, own or acquire.

The board shall have the exclusive power and the duty to establish rates and provide for the assessment and collection of charges for municipal electric, water, or sanitary sewer system **or other utilities**, or the product or **services of any other plant or works** of the city which the board may have under its supervision, control or operation. The board shall have additional powers, duties and functions as may be conferred upon it by ordinance.

All changes in rates, fees, or charges levied by the board of public works shall be preceded by a public hearing no longer than thirty (30) days nor less than fifteen (15) days prior to the rate, charge, or fee change.

No fee, charge or surcharge generating money for the general revenue fund of the City of Hannibal may be levied by the board of public works unless authorized by ordinance. Any such fee, charge or surcharge cannot exceed the rate of five and one half (5 1/2) percent of the charges for water, electric power, electric lights, and sewer services, **or other municipal services which the board may have**

under its supervision, control and operation, without the favorable vote of the majority of the qualified electors in a city election.

2.3.2 Recent BPW Funding Levels for Stormwater Operations

Under the City Charter, the BPW is responsible for stormwater in pipes and storm sewers. BPW does not collect fees for its stormwater management activities. BPW takes funds from its electric, water and (primarily) wastewater functions to undertake whatever stormwater activities it performs. For this reason, BPW typically spends less than \$5,000 per year on stormwater management.

Stormwater runoff has a direct link to the performance and cost of BPW's wastewater collection, conveyance, and treatment system. Excessive infiltration and inflow of stormwater into the sanitary sewer systems is evidenced by very high wet weather flows (as compared to dry weather flows). As part of BPW's efforts to control infiltration/inflow into the City's sanitary sewer system, and thereby reduce the peak flows going to the wastewater treatment plant, BPW has investigated storm drainage in sewers in various part of the City and from time to time becomes involved in corrective measures.

BPW is also responsible for the operation of the Bear Creek Dam (described in Volume 1, Section 2.9, page 24), which helps to reduce flooding along Bear Creek inside the City. BPW has never undertaken capital improvement projects for storm sewers in Hannibal.

3. Funding Methods for Stormwater Management

3.1 Overview of Local Government Funding

Funding of stormwater management should be considered in the general context of the authority and power of local government, and their governance structures and practices. These are fundamentally legal issues that are heavily influenced by the constitutional, legislative, and case law in each state, which range from narrowly restrictive to broadly authorizing. In the case of Missouri, the municipal funding environment is relatively restrictive. Although Missouri cities have a broad general authorization to perform stormwater management, and Home Rule authority is available to them, funding limitations constrain their flexibility and capability to fulfill this role.

Although the general public tends to view any form of governmental funding as a "tax", in fact the constitutional and legislative authorizations providing for various types of funding in the states and commonwealths of the United States create distinctions among them. The four primary stormwater management funding mechanisms used by municipal governments in the United States are:

- 1) general taxes (e.g., property, income, and retail sales taxes);
- 2) ad valorem and non-ad valorem special assessments;
- 3) exactions; and,
- 4) service fees (sometimes called User Fees or User Charges).

Courts in several states, including Missouri, have defined and characterized these various municipal funding mechanisms in order to distinguish among them. In doing so, they have assigned certain attributes to the different forms of funding available to local governments. Whenever a municipal funding mechanism is challenged in court, these attributes are examined to determine whether it is a tax, fee, exaction, or assessment in its actual application, regardless of how it may be titled.

The body of case law in Missouri associated with local government funding and particularly with stormwater funding is described in this section. A key issue in Missouri is whether a given funding method is subject to a ballot issue. In determining whether a municipal funding mechanism is properly structured and applied within the constraints and/or authority that pertain in a given situation, the Missouri courts have carefully considered the intent of the local legislative authority in determining the status of the funding mechanism at issue. The courts have also indicated that the nature of the municipal function associated with a given funding mechanism is very important.

Federal constitutional and legislative factors also apply. For example, federal civil rights laws prohibit discrimination based on persons' race, religion, gender and other specified factors. This extends to the application of local government funding through taxes and other mechanisms. The brief summary in this report is written from a management perspective and for background only, and does not constitute legal advice or counsel.

3.2 General Governmental and Proprietary Functions of Local Governments

The functions of cities, counties, and special-purpose districts are divided into “general governmental” functions and “proprietary” functions. General governmental functions are usually funded primarily through taxes of various sorts (property, income, sales, etc). In contrast, proprietary functions are normally funded wholly or primarily through service or user fees or charges. Exactions and assessments are not necessarily uniquely applicable to general governmental or proprietary functions. Exactions are most commonly associated with franchise rights, privileges, and development-related fees. Some exactions are limited in their application, while others are not and may be used for general governmental purposes. Special assessments are most commonly used to pay for capital projects serving limited geographical areas or clientele groups.

3.2.1 Utilities

Municipally owned and operated utilities commonly provide water supply, wastewater treatment, stormwater management, electricity, natural gas, and solid waste disposal. Utilities are usually operated as financially self-sufficient enterprise accounting units, and are commonly segregated from general fund accounts of municipalities or another government entity. (The Board of Public Works in Hannibal fits this model.) This enterprise approach typically involves a local government in a business-like operation that provides commodities or services to customers. Other enterprises such as parking garages have also been managed and funded as utilities in some states. Stormwater utilities have been established by more than five hundred communities nationwide in the past thirty years, including Kansas City and Columbia, Missouri.

Municipal water, wastewater, stormwater, and other activities have historically been viewed as proprietary functions of local governments. More recently, however, the basic nature of traditional proprietary functions has been changing and most are now largely regulatory in their application. There is a growing recognition in the courts that water supply, wastewater treatment, stormwater management, and solid waste disposal serve the general governmental function of protecting public health, safety, and welfare as well as the proprietary function of providing their respective services to customers.¹

The federal Clean Water Act (Public Law 92-500 and subsequent amendments such as the 1987 Water Quality Act) require that local governments (including Hannibal) apply for, obtain, and comply with stormwater discharge permits intended to limit the discharge of pollutants to receiving waters such as streams and rivers. This parallels the impact on local governments of the Clean Water Act (on wastewater treatment programs), the federal Safe Drinking Water Act (on water supply programs), and the federal Resource Conservation and Recovery Act (on solid waste management programs). The activities that local governments perform in each case are now dictated to a large degree by the regulatory role mandated by those various federal and associated state laws as opposed to the strictly proprietary

¹ In *Craig v. Macon*, the Missouri Supreme Court recognized that the purpose of mandatory solid waste collection services is to protect the public health by properly managing waste disposal, not merely a business function based on picking up individuals' refuse.

function local governments previously performed. This is significant because the degree of latitude given to local elected officials to make decisions on funding mechanisms incidental to regulatory functions of government is generally greater than that associated with funding of proprietary (business) functions that are not regulatory in nature.

The utility approach espouses a "user-pays" philosophy. Stormwater utilities typically employ service fees to support all or a large proportion of their programs in a manner similar to water supply, wastewater, and solid waste utilities. The utility approach to managing and funding stormwater control has been sustained in several state courts. In some of those cases the courts considered the type of physical systems typically involved, the functions commonly performed, and the relationship between service fee rates and the conditions on individual properties that place demands on the stormwater systems and programs.

Utilities usually employ service fees to generate the majority of the revenue for their specific purposes. The courts have generally held that service fees must be directly related to the purpose of the utility program (e.g., water supply, wastewater treatment, stormwater management, solid waste disposal), and must apportion the costs in a fair and reasonable manner. The service fees must bear a substantial relationship to the cost of providing the specified services and facilities. Fees are based on an equitable apportionment of costs rather than benefit, which is a characteristic of special assessments.

3.2.2 Stormwater Management as a Utility Function

The basic issue of whether stormwater management is a legitimate utility service is often challenged. Three reasons have been cited by cities and counties to justify managing and funding stormwater management as a utility.

1. In terms of the service responsibilities and functional activities associated with other municipal government programs, stormwater management most closely resembles water supply, wastewater treatment, and solid waste management. All have been subject to federal mandates in recent decades that impose increasing regulatory roles upon local governments coincidental to the provision of such services, and all are commonly managed and funded as municipal utilities.
2. The funding demands of a stormwater program are more similar to municipal water supply, wastewater treatment, and solid waste management programs than to other functions. Capital investment in infrastructure and continuous routine maintenance and remedial repair are required by all these functions. Stormwater management shares the regulatory nature of other municipal utility functions. Stormwater systems collect and dispose of stormwater in the same sense that a wastewater treatment program collects and disposes of sewage and a solid waste program collects and disposes of refuse.
3. Stormwater service demands are met by a combination of physical facilities and operational programs. The cost of the facilities and programs are related to the development

characteristics of individual parcels of property and activities taking place on those properties rather than the economic value of the properties. The economic value of a property does not necessarily determine its service demands on the stormwater system. Again, this corresponds most closely to water supply, wastewater treatment, and solid waste management.

Thus, cities and counties have contended that the inherent nature of stormwater management creates a parallel with water supply, wastewater treatment, and solid waste management functions. All of these functions involve the construction, operation, and regulation of an extensive system of infrastructure that requires a substantial capital investment. All are subject to federal mandates. As the infrastructure is being developed, the level of capital expense for large projects may vastly exceed the financial resources available in any given year. This may necessitate bonding to fund the major projects, which in turn requires a reliable source of funding to pay for the bond debt service. The physical systems deteriorate over time, necessitating periodic repair and replacement, which may also require infrequent but substantial expenditures. Stormwater systems must also be cleaned and otherwise routinely maintained to ensure their functionality, resulting in on-going operating expenses that require the adequate and stable funding that a utility typically offers. Asset management and life-cycle accounting practices applicable to public infrastructure treat stormwater systems in the same manner as water supply, wastewater treatment, and solid waste programs.²

Financing Capital Improvements – Utilities are uniquely well suited to the funding requirements of such functions. For example, virtually every local stormwater management program must build capital improvements to augment, alter, or replace natural drainage systems. Many of these capital improvements are very costly. Once a revenue stream is adequately demonstrated, a utility can utilize bonding to pay for the most costly of capital improvements in the same way that water and sewer utilities do. Bonding spreads the cost of facilities over a period of time more closely approximating the facility's useful life than is possible through some other funding methods. Through the design of a utility service fee rate methodology, bonding can tie the cost distribution to the demands placed on the systems by individual properties over time. Service fees can also be structured to recover the cost of both operations and associated non-operating expenses like operating and emergency reserves. These attributes are as applicable to stormwater management as they are to water, wastewater, and solid waste programs.

Service fees match Service Demands – The forms of funding available to utilities, most notably service (user) fees, allow greater flexibility in structuring funding to attain a desired distribution of costs than other funding methods such as property taxes. A general legal tenet is that utility funding must be consistent with the service and facility demands created by the users. Most other local government functions (e.g., police, social services, and libraries) are funded by various taxes, exactions, and assessments that have little or no relationship to demands placed on systems or programs by the users of these services.

² The Government Accounting Standards Board (GASB) Rule #34 dictates that capitalization of new infrastructure and recapitalization provisions for replacement of aging infrastructure be incorporated into cost and rate analyses for all manner of municipal utilities.

Distinct philosophies of local government funding have evolved to support general governmental functions and proprietary functions. Taxes, special assessments, exactions, and service fees must satisfy what the courts have said are their philosophical foundations as well as more specific characteristics, standards and tests in individual applications (e.g., the Keller factors in Missouri). The various state and commonwealth courts have not been uniform or consistent, however, in the degree of compliance they demanded with the philosophical foundation for each funding mechanism.

Fair & Reasonable Test – The stormwater management funding decisions in Hannibal must recognize the standards and norms that have evolved for various local government functions over many years, as reflected in the Missouri Constitution and legislation and in a body of judicial decisions, definitions, and tests that are applied. With regard to service fees or charges for various municipal government purposes managed as utilities, the philosophy that guides rate design is fairly well refined. The fundamental test applied by the courts to service fees or charges is that utility rate structures must be “fair and reasonable” and that the resulting fees or charges must “bear a substantial relationship to the cost of providing services and facilities”.

By “fair” the courts have deemed that service fees to similarly situated properties or customers should be similar, and that charges to dissimilar properties or customers should be relative to the differences in demands placed on the systems and the services required. “Reasonable” means that a rate structure should be proportional to the service provided. The “substantial relationship” between service fees and the cost of services and facilities requires that a logical linkage or “rational nexus” must be apparent. Mathematical precision is not usually required to satisfy any of these standards.³

Judicial Deference – The courts have allowed municipalities (and special-purpose agencies such as sewer districts) a high degree of flexibility in structuring their utility rates to reflect local needs and practices. One of the characteristics that sets service fees apart from taxes, exactions, and special assessments is the latitude the courts have extended to local legislative bodies (city, county, special-purpose district, and regional councils, commissions, and boards, etc.) to determine how service fee rates should be structured to achieve overall community objectives in providing water, sewer, stormwater, solid waste, electric, gas, and other such services and facilities. This broad latitude is generally termed “judicial deference.”

Under judicial deference, the courts commonly presume that a utility service fee rate structure adopted by local elected officials or boards is appropriate and correct in their community unless a plaintiff can conclusively demonstrate that the local officials acted in an arbitrary and capricious manner in adopting the rates, or that the results are illegally discriminatory. Therefore, a plaintiff challenging a utility service fee rate structure bears a very large burden of proof. This allows a broader philosophy to be applied to service fees than to other municipal funding methods, yielding a variety of utility rate structures for water supply, wastewater treatment, solid waste management, stormwater management, and even electricity and gas services. As a result, utility rate structures tend to be generally consistent but rarely identical from place to place. None of this, however, diminishes the need to assess the impact of the Hancock Amendment on any prospective service fee in Missouri, since the design of rates is independent of the procedural issue.

³ See *Craig v. City of Macon, MO*.

In most cases involving stormwater utility service fees the term “stormwater service” has been broadly interpreted. For example, stormwater service has been generally accepted to include, but not be limited to, the following:

- improvement, operation, and regulation of systems to provide collection, conveyance, and treatment of stormwater;
- protection of properties from stormwater runoff;
- pollution control; and,
- support of vehicular and pedestrian transportation, mobility, and access to properties.

The underlying philosophy evident in the design of stormwater service fee rate structures in other cities and counties reflects the fundamental tests that the courts have commonly applied to other types of municipal utility service fees. Stormwater service fees or charges are usually based on the factors that influence the peak rate of runoff from properties, the total volume discharged, and (in some cases) the pollutant loads carried in the stormwater because these impacts translate more or less directly into system and program demands and thus costs.

Benefits to Individual Property Owners Not Significant – Benefit is not a characteristic of service fees and charges and is not usually quantified in the calculation of stormwater service fees and charges. “Benefit” has a relatively specific and limited legal definition in terms of local government funding methods. Benefit has been the foundation of non-ad valorem special assessments, which must reflect the “direct and special benefit” peculiar to each individual property resulting from the subject project or, in some instances, program. Benefit is technically contained in the form of increased utilization of the property assessed, not simply an increase in the economic value of the land. Some assessment concepts do, however, dictate that special assessments not exceed the value of a property after the beneficial improvement is realized. The standards, tests, and specific methods allowed for quantifying benefit differ from state to state.

It is possible to consider some of the “benefits” of stormwater management in the design of a “service fee” rate structure if the local legislative body perceives a given benefit to be of service to a property in a broad sense. However, this does not require that “benefit” be specifically quantified in service fee calculations for individual properties in the same manner that would be required for non-ad valorem special assessments.

For example, while stormwater quality management may provide a “general benefit” to the entire community, it would be extremely difficult to quantify the “special benefit” derived from stormwater quality management accruing to individual properties. It can be fairly stated that providing improved water quality is a “service” to the community at large that realizes a “general benefit” of better public health. However, the service of stormwater quality management does not create benefits peculiar or special to individual properties.

In this context, the “benefits” to the community in general resulting from a stormwater quality management program can justify recovering the cost through a broadly-distributed service fee even though specific water quality “services” are not performed for individual properties. Likewise, provision

of adequate drainage service along roadways is generally beneficial to the community in the form of safer driving conditions, but a special benefit would be difficult to assign to specific drivers or pedestrians. A comparable logic has been applied to justification of universal wastewater treatment and solid waste fees to all properties. Even though an individual property owner or manager may choose to dispose of its own wastewater or refuse independently, the existence of a public disposal system is a "service" to that property as a result of the overall enhancement of public safety it creates. This is generally consistent with the Missouri Supreme Court's decision in *Craig v. City of Macon*.⁴

Demand for Services – "Demand on the systems" is considered in the design of most utility rates, especially when variations in demand may have meaningful impacts on the cost of services and facilities. Practically speaking, demand on the systems is one way of quantifying the cost of facilities and activities associated with their long-term operation as a representation of the "cost of service". For example, some electric utilities structure rates so peak hour demand costs more than non-peak hour demand. Peak hour generation and transmission demands often translate directly into higher system requirements and costs. Increased peak hour electricity rates thus reflect the cost impact of peak hour demand on capacity provisions in the system. Similarly, stormwater rate structures based on impervious area might also be interpreted to be highly reflective of peak demand, since impervious surfaces greatly increase peak rates of runoff and require large capacity increases in stormwater conveyance and detention systems if flooding, erosion and other problems are to be avoided.

The short-term cost of stormwater services and facilities is primarily a function of peak demand (system capacity), associated engineering, system maintenance needs, and compliance with water quality mandates. In today's local setting, stormwater quality control is not likely to be a dominant factor in the cost of services and facilities, but is clearly an increasing priority for citizens and municipal administrators. In light of the courts' broad perspective of the philosophy supporting service fees in general and the latitude allowed to local elected officials, Hannibal would be justified in adopting a philosophy of stormwater management funding that reflects the cost of providing services and facilities to meet capacity demands and maintenance needs. Benefit could be a secondary consideration. However, it is an appropriate consideration only to the degree that a service fee rate methodology or other funding methods are used to fund services in the form of systems and activities that are of general benefit to the community, e.g., stormwater quality management and public education to promote personal safety during flood events.

The design of a stormwater service fee rate methodology translates the utility funding philosophy into "real life" by determining the apportionment of the cost of services and facilities across the community. The critical issue is how stormwater service fee rates are structured to ensure that the philosophical objective is attained. As suggested above, a philosophy of funding stormwater management that primarily reflects the cost of providing services and facilities is consistent with a "utility" approach, as contrasted to the benefit philosophy of "special assessments" and other municipal funding philosophies underlying taxes, exactions, etc.

⁴ *Craig v. City of Macon*, 543 S.W.2d 772, in which the Missouri Supreme Court held that the provision of solid waste collection and disposal is not strictly to serve an individual person or property, but rather to ensure that refuse is properly managed to ensure protection of the public health, safety, and welfare.

3.3 Overview of Funding Sources for Stormwater Management

The following revenue sources and funding methods and mechanisms may be appropriate for some or all of the costs of stormwater management in Hannibal.

- 1) General Fund appropriations
- 2) Stormwater service fees
- 3) Fees for plan review, development inspection, and special inspection
- 4) Special assessments
- 5) Bonding
- 6) In-lieu of construction fees
- 7) System development charges
- 8) Impact fees
- 9) Developer extension/latecomer fees
- 10) Federal and state funding opportunities

The information presented in this section is somewhat generic. More specific reference to funding mechanisms provided by Missouri statutes is contained in Section 4.5 addressing constitutional, legislative, and case law issues.

3.3.1 General Fund Appropriations

The stormwater management program in Hannibal has been funded from the City's General Fund appropriations for many years. Although it is difficult to identify all expenditures related to stormwater management, total spending by DPW including direct capital outlays over the past ten years has probably amounted to approximately \$5,000 annually. The General Fund, with approximate annual revenues of \$21,500,000, clearly has sufficient revenue to support an increase in stormwater management funding either through a reallocation of current resources or tax increases, though it is questionable if either option would be politically popular.

Reliance on General Fund support of stormwater management apportiones the costs in relation to the sources of revenue for that fund, which are primarily property and sales taxes. This presents something of an inequity in the sense that many properties and people that place demands on the stormwater systems and services are exempt from such general revenue taxes. For example, there are numerous schools, churches, and other properties that do not generate property tax revenue. Such properties do not currently participate in funding stormwater management through the City's General Fund, yet they discharge a substantial proportion of the total stormwater runoff in Hannibal.

Even some private properties, for example discount retail stores, parking lots and warehouses that have large expanses of impervious coverage, do not pay General Fund taxes commensurate with the demands they impose on the stormwater systems. Conversely, other properties have little impact on stormwater runoff but pay substantial property taxes. They are paying more for stormwater management through the General Fund revenue sources than they would through other funding methods, for example a service fee that reflects the service demands placed on the stormwater program and systems.

Hannibal's General Fund revenues are relatively stable from year to year but appropriations for any specific purpose are uncertain. Revenues within the General Fund are not dedicated to any specific purpose, and allocations shift with perceived priorities. Stormwater management needs are likely to receive better treatment in the budget in a year following severe storms and drainage problems than in a year following a drought. This makes it difficult to plan and consistently carry out a long-term program plan that depends on reliable funding year after year.

3.3.2 Stormwater Service Fees

Under the Missouri Constitution and statutes, cities are generally enabled to conduct stormwater management, although the structure of municipal stormwater programs and the methods of funding are not dictated by law. A city's general authority is supplemented by federal and state laws that confer a water quality regulatory role upon local governments through the National Pollutant Discharge Elimination System. Stormwater service fees appear to be within Missouri cities' scope of general authority and police powers, and in fact have been adopted in Kansas City and Columbia. There is no specific rate methodology that must be followed in setting service fees. Under a legal concept termed "judicial deference" the courts grant city councils broad discretion to structure service fees as they see fit, which would allow the Hannibal City Council to apportion the cost of stormwater management across the community as deemed appropriate through the design of a service fee rate structure.

Although most local governments that employ service fee funding for stormwater management do so under a stormwater utility, that mechanism is not necessarily dictated. Several communities in Missouri and other states have integrated a stormwater service fee with other water resource management fees, most commonly wastewater service fees. For example, the St. Louis Metropolitan Sewer District (MSD) has a specific fee that is allocated solely to the stormwater component of the sewerage systems the agency operates. Independent cost centers and rate methodologies are typically employed for stormwater and other functions in these cases. Most of the communities using this approach have extensive "combined" sewers that collect and transport both stormwater runoff and sanitary sewage.

Regardless of whether Hannibal opted to have an integrated or separate service fee, it would quite likely be subject to the Hancock Amendment to the Missouri Constitution. If a stormwater fee was incorporated into BPW's wastewater service fee it would be appropriate to have a separate stormwater rate methodology supporting a separate cost center within the existing wastewater enterprise fund or an independent enterprise fund. It is almost certain that any covenants associated with wastewater bonds presently in force would dictate that an "arm's length relationship" be established and maintained between stormwater and wastewater budgets and funds. A variety of rate methodologies could be applied

in either case. The primary consideration would be to establish an adequate linkage between the cost of providing services and facilities and the apportionment of those costs through the rate structure.

Differences between Stormwater and Wastewater Management – It must be emphasized that the system demands that result in the costs of service that the wastewater and stormwater programs incur do not have the same origin and the same rate methodology should not be used for both. Wastewater treatment costs are associated primarily with the quantity and strength of domestic and industrial sewage, while stormwater costs are related principally to peak flow of surface runoff which is heavily influenced by land development practices and patterns. Different types of rate methodologies would therefore be needed for wastewater and stormwater management service fees in the event that a consolidated fee is adopted. Simply increasing the City's current wastewater rates to recover stormwater management costs is not technically supportable. The other Missouri cities that have established stormwater utilities have kept the stormwater utility separate from the wastewater entity and have used independent service fees.

Significance of Impervious Area – Stormwater service fee rates are most often based on conditions on properties that affect the peak rate of runoff, total volume discharged, and pollutant loadings on receiving waters. The most common rate structures used by cities in Missouri and nationally are based on the amount of impervious area (roofs, paved areas, etc.) on each property. Impervious coverage increases the proportion of rainfall that runs off the land during and following rain storms. Stormwater rates have also been based on the gross area of properties and a factor that reflects the intensity of development (most notably in Bellevue, Washington and Cincinnati, Ohio). A few cities and counties have incorporated both gross area and impervious area or the percentage of imperviousness into their rate calculation (for example, Denver, Colorado).

Simplified residential rates are common, with many stormwater service fee methodologies having a flat-rate charge for all single-family residential properties. Service fee charges to non-residential properties are normally higher than residential charges, reflecting the greater runoff they typically generate. An "equivalent residential unit" approach is often used to equate service fees on non-residential properties to the rate applied to residences. Monthly residential rates typically range between \$3.00 and \$5.00, although a few very advanced programs charge as much as \$12.00.

The revenue generated by a stormwater service fee is a function of the design of the rate structure and the make up of the community. Based on the experiences of comparable communities, a typical rate structure might be expected to generate between \$20 and \$50 per gross acre annually for each \$1 per month billed to residential properties. Thus, a \$3 per month service fee might generate \$60 to \$150 per acre each year, although the higher figures are typical of densely developed urban areas like Cincinnati, Ohio and Seattle, Washington.

A stormwater service fee, whether established under a stormwater utility or a wastewater utility, could be coordinated with other funding methods. Revenue from service fees and other types of fees examined in this report (including allocations of General Fund resources) can be blended to tailor the apportionment of stormwater management costs as the City Council sees fit.

Equity of funding can be enhanced through the service fee rate design process. For example, stormwater service fees may be applied to non-taxable (public) as well as privately owned properties. In comparison to tax-based funding strategies, use of a service fee relieves taxable (private) properties of a portion of the cost of stormwater management.

Credits to Owners & Developers for Stormwater Improvements – Service fees also offer the opportunity to incorporate incentives such as credits to reward responsible stormwater management such as on-site detention of runoff, and to compensate for activities performed by the property owners which are beneficial to the stormwater management program. Griffin, Georgia offered a credit to the local school district to incorporate a “water-wise” curriculum in the district’s science program that would satisfy one element of the City’s NPDES permit.

No specific legislative authority is needed to incorporate credits and offsets as an element of a stormwater service fee rate methodology. The authority to adopt credits and offsets is generally encompassed by the basic ratemaking powers provided to locally elected officials. That authority includes the latitude to establish a variety of stormwater utility service fees and appurtenant rate modifiers such as credits and offsets to achieve what the authority believes is an equitable allocation of costs.

Credits are frequently included as part of a stormwater service fee rate methodology. Offsets are not. As noted previously, the courts have generally deferred to locally elected officials in deciding what is appropriate for their communities, especially in terms of service fee rate design. Courts in several states have also cited the existence of credits as a characteristic of service charges (as distinguished from taxes) in cases where a stormwater service fee has been challenged.

Credits against stormwater service charges are most commonly used to account for the mitigative effect of on-site controls. In that sense, the credits are like industrial pre-treatment credits for industrial wastewater dischargers. Credits may also be given for activities or functions performed by individual property owners that reduce the demands borne by the public entity. The credits are usually “conditional”, i.e. they are predicated on a property owner's continuing compliance with an approved design and operating standards established by the stormwater management agency or on continuing provision of an activity subject to a credit. Credits usually continue as long as the applicable standards are met or the activities are provided.

In comparison, offsets are one-time, dollar-for-dollar allowances for extraordinary expenses that produce a public benefit. For example, if a developer has installed a regional stormwater detention system that provides storage capacity in excess of that normally required for such a development, the cost of upstream regional detention or downstream public stormwater conveyance systems may be reduced. In such cases, a one-time offset against a service fee might be granted to the developer for the additional incremental capital expense of providing the excess capacity.

The stability of revenue from a stormwater service fee ensures that long-range scheduling of capital improvements and operations can be done with reasonable assurance that funding will be available. Another advantage of a stormwater service fee might be to free up City’s General Fund resources for

other purposes, though the "windfall" in this case would be inconsequential because the City has historically spent virtually nothing on stormwater management.

The biggest potential disadvantages of a stormwater service fee are the high visibility and the cost of development and implementation. Regardless of technical distinctions between taxes, exactions, assessments, and service charges, any form of government funding will be viewed by a majority of citizens and property owners as a "tax" and will thus be potentially unpopular. The cost of stormwater utility implementation in Hannibal is estimated to be \$150,000 to \$250,000 depending on the rate methodology selected. This figure assumes that the preferred rate methodology is similar to those in use elsewhere.

3.3.3 Plan Review, Development Inspection, and Special Inspection Fees

Hannibal has been reviewing stormwater improvement plans in conjunction with development approvals for many years. Although there is no specific statutory authority for special service fees for stormwater management plan review and inspections, these reviews could reasonably be included under the scope of a stormwater service fee rate methodology since these are clearly fees for special services.

The rationale for including such fees in a rate methodology is based on the origin of demand for service concept, in which costs are apportioned only among those whose needs require a specific service. The full range of services and facilities provided by a stormwater management program is not uniformly required throughout a community. Some services, such as plan reviews and inspections, are provided only to a specific clientele. Instead of distributing the cost of such services among all service fee ratepayers, special service fees can be adopted which apply only to the parties who are served.

Fees of this type are often incidental to the performance of specific regulatory activities that are intended to protect the public health, safety, and welfare. Some of the regulatory activities may be mandated by federal and/or state requirements or as conditions of NPDES stormwater discharge or other permits. In other cases special purpose fees are simply intended as a cost recovery mechanism that assigns the expense to a specific clientele that is served.

Special fees may have applications beyond plan review and inspection services. For example, experience has demonstrated that on-site detention systems tend to deteriorate rapidly after about five years. Maintenance is sometimes deferred, or alterations may be intentionally or unintentionally made to facilities, compromising their functionality. Annual or biannual inspections may be required to ensure that on-site systems are properly cared for and not altered from their approved design. It would seem appropriate that the cost of such inspections be assigned to the specific property owners through special fees, thus relieving the general service fee ratepayers of that cost of service.

Adoption of special fees to recover the costs of such functions would require that other City fees associated with the same reviews or inspections be evaluated to ensure that developers are not being charged twice for the same services. This might require adjustments in other fee schedules, and accounting changes to ensure that the special fees for stormwater plan review, inspections, etc. are allocated to a stormwater enterprise or special revenue fund.

3.3.4 Special Assessments

For many decades capital improvements to stormwater drainage systems in many states were commonly funded through special assessments upon benefited properties or special taxes (e.g., sales taxes, gasoline taxes). The special assessment concepts in the United States evolved from historic English ditch law concepts originally conceived to pay for drainage of farmlands. The historic assessment concept was predicated on allocating drainage costs to the farmers in proportion to the direct and special benefits they individually derived in the form of increased crop yields and grazing use. This led to methodologies that were associated with the value of the enhanced use of the land rather than the demands placed on the drainage systems.

Chapter 88 of the Missouri statutes authorizes the creation of special assessment districts to finance public improvements, including stormwater management facilities. The statutes provide that a city must draw a district and determine the improvements to be made that will benefit the district. A district is established by ordinance adopted by the City Council after a public hearing. The ordinance must reflect the total assessment and method of assessment. The city assigns a portion of the total cost of the improvements within that area to each parcel in the district. Special tax bills are issued and are payable in 60 days or in installments over a period of up to 10 years. Tax bills paid in installments include interest. If a property owner defaults on the tax bill, the remedy is to pursue a tax foreclosure sale.

Inherent shortcomings of special assessment funding as applied to stormwater drainage systems in an urban setting have also become increasingly evident in recent years. The chief drawback of the traditional special assessment methodology is that the distribution of costs must be proportionate with the direct and special benefit accruing to each property being assessed. The benefit must be definable, measurable in some economic manner, and available to the property being assessed within a practical timeframe. General benefits accruing to all properties as a result of a stormwater improvement cannot be used to justify a special assessment, for example better traffic movement along roads that are not frequently flooded or improved water quality.

The courts have established substantially different standards for special assessments versus service fees. Broad latitude is given to local elected officials in setting service fee rates. Special assessments must comply with more restrictive technical standards based on individual benefit. Fully complying with the standards the courts have set for special assessments requires more precise and costly data than is needed to support a service fee, which must simply be fair and reasonable in its general application.

As a result, special assessments for drainage are most workable in a very localized application. For example, improving a ditch or channel that directly serves a few properties or a relatively small area is an appropriate project for special assessment funding. A special assessment is less suitable for capital projects that serve a wide area, and wholly unsuited to facilities providing a general service (or benefit) to the community at large as compared to specific individual properties. Because so much of what must be done to effectively manage stormwater quantity and quality in Hannibal is not directly and specially beneficial to individual properties, assessments are not workable as the prime source of funding for the stormwater management program priorities projected for the foreseeable future.

While the provisions of Chapter 88 provide a method for creating special assessment districts to finance improvements in particular areas, this approach is not widely used in Missouri. The special tax bills that are issued are not a familiar concept for investors and are not widely marketable, unlike municipal bonds. The only remedy for investors, if a landowner defaults, is to institute a tax foreclosure sale on the property, a lengthy procedure that requires strict compliance with statutory guidelines. This adds to the unattractiveness of this mechanism to investors.

Nationally, the pressure to identify new funding methods has increased as assessments have become less and less suitable for stormwater management programs and projects in recent years. The emerging "watershed" orientation of stormwater master planning and improvements accentuates the limitations associated with special assessments. The advent of an increasing local government role in stormwater quality management has further eroded the usefulness of special assessment funding, since it is particularly difficult to demonstrate the direct and special benefit of stormwater quality management to individual properties.

A stormwater utility special service fee can be used instead of a special assessment to isolate certain costs to a limited number of properties or persons served by a specific capital improvement or program activity. A special service fee is much more flexible than an assessment, can be applied to large areas as well as small, and does not have to meet the more rigorous benefit tests applicable to direct and special benefit allocations. Instead, a special service fee adopted under the umbrella of general ratemaking practices must adhere to the standards generally applied to service fees.

When employing special service fees in situations where special assessments might have been used in the past, it is vitally important that a consistent approach be applied. A level of service provided to one portion of the service area and funded through the normal service fee should not be subject to a special service fee in another portion of the service area unless the long-term cost for that comparable level of service is clearly so different that a special fee can be justified. Just as wastewater utilities do not charge customers located farther from a wastewater treatment plant a premium over those located nearby, special service fees are rare except in cases when significant differences in the cost of providing a comparable level of service exist.

The other circumstance in which special fees are sometimes used is when a capital improvement is expedited apart from normal priorities or is designed and built to a higher level of service than normal. The departure from normal priorities or service level can be translated into a special service fee. The drawback to such practices is that the public may perceive it as an elitist policy enabling more affluent customers to "buy their way up" the priority list or obtain more service regardless of what objective program priorities may be.

3.3.5 Bonding

The Missouri Constitution and statutes authorize the use of bonding for capital improvements to local infrastructure, including stormwater systems. Bonds are not a revenue source, but simply a method of borrowing for debt service on other revenue sources. Capital improvements can also be funded through

annual budget appropriations, but annual revenue resources are often insufficient to pay for major capital investments.

The chief advantage of bonding is that it allows construction of major improvements to be expedited in advance of what could be funded from annual budget resources. This is accomplished by spreading the costs over time, much like a home mortgage or automobile loan enables a buyer to acquire assets they could not buy for cash. In the case of stormwater management, expediting a capital project by several years through bonding may result in significant public and private savings if flooding, other damaging impacts, and inflation of land acquisition and construction costs are avoided. The major disadvantage of bonding is that it is essentially a loan that incurs an interest expense, which increases the total cost of capital projects, land acquisition, etc.

Two types of bonding are available to cities and counties in Missouri, revenue bonding and general obligation bonding. General obligation bonding incurs a debt that has first standing with regard to public assets and is backed by the "full faith and credit" of the issuing agency. General obligation bonds require voter approval. All revenues, including various taxes, may be used to service a general obligation debt. In contrast, revenue bonding is supported and ensured only by particular revenues specified in the bond covenants, such as service fees.

Creation of a separate source of revenue that is earmarked specifically for stormwater management (e.g., a stormwater service fee) would allow the City to sell revenue bonds to pay for stormwater capital improvements if market acceptance was attained for the bonds. However, revenue bonding issued by Hannibal would not be backed by the full faith and credit of the City, and would likely incur a slightly higher interest rate in the bond market. Recent history suggests that the bond market has recognized the stability of stormwater service fee income, and has priced stormwater revenue bonds favorably.

It is also possible to issue general obligation debt that is backed by the full faith and credit of the issuer but has debt service funded from a designate revenue source like service fees. This is commonly referred to as "double-barreling" of bonds. It typically attains the same bond rating and interest rate as general obligation debt without requiring a general tax increase, although the fall-back position for the bond holders is a covenant by the issuer that its full faith and credit is ultimately behind the bond.

Bonds are not intended to be a funding mechanism for day-to-day operations, but some costs can be viewed either as a capital or operating expense. For example, the lack of a clear distinction between remedial repairs and new construction has resulted in bonding sometimes being used for major repairs that might also be considered an operating expense. Given the stormwater needs in Hannibal, the most appropriate use of revenue bonding would be for capital construction and acquisition of land and easements for maintenance access to the many creeks and ditches in the community.

3.3.6 In-lieu of Construction Fees

In-lieu of construction fees are not specifically authorized under Missouri law, but might conceivably be adopted as one element of a comprehensive stormwater service fee rate methodology. The need for in-lieu of construction fees stems from problems associated with requiring on-site detention systems on

numerous residential subdivisions and commercial properties. Detention systems store stormwater runoff during the peak of a storm event and slowly release it afterward, and have been shown to reduce the discharge of pollutants by allowing some settling to take place. However, on-site detention requirements result in small and relatively inefficient systems on private properties, which often are not properly maintained. They tend to deteriorate rather quickly, and can be easily modified or even eliminated entirely without the City's knowledge. A proliferation of small detention facilities quickly creates an inspection and enforcement problem for a local government. Fewer large systems serving many properties would be more reliable and efficient, but on-site detention involves a private developer paying for the facility whereas the general public usually pays for regional systems.

An in-lieu of construction fee offers a practical option that may be preferable to both developers and the City if widespread use of on-site detention systems becomes a strategic element of the long-term stormwater management plan. Developers would simply be required to pay a fee in-lieu of building an on-site system, assuming that the off-site impacts on properties immediately downstream of the development could be avoided.

In-lieu of construction fees are sometimes confused with impact fees and other development exactions (see below). However, in-lieu of construction fees are usually a substitute for requiring on-site solutions, and may be used even in instances when an on-site system would work. In contrast, impact fees are generally used to pay for off-site measures to compensate for the service-demand effects of a development that are not solvable on-site. For example, the impact of a shopping center on stormwater runoff might be resolved either by requiring an on-site detention system or by building a regional facility off-site that is paid for in part through in-lieu of construction fees. Shopping center traffic that clogs nearby roads cannot be solved on-site, but an impact fee might be used to pay for additional traffic lanes and/or signalization to mitigate the impact on roadways for some distance away from the shopping center.

The major advantage of in-lieu of construction fees is that the City (and thus the taxpayers or ratepayers) would not solely bear the capital expense for regional detention and other systems to mitigate the runoff impact created by private development projects. Developers would be required to mitigate the impact of their projects, and the long-term regulatory problems of numerous on-site detention systems would be avoided.

The most important disadvantage of in-lieu of construction fees is that they rarely generate sufficient revenue to fund construction of regional detention facilities or to enlarge conveyance systems. This dictates that other revenues must be available to initially build regional facilities, so the taxpayers or ratepayers are burdened with the up-front cost. In-lieu of construction fees can be a meaningful component of total long-term cost recovery, however. It is also necessary that well-refined capital improvement plans be available from which the cost of the necessary regional improvements can be determined as the basis for setting in-lieu of construction fees.

3.3.7 System Development Charges

System development charges are also known as capital recovery charges, capital facilities fees, utility expansion charges, and by other titles. They are not specifically provided for by authorizing legislation in Missouri, but have been incorporated implicitly into stormwater and other utility service fee rate structures in Missouri and elsewhere.

Capitalization charges differ from impact fees. Instead of being based on impact mitigation through additional improvements or systems, they are usually designed to recover a fair share of the prior public investment in excess infrastructure capacity from a developer who makes use of that additional capacity. In most cases, the excess capacity has been provided in anticipation of development projects. It is usually a more economical and prudent long-term policy to anticipate growth-related stormwater service demands than to attempt to increase service capacity as growth occurs.

There are several ways of structuring and calculating capitalization charges, including the growth-related cost allocation method, the system buy-in approach, the marginal incremental cost approach, and the value of service methodology. These differ from in-lieu of construction fees and impact fees primarily in terms of: 1) the fundamental purpose of the charges; 2) their relationship to the point in time when improvements are made versus when the charges are collected; and 3) their relationship to specific facilities which are funded through service charges. In most cases, system development charges are related solely to capital costs, as opposed to operating expenses. However, some justification may exist in certain circumstances for incorporating long-term operating expense associated with system capacity into a capitalization charge.

System development charges basically provide a mechanism whereby developers participate in paying for excess capacity that was previously built into a public system in anticipation of their needs. In effect, a system development charge allows a deferral of participation in the capital cost of a facility until a property is developed and makes use of the provisional capacity. The use of such fees for stormwater management capital costs is clearly appropriate since most drainage systems are consciously designed to provide excess capacity to accommodate future development in an economical manner.

When contained within a user fee structure, a stormwater capitalization charge is typically structured to reflect the basic rate methodology employed. Most stormwater service fees are based on impervious area. The obvious result is that only developed properties are charged a service fee. Undeveloped properties do not have impervious area and therefore are not charged. However, capital facilities being funded by the service fee will usually be designed with future conditions in mind, including the impact of growth. This results in excess capacity being incorporated into the system and being paid for solely by currently developed properties under an impervious area methodology. A capitalization charge may therefore be adopted as a recapture mechanism to ensure a fair and reasonable allocation of the capital costs among all properties using the facilities over time. The calculation of a capitalization charge may also include a system depreciation factor so that a development built near the end of the useful life of a facility pays only for the portion of the life cycle when it is using the capacity provided.

Some communities have adopted a service fee rate methodology which bills undeveloped as well as developed properties. This is most common when extensive major capital improvements to the systems are being funded and built and it is desirable to spread the cost as widely as possible to keep rates low. If designed to properly allocate capital costs, this type of rate methodology can obviate the need for a capitalization charge to recapture deferred financial participation. However, this approach also poses a potential inequity. It is based on speculation that all undeveloped properties will be developed to the design condition within the life cycle of the facilities and make use of the capacity provided, which may or may not be a reasonable assumption in all cases.

3.3.8 Impact Fees

Impact fees are a developer exaction that has been associated with a variety of public infrastructure components across the United States. Impact fees are often popular with existing residents who wish to see developers pay the entire cost of new capital facilities. Naturally, they are just as often highly unpopular with developers. Specific applications of this type of funding method have been the subject of a great deal of litigation nationally. An unusual aspect of impact fees is that state courts around the country have been notably inconsistent in their definition of them and decisions on their application.

Standards have evolved for adopting and applying such fees and have been institutionalized in legislation in several states. Development sector interests, particularly home builders associations, have taken the offensive and gained adoption of impact fee laws in several states that impose so many administrative burdens and limitations on use of impact fees that they are essentially impractical as a funding source for stormwater system improvements.

Impact fees are typically limited to situations in which the impact of new development on existing infrastructure systems is: 1) measurable and certain; 2) of definable geographic or systemic extent; and 3) quantifiable in terms of the incremental capital investment that will be required to maintain (not attain) an adequate service level. The final point is critically important in terms of stormwater management systems. Few of the local stormwater systems that have problems could be described as providing an adequate level of service at the present time. Impact fees cannot be used to bring an inadequate existing system up to an adequate service level, and thus are not useful in correcting the many problems that currently exist in the stormwater systems in Hannibal. Impact fee revenues must also be earmarked for specific projects or uses, must be expended relatively quickly, and, if not spent for the stated purpose, must be returned to the developer, often with interest.

Even though there is some new development and redevelopment taking place in Hannibal, most of it cannot be reliably shown to demand additional service capacity exceeding what would be provided by an adequate system (if one was in place). The City simply does not have the engineering analyses and master plans to support such a position. An impact fee would therefore generate little revenue and place burdensome administrative demands on Hannibal to manage and track the use of the funds. A system development charge adopted as part of a stormwater service fee rate structure is a better mechanism to ensure that new development participates fairly in the cost of facilities. SDCs differ from impact fees in several important ways (see System Development Charges, above).

3.3.9 Developer Extension/Latecomer Fees

Developer extension/latecomer fees are not specifically provided for in Missouri statutes as a source of funding extensions of stormwater systems, but might be within the authority of local governments if adopted as part of a comprehensive stormwater service fee rate structure. They are not a revenue mechanism, but rather a means of properly distributing capital investment costs among several properties when a facility is built by one developer with excess capacity to accommodate adjacent or nearby properties that are to be developed subsequently. The most common use of this type of fee around the country is for water and sanitary sewer system extensions.

A developer extension/latecomer fee works in the following way. Developer "A" proposes a project that requires a stormwater (or water, or sewer) system with "x" capacity. Practical design considerations indicate that a larger system should be installed to properly serve other nearby properties that are currently undeveloped but would be likely to use the system when they are developed in the future. Developer "A" therefore is required to build a larger system than necessary simply to serve his or her property, and incurs an additional cost. Property owners subsequently tapping into the improved system when their development occurs are charged a one-time fee by the administering agency for connecting to it, and the fee is then transferred to Developer "A".

This type of fee is supposed to be structured so that Developer "A" and all other property owners ultimately bear a fair proportion of the capital cost associated with system. The administering agency typically receives no revenue from the fee, although some do charge administrative expenses on top of the capital cost that is being distributed by this funding mechanism. This type of fee appears to be practical and feasible for Hannibal, but only in the future when the capital improvement needs have been fully defined for local areas and development standards are adopted requiring provision of excess service capacity as a condition of development approvals.

3.3.10 Federal and State Funding

Hannibal has all necessary authority to make use of federal and state government grants and loans that might be available to help support its stormwater management program. The only action needed is for the City Council to apply for and accept various grants and loans. However, with the exception of the funding that might possibly be available in the future from the United States Army Corps of Engineers or the State of Missouri's revolving loan fund for water quality management, there are few federal and state funding mechanisms for local stormwater management programs. Federal involvement in stormwater management (other than regulatory programs) is typically limited to advisory assistance, cooperative programs like those provided by the United States Geological Survey and the Corps of Engineers, and emergency response following devastating floods.

4. Trends for Stormwater Management Programs

4.1 Introduction

In response to widespread stormwater problems in Hannibal, City officials in Hannibal are interested in finding ways to improve the delivery of stormwater management services and facilities. As described in Section 2, the City currently provides a stormwater management program that is essentially reactive. Hannibal wishes to consider options for increasing operational services and upgrading its drainage infrastructure to provide a higher level of service. Doing so will require additional funding, which is not possible with present resources unless other City programs are reduced. That is likely to be deemed unacceptable to the community, which dictates that the revenue stream of existing funding sources be enhanced and/or that new sources be found.

The scope, extent, and level of stormwater service to be provided is one of the key issues that must be addressed before the feasibility of prospective funding methods can be evaluated. Scope of service involves "what" stormwater management functions the City wishes to provide. Extent of service has two dimensions: 1) the geographical area where the City will perform stormwater management; and, 2) the delineation of which components of the drainage systems will fall under City operation and management. The level of service involves performance standards, in terms of physical capacity and the frequency at which various activities are performed.

This section provides an overview of the trends and changes in stormwater management across the United States and a strategy for upgrading stormwater management in Hannibal. The purpose of this projection is simply to describe the program elements likely to be needed in the future and roughly estimate the magnitude of the funding requirement so the feasibility of various funding options can be weighed in an appropriate context. If the City deems one or more of the funding options to be feasible, then these need to be examined in greater detail in a follow-up phase.

4.2 Historical Trends in Stormwater Management

Communities perform stormwater management to meet a variety of objectives and at differing levels of service based on their perceptions of needs and purposes. Various patterns of stormwater management have occurred over the years, and these have evolved as the base of knowledge, experience, values, and external influences change. Thus, there are many possible trends on any topic or issue that exist at a given point in time. Different trends may emerge, ascend, coalesce with other perspectives, and fade away as circumstances change.

In the case of stormwater management, a series of shifts have occurred historically in the United States. The pace of change has accelerated in the past thirty years. Key changes have been driven by (or at least have paralleled) broader social, economic, legal, and governance trends. In particular, the stormwater management role of local government has significantly changed as a result of federal environmental protection laws and court decisions. Significant advancements in engineering, technology, and management systems have facilitated these changes.

Notably, stormwater management is no longer concerned only with flood protection or drainage of water. Nor is it a purely local issue. The extension of the federal government's National Pollutant Discharge Elimination System (NPDES) to municipal stormwater discharges, which began in 1990, has brought water quality to the forefront. Watershed management and comprehensive water resource management (including water supply, wastewater treatment, groundwater protection, and other issues) are the keynotes of current emerging trends. This has hastened the obsolescence of old stormwater management practices that were primarily oriented toward flood protection and erosion/sedimentation control.

There have been many stormwater management trends in the United States. These trends correspond chronologically to the country's evolution from the exploratory period of the 17th and 18th centuries, through the agricultural period and emergence of the industrial age in the 19th century, to the modern scientific/technical era of the 20th and, now, 21st centuries. Significant change has occurred in many aspects of stormwater management and the roles of local government over this lengthy period.

Early Patterns of Storm Water Management – In the colonial period small-scale stormwater management was principally performed for agricultural purposes, such as increasing crop yields and facilitating animal husbandry. The objective was to control the quantity of runoff, by routing it into and through conveyance systems such as ditches to discharge into ponds, lakes, streams or rivers. The earliest perspective of stormwater management in cities paralleled the rural approach – put the stormwater into ditches and get it away from actively used properties. The predominant thinking was that “If it is good enough for the farm, it is good enough for town”. English ditch law concepts were adopted in the American colonies to organize these efforts and apportion the costs. Many local governments were also involved in building flood protection works during this period, since the cities and towns were typically located along rivers that provided the primary mode of transportation.

It soon became apparent that open drainage ditches might work fine for farms, but they create problems in towns. A trend slowly emerged of putting stormwater into wood-stave pipes. Benjamin Franklin noted that a primary objective of piping stormwater in Philadelphia was to keep women's petticoats from dragging in muddy streets and paths. This practice evolved with new technologies as brick, metal, and concrete became the materials of choice for containing and conveying stormwater runoff.

As towns grew into larger cities the control of human wastewater became an issue, resulting in the installation of pipes and brick sewers to collect, convey, and discharge sewage. This presented a new opportunity to capture and discharge stormwater as well, and “combined sewers” became common during the 19th century as urban centers like Boston, Baltimore, Philadelphia, New York City, and St. Louis developed. Of course, they weren't known as combined sewers then because the concept of separated sanitary and stormwater sewers was not formally introduced until the 20th century.

Early 20th Century – Treatment of sewage prior to discharging it to receiving waters became the preferred practice early in the 20th century for public health reasons. By then, combined sanitary sewage and stormwater sewers were common. At about the same time, the introduction of the automobile contributed to a new stormwater trend based on collecting and channeling stormwater off the rapidly expanding road surfaces as quickly as possible and installing larger drainage systems to prevent road flooding. Road

drainage systems significantly increased the flow in the combined sewer systems. Engineers soon realized that installing separate sewers for wastewater and stormwater would be economically more efficient because the volume of wastewater requiring treatment could be significantly reduced by putting stormwater into separate systems. Separation also reduced the frequency of sewage overflows when conveyance and treatment system capacities were exceeded.

Trends in the 1970s and 1980s – By the 1970s it was recognized that simply collecting and discharging stormwater as rapidly as possible was not working. Trends evolved to control the peak volume of stormwater runoff that reached the structural drainage systems and was discharged downstream. Essentially, the plan was to keep water from the storm sewers, ditches, and channels rather than rushing it into those facilities. The concept of small-scale stormwater detention emerged to attenuate peak flows, and the 1970's and 1980's have been described as the era of "detention mania". In many communities on-site detention was required on all new commercial and residential subdivision developments, resulting in a rapid proliferation of relatively small systems of dubious design and construction quality. However, such systems failed to solve downstream flooding problems in many cases because so much development had preceded the inauguration of on-site runoff control requirements.

Watershed Perspectives – Thus emerged the trend to consider the hydrology of the drainage systems from a broader perspective, often involving entire watersheds. This was facilitated by the introduction of computerized hydrologic modeling of both closed and open drainage systems in the late 20th century. However, even such sophisticated analytical capability did not ensure solutions. Construction of improvements was often delayed because of the high costs and a lack of funding. More than one community simply procrastinated until the next severe storm and flood event occurred, when the quandary for funding reappeared.

Water Quality – By 1980 an additional concern was emerging – the impact of stormwater runoff on receiving water quality. So this trend involved the control of both flooding and pollution. This led to the development of so-called Best Management Practices, or BMPs, intended to reduce the amount of pollution being discharged in stormwater runoff. By the 1990's this morphed into a broader trend concerned with the overall ecology of receiving waters. Wildlife and fisheries habitat, species diversity, water quality protection, and aesthetic interests became influential forces in stormwater management.

At the close of the 20th century the next extension of that trend promoted the concept that "water is water" in all its varied forms and circumstances, and it should be managed holistically. As we begin the 21st century, this has now begun to merge disparate interests such as water supply, wastewater treatment, stormwater management, groundwater protection, coastal zone management, and other related issues into a more cohesive approach to water resource management generally. Perhaps most significantly, these concerns and concepts have been institutionalized in legislation and regulatory mandates at the federal level.

Blending of Funding Methods – A pattern has emerged in recent years as more cities and counties adopt stormwater management strategies that include both quantity and quality control and adopt funding to meet the increasingly diverse needs their stormwater programs entail. Funding strategies have become

more complex, often involving several revenue sources instead of a single method. A city or county may rely on one funding mechanism to provide the bulk of the needed revenue, but in many cases special-purpose funding has been selectively used to pay for certain capital improvement, operating, or regulatory functions. This has resulted in a blending of funding methods and funding philosophies that fit with the more complex programs.

Increased Community Participation – It should also be noted that community participation in local governance issues has been radically altered by the emerging internet technology and the dawning of the information age. Direct involvement and participation of the public in stormwater management planning, and in decisions on issues such as funding, are now the norm rather than the exception. Manifestations of this include the now common practice of assembling a stormwater advisory committee as part of the investigative and planning process and conducting community surveys to elicit public comments.

4.3 Overview of Municipal Stormwater Management Services

The stormwater management practices of cities, counties, and special-purpose districts are changing rapidly as new trends emerge, technology improves, environmental laws become more rigorous and more strictly enforced, community expectations increase, and the risk and expense of failing to solve drainage problems grows. Prior to the 1970's, municipal stormwater management was typically reactive. It was given a secondary status and often ignored entirely. Most local governments did little to effectively manage stormwater drainage and virtually nothing to mitigate its water quality impacts. Even flooding incidents typically elicited only short-term reactive measures that addressed symptoms rather than causes. Few true solutions were attained. Deferring solutions to drainage problems makes little long-term sense, but it has been a prevailing practice for many municipalities over the years.

The most visible stormwater problems that cities deal with are flooding, channel erosion, and sedimentation. These result in highly visible, damaging, and sometimes life-threatening impacts. In contrast, pollution of receiving waters due to stormwater runoff is long-term and more subtle impacts than flooding and erosion. Stormwater quality management has gained visibility and a higher priority in the past thirty years, in part due to mandates contained in the 1972 Clean Water Act (CWA)⁵ and 1987 Water Quality Act amendments to the CWA. The City of Hannibal must now comply with a National Pollutant Discharge Elimination System (NPDES) permit for its stormwater systems. This increasing emphasis on water quality dictates that local governments undertake a preventive approach rather than reactive.

There is a broad range of activities that may be performed by a municipal stormwater management program (see **Table 1**). Few communities perform all of these activities. These activities can be classified as administration, public involvement and education, billing and finance, stormwater quality management, engineering and planning, operations, regulation and enforcement, and capital improvements.

⁵ Public Law 92-500

Table 1
Stormwater Management Functions

| | |
|---|--|
| Administration <ul style="list-style-type: none">General AdministrationGeneral Process Planning & DevelopmentInter-local Coordination Public Involvement and Education <ul style="list-style-type: none">Public Awareness and EducationPublic InvolvementStanding Citizen's and Focus Groups Billing and Finance <ul style="list-style-type: none">Billing OperationsDatabase ManagementCustomer ServiceFinancial ManagementCapital OutlayOverhead CostsCost ControlSupport Services Stormwater Quality Management <ul style="list-style-type: none">Quality Master PlanningRetrofitting ProgramMonitoring ProgramStructure and Non-Structure BMP ProgramsPesticides, Herbicides and FertilizerUsed Oil and Toxic MaterialsStreet Maintenance ProgramSpill Response and Clean-UpProgram for Public Education and ReportingLeakage and Cross ConnectionsIndustrial ProgramGeneral Commercial and Residential ProgramIllicit Connections and Illegal DumpingLandfills and Other Waste FacilitiesCombined Sewers ProgramGroundwater and Wellhead ProtectionDrinking Water ProtectionWatershed AssessmentsSeptic, Inflow, and Infiltration Corrections | Engineering and Planning <ul style="list-style-type: none">Design Criteria, Standards and GuidanceField Data CollectionMaster PlanningDesign, Field and Operations EngineeringHazard MitigationZoning SupportMulti-objective Planning SupportGIS and Database ManagementMappingLand Use Planning & Controls Operations <ul style="list-style-type: none">General Maintenance ManagementGeneral Routine MaintenanceGeneral Remedial MaintenanceEmergency Response MaintenanceInfrastructure ManagementPublic Assistance Regulation and Enforcement <ul style="list-style-type: none">Code Development and EnforcementGeneral Permit AdministrationDrainage System Inspection and RegulationZoning and Land Use RegulationsSpecial Inspection ProgramsFlood Insurance ProgramMulti-Objective Floodplain ManagementErosion Control Program Capital Improvements <ul style="list-style-type: none">Major Capital ImprovementsMinor Capital ImprovementsLand, Easement, and Right-of-Way |
|---|--|

4.4 Functions of a Stormwater Management Program

The successful management of stormwater in a community involves several functions. Stormwater processes occur across a complex infrastructure of inlets, gutters, storm sewers, ditches, channels streams, and rivers. Stormwater events bring temporary forces into the community environment that can move and float objects and erode soils; flood yards, driveways, streets and even structures; and even threaten human safety and cause loss of life. Management of this infrastructure involves engineering and planning for the physical system, regular operation and maintenance to ensure proper function during the next events, and financing of these functions. Capital improvement programs are frequently necessary to upgrade the infrastructure for satisfactory operation. And the improved understanding of environmental relationships has lead to federal regulation of stormwater quality. All of these functions can fit into the operation of a stormwater utility.

4.4.1 Engineering & Planning

Engineering and planning is a basic function for successful management of stormwater runoff. Design standards for the physical system are needed to ensure adequate capacity for the passage of storm flows. With the variations in storm events, it is reasonable to design for the small, frequently occurring storms, and even the moderate-sized occasional storms. However, it becomes financially impractical to build for the large, infrequent storms, so analysis is warranted to determine what represents the greatest benefit to the community.

Engineering and planning can entail maintaining and enforcing a set of practical design standards for the community governing the current system and future development. A physical inventory of the stormwater infrastructure is valuable to assess the condition and capacity of the system, and to identify bottlenecks that cause problems. Mapping and geographical information systems (GIS) can aid in tracking these physical assets.

Planning for stormwater can preserve 100-year floodplains for land uses that are compatible with periodic flooding, such as parks and recreation and open space corridors. Planning can also identify conflicts between stormwater processes and residential, commercial, and industrial land uses, and where improvements are needed to reduce risks of property damage and threats to human life.

Encroachment of building or property improvements into stream channel banks can reduce the area available for passage of stormwater flows. Over a period of years, construction on the banks of channels, without consideration to the watershed and hydraulic factors, can constrain peak storm flows and create flooding and property damage upstream. The acquisition of easements for the adequate passage of storm flows can prevent future encroachment into channels and aid in remedying any existing encroachment problems.

4.4.2 Operations & Maintenance

Operation and maintenance of the stormwater system is needed to ensure the functional integrity of the constructed system, as well as remove blockages and maintain system capacity. Inlets, pipes and culverts

can accumulate trash and debris carried by stormwater runoff and reduce the capacity to carry flows. Flooding can result if these pathways are not maintained. There will be critical places around the community, particularly streets and intersections, sidewalks, yards, and even buildings that can be vulnerable to flooding when the system loses capacity to convey flows.

Natural processes cause the deterioration of inlets, pipes and culverts that make up the stormwater system, and soil erosion around these components and along channels can threaten structures nearby. Periodic inspections are needed throughout the system to assess the condition and identify critical places where repairs, replacement or other remedial measures are necessary.

4.4.3 Billing & Finance

A stormwater utility must have funding mechanisms in place to pay for infrastructure improvements and operations. Stormwater utilities can receive funding from service charges or the collection of taxes, fees or other assessments. Billing of customers served by the utility is a basic function that requires a list of accounts and provisions for closing old accounts and opening new ones as ownership changes. Financial management is needed for the receipt and disbursement of funds. Budgeting for revenues and expenses is needed for prudent management.

4.4.4 Stormwater Quality Management

In recent years the federal government has extended the National Pollutant Discharge Elimination System (NPDES) to stormwater in an effort to maintain the environmental quality of the nation's waterways. The most recent iteration applicable to smaller cities and towns is known as "NPDES Phase II", and is hallmarked by discharge permits issued to local governments. Hannibal, by virtue of its population, has become part of this program, and is required to maintain a stormwater permit and program to improve water quality of stormwater discharges. There are six management practices that communities are required to implement under this program, termed "minimum control measures". These are as follows:

- 1) Public education and outreach
- 2) Public participation/involvement
- 3) Illicit discharge detection and elimination
- 4) Construction site runoff control
- 5) Post-construction runoff control
- 6) Pollution prevention/good housekeeping

Compliance with the federal program is not optional and is a logical part of a stormwater utility.

4.4.5 Capital Improvements Program

Deficiencies in the stormwater infrastructure can arise due to lack of capacity in parts of the system or the physical deterioration of structures or features. As communities grow or change, pipes or culverts that were once adequate in size may become too small to handle the increased runoff. Land uses within a watershed can change, causing increased runoff into drainage systems.

A capital improvement program (CIP) is needed to address a variety of issues. CIPs for stormwater improvements can encompass minor projects to remedy deficiencies at specific locations, and it can include major projects to overhaul or upgrade parts of drainage systems within entire watersheds. CIPs for stormwater can focus on providing an adequate number and size of inlets feeding drainage channels or storm sewers having enough capacity to carry storm flows away from buildings and roadways. CIPs can address erosion of stream banks that threaten streets, bridges, homes or commercial/industrial buildings. CIPs can address areas where public safety is compromised by flooding, i.e. roads or intersections that are periodically flooded and interfere with the travel of emergency vehicles or where vehicles may become stalled or trapped by rising waters.

CIPs entail the expenditure of public funds for improvements that benefit the community. Easements for stormwater passage are typically needed where private property extends across creeks or streams, or where storm sewers or culverts must pass beneath private property. In many cases easements may already exist, and in other cases easements may have to be modified or extended to enable construction and access for maintenance of stormwater improvements. New easements may have to be acquired where substantial flows occur that could impact property owners up or downstream.

4.5 Missouri Constitutional, Legislative, and Case Law Considerations

4.5.1 Overview

Legal issues are at the forefront as the City of Hannibal evaluates its stormwater funding options. However, the legal environment associated with local government finance also has a political corollary that must be recognized. Of special importance in Missouri, the Hancock Amendment to the Missouri State Constitution imposes certain requirements and standards on the process for implementing some forms of local government funding that may affect the City's stormwater management program and funding strategy. Under Hancock, the legality of some funding methods may be tied to a formalized political acceptance process involving voter approval of a ballot issue authorizing a tax, service fee, or other mechanism.

The possibility of adopting stormwater management service fees raises the issue of whether these fees would be subject to the Hancock Amendment. This issue is not clear cut, however, and recent case law suggests rate design concepts and procedural steps that may eliminate the requirement that a fee be subjected to a ballot approval. In any case, it may be desirable in a political sense to seek the public's acceptance through a vote. Thus, the City Council must weigh both the legal and political aspects of the issue.

Although this report includes general legal information, it does not constitute formal legal advice to the City. If the City decides to evaluate the acceptability of one or more of the funding methods described in this report, we strongly recommend that the City's attorney and/or special legal counsel be engaged to assess the applicability of the Hancock Amendment and other legal issues.

4.5.2 Legal Framework of Local Government Funding in Missouri

The legal framework of local government (city, county, special-district) funding in Missouri is extensive. Cities in Missouri have a variety of types of funding available to them.

Requirements for New Land Development – The City's police powers extend to regulatory measures necessary to protect the public health, safety and welfare. Several funding options are associated with the City's police powers, especially with regard to the City's administration of land development. Development exactions are a general category of funding mechanisms associated with development regulations. The law allows a city to require a person seeking development approval to give something to the city or to a common maintenance entity as a condition of such approval, but certain limitations and requirements exist for the application of development exactions.

Traditionally, cities, through the exercise of their police/regulatory powers, have required developers to construct public improvements required to support the development, dedicate land necessary for such improvements, or pay a fee in lieu of either construction or dedication of land as a condition of a specific development's approval. Typically, these development exactions have been imposed at the time of zoning or subdivision approval, with the understanding that the contribution would take place at no cost to the entity requiring the dedication.

In 1987, the United States Supreme Court decided the case of *Nollan v. California Coastal Commission*, in which it held that the 5th Amendment required there be a "rational nexus" between the public interest and the condition chosen to effectuate that interest, i.e., in this case between the need to ensure adequate street capacity and an approval condition requiring improvements to the street network. Then in 1994, the United States Supreme Court decided the case of *Dolan v. City of Tigard*, which expanded on the "rational nexus" by further explaining the degree of connection required.

The Dolan decision held that any condition that required the conveyance of an interest in land must be roughly proportional to the need for new public facilities generated by the proposed development. A precise mathematical calculation is not required, but the entity imposing the condition must make some type of individualized determination that the required dedication is related both in nature and extent to the impact of the proposed development. In other words, there must be a process to determine that there is the appropriate degree of relationship between the required dedication and the impact of the development that is required to convey the interest in land. At a minimum, there must be some methodology used to quantify the development's impact and the amount of the dedication required to offset that impact.

The United States Supreme Court has yet to decide whether Dolan's "rough proportionality" requirement applies to conditions of approval that do not involve the conveyance of an interest in land, such as fees in lieu, escrow payments, impact fees and other regulatory fees. Lower federal courts and state courts are

divided on the issue of the "rough proportionality" application beyond land dedication requirements. Some courts have applied the test to fees imposed on an adjudicative or ad hoc basis, but not to fees imposed through an area-wide, generally applicable legislative enactment. Others have applied the test only to conditions requiring the conveyance of an interest in land and not to fees at all. Missouri cases have not specifically addressed the issue, post-Dolan. They hold only that there must be a "reasonable relationship" between the condition and need for the condition.

An impact fee is a type development exaction requiring the development applicant to pay a fee as a condition of development approval. As stated above, there is some disagreement among the courts as to the application of the Dolan "rough proportionality" test to monetary exactions such as impact fees. Impact fees would likely be exempt from the election requirements of the Hancock Amendment to the Missouri Constitution (addressed later in this report) if the fee is structured to be consistent with Missouri case law related to user fees; otherwise, an election would be required at which a majority of those voting on the question would be required to approve its imposition.

All impact fees collected must be spent for improvements that benefit those who pay the fee. This requirement has temporal, spatial and other constraints. The fees paid must be spent within a reasonable period of time from the date paid and must be spent on the type of facility improvements for which it is paid, and in a location that provides benefit to the feepayer. The amount of the fee collected with respect to each development cannot exceed an amount that reasonably reflects the cost of constructing those improvements that are required as a result of demand for new facility capacity created by the development.

There is no specific statutory authority for cities in Missouri to impose impact fees, but such authority may be inferred from several sources. The general authority to conduct city planning and enact zoning and subdivision regulations could be found to provide implicit police power authority to implement impact fees, although this issue has not been decided by the Missouri courts. With respect to constitutional charter cities, so long as there is no provision in the applicable charter that expressly or implicitly prohibits the imposition of impact fees, the charter would provide authority to enact impact fee ordinances, pursuant to their home rule powers.

Basic Taxing Powers – Hannibal has a range of basic taxing powers, with limitations as contained in the Missouri Constitution and laws adopted by the legislature. Excise taxes are one form of taxation. An excise tax is a method of raising revenue by levying a tax on a particular activity. An excise tax has been defined as a tax that is measured by the amount of business done, income received, or by the extent to which a privilege may have been enjoyed or exercised by the taxpayer, irrespective of the nature or value of the taxpayer's assets or investments in business. It is different than a property tax, which is a tax on the assessed value of property.

Excise Taxes – An excise tax is not subject to the benefit or nexus requirements of a fee imposed pursuant to a city's police/regulatory power, such as an impact fee (see above). This means that for the tax to be legal, there need not be a quantifiable relationship between the tax imposed and the demand for public services created by the activity upon which the tax is imposed; such as a new development and the

resultant demand for new streets, water, sewer, parks or other public facilities that new development creates.

An excise tax's purpose is to raise revenue, not to pay for costs created by the activity upon which the tax is imposed. There is no legal limit on the rate of an excise tax that could be imposed, so long as it is not confiscatory. Neither is there a prescribed methodology a city must use to establish the rate of the tax. In establishing the tax rate, a city is constrained only by its duty to exercise its legislative power reasonably. However, to establish a tax rate that will generate revenues sufficient to meet identified costs, a city may use a tax rate calculation methodology that takes into consideration the extent to which the taxpayers generate the need for the revenues. So long as the requisite authority exists, the tax is adopted in conformity with the procedural and substantive aspect of that authority, and the methodology used to set the rate is reasonable and not confiscatory the tax should be valid. The Hancock Amendment to the Missouri Constitution prevents an excise tax from being imposed unless first approved by a majority of those voting at an election on the question.

Unlike an impact fee, the funds collected from an excise tax do not have to be "earmarked" for a particular purpose, such as street improvements or drainage infrastructure and operations. The funds collected from an excise tax may be simply placed in a city's general fund for use for any valid public purpose. While "earmarking" of funds is not legally necessary, from a practical standpoint, a city could state that the purpose of the excise tax is to provide for stormwater improvements. This could be done in a number of different ways, including specific limitations in the ballot language pursuant to Hancock, specific language in the ordinance adopting the tax or less formally through the adoption of a resolution.

The Missouri General Assembly has enacted authority which specifically allows third class and special charter cities to impose an excise tax in the form of a license tax on "building contractors." Constitutional charter cities also have this authority unless there is contrary language in the city's charter.

Sales Taxes – Missouri statutes authorize cities to impose a sales tax of up to one-half of one percent on all retail sales in the municipality for the purpose of funding capital improvements, including operation and maintenance. The sales tax must be authorized by the City Council and approved by a simple majority of the voters in an election. If the measure fails to obtain a simple majority, it cannot be resubmitted to the voters for at least 12 months. A city may issue bonds to be retired from revenues derived from the capital improvements sales tax. Such bonds must be approved by either four-sevenths or two-thirds of those voting at the election, depending upon the election date when the issue is submitted to the voters. (See General Obligation Bonds below).

Missouri statutes authorize a city to impose a sales tax of one-half of one percent on all retail sales in the municipality to generate revenues specifically for transportation purposes, which may extend to those stormwater systems located within road rights-of-way. The sales tax must be authorized by the City Council and approved by a simple majority of the voters in an election. The proceeds of the tax must be used for transportation purposes, which is defined to include the construction, reconstruction, repair and maintenance of; the acquisition of lands and rights-of-way for; and planning and feasibility studies for streets, roads and bridges; and the financial support of public mass transportation systems. Storm water

conveyances associated with streets can be built using the proceeds of this tax. This statute also authorizes a city to issue bonds for transportation purposes to be retired by the revenues from the sales tax imposed. These bonds do not count against the city's debt limit.

State statutes also authorize cities to impose a sales tax of up to one-half of one percent on all retail sales in the municipality for the specific purposes of providing funding for stormwater control or for local parks, or both. The City of Hannibal has exercised this option within its jurisdiction. The sales tax must be authorized by the City Council and approved by a simple majority of the voters in an election. If the measure fails to obtain a simple majority, it cannot be resubmitted to the voters for at least 12 months.

Property Taxes – Missouri Revised Statute § 88.832 enables any municipality to levy a tax on all property made taxable for state purposes in the amount necessary to pay for the construction, reconstruction, and repair of a general sewer system. The tax is called a "special public sewer tax" and may be of the amount required for the sewer provided by ordinance to be built. The tax is imposed over the entire municipality on each lot. In addition, a district sewer may be created by ordinance by a petition of a majority of real property owners or whenever the municipality deems a sewer district necessary for sanitary or other purposes. The district sewer is funded by a special tax imposed on each lot in the district. It appears that this statute may extend to combined sanitary/stormwater sewers or even to separated stormwater sewers when the improvement and management of such systems is associated with efficient provision of wastewater collection and treatment.

Chapter 88 of the state statutes authorizes the creation of special assessment districts to finance public improvements, including stormwater management facilities. The statutes provide that a city must draw a district and determine the improvements to be made that will benefit the district. The district is established by ordinance adopted by the City Council after a public hearing. The ordinance must reflect the total assessment and method of assessment. The City assigns a portion of the total cost of the improvements within that area to each parcel in the district. Special tax bills are issued and are payable in 60 days or in installments over a period of up to 10 years. Tax bills paid in installments include interest. If a property owner defaults on the tax bill, the remedy is to pursue a tax foreclosure sale.

While the provisions of Chapter 88 do provide a method for creating special assessment districts to finance improvements in particular areas, this approach is not widely used in Missouri. The special tax bills that are issued are not a familiar concept for investors and are not widely marketable, unlike municipal bonds. The only remedy for investors, if a landowner defaults, is to institute a tax foreclosure sale on the property, a lengthy procedure that requires strict compliance with statutory guidelines. This adds to the unattractiveness of this mechanism to investors.

Community Improvement Districts – State statutes also authorize the creation of Community Improvement Districts (CID). A CID may be initiated by petition signed by 1) property owners collectively owning more than 50% by assessed value of the real property within the boundaries of the proposed district and 2) more than 50% per capita of all owners of real property within the boundaries of the proposed district. The petition must include a five-year plan stating a description of the purposes of the proposed district, the services it will provide, the improvements it will make and an estimate of costs

of these services and improvements to be incurred. The petition must also include the maximum rates of real property taxes that may be submitted to the qualified voters in the district for approval, the maximum rates of special assessments and the methods of assessment that may be proposed by petition, and any other proposed limitations on the powers of the district. The statutes require the City Council to hold a public hearing on a proposed CID within 45 days after the petition is filed. The CID may be established by ordinance by the City Council after the public hearing.

A CID may be established as either a political subdivision or as a not-for-profit corporation. If the CID is established as a political subdivision, it is governed by a board of directors that, as specified in the petition, is either elected by the qualified voters in the district or appointed by the City. If the CID is a not-for-profit corporation, the directors are selected in accordance with the provisions of Chapter 355 of the statutes (general not-for-profit corporations law).

The statutes provide a CID with a variety of enumerated powers, including the authority to construct, reconstruct, install, repair, maintain, and equip public improvements including parks and streets. The improvements in a CID organized as a political subdivision or a not-for-profit corporation may be funded by the imposition of special assessments. Special assessments may be imposed only by the board of directors by resolution after receipt of a special assessment petition signed by 1) owners of real property collectively owning more than 50% by assessed value of the real property within the boundaries of the district and 2) more than 50% per capita of all owners of real property within the boundaries of the district. The petition must also specify the projects to be funded by the special assessments, the method of allocation, the amount of the proposed assessments, and the expiration date of the assessments. If the CID is a political subdivision, the improvements may also be funded by a real property tax levied within the district after approval by a majority of the qualified voters within the district.

Neighborhood Improvement Districts – Missouri statutes also authorize the creation of Neighborhood Improvement Districts (NID). Under the NID statutes, particular areas of land may be designated by the City Council as a "neighborhood" that will benefit from a particular public improvement or improvements, including streets and parks. Landowners within each designated neighborhood must authorize the formation of the NID either by a vote of approval or by submission of a petition to the City Council signed by the owners of record of at least two thirds by area of all real property located within the proposed NID. A NID proposed by election requires the same percentage of affirmative voters of all qualified voters residing within the proposed district as is required for approval of general obligation bonds (see below). Upon receiving the requisite voter approval or a filing of a petition, the City Council may by resolution or ordinance determine the advisability of the specified improvements and order that the district be established.

If an NID is approved, the City Council may authorize the issuance of general obligation bonds to finance construction of improvements. To secure the bonds, a portion of the total cost is assessed against each landowner within the NID and the special assessment becomes a tax lien against the property. The method of apportioning assessments among the property owners within the NID is established prior to the creation of the NID. The bonds may be issued without a vote of the public if the city agrees to rely on existing revenues and surpluses as a source of repayment in the event that the special assessments made

against property in the NID prove to be insufficient to fund repayment. Bonds issued pursuant to this option do not count against a city's regular debt limit, but cannot exceed 10% of the assessed value of tangible property in the issuing city.

State statutes authorize cities to establish special business districts for specified areas of the city upon petition by one or more owners of real property in the proposed district. The purpose of the law is to grant to such districts the power to levy special fees and taxes in each district for the maintenance and improvement of the special business district. Property owners in the district may be taxed on an ad valorem basis at the rate of \$.85 per \$100 of assessed valuation. Businesses may be assessed a license tax (subject to a protest by businesses representing a majority of the total license taxes).

The taxes and fees of a special business district may be used for the purpose of maintaining and improving public facilities in the district, which conceivably could include stormwater infrastructure. Discretion as to the types and amounts of expenditures lies solely with the City Council, which appoints a commission or advisory board to make recommendations as to expenditures and uses. The district may issue general obligation bonds for up to 20 years, if authorized by the City Council and approved by either four-sevenths or two-thirds of the voters in the district voting in an election, depending upon the election date when the issue is submitted to the voters. These general obligation bonds count against the City's statutory debt limit.

Tax Increment Financing – Missouri statutes allow cities to use tax increment financing (TIF). The basic concept behind tax increment financing is that the redevelopment of the area approved as a redevelopment district will increase the equalized assessed valuation of the property, thereby generating new revenues to a City that can be used to pay for specified costs of a redevelopment project. These costs may include installation, repair, construction and reconstruction of streets and acquisition and construction of other public facilities within a redevelopment area, including stormwater drainage infrastructure.

Property taxes and other revenues generated by the existing development in a legislatively defined redevelopment district are frozen when the redevelopment is approved by the City Council and the increased property tax and a portion of other revenues generated by the new development are captured and placed in a special fund to pay for the costs of redeveloping the area. Those new property tax revenues are the source of the term "increment," and they are also referred to as "payments in lieu of taxes" (PILOTs). In addition to the PILOTs, the development may also capture up to fifty percent of certain locally imposed taxes (commonly referred to as economic activity taxes or "EATS") such as local sales, franchise taxes and utility taxes and local earnings taxes to fund project costs.

Certain new state revenues (one-half of general state sales tax or one-half of state individual income tax withheld from new employees in the redevelopment area) generated by a redevelopment project may also be captured under limited circumstances where the area subject to TIF is blighted and is located in either an enterprise zone, federal empowerment zone, or a central business district or urban core area with at least one 50 year old building and that suffers from 20 year pattern of declining population or property tax revenue. State statutes also authorize bonds to be issued that are paid from the PILOTs and EATs

generated in the redevelopment area. The bonds do not count against the City's debt limit. The TIF statute limits the areas of the City that are eligible for TIF to "blighted," "conservation" (near blighted) or "economic development" areas as defined in the statute. It should be noted that the constitutionality of the use of TIF in "economic development" areas has been questioned.

Transportation Development Districts – Missouri statutes authorize a City to create transportation development districts encompassing all or a portion of the City. The statutorily-stated purpose of a transportation development district is to fund, promote, plan, design, construct, improve, maintain, and operate one or more transportation projects or to assist in such activity. A transportation development district is created by submission of a petition to the circuit court from either 50 registered voters in each county in the district, by owners of real property in the district, or by the City Council. The petition must identify the district's boundaries, each proposed project, and a proposal for funding the projects.

After receipt of a petition for a transportation development district and a hearing to determine that the petition complies with the law, the circuit court enters a judgment certifying the questions regarding creation of the district, projects to be developed, and proposed funding for voter approval. If a simple majority of registered voters or property owners included in the district boundaries (depending on the type of petition submitted to request creation of the district) vote in favor, the transportation development district is created. If the issue fails, it cannot be resubmitted to the voters again for 2 years. If approved, an election is held within 120 days to elect a board of directors for the district.

Once created, a transportation development district is a separate political subdivision of the state with powers such as condemnation, the power to contract with parties, to lease or purchase real or personal property, and to sue and be sued. A City has no control or jurisdiction over transportation development district projects, unless the control is agreed to by contract. However, the board of directors of the district cannot increase or decrease the number of projects in the district without first obtaining authorization of the voters and the approval of the Missouri Highways and Transportation Commission and/or the City, depending on the project.

A transportation development district may fund approved transportation projects (subject to the approval of a city or the Missouri Highway and Transportation Commission, depending upon the project) utilizing one or more financing mechanisms authorized in the election. These projects could reasonably include improvements to drainage infrastructure. The financing mechanisms available are special assessments, property taxes, sales taxes and tolls. The amount of a sales tax may not exceed 1 percent. After enactment, the sales tax is subject to a citizen petition for an election to repeal the tax. There is no statutory limit on the amount of special assessments or tolls that can be imposed. Transportation development districts are also authorized to issue bonds, including revenue bonds, by resolution of the board of directors without a vote of the public. These bonds do not count against a City's debt limit because they are issued by the district (a separate political subdivision of the state) and not by the City.

Transportation Corporations – State statutes authorize the creation of private, non-profit transportation corporations. Transportation corporations are private entities formed to "fund, promote, plan, design, construct, improve, maintain, and operate one or more [transportation] projects or to assist in such

activity." Transportation corporations are created by submission of an application signed by at least 3 registered voters to the Missouri Highways and Transportation Commission requesting that the Commission authorize creation of a transportation corporation to act within a designated area. The application must include preliminary plans and specifications, including the proposed plan for financing a project.

Transportation corporation projects are limited to those that will be a part of the state highways and transportation system. The transportation corporation is governed by a board of directors appointed by the Commission, and is granted the power to contract, to lease or purchase real or personal property, and to sue and be sued. Transportation corporation projects are subject to approval by the Missouri Highways and Transportation Commission. Transportation corporations are authorized to charge fees for services and to collect tolls for use of transportation corporation projects. Transportation corporations are also authorized to issue bonds, including revenue bonds, by resolution of the board of directors without a vote of the public. The maximum amount of the fees and/or tolls that may be collected or bonds that may be issued is not set by statute.

County, state and federal programs exist that may provide a funding source for improvement projects, including stormwater infrastructure. Such programs would be available only for projects meeting the criteria of the particular aid program and may only be available for improvements forming a part of the funding entities' network, i.e., federal funds for U.S. highways, state funds for State highways etc. Although some grants may be available, most programs will require a local "match" by a City to pay a specified portion of the project costs in order to leverage the funds from the other governmental entity. Most of these funding decisions require substantial lead time, and for some types of improvements, funding decisions may have already been made for virtually all of these funds for the immediate future, i.e., streets, roads and highways.

General Obligation Bonds – Subject to certain constitutional and statutory limitations, primary of which is a constitutional limit on the total amount of debt a City can incur based upon a set percentage of its assessed valuation, a City has the ability to raise funds for street and other public improvements by the issuance of general obligation bonds. General obligation bonds are long-term obligations of a City backed by its full faith and credit. General obligation bonds may be used to pay for all or a part of public infrastructure costs. General obligation bonds must be authorized by a vote of the public. The vote requirement for their issuance is four-sevenths at the general municipal election day (April), primary election day (August), or general election day (November) and two-thirds at all other elections.

Revenue Bonds – Missouri cities are also authorized to issue revenue bonds. Revenue bonds are typically issued to finance facilities that have a definable user or revenue base. They are obligations that are secured by the pledge of a specific source of funds from the facility or project which is financed. Citizens using the services pay for the financing costs through the rates or fees that are charged. These types of bonds are typically used to finance water, sewer, and utility improvements.

Market acceptance of revenue bond issues is dependent upon the necessity and viability of the underlying improvement and the certainty of a regular and sufficient stream of revenue from the project to retire the

resultant debt in accordance with an established schedule. The issuing resolution and contract usually require the issuer to charge adequate fees in order to amortize the debt, maintain the financed facility, and fund certain reserve requirements. The interest and principal of these bonds do not constitute an indebtedness or obligation of the city issuing the bonds.

The Missouri Constitution provides specific authority for some types of revenue bonds. In addition, the General Assembly has enacted legislation permitting the issuance of revenue bonds for purposes other than those specified in the Constitution without an election. Prior to the 1971 Constitutional amendment regarding home rule powers of constitutional charter cities, the Missouri Supreme Court upheld the authority of these types of cities to issue revenue bonds for purposes other than those identified in the Constitution as long as the city's charter authorized issuance of such bonds. The 1971 Constitutional amendment regarding home rule changed the nature of a city's charter from a document that identifies powers granted to the city to one that identifies only limits on the city's powers.

The 1971 amendment specifically states that constitutional charter cities "shall have all the powers which the general assembly of the state of Missouri has the authority to confer upon any city, provided such powers are consistent with the constitution of this state and are not limited or denied either by the charter so adopted or by statute." As a result, constitutional charter cities now should be permitted to issue revenue bonds without specific authority conferred in the charter as long as there is no violation of any constitutional, statutory, or charter provisions. Although an election would not be required for the issuance of revenue bonds issued under home rule authority, an election may be required to authorize the mechanism that generates the revenue source to be pledged to pay off the bonds.

4.5.3 Hancock Amendment to the Missouri Constitution

Amendment No. 5 to the Missouri Constitution was approved by Missouri voters on November 4, 1980. It is commonly referred to as the Hancock Amendment, and was codified at Article X, Sections 16 through 24. The Amendment's purpose is to control both governmental revenue and expenditure increases.⁶ The restrictions on local government authority imposed by the Amendment are contained in Section 22. This Section provides, in part:

- (a) Counties and other political subdivisions are hereby prohibited from levying any tax, license or fees, not authorized by law, charter or self-enforcing provisions of the constitution when this section is adopted or from increasing the current levy of an existing tax, license or fees, above that current levy authorized by law or charter when this section is adopted without the approval of the required majority of the qualified voters of that county or other political subdivision voting thereon.

The Missouri Legislature enacted a statute that defines the term "increasing" as it is used in Article X, Section 22. The Statute provides:

The term "increasing" as used in section 22 of Article X of the Constitution of the State of Missouri when referring to any license or fee of any county or other political

⁶ *Buchanan v. Kirkpatrick*, 615 S.W.2d 6, 13 (Mo. banc 1981)

subdivision does not mean adjustments in the level of any license or fee necessary to maintain funding of a service, program or activity which was in existence on November 4, 1980, or which was approved by a vote of the people subsequent to November 4, 1980. A statement of the costs necessary to maintain the funding of such service, program or activity shall be prepared and shall indicate the service, program or activity supported by the license or fee. The statement and work papers related thereto shall be a public record and subject to examination pursuant to chapter 610, RSMo.

In 1982, the Missouri Supreme Court gave a broad reading of the phrase "tax, license or fees" as contained in the Hancock Amendment.⁷ In the subject case, St. Louis County increased its fees "for numerous county services, such as parks and building inspection[s]."⁸ A taxpayer challenged this increase and argued that no increase can occur without voter approval. The County argued that user fees were outside the scope of the phrase "tax, license, or fees" and therefore the Hancock Amendment did not apply. The Court relied on definitions contained in Webster's Third New International Dictionary and stated,

"Reading the words examined here for their ordinary and customary meanings, they present a sweeping list of the types of pecuniary charges the government makes. Quite simply, this exhibits an intent to control any such charges to the extent that the voters must approve any increase in them."⁹

The issue was not closed, however. Between 1982 and 1991, the appellate courts struggled to develop a coherent interpretation of the Hancock Amendment. In *Beatty v. Metropolitan St. Louis Sewer District*, the Court wrote

"In this case we return to our continuing struggle to define the parameters of the Hancock Amendment and particularly of Article X, Section 22(a) of the Missouri Constitution".¹⁰

Some decisions held that a particular charge was subject to the Hancock Amendment, while other fees were not. In one case the Court held that "fees" did not include special assessments charged for street improvements to abutting landowners because those owners were not provided with a "privilege" or a "service".¹¹ In another it was held that voluntary payments by a city utility board into the city general revenue fund, a fee in lieu of a franchise tax, was not a tax, license or fee.¹² In other cases, however, courts held that the Hancock Amendment applied to fees charged by private companies for using publicly-owned facilities¹³ and that enactment of a \$150 inspection and permit fee for removal and demolition of buildings.¹⁴

⁷ *Roberts v. McNary*, 636, S. W. 2d 332 (Mo. banc 1982)

⁸ *Id.* at 334

⁹ *Id.* at 336

¹⁰ See generally *Beatty v. Metropolitan St. Louis Sewer District*, 867 S. W. 2d 217, 218 (Mo. banc 1993)

¹¹ *Zahner v. City of Perryville*, 813 S. W.2d 855, 858 (Mo. banc 1991)

¹² *Pace v. City of Hannibal*, 680 S. W.2d 944 (Mo. banc 1984)

¹³ *Loving v. City of St. Joseph*, 753 S.W.2d 49 (Mo. App. W.D. 1988)

¹⁴ *State ex rel. City of St. Louis v. Lutz*, 653 S.W.2d 703 (Mo. App E.D. 1983)

In 1991, the Missouri Supreme Court reversed itself in deciding *Keller v. Marion County Ambulance District*¹⁵, ruling that the District's policy of collecting fees rather than imposing a subscribed charge to all consumers in the service area without a voted approval was allowed by the Constitution as amended by the Hancock provisions. A group of taxpayers challenged the fees in a class action, alleging that the service charge increases constituted a tax and should have been submitted to the voters for approval.

The *Keller* case is especially notable because the Supreme Court established some standards for the courts future reference in Hancock Amendment cases. The Court began by reviewing previous Hancock Amendment decisions and then stated that

"there are two types of local revenue increases: those subject to the Hancock Amendment and those not subject to the Amendment."¹⁶

The Court noted that a majority of the Ambulance District's new service charges "were increases over the previous charges, and none were submitted to the voters for approval." In *Keller* the Court overturned *Roberts v. McNary*, reasoning:

If the people of Missouri intended to prohibit localities from increasing any source of revenue without voter approval, a general term like "revenue" or "revenue increase" could have been used. Instead, the people of Missouri characterized "fees" in section 22(a) as an alternative to a "tax." This characterization suggests that what is prohibited are fee increases that are taxes in everything but name. What is allowed are fee increases which are "general and special revenues" but not a "tax."

The Court held that

"increases in the specific charges for services actually provided ... are not subject to the Hancock Amendment."¹⁷

The Court instructed that future courts should

"examine the substance of a charge, in accordance with this opinion, to determine if it is a tax without regard to the label of the charge."

The Court established five criteria as "helpful" guidance in determining whether a charge constituted a tax or a fee. These criteria are commonly known as the "*Keller* factors."

1. When is the fee paid? Fees subject to the Hancock Amendment are likely due to be paid on a periodic basis while fees not subject to the Hancock Amendment are likely due to be paid only on or after provision of a good or service to the individual paying the fee.
2. Who pays the fee? A fee subject to the Hancock Amendment is likely to be blanket-billed to all or almost all of the residents of the political subdivisions, while a fee not subject to the Hancock Amendment is likely to be charged only to those who actually use the good or service for which the fee is charged.

¹⁵ *Keller v. Marion County Ambulance District*, 820 S.W.2d 301 (Mo. banc 1991)

¹⁶ *Id.* at 303

¹⁷ *Id.* at 305

3. Is the amount of the fee to be paid affected by the level of the goods or services provided to the fee payer? Fees subject to the Hancock Amendment are less likely to be dependent on the level of goods or services provided to the fee payer while fees not subject to the Hancock Amendment are likely to be dependent on the level of goods or services provided to the fee payer.
4. Is the government providing a service or good? If the government is providing a good or a service, or permission to use government property, the fee is less likely to be subject to the Hancock Amendment. If there is no good or service being provided, or someone unconnected with the government is providing the good or service, then any charge required by and paid to a local government is probably subject to the Hancock Amendment.
5. Has the activity historically and exclusively been provided by the government? If the government has historically and exclusively provided the good, service, permission or activity, the fee is likely subject to the Hancock Amendment. If the government has not historically and exclusively provided the good, service, permission or activity, then any charge is probably not subject to the Hancock Amendment.

The Court supported its analysis contained in the *Keller* decision that *Roberts* was decided too broadly by recognizing that the

“traditional distinction between ‘true’ user fees and taxes denominated as fees...”, and explaining that “fees or charges prescribed by law to be paid by certain individuals to public officers for services rendered in connection with a specific purpose ordinarily are not taxes ... unless the object of the requirement is to raise revenue to be paid into the general fund of the government to defray customary governmental expenditures ... rather than compensation of public officers for particular services rendered”

In applying this guidance, the Court stated that:

“No specific criterion is independently controlling; but, rather, the criterion together determine whether the charge is closer to being a ‘true’ user fee or a tax denominated as a fee.”¹⁸

In a later opinion, the Missouri Supreme Court cast some doubt on how long the *Keller* factors would remain viable by stating, in response to an argument that *Keller* should be overruled:

“While the Court will continue to assess the wisdom and viability of *Keller’s* holding in appropriate cases, we need not decide *Keller’s* ultimate fate in this case.”¹⁹

Three recent cases suggest that the application of the *Keller* factors typically result in a “split decision” on the issue of tax versus fee status.²⁰ Rarely do all criteria indicate that a given charge is one or the other.

¹⁸ Id. at 304-05 n.10

¹⁹ *Beatty v. Metropolitan Sewer Dist.*, 867 S.W.2d 217, 220 (Mo. banc 1993)

²⁰ *Beatty v. Metropolitan Sewer Dist.*, 867 S.W.2d 217, 220 (Mo. banc 1993); *Feese v. City of Lake Ozark*, 893 S.W.2d 810 (Mo. banc 1995); and *Missouri Growth Association v. Metropolitan St. Louis Sewer Dist.*, 941 S.W.2d 615 (Mo. App. E.D. 1997)

The following general law and specific case law references may also lend clarification to several issues associated with stormwater management funding in Hannibal.

- McQuillen, *Municipal Corporations Section 31.10*, states a general rule that the establishment and maintenance of a sewer system is usually regarded as an exercise of the municipality's police powers, i.e. it is essentially regulatory in nature.
- The Colorado Supreme Court affirmed a finding by the trial court that the City and County of Denver's ordinance establishing a stormwater utility and adopted stormwater service charges was "... rationally related to a legitimate state purpose of financing the maintenance and construction of new storm sewers." In the same decision the Court affirmed the trial court's decision that the Ordinance created a service charge and not an unconstitutional tax. *Zelinger, et al v. City and County of Denver* 724 P.2d 1356
- In *Craig v. City of Macon*, 543 S.W.2d 772 which dealt with a solid waste service charge, the Missouri Supreme Court wrote:

"Generally the function of the police power has been held to promote the health, welfare, and safety of the people by regulating all threats either to the comfort, safety, and welfare of the populace or harmful to the public interest. . . . appellants contend that because they do not have their garbage removed, they do not use the service for which they are billed, and therefore, the ordinances are unreasonable. Appellants, however, erroneously assume that the only benefit conferred by the statute is the removal of one's own garbage. The legislative intent and the purpose of the City's ordinances are not primarily to remove waste from the community for the convenience of residents, but rather to protect the public health by regulating the collection and disposal of garbage, and thereby minimizing or eliminating a source of disease from the community. Although the appellants may not have waste to be collected, the regulatory scheme protects the entire public, not just those who have waste for disposal."
- In Washington State, the Supreme Court has written that

"The actions of a city,... in creating a storm and surface water utility are exercises of the police power, and charges to property owners are not "special assessments" for which a special benefit is required..." *Teter, et al v. Clark County and the City of Vancouver*; 104 Wash. 2d 227; 704 P.2d 1171.
- The Washington Court also cited *Craig v. Macon*, writing:

"Notably, courts in other states have also held such charges to be valid when imposed as part of a general police power measure. . . . As a police power measure, the statute enabled the city to take whatever measures were reasonably required to meet the public health needs. The charges were only incidental to the regulatory scheme; the payments went only toward the costs of that program; none of the money went into the general revenue."

Thus, because the service fee money collected in Clark County was for a specific purpose (to pay the cost of a stormwater management program that was directed at protection of the public health) the charge was deemed a valid service fee.

4.5.4 Local Government Responsibilities for the Impact of Ministerial Actions

Other legal considerations influence the development of a stormwater management program and funding strategy. Most notably, the scope of local government responsibilities and potential liabilities associated with those responsibilities is gradually broadening. Courts in several states have expanded the scope of responsibility of local governments in relation to the impacts of their ministerial actions. This trend has had a spill-over impact on stormwater management programs and, indirectly, on associated funding decisions.

For example, for many years municipal governments approved subdivision and commercial development proposals without incurring any specific responsibility or liability for service deficiencies that might presently exist or result as a consequence of the development. In recent years, however, courts in several states have begun to make local governments responsible for considering the potential for problems caused by private developments. This is typically done through environmental impact assessments.

Stormwater runoff has become a focal concern in the adoption of land use plans and approval of specific development proposals. Some cities and counties have been required to improve downstream drainage systems subjected to increased runoff and resulting flooding and erosion due to subdivision and commercial development approvals. There are parallels in which local governments have been required to provide adequate water supply, wastewater treatment, and solid waste management for developments they have approved. Several states have even adopted growth management laws that dictate that local governments have adopted infrastructure plans that consider development impacts and demonstrate an ability to capitalize the systems that future growth will demand.

4.6 *Conclusions and Recommendations for Hannibal*

Based upon the analysis presented in Sections 3 and 4, there are several stormwater funding strategies available to the City of Hannibal. It would appear that a stormwater service fee offers more flexible, stable, and equitable long-term stormwater management funding than any other option. This will be a viable approach only if it can gain public acceptance. A stormwater service fee might be subject to voter approval pursuant to the Hancock Amendment to the Missouri Constitution. Thus public acceptance is crucial regardless whether it is placed before the voters or not. We recommend that the City give further consideration to the adoption of a stormwater service fee and prepare the way for public acceptance by conducting on-going public education and involvement in the issue.

While most cities and counties establishing stormwater service fees have done so through a "stormwater utility", it must be stressed that service fee funding does not necessarily dictate that a separate stormwater utility be established. The City's BPW utility could conceivably be used to establish stormwater service fees as a separate cost and accounting center. There are several advantages associated with an independent stormwater utility that make it the preferred approach in most cities. Regardless of the

institutional mechanism employed, only a service fee appears to be capable of generating sufficient revenue to meet the long-term program needs identified in Hannibal.

Whether a service fee is feasible involves several considerations. A stormwater service fee will be feasible in Hannibal only if it:

- 1) results in a technically equitable allocation of costs that is understandable to the general public;
- 2) ensures that the revenue is dedicated solely and specifically to stormwater management; and,
- 3) is packaged and presented in a way that makes sense to the voters.

As indicated in this report, a service fee appears to have several significant advantages over other funding options. It is highly flexible, offers the prospect of stable funding over time, allows restrictive dedication of the revenues to stormwater management only, and enables elected officials to craft an equitable distribution of costs through a service fee rate design. A service fee rate structure can allocate costs based on the demands placed on the systems instead of property value or other factors unrelated to stormwater service needs.

Needs change, and the ability of the funding method(s) to adjust in concert with needs is critically important. A service fee rate methodology can be periodically adjusted along with major transitions in programs and priorities, especially in terms of system improvements. Other funding methods can be integrated with a service fee, either as part of a rate structure or independently. Some funding methods differ in their suitability for capital, operating, regulatory, and other types of costs. The revenue stream created by a stormwater service fee is suitable for virtually any aspect of a program. It could also allow revenue bonding for major capital investments, enabling Hannibal to expedite major improvements to the stormwater systems without limiting its general obligation bonding capacity for other purposes.

A stormwater service fee has sufficient revenue potential to assure consistent funding at a level which would support an aggressive program. The City's General Fund clearly has sufficient total revenue capacity to meet the objectives identified in the mission and priorities that may be identified for the stormwater program. However, it must also support numerous other municipal services that do not lend themselves to service fee funding (such as police services, libraries, and social services). A stormwater service fee could relieve, partially or wholly, the demands that stormwater management now places on the City's General Fund or would impose in the future.

Most stormwater utilities are accounted for as an enterprise or special revenue fund, which provides dedication of the revenues strictly for stormwater management, thus improving accountability. Money not spent in one fiscal year carries over into the following year and cannot be diverted to other uses. This creates an "arm's length" relationship with other municipal funds and encourages good stewardship of the financial resources intended for stormwater management.

The major disadvantages of a service fee are that it costs money to implement and new fees might be politically unpopular. In addition, a service fee might be subject to ballot approval. The cost of fully implementing a stormwater utility and associated service fee in Hannibal is expected to be \$150,000 to \$250,000, depending on many decisions yet to be made by the City. Political acceptance is more difficult

to forecast. Public reaction to stormwater service fees elsewhere has ranged from very positive to very negative. Given the extent of local drainage problems, one might conclude that the community would be receptive to a workable long-term solution. A program and funding strategy that offers a realistic prospect of solutions will have to be communicated convincingly to gain public support for the utility approach and its associated service fee.

If the City Council chooses to establish a stormwater service fee it will have to address both institutional and legal funding issues. These include whether to establish a separate stormwater utility or integrate a stormwater management service fee with the wastewater enterprise fee using separate cost centers to preserve the segregation of the revenues. The City Council will also have to decide how to structure service fees. One or more ordinances would have to be drafted and adopted. The experiences of other cities and counties suggest that an intensive public information effort should be conducted to explain the stormwater utility/service fee concept to the community, even if it is integrated with the wastewater fee. A ballot issue, whether required to comply with the Hancock Amendment or simply to satisfy political realities, might be voted down by the electorate, negating the City's efforts to establish the utility and service fee.

A dedicated stormwater enterprise or special revenue fund likely could be in place (as an accounting entity) by July 1, 2006, either as a separate cost center under the wastewater enterprise fund or as an independent enterprise or special revenue fund. However, the work required to design a suitable service fee rate methodology, prepare a master account file, and adjust the existing billing systems or develop a new system could require at least another six months. The actual schedule would depend on many decisions yet to be made, such as the service fee rate design and the need for a ballot approval. Thus, while it appears that stormwater service fees could be implemented as early as January 1, 2007, it might be more realistic to expect implementation by July 1, 2007.

Regardless of whether a utility is in place during 2006 or 2007, a stormwater utility fund could assume some stormwater management costs beginning in 2006. The City would still have to find other revenues to pay for costs prior to the initial service fee billing, and there could be a potential exposure should the voters not approve a service fee, negating the City's funding strategy. Possible sources for interim funding until a service fee could be implemented include General Fund appropriations or inter-fund loans from other funds. In part, this may depend on how the City Council might choose to blend service fee and other revenues to pay for stormwater management. Service fee revenue might conceivably be used to cover debt service of stormwater capital improvement bonds approved by the City Council in the future. This would relieve the General Fund of that potential expense.

Given the status of Hannibal's current stormwater management program, the City clearly faces a steep "program development curve" in the next few years as administrative, operational, capital investment, and regulatory elements of the strategy are formulated and carried out. It will take five to ten years before a comprehensive program can be fully attained, and perhaps twenty years or more to plan, design, and build out the full range of major capital improvements that are needed. Funding should be expected to evolve along with the program. Full implementation of various funding mechanisms associated with the City's stormwater program may therefore require ten years or more.

5. Options for Stormwater Management in Hannibal

5.1 Identification of Alternative Organizational Strategies

As discussed in Section 2, the Hannibal City Charter splits the responsibilities for stormwater management between the Department of Public Works (DPW) and the Board of Public Works (BPW). This division of responsibilities effectively hinders both organizations from managing the entire stormwater problem in Hannibal. For the purposes of identifying options, it would appear that stormwater management in Hannibal could be accomplished in one of four ways:

- 1) Option 1 – Stormwater Management within DPW. All stormwater management functions could be assigned to the DPW. Charter changes would be required to relieve BPW of their management of stormwater flow in pipes and sewers, and bring these responsibilities under DPW. This strategy would build upon DPW's strengths for engineering, building permit review, streets and roads, parks and compliance with the federal Stormwater NPDES Phase II program. Funding and manpower would have to be increased for DPW to oversee stormwater.
- 2) Option 2 – Stormwater Management within BPW. All stormwater functions could assigned to BPW. Charter changes would be required to relieve DPW of their management of stormwater flow in open channels, and bring these responsibilities under BPW. This strategy would build upon BPW's strengths for wastewater operations, sewer system maintenance, GIS mapping, customer accounts, and billing. Stormwater engineering, planning, and certain operations and maintenance functions would have to be added to BPW, or services would have to be acquired from DPW and/or outside vendors. Specific funding in a category separate from electric power, water supply, and wastewater treatment would have to be created for BPW to oversee stormwater. Manpower would have to be added to BPW to oversee stormwater.
- 3) Option 3 – Split Roles between DPW and BPW for Stormwater Management. A third option for stormwater management in Hannibal could involve a new division of roles between BPW and DPW. BPW would use their current accounting system and billing functions to collect user service fees for the new stormwater utility. DPW would perform the engineering and planning functions for stormwater and direct the formulation, design and construction oversight of capital projects. BPW would provide all operations and maintenance of the stormwater system, including those currently performed by DPW. Some functions might be contracted for from DPW or outside vendors. Charter changes would be required to eliminate the separation of enclosed storm sewers from open channels, so that both DPW and BPW would no longer be responsible different management aspects of the entire stormwater system.
- 4) Option 4 – Merge DPW and BPW into a central Public Works Function, including Stormwater. Under this option, DPW and BPW would be merged into a single organization, providing the current utility services (electric, water, and wastewater), adding stormwater as a utility function, and merging the engineering functions currently performed by the DPW. This would be the most radical change within the City government. Significant changes would be needed to the City

Charter to accomplish the merger of DPW and BPW. Since DPW is supported by the City's General Fund, and BPW is supported by user service fees, considerable thought would be required to work out a formula for funding of the new combined organization.

An option not listed here includes creating a new department for stormwater management, since this would involve duplication of many functions already being performed in some way by either DPW or BPW.

Another option not listed is "do nothing". Residents in some parts of the City have tolerated a variety of stormwater problems for most of the City's history, and at times the community has suffered considerable setbacks due to flooding. This is unacceptable, but certainly a potential outcome if a consensus is not reached.

5.2 Evaluation of Organizational Alternatives

Four options are identified above to manage future stormwater issues in Hannibal. All these options would require changes in the DPW and the BPW, and would require changes to the City Charter before they could be implemented. Several factors should be considered in screening these options to find the best approach.

5.2.1 Funding for Stormwater Management

As outlined in Sections 3 and 4 of this report, citizens could finance stormwater improvements and operations in Hannibal by allocating funds from the City's General Fund, increasing property or sales taxes, employing other means of assessments, or by setting up a stormwater utility supported by service fees. The four organizational options all have implications for the funding strategy used.

Option 1 – Stormwater Management within DPW. DPW is primarily supported by the City's General Fund, although the nominal fees the City collects for building permits are associated with permit reviews performed by DPW. DPW relies upon the Department of Revenue, Finance and Collection in City Hall and upon the Department of Budget, Audit, Purchasing, Control of Expenditures and Indebtedness (also in City Hall) for administrative support of its functions. Assigning stormwater management to DPW would require diversion of taxes within the General Fund, increasing taxes, or adding assessments. A stormwater utility could be created within DPW, but the billing of customers and setting up new accounts/closing old accounts would have to be performed by the Department of Collection in City Hall, by BPW as an integrated component of its existing billing system, or by a private vendor.

Option 2 – Stormwater Management within BPW. BPW is a City-owned utility, and is entirely supported by User or Service Fees it collects for electric service, water supply and wastewater treatment. If a stormwater utility were created within BPW, it would be a logical extension of the three utility services already provided there. The same customer accounts now maintained by BPW would be the ones billed for stormwater service fees, though some "stormwater only" accounts might have to be added (for example, for parking lots that have substantial impervious areas generating stormwater runoff but do not have water, wastewater, or electricity services).

Option 3 – Split Roles between DPW and BPW for Stormwater Management. DPW and BPW currently split responsibilities for stormwater management in Hannibal, but they manage different parts of the drainage system. Under this option, the current strengths of both organizations, and the current sources of funding for both organizations could remain. As with the other options, additional funds for stormwater would be required, and if these come from a Stormwater Utility, then BPW is already equipped to handle the accounting and billing. A utility could be established either within the BPW or as separate division and accounting unit of the City under the DPW.

Option 4 – Merge DPW and BPW into a Central Public Works Function, including Stormwater. Merging DPW and BPW into a single organization, providing the all the current functions and utility services, and adding stormwater is a radical change within the City Government. With most of DPW's functions being supported by the City's General Fund, and all of BPW's functions being supported by User Fees, the new organization would require a new accounting structure to track and report its finances. This creates complexity that could be regarded as unworkable. In any case, new funds would be required for stormwater management, either from a utility or some other source.

5.2.2 Oversight of a Stormwater Capital Improvements Program

Option 1 – Stormwater Management within DPW. Stormwater capital improvement programs require public relations to identify and prioritize stormwater needs, considerable engineering to formulate and design projects, and construction oversight to ensure projects are properly built. Aspects of all of these functions currently reside at City Hall in DPW. However, there is not currently enough manpower within DPW to perform a stormwater capital improvements program, plus carry out all the other duties. This can be remedied in a variety of ways depending upon the size of the stormwater management program that might be adopted.

Option 2 – Stormwater Management within BPW. BPW periodically undertakes capital improvement projects for electric power, water supply and wastewater treatment, so stormwater capital improvements could certainly become part of BPW's program. BPW uses engineering consultants for the design of its projects and competitively bids them out for construction. For stormwater, public involvement and citizen input is vital to a successful stormwater program, as well as engineering. BPW currently provides some public relations functions but ultimately obtains approval for its capital improvements projects from City Hall.

Option 3 – Split Roles between DPW and BPW for Stormwater Management. Under Option 3, if the City chooses to retain the split roles for stormwater management within both DPW and BPW, it would appear that DPW, with its existing engineering functions, should take the lead in formulating and directing stormwater capital improvement projects.

Option 4 – Merge DPW and BPW into a Central Public Works Function, including Stormwater. With a centralized Public Works Department, the engineering group would carry the responsibility for capital improvements projects.

5.2.3 Customer Service to Resolve Complaints and Problems

Option 1 – Stormwater Management within DPW. DPW is equipped to receive resident complaints for streets and buildings, and has the basic staff to respond to complaints. Stormwater complaints would be similar to those already handled by DPW. The engineering function within DPW has the capacity to use resident input to identify stormwater needs and evaluate and prioritize projects to reduce or eliminate stormwater problems.

Option 2 – Stormwater Management within BPW. BPW has a customer service function to assist its customers when problems arise with electric service, water supply or wastewater needs. BPW lacks the engineering functions to evaluate stormwater complaints and tie them to capital improvement projects, but could add suitable staff or obtain support from DPW or private vendors.

Option 3 – Split Roles between DPW and BPW for Stormwater Management. If DPW and BPW were to continue to jointly oversee stormwater management in Hannibal, it would appear that BPW's resources for maintenance of the sewer system would be best used when replying to operational problems. Customer complaints could come into BPW, but a log should be maintained for DPW to use in periodic engineering reviews of problem areas.

Option 4 – Merge DPW and BPW into a Central Public Works Function, including Stormwater. If DPW and BPW were merged, the handling of customer complaints would be the same as option 3 above.

5.2.4 Leadership and Management of Stormwater Issues

Option 1 – Stormwater Management within DPW. DPW, with its engineering functions, is better suited for leadership of stormwater issues within the City government. DPW lacks the resources for mapping and asset management of the stormwater system, but these could be added.

Option 2 – Stormwater Management within BPW. BPW offers the best organization and resources for operation and maintenance of many components of the stormwater drainage system, but lacks the engineering resources to formulate and direct a capital improvement program. Engineering would have to be added to BPW to oversee this role, or outside vendors would have to be retained to provide comparable support services.

Option 3 – Split Roles between DPW and BPW for Stormwater Management. With joint DPW and BPW roles in stormwater management, policies and procedures would have to be created for each to be responsible for defined activities. The engineering function within DPW appears best suited to direct and manage the overall stormwater program, especially in terms of planning and regulatory activities. The GIS mapping function now at BPW should remain with BPW, but perhaps should become part of an "Engineering Group" at BPW that reports to DPW and supports all utility requirements for mapping. The operations functions at BPW would add stormwater maintenance to their responsibility, and stormwater operations and maintenance performed by street crews in DPW could be expanded or the responsibilities could be shifted to BPW.

Option 4 – Merge DPW and BPW into a Central Public Works Function, including Stormwater. The management and leadership of stormwater issues under a Central Public Works function would be similar to that described for Option 3 above.

5.3 *Recommendations for Organizational Structure*

Should the City of Hannibal decide to increase funding for stormwater management, as suggested in Section 4, then an organizational structure will be needed that can be accountable to the mayor, the city council, and the citizens for its stormwater management activities.

5.3.1 Recommendation for Option 3 as a Short-term Solution

Based upon the above analysis, it would appear that Option 3, involving both DPW and BPW in the management of stormwater issues, offers the most viable short-term operational approach for the City. This option makes greatest use of existing expertise and resources now residing within DPW and BPW. It would minimize the amount of new staff that would need to be hired, and perhaps could eliminate the addition of new staff altogether if suitable use is made of outside vendors for certain functions.

5.3.2 Analysis of DPW and BPW Strengths for Stormwater

A generic list of stormwater functions performed by municipal governments was presented in Table 1 (page 31 in Section 4.3). Applying this list to Hannibal's situation identifies strengths in DPW and BPW that could be utilized in a future joint stormwater management program. This analysis is presented in Table 2 (see next 2 pages). There are functions listed in Table 2 that are not presently part of either DPW or BPW programs, and indeed might not be part of future stormwater programs in Hannibal. These have been retained in the Table, with tentative assignments for everything where perceived strengths exist. Many of the functions in Table 2 are extensions of both DPW and BPW responsibilities, so the Table reflects both strengths as appropriate.

DPW and BPW have strengths with Administration and Regulation and Enforcement. DPW has strengths in Public Involvement and Education, Engineering and Planning, Capital Improvements, and Stormwater Quality Management (federal Stormwater Phase II compliance). BPW has strengths in Billing and Finance and Operations.

Table 2 (Page 1 of 2)

DPW/BPW Strengths for Stormwater Management in Hannibal

| Function | DPW Strength | BPW Strength |
|--|-----------------|-----------------|
| Administration | ■ | ■ |
| General Administration | ■ | ■ |
| General Process Planning & Development | ■ | ■ |
| Area-wide Coordination | ■ | ■ |
| Public Involvement and Education | ■ | |
| Public Awareness and Education | ■ | |
| Public Involvement | ■ | ■ |
| Standing Citizen's and Focus Groups | ■ | |
| Billing and Finance | | ■ |
| Billing Operations | | ■ |
| Database Management | | ■ |
| Customer Service | | ■ |
| Financial Management | | ■ |
| Capital Outlay | ■ | ■ |
| Overhead Costs | | ■ |
| Cost Control | ■ | ■ |
| Support Services | | ■ |
| Engineering and Planning | ■ | |
| Design Criteria, Standards and Guidance | ■ | |
| Field Data Collection | ■ | ■ |
| Master Planning | ■ | |
| Design, Field and Operations Engineering | ■ | |
| Hazard Mitigation | ■ | |
| Zoning Support | ■ | |
| Multi-Objective Planning Support | ■ | |
| GIS and Database Management | | ■ |
| Mapping | | ■ |
| Land Use Planning & Controls | ■ | |
| Operations | | ■ |
| General Maintenance Management | | ■ |
| General Routine Maintenance | | ■ |
| General Remedial Maintenance | | ■ |
| Emergency Response Maintenance | | ■ |
| Infrastructure Management | ■ | ■ |
| Public Assistance | ■ | ■ |

Table 2 (Page 2 of 2)
DPW/BPW Strengths for Stormwater Management in Hannibal

| Function | DPW Strength | BPW Strength |
|--|--------------|--------------|
| Regulation and Enforcement | ■ | ■ |
| Code Development and Enforcement | ■ | ■ |
| General Permit Administration | ■ | ■ |
| Drainage System Inspection and Regulation | ■ | ■ |
| Zoning and Land Use Regulations | ■ | |
| Special Inspection Programs | ■ | ■ |
| Flood Insurance Program | ■ | |
| Multi-Objective Floodplain Management | ■ | |
| Erosion Control Program | ■ | |
| Capital Improvements | ■ | |
| Major Capital Improvements | ■ | |
| Minor Capital Improvements | ■ | |
| Land, Easement, and Right-of-Way | ■ | |
| Stormwater Quality Management | ■ | |
| Quality Master Planning | ■ | |
| Retrofitting Program | ■ | |
| Monitoring Program | | ■ |
| Structure and Non-Structural BMP Programs | ■ | |
| Pesticides, Herbicides and Fertilizer Programs | ■ | |
| Used Oil and Toxic Material Programs | ■ | |
| Street Maintenance Program | ■ | |
| Spill Response and Clean-Up | | ■ |
| Public Education and Reporting Program | ■ | |
| Leakage and Cross Connections | | ■ |
| Industrial Program | ■ | |
| General Commercial and Residential Program | ■ | |
| Illicit Connections and Illegal Dumping | ■ | ■ |
| Landfills and Other Waste Facilities | ■ | |
| Combined Sewers Program | | ■ |
| Groundwater and Wellhead Protection | n/a | n/a |
| Drinking Water Protection | ■ | ■ |
| Watershed Assessments | ■ | |
| Septic, Inflow, and Infiltration Corrections | | ■ |

5.3.3 Proposed Leadership for Stormwater Functions in Hannibal

Based upon the initial analysis earlier in this section, it is proposed that the Director of Public Works/City Engineer (DPW/CE) be responsible for managing the City's overall stormwater management program. This person already oversees closely related programs for building inspection, building permit review, streets, parks, and the federal Stormwater Phase II compliance program. The DPW/CE would oversee stormwater activities in both DPW and BPW (Table 3). If the City opts to establish a stormwater utility, that organizational/accounting entity could be a part of BPW or a separate financial unit of the general government under DPW. Regardless, the most likely scenario for billing, collecting, and accounting for service fees lies in the existing utility billing system in BPW. That service could be expanded to include another line item (stormwater), with suitable apportionment of the cost of expanding and operating the billing system among the constituent services.

Table 3
Proposed Reporting Relationships for a new Stormwater Program

| Functional Area | Current Reporting Relationship | Future Reporting Relationship |
|--------------------------------|--|---|
| Administration | DPW staff reports to DPW/CE | No changes |
| Public Involvement & Education | Responsibility of DPW/CE, customer service within BPW | Customer Accounts and Customer Complaints directed to BPW for Billing & Operations, Public Involvement & Public Education Programs responsibility of DPW/CE |
| Billing and Finance | BPW function | Continue BPW function, provide periodic financial reports to DPW/CE |
| Engineering & Planning | Responsibility of DPW/CE Mapping & GIS/database done by BPW | Form an Engineering Group within BPW to continue mapping and GIS/database maintenance for all utility functions, add permit reviews and capital project planning to this group, and link direct line reporting to DPW/CE. |
| Operations | BPW function | Keep field operations within BPW |
| Regulation & Enforcement | Responsibility of DPW/CE | Assign this responsibility to the new Engineering group at BPW. |
| Capital Improvements | Responsibility of DPW/CE | Assign this responsibility to the new Engineering group at BPW. |
| Stormwater Quality Management | Responsibility of DPW/CE | Assign this responsibility to the new Engineering group at BPW. |

Notes: DPW = Department of Public Works
BPW = Board of Public Works
DPW/CE = Director of Public Works/City Engineer (heads DPW)

As outlined in Table 3, residents of Hannibal could be better served by closer linkages between DPW and BPW. The City Charter provides for the appointed Director of Public Works/City Engineer (DPW/CE) to also serve as *ex-officio sewer commissioner* (City Charter Section 5.02, see this report page 3). In the present City organization, the DPW/CE is not effective in this role, because wastewater treatment is a classic utility function performed by BPW. There are several ways to add to the linkages between DPW and BPW:

- 1) One possibility is that the DPW/CE becomes the fifth member of the Board of Public Works. This strengthens his role as sewer commissioner, adds engineering direction to BPW, and increases staff accountability for stormwater functions in BPW. The four member board in BPW is appointed by the mayor and City Council, and the DPW/CE is also appointed by them and serves at their discretion.
- 2) Another possibility is for DPW and BPW to remain as separate organizations (and separate funding/budgeting sources) within the City government, but they both report to the DPW/CE. This potentially eliminates the four-member board overseeing BPW, and consolidates the management of both organizations under one leader, but it maintains full accountability to the City Administrator, Mayor, and City Council. Capital budgets within BPW are currently subject to review and approval by the Mayor and City Council, and would not be affected by this change. However, this consolidation of management and leadership would likely require additional reorganization below the DPW/CE to maintain accountability and effectiveness.

These are initial concepts that bring both advantages and disadvantages compared with the present system. It will be up to the city government and residents to consider whether any changes should be made in the City Charter if the City wishes to institute a stormwater utility, and how to proceed.

6. Conclusions and Recommendations

6.1 *Current Stormwater Management in Hannibal*

1. Hannibal's Department of Public Works (DPW) is responsible for stormwater on the land surface and in open channels. This is a logical extension of DPW's responsibility for streets and parks.
2. Hannibal's Board of Public Works (BPW) is responsible for stormwater in enclosed storm sewers. This is a logical extension of BPW's responsibility for sanitary sewers and wastewater treatment.
3. Occasional special stormwater projects are performed by DPW, but the overall level of funding for stormwater drainage improvements within DPW has generally been less than \$5,000 per year.
4. BPW collects user service fees for electric power, water supply and wastewater treatment, but is not authorized to collect fees for stormwater maintenance or improvements. BPW spends less than \$5,000 per year for investigating problems within the storm sewer system and maintaining that system. These expenditures are drawn from BPW's budget for wastewater operations.
5. There are places in Hannibal where stormwater starts on the land surface, enters storm sewers through inlets in yards or along streets, flows through underground piping for some distance, discharges into an open channel, goes back into a storm sewer, reaches another open channel down hill, and enters a stream or creek.
6. Stormwater cannot be adequately managed in Hannibal by making one organization responsible for stormwater in open channels and another organization responsible for stormwater in sewers.

6.2 *Funding Methods for Stormwater Management*

1. Past funding for stormwater in Hannibal has primarily been taken from the City's General Fund and has been inadequate to repair and maintain a stormwater drainage system or to fund much in the way of stormwater capital improvements.
2. The residents of Hannibal could allocate funds for stormwater from existing revenue sources, including property, sales or other taxes. However, these funds would either reduce financing available for other community programs, or require an increase in taxes.
3. Municipally owned and operated utilities commonly provide water supply, wastewater treatment, stormwater management, electricity, natural gas, and solid waste disposal. These utilities are usually operated as financially self-sufficient enterprise accounting units, and involve a business-like operation that provides commodities or services to customers. Stormwater utilities have been established by more than four hundred communities nationwide in the past thirty years, including Missouri.

4. The Hannibal Board of Public Works is successfully delivering electric power, water supply, and wastewater treatment to the citizens of Hannibal. All of these are classic utility services to the community.
5. Nationwide, many communities are turning to the concept of a stormwater utility, financed by stormwater user fees, to support stormwater management programs. Typical residential user fees can range between \$3.00 and \$5.00 per month, depending upon the level of stormwater service desired by the community.

6.3 Constitutional and Case-Law Considerations in Missouri

1. Whether a stormwater service fee is feasible in Hannibal involves several considerations:
 - a) results in a technically equitable allocation of costs that is understandable to the general public;
 - b) ensures that the revenue is dedicated solely and specifically to stormwater management; and,
 - c) is packaged and presented in a way that makes sense to the voters.

6.4 Organizational Strategies for Stormwater Management in Hannibal

1. Changes to the City Charter should be made to clearly define responsibilities for stormwater management within the City's organizational structure.
2. The City should seriously consider the creation of a stormwater utility to provide a stable base of financing for stormwater capital improvements, stormwater operations, and compliance with federal stormwater quality programs. BPW's existing functions for user account maintenance and billing/collections, plus operations for the sanitary sewer collection system are valuable resources for a stormwater utility. Hannibal does not need a second, separate utility just for stormwater.

6.5 Public Information & Public Involvement

1. During the preparation of this Stormwater Master Plan, over 950 of Hannibal's residents (and business owners) responded to the Stormwater Questionnaire. Stormwater drainage is an issue that generates public opinion and interest.
2. A public information program for stormwater issues is needed in Hannibal to enable City residents to better understand many stormwater issues. Several basic issues include the following:
 - a) There are 35 watersheds around Hannibal, each with its own impacts upon stormwater. The homes and businesses within each watershed contribute in some small way to stormwater runoff, and many are affected by it.
 - b) The Bear Creek Dam is a community asset to reducing flash flooding through the valley across southern Hannibal. However it only controls 28 square miles of watershed, and leaves another 23 square miles of watershed downstream uncontrolled.

- c) Many citizens are interested in the operation of the Dam. The City, through its Board of Public Works, should consider releasing a table showing the hourly status of the gates at the Bear Creek Dam for publication in the Courier-Post (perhaps with the daily weather statistics?). This release of information should be done every day for the previous 24 hours.
- d) Many problems in Hannibal are related to a lack of stormwater infrastructure. Overland flow must travel large distances, passing near homes and businesses, before reaching a channel. This provides opportunities for excessive ponding, flooding and freezing in many parts of the community.
- e) Much of Hannibal's stormwater infrastructure is old and deteriorated. Many storm sewers, where they exist, were built many years ago, and do not offer enough capacity to adequately convey flow into creeks and channels. Water from heavy rains backs up and causes flooding, basement backups and other problems.
- f) Many channels around Hannibal do not have enough capacity to carry moderate and large rains, and flow escapes out of banks periodically. Where homes and businesses are built nearby, they are exposed to flooding and/or erosion.
- g) Many people, both residents in the older parts of town as well as in the newer subdivisions, feel stormwater design standards for new development is inadequate. Perhaps a citizen's task force, with enough interest to meet several times, should be commissioned to review current practices and formulate recommendations for future community preferences. This task force should have access to the City Engineer or another engineer for guidance on stormwater issues.
- h) Hannibal's past funding for stormwater has been inadequate for the operation and maintenance of storm drainage facilities, let alone following some type of stormwater capital improvements program. With better stormwater information, residents can understand the options available and the choices they face.

6.6 Development and Implementation of a Stormwater Utility

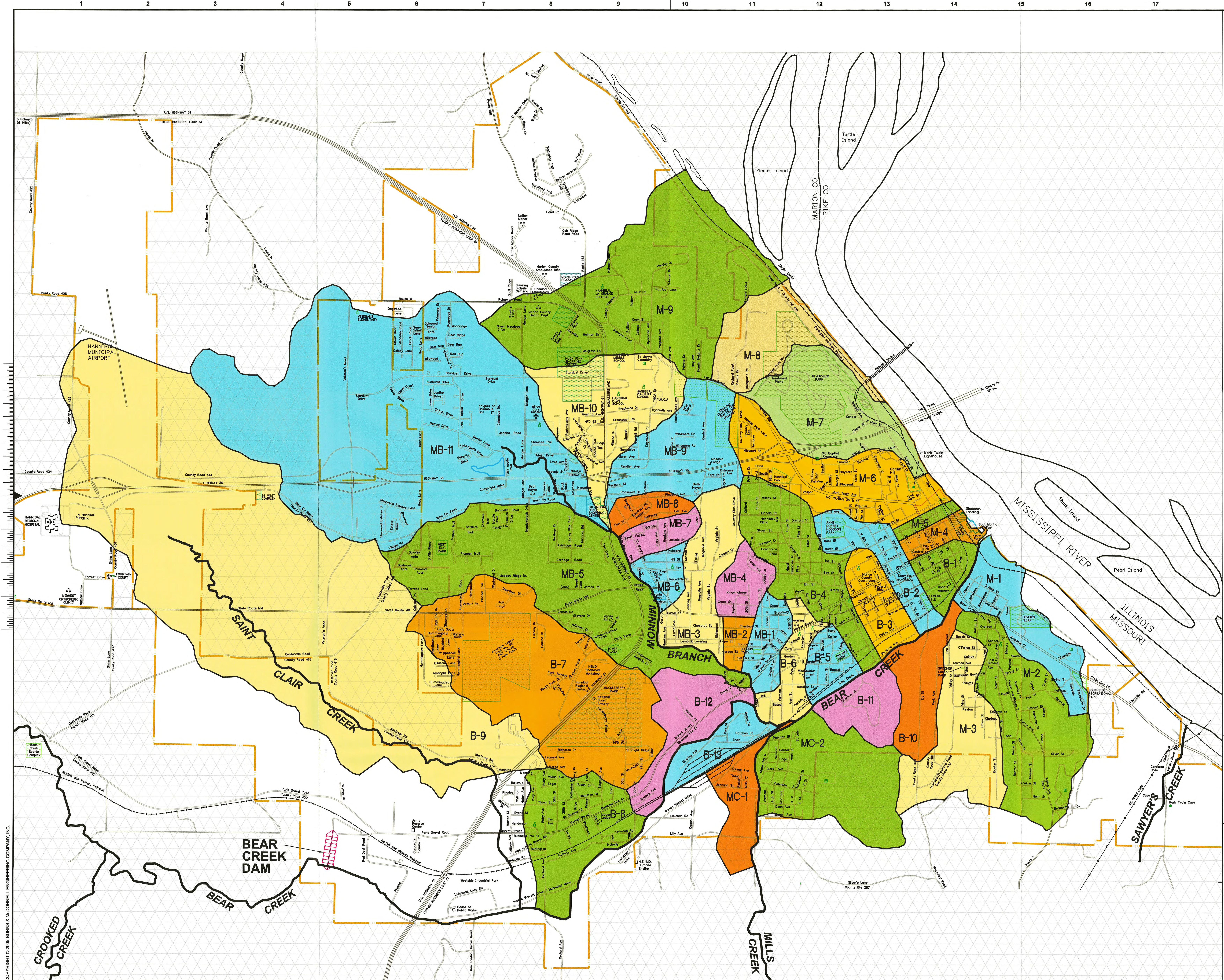
1. The next step for Hannibal toward a stormwater utility should be called Phase 2 – Development. The duration for this phase would be expected to take 8 to 10 months. During the Development Phase, the following activities should be performed:
 - a) Perform a cost of service analysis
 - b) Review organizational issues
 - c) Examine funding policies
 - d) Perform a rate analysis
 - e) Prepare data and account files

- f) Analyze the billing system to be used
 - g) Pursue a public information program
 - h) Formulate a ballot issue
2. The last phase toward a stormwater utility should be called Phase 3 – Implementation. The duration for this phase would be expected to take 6 to 8 months. During this Phase, the following activities should be accomplished:
- a) Adopt the rate ordinance
 - b) Make decisions on data policies and procedures
 - c) Assemble the account files
 - d) Modify the billing system
 - e) Implement billing systems
 - f) Apply public information outcomes
 - g) Setup a customer service program

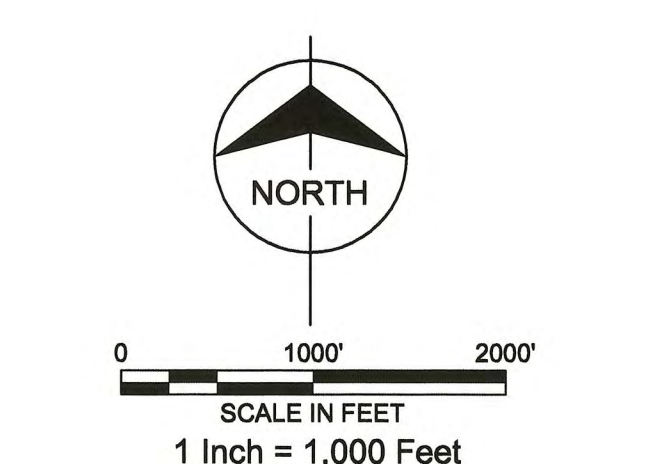
Appendix A

Figure A—Map of Watersheds in Hannibal





| no. | date | by | ckd | description |
|-----|------|----|-----|-------------|
|-----|------|----|-----|-------------|



- LEGEND**
- OUTSIDE CITY LIMITS
 - SCHOOL
 - HOSPITAL, CLINIC AND AMBULANCE
 - CEMETERY
 - POINT OF INTEREST
 - CITY LIMITS
 - CREEK

| | | | |
|--------------------------|--|---------------------------|--|
| date 6/03/05 | | designed D. KOSCIELSKI | |
| checked D. KOSCIELSKI | | detailed D. KOSCIELSKI | |
| checked D. MIZELL | | contract --- | |

Hannibal, Missouri
America's Hometown

| | | | |
|---------------------------------|-----------------|---|--|
| HANNIBAL STORMWATER MASTER PLAN | | | |
| MAP OF WATERSHEDS IN HANNIBAL | | | |
| project 38204 | contract --- | sheet 1 of 1 sheets | |
| drawing FIGURE A | rev. --- | file I:\HANNIBAL\38204\CADD\EXHIBITS\Updated_FigureA.dwg | |

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Appendix B

Stormwater Questionnaire and Survey Results



City of Hannibal Stormwater Questionnaire

The City of Hannibal invites you to participate in addressing and improving stormwater management throughout our City. The purpose of this questionnaire is to help the City of Hannibal become better aware of your views on stormwater needs and issues. Because we value your input in developing a plan for managing stormwater, we ask you to fill out this questionnaire.

Name _____

Address _____

Phone _____ If we have questions,
may we call you? Yes _____ No _____

How many years have you been at this address? _____ years

1. Have you been affected flooding, erosion,
sedimentation, or water pollution at this
location? Yes _____ No _____

If Yes, how often in the past five years?

_____ once _____ 2 to 4 times _____ 5 or more times

2. Is your neighborhood impacted by drainage
problems? Yes _____ No _____

If Yes, please briefly describe the location and problems.

3. Are you aware of drainage problems that
impact other areas of Hannibal? Yes _____ No _____

If Yes, please briefly describe the location and the problems.

4. Please check stormwater drainage problems you have experienced in the
past five years:

- _____ a. Flooding or temporary ponding on your property
- _____ b. Local street flooding
- _____ c. Basement flooding (other than sanitary sewer)
- _____ d. Basement flooding (due to sanitary sewer backup)
- _____ e. Water pollution of ditches, ponds, lakes, streams, or the River
- _____ f. Property damage from erosion or sedimentation
- _____ g. Danger to my life and/or others in my family
- _____ h. Damage to my home, business or other buildings
- _____ i. Damage to contents of the structure
- _____ j. Disruption of vehicle or pedestrian mobility due to flooding or erosion
- _____ k. Other (please describe at end of the next page)

Please return completed surveys by March 18, 2005

Three ways to return:

- | | | |
|-------------------|--------------------|-------------------|
| a) <u>mail:</u> | b) <u>mail to:</u> | c) <u>Fax to:</u> |
| with your | City Engineer | 221-0646 |
| next utility bill | City of Hannibal | |
| | 320 Broadway | |
| | Hannibal, MO 63401 | |

City of Hannibal Stormwater Questionnaire

5. Have you done anything to fix drainage problems on your property?

Yes _____ No _____

If Yes - Please describe:

6. What should be the priorities for the City's stormwater program? From the list below, indicate what Hannibal should make its top 3 priorities by marking a 1, 2 & 3.

- _____ a. Minimize temporary ponding on private property during and following storms
- _____ b. Protect and improve water quality by reducing pollution in stormwater runoff
- _____ c. Increase land use and other controls to reduce stormwater problems
- _____ d. Minimize street flooding
- _____ e. Preserve and actively maintain natural drainage channels
- _____ f. Regulate development practices more rigorously
- _____ g. Build new stormwater system improvements
- _____ h. Minimize damage to structures (e.g., homes, businesses, other buildings)
- _____ i. Maintain/repair existing stormwater systems
- _____ j. Limit environmental damage to natural systems such as creeks
- _____ k. Provide public access greenways along stream channels
- _____ l. Reduce erosion and sedimentation along channels, ditches, and streams

7. Improving stormwater management will cost money. To help fund stormwater projects and activities, there are several potential funding options. Please check the two that you would most prefer to see used in Hannibal if an improved stormwater program is adopted.

- _____ a. Stormwater sales tax
- _____ b. Increased property tax
- _____ c. User fees based on each property's demands on stormwater systems/programs
- _____ d. Increased fees for new development

THANK YOU FOR YOUR INPUT.

Additional comments or concerns regarding the City's stormwater problems and stormwater needs.

Database
City of Hannibal Stormwater Questionnaire

September 2005

| General Information | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|-------------------------------|-----------|-----------------|-------|-----------|--------------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 1 | Neimeyer, Ken | 4227 | Deer Run Dr | | MB-11 | 221-5097 | y | 10 | n | | n | n | | | | | | | | | | | | n | h | i | f | d | |
| 2 | Jenkins, Muriel | 215 | Sheperd Place | | MB-8 | | | 40 | n | 1 | n | n | | | | | | | | | | | | n | i | | | d | |
| 3 | Robb, Bill | 33 | Heritage Dr | | MB-5 | 248-0518 | y | 13 | n | | n | n | | | | | | | | | | | | n | d | a | h | a | |
| 4 | Rodgers, Pamela | 1 | Lady Sioux Ct | | B-7 | 541-3062 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 5 | Scotter's Car Wash | 3801 | Market St | | B-8 | 248-4522 | y | 5 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 6 | Watts, Donny | 519 | Clover Ct | | MB-11 | 221-3249 | y | 5 | y | 5 | y | n | A | | | | | | | | | | | n | a | e | c | | |
| 7 | Forester, Francis | 62 | Homestead Rd | | B-7 | 221-5343 | y | 5 | n | | n | n | | | | | | | | | | | | n | | | | d | |
| 8 | Hoskins, Betty | 56260 | Janapas Trail | | | | n | 11 | n | | n | n | | | | | | | | | | | | n | a | b | c | c | c |
| 9 | Mayes, Jenny | 1718 | Patchen St | | MC-2 | 221-9472 | y | | y | 3 | y | y | A | B | C | | | F | G | H | I | J | | y | d | g | e | d | |
| 10 | Nickell, Jim | 38 | Brook Drive | | MB-11 | 221-3803 | n | 3 | n | | n | n | | | | | | | | | | | | n | f | c | a | c | c |
| 11 | Treon, E. Isbell | 61 | Sherwood Est Dr | | MB-11 | 221-8543 | y | 18 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 12 | Bergman, Tyler | 620 | Clover Rd | | MB-11 | 248-2131 | y | 2 | n | | n | y | | | | | | | | | | | | n | b | d | h | c | |
| 13 | | | | | | | | 2 | n | | n | n | | | | | | | | | | | | n | j | i | b | a | c |
| 14 | Rodgers, Pamela | 39 | Sherwood Est Dr | | MB-11 | 221-1827 | y | 18 | n | | n | n | A | | | D | | | | | | | | n | j | a | g | c | |
| 15 | Perry, Rodney | 13 | Paulina Dr | Apt A | B-7 | 248-0965 | y | 5 | n | | n | y | | | | | | | | | | J | | | b | i | k | c | |
| 16 | Soileac | 93 | Meadows Rd | | MB-11 | 221-1726 | y | | n | | n | n | | | | | | | | | | | | | | | | | |
| 17 | Carter, Craig | 16 | Village Rd | | MB-11 | 231-0678 | y | 5 | y | 5 | y | n | A | b | | | | F | | | | | K | y | b | a | c | c | d |
| 18 | Peters, Louis | 417 | Clinic Rd | | B-7 | 406-4818 | y | 26 | n | | n | y | | | | | | | | | | | | | | | | | |
| 19 | First Un Meth Church | 901 | Broadway | | B-3 | 221-0745 | y | 97 | y | | n | y | | B | | | | | | | | | | n | i | g | e | a | |
| 20 | Taylor, Cathy A | 643 | Head Lane | | MB-11 | 406-0082 | y | 5 | n | | y | y | A | b | | | | | | | | J | | n | d | i | g | b | d |
| 21 | Mullen, David C | 4089 | Jericho Rd | | MB-11 | 221-7723 | y | 25 | y | 5 | y | y | A | | | | | F | | | | | | y | j | e | i | a | d |
| 22 | Trantham, Justin | 40 | Brook Drive | | MB-11 | 816 679-3746 | n | 17 | n | | n | y | | B | | | E | | | | | J | | n | b | j | i | c | |
| 23 | Pitney, Ben | 32 | Brook Drive | | MB-11 | 221-4778 | y | 10 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 24 | Dillman, Elizabeth | 1804 | Booker St | | M-3 | 221-1462 | y | 12 | n | | n | n | | | C | | | | | | | | | n | h | e | i | | |
| 25 | McHenry, Jack, Laurie | 501 | Clover Rd | | MB-11 | 231-0813 | y | 2 | y | 5 | y | n | A | | | | | F | | | | J | | n | a | b | d | a | c |
| 26 | DeStefano, Joe | 929 | Warren Barrett | | B-13 | 221-9431 | | 25 | y | 3 | y | y | | B | | | | | | | | | | y | d | | | b | d |
| 27 | Dusenberry, Ken, Marjorie | 46 | Brook Drive | | MB-11 | 221-5306 | y | 3 | n | | n | y | | | | | | | | | | | | | | | | | |
| 28 | Brownell, Sarah, Riedle, Chad | 517 | Head Lane | | MB-11 | 541-1022 | y | 1 | n | | y | n | | | | | | | | | | | | | b | j | e | a | d |
| 29 | Starrett, Betty | 110 | Huckleberry Hts | | MB-5 | 248-3212 | y | | y | 3 | n | | | | | D | | | | | I | | y | | | | | | |
| 30 | MCW Savings Bank | 228 | Broadway | | B-1 | 221-0893 | y | 31 | y | 5 | | | | B | | | | | | | | J | | y | i | i | e | a | |
| 31 | Couch, Ernest C | 14 | Park Terrace Dr | | B-7 | 248-0475 | y | 15 | y | 5 | | n | A | b | | | E | | | | | | | y | | | | | |
| 32 | Curfman, Paul, Rose | 56398 | Janapas Trail | | | 221-5041 | | 22 | n | | n | n | | | | | | | | | | | | n | | | | c | |
| 33 | Gaines, Michael | 4241 | Sunburst Dr | | MB-11 | 795-2247 | y | 1 | n | | y | n | | B | C | | | | | | | | | n | | | | | d |
| 34 | Albright, Bryan | 4024 | Edgewood | | MB-9 | 248-3504 | y | | n | | n | n | | | | | | | | | | | | n | | | | | |
| 35 | Brown, Robert L | 200 | Hummingbird Ln | | B-9 | 248-8030 | y | 6 | n | | n | y | | | | | | | | | | | | n | | | | b | c |
| 36 | McCluskie, Kelly | 37 | Arthur Rd | | B-7 | 248-2940 | y | 8 | n | | y | y | | B | | D | | | | | I | | | n | d | i | e | c | d |
| 37 | Hunter, Edward | 61 | Homestead Rd | | B-7 | 221-2773 | y | 15 | n | | n | n | | | | | | | | | | | | n | f | g | i | d | |
| 38 | Lambert, Dennis | 74 | Heritage Dr | | MB-5 | 248-3348 | y | 11 | y | 3 | y | y | A | B | C | | | | | H | I | | y | f | h | e | d | | |
| 39 | Diamond Car Wash | | Diamond Blvd | | M-9 | 221-6459 | y | 14 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 40 | Plaza Car Wash | 2721 | James Rd | | MB-5 | 221-5724 | y | 26 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 41 | Suchland, Art | 3911 | Ely Rd, West | | B-10 | 221-6186 | y | 13 | n | | n | n | | | | | | | | | | | | n | f | e | c | c | d |
| 42 | Powell, Everett | 302 | Huckleberry Hts | | MB-5 | 221-6722 | | 20 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 43 | Nichols, Tammy | 24 | Amaryllis Lane | | B-9 | 231-0246 | y | 3 | n | | n | n | | | | | | | | | | | | | | | | | |
| 44 | Monner, Matt | 120 | Jupiter | | MB-11 | 221-3827 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 45 | Dryden, Gary | 1 | D'Ville Place | | MB-5 | 221-9221 | y | 16 | n | | n | n | | | | | | | | | | | | n | f | e | i | c | d |
| 46 | Miller, Fred | 111 | Saturn Drive | | MB-11 | 221-2429 | y | 5 | n | | y | | | B | | | | | | | | J | | n | d | g | i | a | d |
| 47 | Pierceall, Linda | 75 | Meadows Rd | | MB-11 | 221-4648 | y | 8 | n | | n | n | | | | | | | | | | | | n | i | e | b | c | d |
| 48 | Hinds, Jeffrey | 751 | Clover Rd | | MB-11 | 221-2357 | n | 3 | n | | y | n | | | | | | | | | | | | | e | i | g | c | d |
| 49 | Johnson, David | 230 | Lake Apollo Dr | | MB-11 | 221-1381 | y | 7 | n | | y | n | | B | | | | | | | | | | | e | f | i | a | d |
| 50 | Wells, Raymond | 21 | Settlers Trail | | MB-5 | 221-7528 | y | 17 | n | | n | y | | | | | | | | H | | | y | e | e | f | i | a | c |
| 51 | Lane, Steve | 75 | Heritage Dr | | MB-5 | 221-3416 | y | 16 | y | 3 | n | n | | | | | | | | | | | K | y | i | f | e | c | d |
| 52 | Curtis, Anthony | 515 | Clover Rd | | MB-11 | 221-2224 | y | 5 | y | 5 | y | y | A | | | | | F | | | | | | n | g | i | i | a | d |
| 53 | Broughton, Ben, Jo | 215 | Gemini Dr | | MB-11 | 221-5616 | y | 27 | n | | n | n | | | | | | | | | | | | n | e | f | i | c | d |
| 54 | Buckman, Paul | 278 | Pioneer Trail | | | 221-9306 | y | 28 | y | 5 | y | n | A | b | | | | | | | | | | n | a | d | i | d | |
| 55 | Melgrove Pro Bldg | 7 | Melgrove | | M-9 | 221-2340 | y | 12 | y | 3 | y | n | A | | C | D | | F | | | I | | | n | a | b | g | | |
| 56 | King, John | 64 | Homestead Rd | | B-7 | 221-4395 | y | 2 | n | | n | n | | | | | | | | | | | | n | b | c | f | c | |
| 57 | Fletcher, Tom, Lisa | 150 | Saturn Drive | | MB-11 | 221-0613 | y | 10 | y | 5 | y | n | A | | | | | | | | | | | n | a | g | i | a | d |
| 58 | Gillett, Rita V | 50 | Homestead Rd | | MB-5 | 248-0768 | n | 15 | | | | | | | | | | | | | | | | n | | | | c | |
| 59 | Voepel, Andy W | 4310 | Stardust Dr | | MB-11 | 221-3022 | y | 0 | n | | n | n | | | C | | | | G | | | | | n | b | i | d | a | c |
| 60 | Day, David H Sr | 204 | Westwood Dr | | B-7 | 221-8838 | y | 16 | n | | n | y | | | | | | | | | | | | n | | | | | |
| 61 | Murphy, David | 75 | Coachlight Dr | | MB-11 | 795-3066 | n | 2 | n | | | y | | B | | | | | | | | | | n | d | e | i | a | c |
| 62 | Greening, Ann L | 702 | Huckleberry Hts | | MB-5 | 406-5526 | n | 1 | n | | n | n | | | | | | | | | | | | | | | | | |
| 63 | Bubolz, Sonja | 325 | Hummingbird Ln | | B-7 | 248-0492 | y | 1 | n | | n | y | | B | | | E | | | | | J | | n | b | d | g | b | |
| 64 | Henderson, Don | 121 | Hummingbird Ln | | B-7 | 221-7161 | y | 5 | n | | | n | | | | | | | | | | | | n | | | | | |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|----------------------------------|-----------|-----------------|-----|-----------|-------------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|------|------|----------------|-----|-----|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | |
| 65 | Andrews, Mark S | 54 | Carriage Rd | | MB-5 | 221-3071 | n | 10 | n | | y | y | A | B | C | D | | F | | H | I | | | y | b | d | g | a | b | | |
| 66 | McCartney, Francis | 4217 | Ely Rd, West | | B-10 | 221-3848 | y | 7 | n | | n | n | | B | | | | E | | | | | | n | | | | | | | |
| 67 | Willitt, Wilbur | 37 | Cherokee Trail | | MB-5 | 221-6925 | y | 20 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 68 | Williams, Nita | 30 | Heritage Dr | | MB-5 | 248-0053 | y | 2 | y | 5 | y | y | | B | | | | | | | | | | n | a | d | b | a | d | | |
| 69 | Glass, John | 57 | Carriage Rd | | MB-5 | 248-3059 | y | 14 | y | 5 | y | | | B | | | | | | | | | | n | f | d | g | d | | | |
| 70 | Rive, Beverly J | 204 | Huckleberry Hts | | MB-5 | 221-5438 | y | 8 | n | | n | y | | | | | | | | | | | | | | | | | | | |
| 71 | Schullen, C O | 3400 | Fox Run Ln | | B-7 | 221-5471 | y | | n | | n | n | | | | | | E | | | | | | n | i | j | l | d | | | |
| 72 | Heaton, Quintin,Haidee | 304 | Lake Apollo Dr | | MB-11 | | n | 2 | n | | n | | | | | | | E | | | | | | | k | l | e | c | d | | |
| 73 | Woodson, Otis,Vanda | 68 | Homestead Rd | | B-7 | 221-0016 | y | 20 | n | | n | n | | | | | | | | | | | | n | i | e | j | c | d | | |
| 74 | Glascocock, William | 4 | Homestead Rd | | B-7 | 221-0826 | y | 27 | n | | n | y | | | | | | | | | | | | | f | i | l | | | | |
| 75 | Miller, Donald L | 403 | Rosewood | | MB-11 | 248-2193 | y | 11 | y | 5 | y | | | | | | | E | | | | | | | | | | | | | |
| 76 | Dowell-Marshall, Dorothy | 359 | Lake Apollo Dr | | MB-11 | 248-3931 | y | 7 | n | | n | n | | | | | | | | | | | | n | | | | | c | | |
| 77 | Harbourn, Wayne,Cheryl | 8 | Surrey Hill Rd | | MB-5 | 221-0104 | n | | n | | n | n | | | | | | | | | | | | n | | | | | d | | |
| 78 | Tischer, David L | 321 | Rosewood | | MB-11 | 221-6385 | y | 12 | y | 5 | y | n | | | | | | F | | | | | | y | e | | | a | b | | |
| 79 | Degulia, Betty | 671 | Clover Rd | | MB-11 | 248-8237 | y | 5 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 80 | Wagner, Delois K | 4303 | Stardust Dr | | MB-11 | 221-3680 | y | 16 | y | 5 | y | y | A | | | | | F | | | | | | y | f | h | | d | | | |
| 81 | Ledbetten, Tim | 4205 | Sunburst Dr | | MB-11 | 221-8685 | y | 14 | n | | n | n | | | | | | | | | | | | n | e | f | k | a | c | | |
| 82 | O'Feaster, Milton | 679 | Clover Rd | | MB-11 | 248-1271 | y | 6 | n | | n | | | | | | | | | | | | | | | | | | | | |
| 83 | Ovellette, David | 47 | Carriage Rd | | MB-5 | 221-1178 | y | 14 | n | | y | n | | B | | | | | | | | | | n | h | d | j | a | c | | |
| 84 | Patterson, Mary | 141 | Satum Drive | | MB-11 | 221-1149 | y | 21 | y | 5 | n | n | | | | | | E | F | | | | | n | a | b | c | | | | |
| 85 | English, Joe | 1835 | Booker St | | M-3 | 231-0069 | y | 2 | n | | n | n | | | | | | | | | | | | n | f | j | l | | | | |
| 86 | Dugger, Tom | 51 | Carriage Rd | | MB-5 | 221-3187 | y | 25 | y | 5 | y | n | | | | | | F | | | | | | n | f | i | e | d | | | |
| 87 | Wild, Jerry | 119 | Main St, South | | B-1 | 221-3223 | y | 15 | y | 3 | y | | | | | | D | | | | | | | | | | | | | | |
| 88 | McPike, Edward | 11 | Hillcrest | | MB-5 | 221-7467 | y | 22 | n | | n | n | | | | | | | | | | | | | i | f | e | | | | |
| 89 | Green, Leau | 83 | Lake Apollo Dr | | MB-11 | 248-3067 | y | 13 | n | | n | y | | B | | | | | | | | | | n | e | f | d | c | d | | |
| 90 | Grant, Pauline | 903 | Huckleberry Hts | | MB-5 | 221-4312 | y | 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | Billings, Stella L | 3720 | Hwy AM | #A | | | n | 4 | | | n | n | | | | | | | | | | | | n | c | i | j | a | c | | |
| 92 | Boum, Patricia A | 60 | Pioneer Trail | | | 221-6486 | y | 5 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 93 | Ahrens, Hale & Lemon LLC | 800 | Broadway | | B-3 | 221-4060 | | 12 | | | n | n | | | | | | | | | | | | | | | | | | | |
| 94 | Natvas, John | 11 | Fair Oaks | | MB-5 | | y | 37 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 95 | Davis, Mark | 804 | Ben Lomond | | M-3 | 248-1481 | y | 1 | n | | n | y | | B | | | | | | | | | | n | d | c | b | c | d | | |
| 96 | Luko, Shirley | 78 | Lake Apollo Dr | | MB-11 | 248-1638 | y | 14 | y | 5 | y | n | A | | | | | F | | | | | | n | b | c | d | b | | | |
| 97 | Dyer, Joe | 4 | Parkview | | B-7 | 248-2158 | y | 2 | n | | n | y | | | | | | | | | | | | | | | | | | | |
| 98 | Ditillo | 4211 | Deer Run Dr | | MB-11 | 221-6015 | | 5 | n | | n | y | | | | | | | | | | | | | | | | | | | |
| 99 | Baker, Janice J | 86 | Stevens Dr | | B-8 | 221-5470 | y | 20 | n | | | | | | | | | | | | | | | y | | | | c | d | | |
| 100 | Engle, Larry | 1400 | Valley | | M-3 | 221-2703 | y | 35 | y | 3 | n | n | | | | | | F | | | | | | y | i | l | g | a | d | | |
| 101 | Barnett, Debra | 905 | Union St | | M-2 | 221-2104 | y | 1 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 102 | Hansmeier, Karl k | 26 | Hibiscus Lane | | B-7 | 248-3526 | y | 1 | y | 5 | y | n | A | | | | | | | | | | | n | | | | d | | | |
| 103 | Northcutt, Norma J | 57 #B | Homestead Rd | | MB-5 | 221-699 | y | 13 | n | | n | | | | | | | | | | | | | | | | | | | | |
| 104 | Kendall, Todd | 13 | Concord Dr | | MB-5 | 221-9024 | y | 5 | y | 3 | y | n | | | | | | F | | | | | | y | | | | c | d | | |
| 105 | Hopwood, Joe | 4220 | Wildwood Ct | | MB-11 | 221-2612 | y | 11 | n | | n | y | | B | | | | | | | | | | n | d | h | j | c | d | | |
| 106 | Ledbetter, Doug | 4223 | Wildrose Ct | | MB-11 | 406-0715 | | 1 | n | | n | n | | | | | | | | | | | | n | l | d | e | b | | | |
| 107 | Johnson, Brenda | 3405 | Market St | | B-8 | 221-3868 | y | 1 | y | 5 | y | n | | | | | | | | | | J | | n | b | e | h | | | | |
| 108 | Haught, Norma J | 819 | Clinic Rd | | B-7 | 221-1209 | y | 20 | n | | n | n | A | | | | | | | | | J | | n | f | l | b | d | | | |
| 109 | Altheide, Charles R | 6 | Fair Oaks | | MB-5 | 221-1773 | y | 43 | n | | n | n | | | | | | | | | | | | n | | | | | | | |
| 110 | Huss, Richard L | 42 | Homestead Rd | | MB-5 | 221-6815 | y | 11 | n | | n | n | | | | | | | | | | | | n | f | i | e | a | c | | |
| 111 | Moen, Don | 4230 | Wildwood Ct | | MB-11 | 248-1266 | y | 7 | n | | n | y | | | | | | | | | | | | n | i | g | d | a | | | |
| 112 | Hartsock, Kenneth | 74 | Satum Drive | | MB-11 | 248-1885 | y | 16 | y | 5 | y | n | | | | | | F | | | | | | n | l | e | c | d | | | |
| 113 | Romeo, Robert | 710 | Cedar Creek | | | | | 1 | | | y | | A | | | | | E | | | | | | n | | | | | | | |
| 114 | Hahon, Bill,Marla | 615 | Sycamore | | M-1 | 221-7134 | y | 24 | y | 3 | y | y | A | b | | | | E | | | | J | | n | d | e | i | c | d | | |
| 115 | Chapilton, Dorothy | 9 | Paulina Dr | | B-7 | 221-3749 | y | 9 | n | | n | n | | | | | | | | | | | | n | e | j | l | d | | | |
| 116 | Cox, Lyle | 4116 | Ely Rd, West | | B-10 | 221-8276 | y | 37 | n | | n | y | | | | | | | | | | | | n | c | e | i | | | | |
| 117 | Campbell, Andrew | 69 A | Pioneer Trail | | | 217-242-873 | y | 1 | y | 1 | y | n | A | | | D | E | | | H | | J | | n | j | f | b | c | d | | |
| 118 | Mark Twian Senior Citizen Center | 116 | Fifth St, South | | B-1 | 221-8411 | y | 5 | n | | n | n | | | | | | | | | | | | n | | | | | | | |
| 119 | Jenks, Nina | 54 | Homestead Rd | | MB-5 | 248-3241 | y | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | Jack's Harbor Marine Co. | 201 | Third St, South | | B-1 | 221-6270 | y | 12 | n | | n | | | | | c | | | | H | I | | y | b | d | | | | | | |
| 121 | Marion County Courthouse | 906 | Broadway | | B-3 | 769-5545 | y | 100 | n | | n | n | | | | | | | | | | | | n | c | d | e | a | d | | |
| 122 | Newman, Nolan, Betty | 18 | D'Ville Place | | MB-5 | 221-8885 | y | 32 | y | 5 | y | y | A | b | | | | | | | | | | n | | | | | | | |
| 123 | Anderson, Lester | 1427 | Valley | | M-3 | 221-7452 | | 25 | | 3 | n | | | | | C | | | | | | | | n | b | d | a | b | c | | |
| 124 | Mears, Ariel, Heather | 711 | Head Lane | | MB-11 | 248-3837 | n | 1 | n | | y | n | A | | | | | | | | | | | n | j | e | h | a | | | |
| 125 | Humphrey, Mark, Karen | 15 | Coachlight Dr | | MB-11 | 248-1416 | y | 6 | n | | y | n | | b | | | | | | | | | | n | d | | | c | | | |
| 126 | Bardeau, Glenna | 9 | Hillcrest | | MB-5 | 221-5166 | y | 6 | y | 3 | | n | A | | | C | | | | | | | | n | l | j | e | c | d | | |
| 127 | Jeffreis, Robert | 63 | Homestead Rd | | B-7 | 231-0404 | y | 6 | n | | n | | | | | | | E | | | | | | n | l | j | e | c | d | | |
| 128 | Sanders, Diana | 708 | Huckleberry Hts | | MB-5 | 221-6682 | y | 3 | n | | n | y | | B | C | | | | | | | | | n | l | i | d | c | | | |

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City of Hannibal Stormwater Questionnaire

September 2005

| General Information | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | | |
|---------------------|-----------------------------|-----------|----------------------|--------|-----------|----------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|---|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | |
| 129 | Burton, Trudy | 3520 | Rt MM | | MB-5 | 248-3214 | y | 12 | | | n | n | | | | | | | | | | | | y | d | | | d | | |
| 130 | Williams, Sue | 4112 | Ely Rd, West | | B-10 | 221-6804 | y | 6 | n | | n | n | | | | | | | | | | | | n | d | e | i | c | d | |
| 131 | Greene, Ron | 1710 | Montana St | | MC-2 | 248-1944 | y | 7 | n | | n | n | | | | | | | | | | | | y | b | i | l | c | d | |
| 132 | Johnson, David | 26 | Hillcrest | | MB-5 | | | 14 | n | | n | y | | | | | | | | | | | | n | d | i | l | c | d | |
| 133 | Burton, Howard | 137 | Rosewood | | MB-11 | 221-5235 | y | 4 | y | 5 | y | y | A | b | | | | F | | | | J | | y | i | l | g | a | b | |
| 134 | Best, Steven | 626 | Clinic Rd | | B-7 | 221-5719 | y | 20 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 135 | Steinman, Dan, Sheri | 102 | Hummingbird Ln | | B-7 | 248-0478 | y | 15 | y | 5 | y | y | A | b | | | | F | | | | J | | y | | | | c | d | |
| 136 | Levy, Ileen | 4106 | Ely Rd, West | | B-10 | 221-0082 | y | 29 | n | | n | y | | B | | | | | | | | | | | | i | f | g | a | |
| 137 | Gloun, Frances L | 1219 | Union St | | M-2 | 221-3520 | y | 50 | n | | n | y | | | | | | | | | | | | n | f | i | k | d | | |
| 138 | Bollotta, John | 6 | Pioneer Trail | | | 221-9287 | y | 30 | n | | n | n | | | | | | F | | | | | | n | a | b | e | a | d | |
| 139 | Higdon, J.R., Carrie | 507 | Lunar Dr | | MB-11 | 248-1460 | y | 15 | y | 3 | y | y | A | | | | | | | | | | | n | d | h | b | c | d | |
| 140 | Steme, Amy | 3732 | Rt MM | | MB-5 | 221-5705 | y | 2 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 141 | Frantz, Karen | 1530 | Lyon St | | B-6 | 221-4944 | y | 1 | | | n | n | | | C | | | | | | | | | | | | | d | | |
| 142 | Carter, Daniel J | 49 | Brook Drive | | MB-11 | 221-1979 | y | 2 | n | | n | y | | B | | | | | | | | | | n | i | g | d | a | d | |
| 143 | Greening, Marjorie | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 144 | Todd, Betty L | 61 | Sherwood Est Ln | Apt 31 | MB-11 | 221-8192 | y | 7 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 145 | Bliss, Doris | 35 | Sherwood Est Ln | | MB-11 | 406-3805 | y | 1 | y | 5 | y | n | A | | C | | | | | H | I | | | y | f | a | h | | | |
| 146 | Lavis, Lawrence | 61 | Sherwood Est Ln | Apt 40 | MB-11 | 248-1582 | y | 4 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 147 | None | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 148 | Waelder, Harold, Janet | 1201 | Fulton Ave | | M-2 | 221-2435 | y | 5 | n | | y | y | | | | | | | | | | | K | n | e | h | | | | |
| 149 | Murff, Samuel | 4314 | Stardust Dr | | MB-11 | 406-0413 | n | 9 | n | | n | n | | B | | | | | | | | | | | | | | | | |
| 150 | Walters, Robert, Willadean | 78-B | Heritage Dr | | MB-5 | 248-1312 | y | 2 | n | | n | n | | | | | | | | | | | | | | f | e | a | | |
| 151 | Himer, George | 3200 | Hamilton | | B-8 | 248-0366 | y | 3 | n | | y | n | | B | | | | | | | | | | y | a | b | e | c | d | |
| 152 | Himer, Harley | 8 | D'Ville Place | | MB-5 | 221-1252 | y | 27 | y | | y | y | | B | | | | | | | | J | | n | e | i | g | c | c | |
| 153 | Jurgens, Alice | 35 | Brook Drive | | MB-11 | 221-4026 | y | 5 | n | | n | y | | | | | | | | | | | | n | b | d | e | c | d | |
| 154 | Brinker, Bonnie | 61 | Sherwood Est Ln | Apt 51 | MB-11 | 221-7496 | y | | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 155 | Bleigh, Betsy | 661 | Head Lane | | MB-11 | 248-0710 | n | 2 | n | | n | n | | | | | | | | | | | | n | b | i | j | | | |
| 156 | Skinner Edna S | 321 | Lake Apollo Dr | | MB-11 | 221-4401 | y | 12 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 157 | Taylor, Carolyn | 56357 | Meyers Trail | | | 221-2133 | y | 2 | y | 5 | y | y | A | b | | | | F | | | | J | | n | b | d | i | c | d | |
| 158 | Burgun, Stephen | 22 | Surrey Hill Rd | | MB-5 | 406-0781 | y | 1 | y | 1 | n | n | | | C | | | | | | | | | y | h | j | l | c | d | |
| 159 | Gaines, Cecil | 35 | Hillcrest | | MB-5 | 221-2238 | y | 36 | n | | n | y | | | | | | | | | | | | | | f | l | d | c | d |
| 160 | Janes, David | 76 | Gemini Dr | | MB-11 | 248-0719 | y | | n | | y | n | | | | | | | | | | | | n | b | c | f | c | d | |
| 161 | Smith, Barbara | 527 | Lunar Dr | | MB-11 | 248-0031 | n | 3 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 162 | Beckett, Betty | 114 | Rosewood | | MB-11 | 221-7540 | y | 12 | y | 3 | | | A | | | | | F | | | | | | n | c | a | f | | | |
| 163 | Moran, John | 404 | Lake Apollo Dr | | MB-11 | 248-3339 | n | 3 | y | 5 | n | n | | | | | | E | F | | | | | n | l | i | e | a | | |
| 164 | Otte, Chester | 545 | Lunar Dr | | MB-11 | 221-2513 | y | 23 | n | | n | n | | | | | | | | | | | | n | | | | | c | d |
| 165 | | | | | | | | 1 | n | | n | y | | B | | | | | | | | | | n | g | b | e | c | | |
| 166 | Waldnhlagr,John E | 101 | Carriage Rd | | MB-5 | 248-1819 | y | 19 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 167 | Aintjir, Curtis | 201 | Centerville Rd | | B-9 | 248-1222 | y | 3 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 168 | Darnold, Doug | 4207 | Deer Run Dr | | MB-11 | 248-8346 | y | 4 | n | | n | n | | | C | | | | | | | | | y | i | l | e | b | | |
| 169 | Ball, Aaron | 2917 | Garfield St | | MB-7 | 248-6653 | y | 1 | n | | n | n | | | | | | | | | | | | n | g | i | k | a | c | |
| 170 | Marshall, Dorothy L | 526 | Clover Ct | | MB-11 | | y | | n | | n | n | | | | | | | | | | | | | | | | | | |
| 171 | Biggs, Lissa | 781 | Head Lane | | MB-11 | 248-1568 | y | 1 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 172 | Baumgardner, Cara | 461 | Lake Apollo Dr | | MB-11 | 231-0778 | y | | n | | y | y | A | | | | | | | | | J | | n | g | k | a | c | d | |
| 173 | Zeiger, Scott | 111 | Maple St, North | | B-4 | 248-4522 | y | 12 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 174 | Zeiger, Scott | 111 A | Maple St, North | | B-4 | 248-4522 | y | 12 | n | | n | n | A | | | | | | | | | J | | n | | | | | | |
| 175 | Zeiger, Scott | 109B | Maple St, North | | B-4 | 248-4522 | y | 12 | n | | n | n | A | | | | | | | | | J | | n | g | k | a | | | |
| 176 | Rolse, John F | 11069 | New London Gravel Rd | | xx | 221-2789 | y | 6 | y | 3 | y | n | A | | C | | | F | G | H | I | J | | y | e | | | a | | |
| 177 | Riggs, Darrell B | 27 | Heritage Dr | | MB-5 | 221-5752 | y | 8 | n | | n | n | | | | | | | | | | | | n | f | b | e | c | d | |
| 178 | Dismukes | 364 | Lake Apollo Dr | | MB-11 | 522-5201 | y | 2 | n | | n | n | | | | | | | | | | | | n | b | c | e | c | d | |
| 179 | Lewton, Lois | 4150 | Red Bud | | MB-11 | 248-1813 | y | 12 | n | | n | | | | | | | | | | | | | n | | | | | | |
| 180 | Pollard, Mary L | 29 | Heritage Dr | | MB-5 | 221-5708 | y | 12 | n | | n | | | | | | | | | | | | | | | | | | | |
| 181 | Closs, Iona | 125 | Clover Rd | | MB-11 | 221-0679 | y | 9 | y | 5 | y | n | A | | | | | | | | | | | y | a | | | d | | |
| 182 | Peters, Joyce | 417 | Clinic Rd | | B-7 | 406-4818 | y | 26 | n | | n | | | | | | | | | | | | | | | | | | | |
| 183 | Stewart, Helen | 103 | Huckleberry Hts | | MB-5 | 221-6800 | y | 5 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 184 | Hamm, Richard R | 4238 | Sunburst Dr | | MB-11 | 248-1429 | y | 16 | n | | n | n | | | | | | | | | | | | | | f | c | j | c | |
| 185 | Jaquet, Kevin, Brandy | 769 | Clover Rd | | MB-11 | 231-0355 | y | 1 | n | | y | y | A | | | | | | | | | | | n | d | h | a | a | c | |
| 186 | McCuue, Mary | 124 | Paulina Dr | | B-7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 187 | Dunn, Ceaser | 9270 | Co Rd 416 | | B-9 | 221-5502 | y | 1 | y | | y | y | A | b | | | | | | | | J | | | | | | | | |
| 188 | Esicar, Bill Dr | 3318 | Deerfield Dr | | B-7 | 406-0445 | n | 10 | y | 3 | y | y | A | | C | | | E | F | | | | | y | a | e | g | d | | |
| 189 | Krigbaum, Jim, Bonnie | 1216 | Fulton Ave | | M-2 | 221-7372 | y | 20 | y | 3 | y | n | A | B | C | | | E | F | | | | K | n | i | e | g | | | |
| 190 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 191 | Shaughnessy, Michael, Laura | 12 | Amaryllis Lane | | B-9 | 406-0401 | y | 2 | n | 5 | y | n | A | | | | | | G | | | | K | n | | | | | | |
| 192 | Holliday, Rachael | 271 | Munger Ln | Apt 51 | MB-11 | 541-5383 | y | 2 | n | | n | n | | | | | | | | | | | | n | i | h | e | c | d | |

Database
City of Hannibal Stormwater Questionnaire

September 2005

| General Information | | | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|---------------------------|-----------|-------------------|--------|-----------|-------------|----------|-------------|-------------|------------|------------|--------------|-----|-----|---------------------|---|---|---|---|---|---|---|---|------------|------|------|------|-----|-----|--|--|-----|----------------|--|--|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | | | | | | | |
| 193 | Anton, Chas P III | 42 | Holiday Dr | | M-9 | 221-8836 | y | 4 | n | | n | n | | | C | | | | | | H | | | n | f | i | j | b | d | | | | | | | | |
| 194 | Brawley, Donald | 93 | Surrey Hill Rd | | MB-5 | 221-3615 | y | 21 | y | 5 | y | y | A | | | | | | | | | | | n | a | f | h | a | d | | | | | | | | |
| 195 | Brachen, Donna | 31 | Brook Drive | | MB-11 | 221-1531 | y | 1 | n | | y | | | | | | | E | | | | | K | n | i | g | h | d | | | | | | | | | |
| 196 | Gundling, Mark | 123 | Rosewood | | MB-11 | | y | 8 | n | | y | y | | | | | | | | | | | | n | i | f | l | c | d | | | | | | | | |
| 197 | Brown, Caroline Joy | 800 | Walnut St | | M-3 | 221-1906 | y | 20 | y | 5 | y | y | | B | C | | | E | F | | | I | | n | b | e | f | a | c | | | | | | | | |
| 198 | Hinak, Velma | 421 | Washington St | | M-1 | 248-0787 | y | 4 | n | | n | n | | | | | | | | | | | | n | b | e | f | a | d | | | | | | | | |
| 199 | Oteebuson, Ruth | 220 | Hummingbird Ln | | B-9 | 221-5094 | y | 10 | n | | n | y | | | | | | | | | | | | n | b | d | e | c | d | | | | | | | | |
| 200 | Stanbudge, Ruth Helen | 322 | Terrace Ave, West | | M-3 | 221-3202 | y | 13 | n | | n | y | | | | | | | | | | | | n | g | i | | c | | | | | | | | | |
| 201 | Jones, Marjorie | 207 | Park Terrace Dr | | B-7 | 221-6810 | y | 11 | n | | n | y | | | | | | | | | | | | n | f | g | d | c | d | | | | | | | | |
| 202 | Kohler, L.R. | 709 | Fulton Ave | | M-2 | 221-7018 | y | 54 | n | | | y | | B | | | | F | | | H | I | | y | h | i | f | | | | | | | | | | |
| 203 | Rush, Alice Louise | 715 | Fulton Ave | | M-2 | 221-5618 | y | 10 | | | n | y | | | | | | | | | | | | | d | | | | | | | | | | | | |
| 204 | Brumbough | 419 | Riverside | | M-1 | 221-1286 | y | 42 | n | | y | n | | B | | | | | | | | | | n | i | j | | d | | | | | | | | | |
| 205 | Rhodes, Sylvia | 1309 | Sierra St | | M-2 | 221-5713 | y | 47 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 206 | Peacock, Errol E | 285 | Munger Ln | Apt 21 | MB-11 | | y | 5 | y | 5 | n | n | | | | | | | | | | | | n | b | | | d | | | | | | | | | |
| 207 | Miller, Barbara J | 21 | Concord Dr | | MB-5 | 221-4768 | y | 8 | n | | n | y | | | | | | | | | | | | n | e | i | b | a | d | | | | | | | | |
| 208 | Wagner, Myron | 28 | Hillcrest | | MB-5 | 231-0854 | y | 2 | n | | n | n | | | | | | | | | | | | y | | | | | | | | | | | | | |
| 209 | Coleman, Noble | 705 | Sycamore | | M-1 | | n | 48 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 210 | Yount, Robert | 58 | Pioneer Trail | | | 221-4399 | y | 25 | y | 3 | y | n | A | | | | | F | | | | | | y | e | i | j | | | | | | | | | | |
| 211 | Lackey, Kamber | 32 A | Fairway | | B-7 | 221-5337 | y | 9 | y | | y | n | | B | | | | F | | | H | | J | n | a | g | l | a | d | | | | | | | | |
| 212 | Yount, Lorraine L | 4203 | Ely Rd, West | #4 | B-10 | 221-7264 | y | 15 | n | | n | n | | | | | | | | | | | | n | | | | d | | | | | | | | | |
| 213 | Holliday, Bob E | 4108 | Ely Rd, West | | B-10 | 221-1622 | y | 38 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 214 | Smith, Pamela S | 110 | Sunburst Dr | | MB-11 | 221-6274 | n | 16 | n | | n | y | | | | | | | | | | | | n | d | e | g | c | d | | | | | | | | |
| 215 | Dickerson, C.F. | 1611 | Montana St | | MC-2 | 221-2027 | | 55 | n | | n | | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 216 | Clark, Charles A | 1012 | Park Ave | | B-10 | 221-4804 | y | 50 | n | | n | y | | B | | | | E | F | | | | J | y | i | f | e | c | d | | | | | | | | |
| 217 | Vidas, Rickey | 552 | Clover Ct | | MB-11 | 406-5575 | y | 4 | n | | y | n | | B | | | | | | | | | | n | d | i | j | | | | | | | | | | |
| 218 | Schwartz, Ted, Sarah | 4159 | Deer Ridge | | MB-11 | 406-1440 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 219 | MacDonald, Kenneth, Susan | 336 | Hummingbird Ln | | B-7 | 221-9335 | y | 5 | n | | y | n | A | | | | | | | | H | | | y | f | e | a | d | | | | | | | | | |
| 220 | Hanslmeyer, William | 128 | Cherokee Trail | | MB-5 | 221-3493 | y | 6 | y | 3 | y | n | A | | C | | | | | | H | I | | y | a | e | h | a | d | | | | | | | | |
| 221 | Lamberson, Marion | 165 | Lake Apollo Dr | | MB-11 | | | 2 | | | y | | | | | | | | | | | | J | | b | c | e | a | c | | | | | | | | |
| 222 | Novara | 410 | Hummingbird Ln | | B-7 | 221-0586 | y | 2 | y | 3 | n | y | | | | | | | | | | | | y | g | d | i | c | | | | | | | | | |
| 223 | McElroy,Hellmuth, Jackie | 6 | D'Ville Place | | MB-5 | 221-4881 | y | 25 | y | 5 | y | | A | B | C | | | F | | H | | J | | y | | | | | | | | | | | | | |
| 224 | Bridgeman, Will | 1225 | Ledford | | B-4 | 221-5649 | y | 24 | y | 1 | y | y | | B | | | | E | | | | | | n | a | b | d | | | | | | | | | | |
| 225 | | | | | | | | 3 | n | | n | y | | B | | | | | | | | | J | n | d | i | h | a | | | | | | | | | |
| 226 | Maisel, C. | 4203 | Ely Rd, West | Apt 12 | B-10 | 231-0429 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | c | | | | | | | | | |
| 227 | Woodhurst, Jamie | 24 | Settlers Trail | | MB-5 | 231-0030 | | 1 | n | | n | n | | | | | | | | | | | | n | | | | d | | | | | | | | | |
| 228 | Fuhrman, Kathleen | 1701 | Montana St | | MC-2 | 221-7467 | y | 25 | n | | y | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 229 | Eamest, John J | 1205 | Park Ave | | B-10 | 221-7517 | y | 36 | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 230 | Wallace, Sam | 1312 | Vermont | | B-6 | 231-0607 | y | 5 | y | 3 | | | A | | | | | | | | | | K | n | e | f | c | d | | | | | | | | | |
| 231 | Yehle, Keith | 252 | Hummingbird Ln | | B-9 | 221-6864 | y | 1 | y | | n | | | | | | | F | | H | | | | n | i | k | i | | | | | | | | | | |
| 232 | White David Sr. | 1712 | Price Ave | | B-8 | 221-5895 | y | 21 | y | 5 | y | y | A | B | C | | | E | F | | | I | J | y | f | d | g | a | b | | | | | | | | |
| 233 | Bush, Dwayne | 3115 | St. Charles St | | B-8 | 248-0624 | y | 16 | y | 5 | y | y | A | B | C | | | F | | | | | J | y | d | h | i | b | | | | | | | | | |
| 234 | Walden, Robert | 3631 | Market St | | B-8 | 221-0730 | y | 22 | y | 5 | y | | A | B | | | | F | | | | | J | n | i | | | | | | | | | | | | |
| 235 | Lighlle, Aaron | 1715 | 36th St | | B-8 | 231-0045 | y | 3 | n | | n | n | | | | | | | | | | | | n | d | b | h | a | | | | | | | | | |
| 236 | Stewart, Linda L | 1410 | Union St | | M-2 | 221-0504 | y | 32 | n | | n | y | | | | | | | | | | | | n | b | e | d | c | d | | | | | | | | |
| 237 | McGregor, Barbara S | 497 A | Head Lane | | MB-11 | 248-1414 | y | | n | | n | y | | B | | | | | | | | | | y | | | | c | d | | | | | | | | |
| 238 | Kalb, Melissa | 1306 | Ruby Ave | | B-8 | | | 3 | | | n | y | | | C | | | | | | | | | y | | | | | d | | | | | | | | |
| 239 | Yahne, Darrin, Nicole | 1107 | Fulton Ave | | M-2 | | | 1 | y | 1 | y | y | A | B | C | | | F | | H | | J | | n | i | h | b | d | | | | | | | | | |
| 240 | Hassien, Joe S | 62 | Carriage Rd | | MB-5 | 248-3351 | y | 1 | | | n | | | | | | | | | | | | | n | f | i | j | c | d | | | | | | | | |
| 241 | Buckwalter, James A | 69 | Heritage Dr | | MB-5 | 221-1661 | y | 8 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | |
| 242 | Embree, S. | 4169 | Deer Ridge | | MB-11 | 221-6848 | y | 3 | n | | n | y | | | | | | | | | | | | n | h | i | b | c | | | | | | | | | |
| 243 | CNI Lee's | 10065 | Co Rd 410 | | | 221-1706 | y | 18 | y | 3 | y | n | | | | | | | | H | I | | | y | a | e | i | | | | | | | | | | |
| 244 | Moss, Delores | 814 | Walnut St | | M-3 | 248-3522 | y | 20 | n | | n | n | | | | | | | | | | | | y | f | i | | | | | | | | | | | |
| 245 | Jones, Charlie | 201 | Garnet St | | MC-2 | 248-0508 | y | 55 | n | | n | n | | | C | | | | | | | | | y | | | | | | | | | | | | | |
| 246 | Simpson, Jim | 2905 | Market St | | B-12 | 573-822-108 | y | | y | 1 | y | n | A | B | C | D | | | | | | I | | | i | e | a | d | | | | | | | | | |
| 247 | Page, Raymond | 3321 | Deerfield Dr | | B-7 | 248-0237 | y | 9 | n | | n | n | | | | | | | | | | | | | | | | | | | | | | | | | |
| 248 | Eddington, Linda Ruth | 418 | Terrace Ave, West | | M-3 | 221-1164 | y | 28 | n | | n | y | | | | | | | | | | | | n | i | j | l | c | d | | | | | | | | |
| 249 | Voss, Tom | 206 | Hummingbird Ln | | B-9 | 221-0548 | y | 7 | n | | n | y | | | | | | | | | | | | n | | | | c | | | | | | | | | |
| 250 | Hayes, Terry | 12 | Paulina Dr | | B-7 | 221-2598 | y | 23 | | | | | | B | | | | | | | | | | n | f | e | i | c | d | | | | | | | | |
| 251 | Tischer, Darell | 1701 | Fulton Ave | | M-2 | 221-1301 | y | 6 | y | 5 | y | n | A | B | C | | | F | | H | | | n | e | g | i | d | | | | | | | | | | |
| 251 | Patterson, Wanda C | 197 | Gemini Dr | | MB-11 | 221-4795 | y | 22 | n | | n | y | | | | | | | | | | | | n | e | i | j | | | | | | | | | | |
| 252 | Washburn, Kenneth, Ann B | 115 | Lake Apollo Dr | | MB-11 | 406-1430 | y | 6 | y | 5 | y | n | A | | | | E | F | | | | | y | e | a | l | b | d | | | | | | | | | |
| 253 | Sublette, Todd, Kate | 105 | Clover Rd | | MB-11 | 248-1766 | y | 6 | y | 5 | y | n | A | B | | D | | F | | | | I | | y | b | h | d | b | d | | | | | | | | |
| 255 | Heibel, Joe., Cindy | 4155 | Red Bud | | MB-11 | 221-1786 | y | 7 | n | | n | n | | | | | | | | | | | | y | d | e | k | c | | | | | | | | | |
| 256 | Betts, Bill | 1209 | Union St | | M-2 | 248-2974 | y | 1 | n | | n | n | | | | | | | | | | | | n | b | h | l | b | | | | | | | | | |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|------------------------------|-----------|----------------------|-----|-----------|----------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 257 | Gottman, Josh, Christy | 1411 | Fulton Ave | | M-2 | 248-1910 | y | | y | 1 | y | n | A | | | | | | | | | | | n | i | b | e | b | c |
| 258 | Wagner, Jean | 128 | Rosewood | | MB-11 | 221-6088 | y | 10 | n | | | | | | | | | | | | | | | | | | | | |
| 259 | Beckner, Nancy A | 3388 | Fox Run Ln | | B-7 | 221-0806 | y | 11 | n | | | | | | | | | | | | | | | | | | | | |
| 260 | Melcalf, Gail | 20 A | D'Ville Place | | MB-5 | 231-0567 | y | 3 | n | | n | n | | | | | | | | | | | | | | | | | |
| 261 | Kuske, Robert | 210 | Sixth St, South | | B-2 | 248-0908 | n | 12 | n | | n | n | | | | | | | | | | | | | | | | | |
| 262 | Perkins, Rose Mary | 4231 | Wildwood Ct | | MB-11 | 221-3078 | | 1 | n | | | | | | | | | | | | | | | n | b | h | i | c | |
| 263 | Taylor, Dave | 5040 | College Ave | | M-9 | 221-2206 | y | 5 | n | | n | y | | B | | | | | | | | | | n | d | f | | d | |
| 264 | Aliser, Bob | 2209 | Marsh | | MB-9 | 221-0425 | y | 30 | y | 3 | y | n | A | | | | | | | | | | | y | e | h | | b | |
| 265 | Haug, Albert, Nettie | 3257 | St. Mary | | MB-6 | 221-6324 | y | 57 | y | 1 | y | | | B | C | D | | | | | | | | y | d | i | | | |
| 266 | Anderson, Christina | 1418 | Paris Ave | | B-4 | | n | 7 | n | | n | y | | | | | | | | | | | | n | b | e | i | a | d |
| 267 | Tutor, Daniel J Sr | 1401 | Walnut St | | M-3 | 221-4641 | y | 17 | y | 5 | y | n | A | | | | | F | | H | I | | y | a | d | g | c | d | |
| 268 | Riney, Robert E | 1216 | Lyon St | | B-3 | 221-7523 | y | 14 | | | n | | A | b | | | | | | | | | | | | | | | |
| 269 | Bailey, Jill | 51 C | Melgrove | | M-9 | 221-2807 | y | 2 | y | 3 | y | n | | | | C | | | | | | | | n | | | | | |
| 270 | Griffin, Earl R | 301 | Huckleberry Hts | | MB-5 | 221-9370 | | 6 | | | y | y | | | | | | | | | | | | | | | | a | d |
| 271 | Hodges, Debbie | 1239 | Lyon St | | B-3 | | n | 10 | n | | y | n | | | | B | | | | | | | | n | a | g | k | | |
| 272 | Orpherm Theater Inc | 425 | Broadway | | B-1 | 221-6600 | y | 1 | n | | n | n | | | | | | | | | | | | | c | e | i | c | d |
| 273 | Larenson, Patricia | 1208 | Ely Rd | | B-10 | 221-7471 | y | 39 | y | | y | n | | | | | | | | | | | | n | | | | | |
| 274 | Elzea, Linda A | 1322 | Vermont | | B-6 | 221-5157 | y | 4 | n | | n | n | | | | | | | | | | | | n | | | | b | |
| 275 | Bryan, Marie | 1316 | Park Ave | | B-10 | 248-8290 | y | 1 | n | | n | n | | | | | | | | | | | | n | d | e | i | b | d |
| 276 | Mastin, Elnara | 1726 | Vermont | | B-6 | 221-3190 | n | 39 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 277 | Hagan, Thomas | 1700 | D St | | MC-2 | 221-5523 | y | 15 | y | 5 | y | n | A | | | | | F | | | | | | n | | | | | |
| 278 | Slupavsky, Randall R | 817 | Fulton Ave | | M-2 | 406-0502 | y | 5 | n | | n | | | | | | | | | | | | | n | b | d | e | a | c |
| 279 | Bailey, Robert G | 2900 B | Market St | | B-12 | 221-5282 | y | 38 | n | | n | n | | | | | | | | | | | | n | i | i | a | | |
| 280 | Gibbons, Michelle R | 3725 | Ely Rd, West | | B-10 | 221-5104 | y | 8 | n | | n | n | | | | | | | | | | | | n | b | j | e | b | c |
| 282 | Gonzalez, Marty | 1 B | Newell Lane | | MB-5 | 406-0897 | y | 3 | n | | n | n | | | | | | | | | | | | n | h | c | b | a | |
| 283 | Yount, Mark | 111 | Hummingbird Ln | | B-7 | 221-9067 | y | 4 | n | | n | y | | | | | | | | | | | | n | g | i | h | d | |
| 283 | Taylor, D. J. | 43 | Satellite Dr | | MB-11 | 221-3347 | y | 9 | y | 5 | y | y | A | | | | | | | | | | | | g | i | d | | |
| 284 | Fette Orchard, Inc. | 2200 | Palmyra Rd | | M-8 | | n | 105 | n | | n | n | | | | | | | | | | | | | | | | | |
| 285 | Watson, James | 804 | Huckleberry Hts | | MB-5 | 248-3083 | y | 8 | n | | n | | | | | | | | | | | | | n | i | b | e | d | |
| 286 | Houghton, Donald | 3903 | New London Gravel Rd | | xx | 221-7835 | y | 35 | y | 5 | y | y | A | B | | | | E | F | | H | I | J | y | a | c | e | c | d |
| 287 | Furman, John | 3920 | New London Gravel Rd | | xx | 221-2964 | y | 27 | n | | y | n | | B | C | | | | | | | | | n | b | f | d | a | d |
| 288 | Lemaster, Jonathan, Rebecca | 16 A | Paulina Dr | | B-7 | 221-1985 | y | 3 | n | | n | n | | | | | | | | | | | | y | d | e | f | | |
| 289 | Nelson, Carl W | 1514 | Robinson | | MC-2 | 221-6599 | n | | n | | n | n | | | | C | | | | | | | | | d | i | | a | d |
| 290 | Patrick, Luther | 1805 | Price Ave | | B-8 | 221-8880 | y | 48 | n | | y | | | | | | D | | | | | | | n | | | | | |
| 291 | Vance Garage | 2832 | Market St | | B-12 | 221-7767 | y | | | | | | | | | | | E | F | | | | | n | | | | | |
| 292 | Thompson, Roger Lee | 1009 | Park Ave | | B-10 | | n | 1 | n | | y | n | | B | C | | | E | | | | | | n | b | c | d | c | |
| 293 | Sebers, Doris E | 1921 | Orchard Ave | | B-8 | 221-5444 | y | 43 | y | 3 | y | | | | | | | | | | | | | n | b | | | | |
| 294 | Grogan, Soneeta | 120 | Hummingbird Ln | | B-7 | 221-2160 | y | 3 | y | 5 | y | n | | | | | | | | | | | | n | | | | a | c |
| 295 | Ferguson, Janet | 26 | Settlers Trail | | MB-5 | 221-2956 | y | 23 | n | | y | | | | | C | | | | | | | | | | | | | |
| 296 | Ball, Wm. R | 15 | 36th St | | B-8 | 221-9124 | y | 38 | n | | n | n | | | | | | | | | | | | | | | | | |
| 297 | Craven, Ronald W | 391 | Lake Apollo Dr | | MB-11 | 221-1331 | y | 22 | n | | n | y | | | | | | | | | | | | n | d | | | d | |
| 298 | Richardson, Audrey | 681 | Head Lane | | MB-11 | 221-7314 | | 12 | n | | n | | | | | | | | | | | | | | | | | | |
| 299 | Schafer, John, Jane | 15 | Homestead Rd | | B-7 | 221-3993 | y | 11 | n | | n | n | | | | | | | | | | | | n | b | e | i | c | d |
| 300 | Barger, Jerry | 1806 | Benton St | | M-2 | 221-6373 | y | 2 | y | 5 | y | n | | B | C | | | | | H | I | | y | h | d | a | b | | |
| 301 | Kirtlink, Dolores | 806 | Huckleberry Hts | | MB-5 | 248-0909 | n | | n | | n | n | | | | | | | | | | | | n | | | | | |
| 302 | Lane, Katherine M | 1713 | Price Ave | | B-8 | 221-1702 | y | 45 | n | | n | n | A | | | | | | | | | | | n | b | c | f | c | |
| 303 | Terry, Reva | 43 | Gemini Dr | | MB-11 | 221-8186 | n | 28 | n | | n | | | | | | | | | | | | | n | g | i | | c | d |
| 304 | Wells, Dorothy P. | 3902 | Evans St | | B-9 | 221-5030 | y | 31 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 305 | Page, Gary (The Other Place) | 105 | Main St, South | | B-1 | 221-4114 | | | y | 5 | y | n | A | | | | | | | H | I | | n | | | | | | |
| 306 | Heusted, Jerry R | 4225 | Wildwood Ct | | MB-11 | 221-2452 | n | 4 | n | | n | n | | | | | | | | | | | | n | d | a | g | c | d |
| 307 | Yager, Carl, Jean | 1720 | 36th St | | B-8 | 221-6981 | y | 2 | n | | n | n | | | | C | | | | | | | | n | i | d | h | | |
| 308 | Billings, Patrick | 3627 | Edgar St | | B-8 | 248-0904 | y | 13 | n | | n | n | A | b | | | | | | | | | | n | a | b | d | c | d |
| 309 | Matson, Enorich G. | 1803 | Ruby Ave | | B-8 | 221-3949 | n | 40 | n | | n | n | | | | | | | | | | | | | d | | | | |
| 310 | Burroughs, Bill J | 1505 | Ruby Ave | | B-8 | 248-0848 | y | 30 | y | 5 | n | | A | | | | | | F | | | | | n | f | g | i | a | d |
| 311 | Jau, Carol | 16 | Settlers Trail | | MB-5 | 248-3135 | y | 13 | y | 3 | n | n | | | | | | | | | | | | | | | | | |
| 312 | Conn, Terry | 25 | Brook Drive | | MB-11 | 221-1853 | y | 14 | n | | n | y | | | | | | | | | | | | n | | | | | |
| 313 | Henderson, Wm H | 210 | Park Terrace Dr | | B-7 | 948-9465 | n | 5 | n | | n | | | | | | | | | | | | | | b | g | i | c | |
| 314 | Alright, Mathew | 121 | Clover Rd | | MB-11 | 231-0165 | n | 1 | n | | n | n | | | | B | | | | | | | | n | d | j | i | | |
| 315 | | | | | | | n | 5 | n | | n | n | | | | | | | | | | | | n | i | f | i | a | c |
| 316 | Parker, Robert | 1125 | Valley | | M-3 | 221-7669 | y | 41 | n | | y | | | | | | | | | | | | | n | a | d | h | | |
| 317 | Bartlett, Mike | 4257 | Stardust Dr | | MB-11 | 406-0669 | y | 1 | y | 5 | n | n | A | | | | | | | | | | | n | b | c | d | | |
| 318 | Calley, Alice G | 201 | Rock St, East | | M-5 | 221-1895 | y | 19 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 319 | Stephens, Larry | 135 | Pioneer Trail | | | 221-7499 | y | 19 | n | | n | y | A | | | | | | | | | | | y | i | f | i | a | d |
| 320 | Goodhart, Gilbert | 1716 | D St | | MC-2 | 221-4583 | y | 37 | y | 5 | y | n | | | | | | | | | | | | y | d | g | j | a | d |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | | |
|---------------------|----------------------------|-----------|----------------------|-----|-----------|----------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|---|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | |
| 321 | Baker, William, Cecelia | 3011 | Market St | | B-8 | 221-4913 | y | 40 | n | | n | | | | | | | | | | | | | | | | | | | |
| 322 | Thompson, Chad | 3102 | St. Mary | | MB-6 | 231-0919 | n | 2 | y | 3 | n | n | A | | | D | | F | | | | | | y | d | e | h | c | | |
| 323 | Van Winkle, Wanda | 1506 | Wellman Ave | | B-9 | 221-4271 | n | 62 | n | | n | n | | | | | | | | | | | | | b | i | c | d | | |
| 324 | Starr, Virgil | 1609 | 36th St | | B-8 | 221-2997 | y | 30 | n | | | | | | | | | | | | | | | | | | | | | |
| 325 | Kinsey, Lucia | 9052 | Co Rd 422 | | | 248-0736 | y | 18 | n | | n | y | | | | | | | | | | | | y | e | f | | c | d | |
| 326 | Sweeney, Robert E | 3401 | Moberly Ave | | B-8 | 221-3791 | y | 54 | y | 5 | y | y | A | | | | | | | | | | K | n | a | d | e | a | c | |
| 327 | Rosser, P. | 32 | Sherwood Est Dr | | MB-11 | 221-8120 | y | 4 | n | | n | n | | | | | | | | | | | | n | | | | c | d | |
| 328 | Shockey, Sharon | 1714 | Patchen St | | MC-2 | 221-5396 | y | | y | 3 | y | n | A | B | | | | F | | H | I | J | | n | g | k | a | a | d | |
| 329 | Thompson, Joan | 1525 | Frank | | B-8 | 248-0393 | y | 27 | n | | y | y | | | | | | | | | | | | n | | | | | | |
| 330 | Hackamaey, Ann | 1825 | 36th St | | B-8 | 406-0954 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | | c | |
| 331 | Nunley, Bob, Penny | 4171 | Stardust Dr | | MB-11 | 221-5982 | y | 7 | y | 5 | y | y | A | B | | | | | G | H | | J | | y | a | f | i | | | |
| 332 | Creason, Arthur A | 717 | Rock St | | M-6 | 221-1632 | y | 36 | n | | n | n | | | | | | | | | | | | n | | | | c | d | |
| 333 | Farris, Tondea | 3804 | Tilden St | | B-8 | 822-9488 | y | 1 | y | 5 | y | n | A | B | | | | | | | | | | n | b | d | i | a | c | |
| 334 | Powell, Brian | 3615 | Tilden St | | B-8 | 221-0862 | y | 14 | y | 3 | y | y | A | B | C | | | | | H | | J | | y | g | i | i | a | c | |
| 335 | Ledford, Raymond, Donnie | 4100 | Cheyenne | | MB-10 | 221-3747 | y | 40 | n | | n | y | | | | | | | | | | | | n | c | i | j | c | | |
| 336 | Herring, Mary M. | 3533 | Market St | | B-8 | 221-2839 | y | 50 | n | | | | | | | | | | | | | | | | | | | | | |
| 337 | Zumwalt, Jeannie | 1611 | Rinker | | MC-1 | 231-0194 | n | 2 | n | | n | n | | | | | | | | | | | | n | b | g | i | c | | |
| 338 | Martin, Gerald W. | 1500 | Etzea | | MC-2 | 221-6805 | y | 39 | y | 5 | y | y | A | | C | | | | | H | | | | y | a | d | h | | | |
| 339 | Terry's Tire & Auto Center | 219 | Third St | | M-4 | | y | 4 | n | | y | y | | B | | | | F | | | | | | n | | | | | | |
| 340 | Null, Jean | 1224 | Lindell Ave | | MB-1 | 221-2394 | y | 40 | y | 3 | y | n | A | B | C | D | | | | | | | | n | d | e | j | a | d | |
| 341 | Fumiss, Richard W. | 1505 | Viley St | | B-8 | 221-7741 | y | 32 | n | | y | y | | B | C | | E | | | | | | | y | | | | | | |
| 342 | Mundell, L. | | Benton St | | M-2 | 221-9053 | y | 10 | y | 3 | y | | | | | | | | | | | | | | b | | | | | |
| 343 | Brown, Frank, Barbara | 10 | Coachlight Dr | | MB-11 | 221-7486 | y | 35 | | | y | | | | | | | | | | | | | | | | | | | |
| 344 | Reid, John | 3812 | New London Gravel Rd | | xx | 248-1922 | y | 10 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 345 | Akerson, Dean | 7 | Homeslead Rd | | B-7 | 221-2825 | y | 3 | n | | n | y | | | | | | | | | | | | | | | | | | |
| 346 | Wigginton, Roy | 1804 | Darr St | | B-8 | 221-7792 | | 11 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 347 | Cole, C. M. | 324 | Arch St, South | | B-6 | | | 43 | n | | n | | | | C | | | | | | | | | y | | | | | | |
| 348 | Powell, Pat | 1022 | Hayward | | M-6 | 221-4327 | y | 34 | y | 3 | n | n | | | | | | F | | | | | | n | b | d | i | c | d | |
| 349 | Wiseman, Charles, Shirley | 3002 | Orchard Ave | | B-8 | 221-2109 | y | | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 350 | Janas, Frank, Janet | 1621 | Westlover Rd | | B-9 | 248-3505 | y | 21 | y | 1 | y | y | | B | | | | | | | | | | y | f | i | d | c | | |
| 351 | Booth, John D | 751 | Head Lane | | MB-11 | | n | 14 | y | 3 | | | | | C | | | | | | I | | | y | c | f | | a | | |
| 352 | Jameson, Wm E | 3309 | Susan Dr | | B-8 | 221-6685 | y | 42 | n | | n | | | | | | | | | | | | | n | f | b | c | c | d | |
| 353 | Whitaker, Greg | 56462 | Janapas Trail | | | 221-8826 | y | 2 | n | | n | n | | B | C | | | | | | | J | | n | b | j | f | a | c | |
| 354 | God's House Church | 925 | Lyon St | | B-3 | 221-5920 | y | 1 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 355 | Murphy, James C | 44 | Homeslead Rd | | MB-5 | 221-6176 | y | 21 | n | | n | y | | | | | | | | | | | | n | | | | | c | d |
| 356 | Bowers, Erin M | 701 | Pine St | | | 221-4891 | y | 2 | n | | n | n | | B | | | | | | | | | | | | | | | | |
| 357 | Borgmyer, Bob | 231 | Locust, North | | MB-4 | 248-1227 | | 9 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 358 | Bundy, Roberta | 101 | Spring St | | M-2 | 221-1398 | y | 4 | n | | n | n | | | | | | | | | | | | n | g | i | a | c | d | |
| 359 | Harsell, Kami | 537 | Lunar Dr | | MB-11 | 406-1455 | y | 3 | n | | y | n | | B | | | | | | | | | | n | d | b | g | c | d | |
| 360 | Porter, Shirley Mae | 902 | Huckleberry Hts | | MB-5 | 231-0234 | y | 5 | n | | n | n | | | | | | | | | | | | | | | | | | |
| 361 | Gerling, Richard W | 2 | Fairway | | B-7 | | | 75 | n | | n | n | A | b | | | | | G | | | | | n | b | d | e | | | |
| 362 | Davis, Daisy | 1514 | Vermont | | B-6 | 221-7276 | y | 1 | n | | n | y | | | | | | E | | | | | | n | b | d | e | | | |
| 363 | Davis, Daisy | 3402 | Moberly Ave | | B-8 | 221-7276 | y | 5 | y | 5 | y | y | A | | | | | | | | | | K | n | b | d | e | a | c | |
| 364 | Copp, Mary E | 1521 | Turn | | B-6 | 221-3667 | | 50 | | | | | | | | | | | | | | | | | | | | | | |
| 365 | Tewell, Charles L | 3500 | St. Charles St | | B-8 | 221-4128 | y | 18 | y | 5 | y | n | | | | | | | | | | | | n | a | b | c | a | | |
| 366 | Wilson, Rhonda | 512 | Lyon St | | B-1 | 248-0011 | y | 2 | n | | n | n | | B | | | | | | | | | | n | a | b | c | a | | |
| 367 | Clark, Susan | 1715 | Ruby Ave | | B-8 | 406-0751 | n | 4 | y | 5 | y | n | A | b | c | | | | | | | | | y | a | d | g | c | d | |
| 368 | Skinner, Mary | 103 | Carriage Rd | | MB-5 | 221-1832 | y | 3 | n | | y | | | B | | | | | | | | | | | | | | | | |
| 369 | Gundling, Geo. W | 1730 | Booker St | | M-3 | 221-1828 | y | 35 | n | | n | n | | | | | | | | | | | | n | f | | | | | |
| 370 | Hendren, Esther | 1705 | Prince Ave | | B-8 | 248-1332 | y | 39 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 371 | McGregor, Michelle | 1244 | Lyon St | | B-3 | 221-2940 | y | 1 | n | | n | n | | | | | | | | | | | | n | | | | | | |
| 372 | Lane, Earl | 2000 | Benton St | | M-2 | 221-4776 | n | 42 | y | 3 | y | y | A | B | C | | E | F | | H | | | | n | j | b | i | c | d | |
| 373 | Builder | | Surrey Hill Rd | | MB-5 | | | 11 | n | | y | n | | B | | | | F | | | | J | | | | | | | | |
| 374 | Amling, Evelyn | 1009 | Park Ave | | B-10 | 221-4336 | y | 4 | n | | n | n | | | | | | | | | | | | n | | | | | b | d |
| 375 | G ? David J | 2705 | Market St | | B-12 | 248-2938 | y | | n | | n | n | | B | | | | | | | | | | n | d | f | i | a | | |
| 376 | Dodd, Joyce | 2101 | Patchen St | | MC-2 | 221-8361 | y | 40 | y | 3 | n | n | A | b | | | | | | | | | | n | d | | | | d | |
| 377 | Morgan, Cathy M | 811 | Lindell Ave | | MB-1 | 221-9271 | y | 21 | y | 5 | y | | A | b | | | | F | | | | | | y | a | e | c | | | |
| 378 | Foster, Tom | 125 | Lake Apollo Dr | | MB-11 | 248-1338 | y | 10 | y | 5 | y | n | A | | | | E | F | | | | | | y | i | g | | a | c | |
| 379 | Woods, Steven | 44 | Satellite Dr | | MB-11 | 406-0627 | y | 1 | y | 3 | y | n | A | | C | | | | | | | | | y | b | g | e | c | d | |
| 380 | Turner, Everett W | 1716 | 36th St | | B-8 | 406-0132 | y | 8 | n | | n | n | | | | | | | | | | | | y | b | e | i | a | d | |
| 381 | Sanders, Raymond, Edna | 1405 | Sierra St | | M-2 | 221-1810 | y | 34 | n | | n | n | | B | | | | | | | | | | | d | b | i | | | |
| 382 | Danelson, Michael | 1518 | Viley St | | B-8 | 248-0207 | y | 28 | y | 3 | y | y | A | | | | E | | | | | | | y | e | h | f | c | d | |
| 383 | Young, Larry | 405 | Olive St | | B-4 | 248-3238 | y | 9 | n | | n | | | | | | | | | | | | | n | e | g | i | | | |
| 384 | Lieurance, Delbert | 821 | Grand Ave | | B-4 | 221-1670 | y | 17 | n | | n | y | | | | | | | | | | | | n | b | e | i | c | d | |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|-------------------------|-----------|----------------------|-----|-----------|--------------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 385 | Roberts, Imogene G | 1007 | Georgia St | | M-6 | 221-4968 | y | 8 | n | | n | n | | | | | | | | | | | | n | e | i | d | c | |
| 386 | Hall, Michael | 71 | Heritage Dr | | MB-5 | 221-4048 | y | 3 | y | 3 | y | y | A | | C | | | | | | | | | y | i | d | c | c | d |
| 387 | Eitel, Rhonda | 903 | Reservoir St | | M-6 | 221-7339 | y | 13 | y | 3 | y | y | | B | | | | F | | | | | J | y | i | d | c | c | d |
| 388 | Bell, Tina M | 500 | Hazel St | | B-4 | 248-0512 | y | 1 | n | | n | n | | | | | | | | | | | | n | b | d | e | c | d |
| 389 | Hawkinson, Mallie | 506 | Clover Rd | | MB-11 | 248-1004 | y | | y | 5 | y | n | A | | | | E | F | | | | | | n | i | g | a | | |
| 390 | Griffith, Virgil, Ellen | 1731 | Booker St | | M-3 | 221-8431 | y | 31 | y | 1 | | n | | | | | | | | | | | | y | i | g | e | | |
| 391 | Haryls, Robert | 3503 | Moberly Ave | | B-8 | 221-1534 | | 40 | y | 3 | y | y | A | | | | | F | | | H | I | J | n | i | a | i | c | d |
| 392 | Demigan, Robert L | 4141 | Deer Run Dr | | MB-11 | 221-6945 | y | 5 | n | | n | y | | | | | | | | | | | | n | h | f | e | c | d |
| 393 | Belcher, Joe | 3600 | Rt MM | | MB-5 | | | 18 | n | | n | y | | | | | D | | | | | | | | | | | | |
| 394 | Scott, George F | 33 | Cherokee Trail | | MB-5 | 231-0164 | y | 1 | | | | | | | | | D | | | | H | I | | y | a | d | e | c | d |
| 395 | Whiley, W. H. | 3917 | New London Gravel Rd | | xx | 221-8102 | y | 20 | y | 5 | y | y | A | | | | | | | | | | | | | | | | |
| 396 | Early Hannibal, Inc | 528 | Union St | | M-2 | 406-4818 | y | 5 | n | | n | y | | | | | | | | | | | | | | | | | |
| 397 | Early Hannibal, Inc | 708-10 | Birch St | | M-1 | 406-4818 | y | 12 | n | | n | | | | | | | | | | | | | | | | | | |
| 398 | Early Hannibal, Inc | 334 | Mark Twain | | M-6 | 406-4818 | y | 10 | n | | n | | | | | | | | | | | | | | | | | | |
| 399 | Stipp, Karena | 97 | Stevens Dr | | B-8 | 353-473-6564 | y | 9 | n | | n | y | | | | | | | | | | | | n | h | a | d | a | c |
| 400 | Hoskies, Howard D | 501 | Sath St | | | 221-5360 | y | 50 | y | 3 | | y | A | B | | | | F | | | H | I | J | y | d | e | h | b | |
| 401 | Wallace, Fannie | 3345 A | Moberly Ave | | B-8 | 406-0979 | | | | | | | | | | | | | | | | | | n | b | g | d | a | b |
| 402 | Callicott, Scott, Tammy | 15 | Fairway | | B-7 | 221-1031 | y | 2 | y | 3 | y | n | | | C | | | | | | | | | n | f | g | d | d | |
| 403 | Sheets, Vernon | 5 | D'Ville Place | | MB-5 | 221-0345 | y | 9 | y | 5 | y | | | B | | | | F | | | | | J | y | | | | | |
| 404 | L Josephine | 400 A | Fourth St, North | | M-5 | 221-2720 | n | 61 | n | | n | | | | | | | | | | | | | y | | | | a | c |
| 405 | Riley, Lawrence E | 1409 | Viley St | | B-8 | 221-1316 | y | 33 | y | 1 | n | n | A | b | c | | | | | | | | | y | | | | a | c |
| 406 | | | | | | 221-8767 | y | 45 | y | 5 | y | n | A | B | C | | | | | | H | | | n | d | e | g | c | |
| 407 | Reidmeyer, Robert | 34 | Cherokee Trail | | MB-5 | 221-4793 | y | 31 | y | 3 | y | | A | | | | | | | | | | | n | | | | d | |
| 408 | Lambert, Bob | 2133 | Grace St | | MB-4 | 221-3427 | y | 30 | n | | n | n | | | | | | | | | | | | n | | | | i | d |
| 409 | Smoot, Mary | 28 | Coachlight Dr | | MB-11 | 221-4507 | y | 25 | y | 5 | y | y | | | | | | | | | | | K | y | d | | | | |
| 410 | McDonald | 45 | Carriage Rd | | MB-5 | 221-2870 | y | 25 | y | 5 | n | n | | B | | | | | | | | | | n | b | d | f | | |
| 411 | Myers, Martha N | 1413 | 36th St | | B-8 | 221-0619 | y | 57 | n | | n | | | | | | | | | | | | | n | i | j | | b | d |
| 412 | Cottrell, Heather | 61 | Sherwood Est Ln | | MB-11 | 221-4558 | y | 1 | n | | n | n | | | | | | | | | | | | n | d | b | j | a | c |
| 413 | Lott, Mary F | 3806 | Tilden St | | B-8 | 221-2214 | y | 4 | y | 5 | y | n | A | | | | E | | | | | I | | n | a | e | h | a | c |
| 414 | Broves, Tom | 1323 | Ely Rd | | B-10 | 248-0331 | y | 6 | y | 3 | y | n | | B | | | | | | | | | | y | b | d | e | a | c |
| 415 | Sanderson, Kris | 701 | Birch St | | M-1 | 248-9857 | y | 1 | n | | n | y | | | | | | | | | | | | n | e | f | i | b | c |
| 416 | Cunningham, Eric | 719 | Olive St | | B-4 | 248-8378 | y | 3 | y | 1 | y | n | A | b | | | | F | | | H | | J | y | a | f | g | c | d |
| 417 | Bueter, Brenda | 3911 A | Evans St | | B-9 | 248-3759 | y | 3 | y | 5 | y | n | A | | C | | | F | | | H | | | y | | | | | |
| 418 | Young, Virgil | 104 | Lamb | | MB-3 | 221-0096 | y | 8 | n | | n | n | | | | | | | | | | | | n | i | | | | |
| 419 | Calicotte, Kathy | 3107 | Market St | | B-8 | 221-7120 | y | 18 | n | | n | n | | B | | | | | | | | | | n | d | e | i | c | |
| 420 | Hurt, David | 241 | Hummingbird Ln | | B-9 | 406-1152 | y | 2 | n | | n | y | | | | | | | | | | | | n | d | c | f | c | |
| 421 | Knutelski, Ron | 10006 | Old 79 | | | 221-6669 | y | 13 | n | | n | n | | | | | | E | | | | | | n | j | b | i | | |
| 422 | Northcraft, Margaret E | 601 | Huckleberry Hts | | MB-5 | 248-3051 | y | 2 | n | | n | y | | B | | | | | | | | | J | n | g | h | d | c | d |
| 423 | Meyer, Nick | 3420 | Hamilton | | B-8 | | n | 25 | n | | y | y | | | | | | | | | | | | n | f | e | i | c | d |
| 424 | Tompkins, Nicholas A | 2603 | Hope St | | MB-1 | 231-0650 | y | 4 | n | | n | n | | | C | | | | | | | | | n | h | d | j | d | |
| 425 | Stone, Ronald | 1604 | Fulton Ave | | M-2 | 406-0486 | y | 3 | y | 3 | | n | A | | | | | | | | | | | y | a | e | i | d | |
| 426 | Gregonis, Aaron | 1421 | Ruby Ave | | B-8 | 221-4440 | y | 8 | n | | y | y | | | | | | | | | | | | n | g | i | d | a | b |
| 427 | Henley, Danny, Nancy | 105 | Levering Ave, South | | MB-3 | 221-9922 | | 19 | n | | y | n | A | b | | | | | | | | | | y | h | c | f | a | c |
| 428 | Walker, Elizabeth A | 1609 | Darr St | | B-8 | 221-4442 | y | 44 | n | | n | y | A | b | | | | | | | | | | n | a | c | f | c | |
| 429 | Wilson, Thomas, Gwenda | 1630 | 29th St | | B-12 | 221-7352 | y | 45 | n | | n | y | | | | | | | | | | | | n | a | c | f | c | |
| 430 | Clarkson, Jerilyn | 207 A | Fourth St, North | | M-4 | | n | | n | | n | n | | | | | | | | | | | | n | i | f | d | c | d |
| 431 | Stevenson, Dallas, Rita | 828 | Sixth St, North | | B-2 | 221-3459 | y | 33 | n | | y | y | | B | | | | | | | | | J | y | g | a | f | b | c |
| 432 | Ahrens, Todd | 73 | Heritage Dr | | MB-5 | 221-4160 | y | 8 | n | | y | n | A | | C | D | | | | | | | | y | i | d | g | a | |
| 433 | Rosenkraus, Jerry | 18 | Hawthorne | | B-4 | 248-3870 | y | 2 | n | | y | n | | B | | | | | | | | | | y | c | i | g | c | d |
| 434 | Johnson, Daniel | 197 | Westwood Dr | | B-7 | 248-0561 | y | 7 | n | | n | y | | | | | | | | | | | | | c | i | g | c | d |
| 435 | Ledbetter, Karl, Becky | 13 | Meadowbrook Dr | | MB-5 | 248-5557 | y | 20 | y | 5 | y | y | | | | | D | | F | | | | K | y | e | j | i | a | d |
| 436 | McIntyre, David W | 4216 | Wildwood Ct | | MB-11 | 221-1507 | y | 10 | y | 3 | y | y | | | | | | F | | | | | | y | j | f | g | c | d |
| 437 | Thone, Jackson | 1911 | Crescent Dr | | B-4 | 248-1262 | y | 11 | n | | n | y | A | | | | | | | | | | | n | d | | | | |
| 438 | Hull, Chris | 15 | Village Rd | | MB-11 | 248-1235 | y | 1 | n | | y | n | | | | | | | | | | | | | | | | | |
| 439 | Ruble, Harold E | 3902 | New London Gravel Rd | | xx | 248-0831 | y | 25 | y | 5 | y | y | A | B | C | | E | F | | | H | I | J | y | a | d | e | a | |
| 440 | McMakin, Jim | 4181 | Stardust Dr | | MB-11 | 221-2714 | y | 15 | y | 5 | y | n | | B | | | | F | | | | | J | n | d | g | i | b | d |
| 441 | Pukins, Imogene | 114 | 20th St | | MB-4 | 248-3272 | | 8 | n | | n | n | | | | | | | | | | | | n | d | h | i | a | c |
| 442 | Bross, Rebecca | 2608 | Pleasant St | | MB-9 | 248-1099 | y | 6 | n | | n | n | | B | | | | | | | | | | n | b | j | g | a | c |
| 443 | Kan-Man Metal Recycling | 1911 A | Prince Ave | | B-8 | 221-0037 | y | 8 | n | | y | y | | B | | | | | | | | | | n | d | | | | |
| 444 | Luckey, Bryan, Carol | 3510 | James Rd | | MB-5 | 248-3164 | y | 12 | y | 5 | y | n | A | b | | | | F | | | | | | y | d | i | g | c | d |
| 445 | Barbee, David | 206 | Edwards St | | M-2 | 221-2054 | y | 15 | y | 5 | y | | A | b | c | | | | | | | | | y | b | d | e | | |
| 446 | Wheeler, Randy | 1400 | Vermont | | B-6 | 406-0247 | y | 5 | y | 5 | y | y | A | | C | | | F | | | | | J | y | g | d | | b | |
| 447 | Sheperd, Susan | 3 | Surrey Hill Rd | | MB-5 | 221-4892 | y | 18 | y | 3 | y | n | A | B | | D | | | | | | I | | y | e | b | a | a | d |
| 448 | Sims, Jason A | 508 | Hazel St | | B-4 | 406-1157 | | 8 | n | | n | n | | | | | | | | | | | | | | | | | |

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| General Information | | | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|---------------------------|-----------|-------------------|---------|-----------|-------------|----------|-------------|-------------|------------|------------|--------------|-----|-----|---------------------|---|---|---|---|---|---|---|---|------------|------|------|----------------|-----|-----|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | |
| 449 | Uake, Dondi L | 1524 | 30th St | Apt 106 | B-8 | 406-0210 | y | | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 450 | Dyke, Danny T | 36 | Cherokee Trail | | MB-5 | 248-8067 | y | 6 | y | 5 | n | n | A | | C | | | | | | I | | | n | e | i | g | c | d | | |
| 451 | Mears, Bruce | 1921 | Market St | | MB-1 | 221-0858 | y | 2 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 452 | Croft, James | 1307 | Ruby Ave | | B-8 | 221-5696 | y | 37 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 453 | Waples, Travis | 522 | Rock St | | M-6 | 221-1569 | y | 40 | n | | n | n | | | | | | | | | | | | n | | | | | | | |
| 454 | Mann, Charles E. | 900 | Paris Ave | | M-6 | 221-3630 | y | 38 | n | | n | | | | | | | | | | | | | n | d | i | k | a | d | | |
| 455 | Mitchell, Kevin, Goldie | 1016 | Fulton Ave | | M-2 | 248-3294 | y | 6 | y | 5 | y | n | A | B | | | | F | | H | | J | | y | i | h | e | | | | |
| 456 | Lyons, Tom, Kelly | 397 | Lake Apollo Dr | | MB-11 | 221-0963 | y | 14 | n | | y | n | | B | C | | E | | | | | | | y | d | i | l | b | d | | |
| 457 | Becker, H. | 502 | Pine St | | | 231-0286 | y | 1 | n | | n | n | A | b | c | | | | | | | | | y | b | i | f | c | | | |
| 458 | Wells, Steven P. | 3 | Forest Hill Rd | | MB-4 | 248-3966 | y | 10 | y | 3 | n | n | | | C | | | F | | H | I | | n | j | i | h | | | | | |
| 459 | Swanson, Warren, Marty | 309 | Grand Ave | | B-4 | 406-0347 | y | 7 | y | 3 | | y | | B | C | | E | F | | | | | y | b | i | d | a | d | | | |
| 460 | Sarno, A. | 4534 | Ely Rd, West | | B-10 | 800-431-251 | y | 2 | n | | n | n | | B | | | | F | | | | J | | n | h | d | g | a | b | | |
| 461 | Jurado, Susan | 1717 | Price Ave | | B-8 | 248-3712 | y | 11 | y | 3 | y | n | | | C | D | | | | | | | y | i | d | e | c | d | | | |
| 462 | Gilbert, Tasha | 1311 | Fulton Ave | | M-2 | 22102821 | n | 1 | n | | y | n | | | C | | | | | | | | n | d | i | f | c | | | | |
| 463 | Miner, Susan | 902 | Fulton Ave | | M-2 | 221-3412 | | 10 | n | | n | y | | | | | | | | | | | n | | | | | | | | |
| 464 | Walden, William H. | 613 | Virginia St | | MB-3 | 221-7982 | | 11 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 465 | Morley, Lyle | 3101 | Moberly Ave | | B-8 | 248-3101 | y | 6 | y | 1 | n | n | A | B | | | E | F | | | | | n | a | b | d | c | | | | |
| 466 | Hogan, Tim, Joni | 3730 | Tilden St | | B-8 | 221-8680 | y | 8 | y | 5 | y | | A | B | C | | | | | H | I | | y | i | l | g | | | | | |
| 467 | Richards, R W (Bob) | 2531 | Pleasant St | | MB-9 | 221-1667 | | 15 | n | | n | n | | | | | | | | | | | n | i | e | c | c | | | | |
| 468 | Franklia, Glory | 711 | Ben Lomond | | M-3 | 221-5356 | y | 13 | n | | n | | | | | | | | | | | | n | h | b | e | c | d | | | |
| 469 | Alber, Mark | 721 | Clover Rd | | MB-11 | 248-0272 | | 1 | | | n | | | | | | | | | | | | n | i | g | b | c | d | | | |
| 470 | Koch, Carianne | 1711 | 35th St | | B-8 | 406-0227 | y | 9 | y | 5 | y | y | A | | | | | F | | H | | n | a | d | e | | | | | | |
| 471 | Suda, P. | 1508 | Ruby Ave | | B-8 | 221-4270 | n | 32 | y | 5 | | y | | | | | | | | | | | n | i | k | f | | | | | |
| 472 | Veach, Teri L. | 94 | Stevens Dr | | B-8 | 248-1806 | y | 9 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 473 | Mayfield, Gary, Jenny | 1200 | Ruby Ave | | B-8 | 221-5667 | y | 28 | | | n | n | A | | C | | | | | | | | n | | | | | | | | |
| 474 | Morris, Nancy S. | 212 | Eighth St, North | | B-2 | 221-3422 | y | 30 | n | | y | y | A | | | | | | | | | | y | a | i | j | c | d | | | |
| 475 | Lamberson, Tessa | 1720 | Park Ave | | B-10 | 248-1203 | y | 1 | y | 5 | y | n | A | | | | | | | | | | y | i | d | f | c | | | | |
| 476 | Medina, Elliott, Julie | 821 | Webb St | | M-6 | 221-3701 | y | 20 | y | | y | n | | | | | F | | | H | I | | n | a | b | c | c | | | | |
| 477 | Bremmer, Ed | 1842 | Crescent Dr | | B-4 | 221-8747 | y | 43 | y | | | | | | | | | | | | | | y | d | e | i | | | | | |
| 478 | Bremmer, Sylvia | 1840 | Crescent Dr | | B-4 | 221-0617 | y | 45 | y | | | | | | | | | | | | | | y | d | e | i | | | | | |
| 479 | B & D Concrete Const. Inc | 130 | Corporate Sq. | | XX | 221-7939 | y | 17 | y | 5 | y | y | A | | | | | | | | | J | | y | i | e | g | c | d | | |
| 480 | Forrest, L P | 14 | Ridgewood Dr | | B-4 | 221-1672 | y | 40 | n | | n | n | | | | | | | | | | | | | | | | | | | |
| 481 | Bowman, Tony | 2710 | Market St | | B-12 | 221-4615 | y | 50 | y | 3 | y | n | | B | | | | | | | | | y | d | e | a | c | | | | |
| 482 | Majors, David, Sue | 721 | Arch St, South | | B-6 | 248-0822 | y | 28 | y | 5 | y | n | | B | | | | | | | H | | J | | | | | | | | |
| 483 | Findlay, Dorothy M | 611 | Olive St | | B-4 | 221-2409 | y | 40 | n | | n | y | | B | | | | | | | | | | | b | d | g | c | | | |
| 484 | Lieurance, John | 3427 | St. Charles St | | B-8 | 221-4342 | y | 6 | y | 5 | y | n | A | B | | | E | | | | | J | n | d | i | | a | c | | | |
| 485 | Strode, Walter | 417 B | Clinic Rd | | B-7 | 795-6029 | y | 3 | n | | n | n | | | | | | | | | | | n | i | e | l | a | c | | | |
| 486 | Colbert, Sharon | 102 | Carriage Rd | | MB-5 | 221-3598 | y | 9 | y | 5 | y | n | | B | | | | | | | | | n | d | g | | b | d | | | |
| 487 | Kendall, Barbara Ann | 661 | Magnolia Ave | | MB-3 | 221-7807 | y | 20 | n | | n | n | | | | | | | | | | | n | | | | | | | | |
| 488 | Janes, Jason D | 523 | Fifth St, North | | M-6 | 221-7597 | y | 3 | n | | n | y | | | | | | | | | | | | g | b | i | c | d | | | |
| 489 | Faulkner, Geraldine M. | 1803 | Chestnut St | | MB-3 | 221-6119 | y | 15 | n | | n | n | | | | | | | | | | | n | | | | | | | | |
| 490 | Bindemann, Charles | 611 | Section St, North | | M-6 | 221-1428 | y | 33 | n | | y | y | | | | | | | | | | | y | f | i | g | d | | | | |
| 491 | Armour, Henry, Sharon | 2924 | Market St | | B-12 | 221-8518 | n | 15 | n | | n | n | | | | | | | | | | | | b | f | i | c | d | | | |
| 492 | Miller, Royden | 631 | Magnolia Ave | | MB-3 | 406-1078 | y | 7 | n | | n | n | A | | | | | | | | | | n | b | f | i | b | | | | |
| 493 | Webster, Bridget | 9 B | Starlight Ridge | | B-7 | 573-541-721 | y | 1 | n | | n | n | | | | | | | | | | | n | | | | | | | | |
| 494 | Niehoff, John | 92 | Stevens Dr | | B-8 | 221-0003 | y | 25 | n | | n | n | | | C | | | | | | | | y | i | f | c | | | | | |
| 495 | Pritchett, Sulro | 615 | Clement St | | M-6 | 221-3218 | n | 20 | n | | y | n | | | C | | | | | | | | y | i | f | c | | | | | |
| 496 | Livingston, Jack L | 612 | Cypress | | M-2 | 248-9876 | y | 3 | y | | y | n | A | | | | E | F | G | | | J | n | a | i | | | | | | |
| 497 | Nicosia, Raymond | 3507 | Rt MM | | MB-5 | 221-3417 | y | 10 | y | 5 | y | n | A | B | | | | F | | | | | y | i | d | g | | | | | |
| 498 | Linnenburger, Wayne | 908 | Reservoir St | | M-6 | 221-9114 | y | 30 | n | | y | n | | | | | | | | | | | n | | | | | | | | |
| 499 | Schulz, Warren, Kim | 131 | Rosewood | | MB-11 | 406-1014 | y | 5 | y | 5 | y | y | A | | | | | F | | | | | y | f | g | i | a | d | | | |
| 500 | Beckett, Mary Ann | 1416 | Paris Ave | | B-4 | 248-1598 | y | 8 | n | | n | y | | | | | | F | | | | | n | e | j | l | a | d | | | |
| 501 | Birthplace, Molly Brown | 600 | Butler | | M-6 | 221-2150 | y | 8 | y | 5 | y | y | A | b | c | | | | | | | | | d | h | i | a | b | | | |
| 502 | Conn, Sandra K. | 3913 | Henderson St | | B-9 | 221-1429 | y | 10 | y | 3 | | y | A | | C | | | | | | | | n | i | d | j | b | c | | | |
| 503 | Thompson, Thelma | 1709 | Broadway | | MB-1 | 221-2382 | y | 40+ | n | | | y | | | | | | | | | | | | | | | | | | | |
| 504 | Forster, Bill | 512 | Clover Rd | | MB-11 | 221-8780 | y | 5 | y | 5 | y | y | A | | | | | F | | | | | | | | | | | | | |
| 505 | Bynum, Cynthia | 242 | Virginia St | | MB-3 | 221-0111 | y | 4 | n | | n | y | | | | | | | | | | | | | | | | | | | |
| 506 | Meshka, Dakota | 111 | Main St, North | | M-4 | 231-0133 | y | 2 | | | y | | | B | | | | | | | | J | | n | d | h | i | d | | | |
| 507 | McFall, Penny | 225 | Division St | | B-4 | 248-2917 | n | 14 | n | | n | y | | | | | | | | | | | n | e | l | j | c | d | | | |
| 508 | Dye, William | 2525 | Chestnut St | | MB-3 | 221-9946 | y | 11 | n | | n | | | | | | | | | | | | n | | | | | | | | |
| 509 | Oakwood Car Wash | 3801 | Market St | | B-8 | 248-4522 | y | 5 | n | | n | n | | | | | | | | | | | n | | | | | | | | |
| 510 | Scooters Car Wash | 3801 | Market St | | B-8 | 348-4522 | n | 5 | n | | n | n | | | | | | | | | | | n | | | | | | | | |
| 511 | Kocher, Diane | 69 | Saturn Drive | | MB-11 | 248-0796 | y | 5 | n | | n | | | | | | | | | | | | | | | | | | | | |
| 512 | Meyer, M. Elaine | 38 | Heritage Dr | | MB-5 | 221-8643 | y | 8 | y | 5 | y | | | B | | | | | | | | | | | | | | | | | |

Database
City of Hannibal Stormwater Questionnaire

| General Information | | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|---------------------------|-----------|---------------------|-----|-----------|----------|----------|-------------|-------------|------------|--------------|-----------|-----|---------------------|---|---|---|---|---|---|---|---|---|------------|------|------|------|----------------|-----|--|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | | |
| 613 | Nagy, Ann | 5 | Cardiff Lane | | M-6 | 221-2813 | y | 4 | n | | n | n | | | | | | | | | | | | n | | | | | c | | | |
| 614 | Harris, Michael | 519 | Rock St | | M-6 | 221-5887 | y | 30 | n | | n | n | | | | | | | | | | | | n | e | f | j | c | d | | | |
| 615 | Rennan, Louis | 300 | 20th St | | MB-4 | 221-4385 | y | 17 | y | 1 | n | | | | C | D | | F | | | | | | y | a | e | h | | | | | |
| 616 | Oglesby, June | 1707 | Pleasant St | | B-4 | 221-2887 | y | 46 | n | | n | n | | | | | | | | | | | | n | e | h | i | c | d | | | |
| 617 | Rumman, Tami | 1708 | Chestnut St | | MB-3 | | | 5 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 618 | Freeman, E. C. | 2701 | Chestnut St | | MB-3 | 221-9930 | y | | n | | y | n | | | | D | | | | | | | | n | | | | | | | | |
| 619 | Romig, Rebecca R. | 1416 | Viley St | | B-8 | | n | 0.2 | n | | n | y | | B | | | | | | | | | | n | d | e | g | a | c | | | |
| 620 | McSparren, Jane | 2827 | Market St | | B-12 | 221-4411 | y | 20 | y | 1 | y | y | | | | | | | | | | | | y | b | i | j | | | | | |
| 621 | Riley, James & Carole Jo | 1606 | Frank | | B-8 | 221-2405 | y | 35 | n | | y | n | | | | | | | | | | | | y | | | | c | d | | | |
| 622 | Collings, Stacy | 11 | Surrey Hill Rd | | MB-5 | | | 5 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 623 | Vaughn, Norman | 10032 | Owens Ave | | MC-1 | 248-0703 | y | 18 | y | 5 | y | y | | | | | | | | | | | | y | g | i | c | | | | | |
| 624 | Miller, Matt | 1926 | Owens Ave | | MC-1 | 221-1465 | y | 7 | y | 3 | y | n | A | | | | | F | | | | | | y | a | e | i | d | | | | |
| 625 | Asmussen, Jeff | 417 | Hill St | | M-5 | 221-7256 | y | 1 | n | | | | | | | | | | | | | | | | | | | | | | | |
| 626 | Oliver, Christine | 207 | Huckleberry Hts | | MB-5 | 221-3233 | y | 2 | n | | n | y | | | | | | | | | | | | | d | e | i | d | | | | |
| 627 | Jost, Harry | 1909 | Crescent Dr | | B-4 | 221-4273 | y | 23 | n | | n | y | | | | | | | | | | | | n | i | | | c | | | | |
| 628 | Curry, Joanne | 2281 | Lilly St | | B-8 | 248-0861 | y | 10 | y | 5 | | | A | b | | | | F | | | | | | n | a | g | i | | | | | |
| 629 | Rendlen, Charles | 11 | Riverpoint Rd. | | M-8 | 221-3544 | | 5 | n | | n | | | | | | | | | | | | | | | | | | | | | |
| 630 | Coleman, L.J. | 334 | Magnolia Ave | | MB-3 | 221-0665 | y | 15 | n | | n | | | | | | | | | | | | | n | b | e | i | b | c | | | |
| 631 | Clark, Ted | 8203 | Haymon | | | 221-1769 | y | 25 | y | 3 | y | n | A | b | | | | | | | | | | y | d | | | | | | | |
| 632 | Brown, Stephanie | 3915 | Market St | | B-8 | 221-8705 | y | 4 | n | | n | | | | | | | | | | | | | | d | h | i | c | d | | | |
| 633 | Moore, Katrina | 1109 | Sierra St | | M-2 | | n | 4 | n | | n | n | | | | | | | | | | | | n | d | a | e | c | d | | | |
| 634 | Salter-Hinojosen, Terri | 2 | Paulina Dr | | B-7 | 406-0644 | y | 5 | y | 5 | y | y | A | | | | | F | | | | K | | y | d | a | g | d | | | | |
| 635 | Bleigh, Paul | 2210 | Palmyra Rd | | M-8 | 221-0137 | | 39 | n | | | | | | | | | | | | | | | | | | | | | | | |
| 636 | Griffin, D. J. | 4917 | College Ave | | M-9 | 221-1257 | n | | n | | y | | | | | | | | | | | | | | i | g | e | a | | | | |
| 637 | Morgan, Trey | 3345 | Moberly Ave | | B-8 | 221-7886 | y | 33 | y | 5 | y | | | | | | | | | | | | | y | i | g | e | | | | | |
| 638 | Morgan, Pat & Frankie | 3345 | Moberly Ave | | B-8 | 735-4468 | y | 35 | y | 5 | y | | | | | | | | | | | | | | i | g | e | | | | | |
| 639 | Pippenger, Ralph & Linda | 1800 | Ruby Ave | | B-8 | 248-8058 | y | 8 | y | 5 | y | n | A | b | c | D | | | | | | | | y | g | i | | c | d | | | |
| 640 | Crenshaw, Lori | 2833 | Market St | | B-12 | 221-7543 | y | 12 | y | 3 | y | n | A | | C | | | | | | | | | n | g | i | j | | | | | |
| 641 | | | | | | | | 35 | n | | n | | | B | | | | | | | | | | | d | | | | | | | |
| 642 | Bleigh, Tom | 2677 | Hyacinth Ave | | MB-10 | 221-2305 | y | 18 | n | | n | n | | | | | | | | | | | | n | i | g | e | a | | | | |
| 643 | Glascok, Robert & Janet | 3101 | Cook Ave | | M-9 | 221-4974 | n | 16 | n | | n | y | | | | | | | | | | | | n | e | b | i | c | | | | |
| 644 | Roeger, William & Gwyneth | 419 | Sixth St, North | | B-2 | 221-9111 | y | 10 | n | | n | y | | | | | | | | | | | | n | d | i | e | c | d | | | |
| 645 | Thomure, Stephen & Nicki | 217 | Locust, North | | MB-4 | 248-1138 | y | 4 | n | | n | n | | | | | | | | | | | | n | i | d | b | a | d | | | |
| 646 | Schnelle, Jacqueline | 1310 | 36th St | | B-8 | 221-1650 | y | 50 | n | | y | | | | | | | | | | | | | y | d | h | g | c | d | | | |
| 647 | Allen, Archie | 1926 | Stuart St | | B-4 | 221-0758 | y | 44 | n | | n | n | | | | | | | | | | | | y | b | d | i | c | d | | | |
| 648 | Dwight, Justin & Angie | 1608 | Westover Rd | | B-9 | 406-1594 | y | 5 | y | 5 | y | n | A | b | | | E | | | | | | y | d | i | e | a | d | | | | |
| 649 | Bowen, Robert | 2519 | Pleasant St | | MB-9 | 221-9399 | y | 3 | n | | n | n | | | | | | | | | | | | n | d | i | e | c | d | | | |
| 650 | Derrick, Neil | 415 | Hafner St | | B-4 | 406-1214 | y | 3 | n | | n | y | | | | | | | | | | | | n | f | g | i | c | d | | | |
| 651 | Barbee, Donald | 1220 | Guernsey Place | | M-2 | 248-1396 | y | 10 | y | 5 | y | y | | | | | | F | | | | | | y | i | i | d | b | | | | |
| 652 | Salsman, Virginia | 1413 | Union St | | M-2 | 248-0433 | n | 19 | | | y | y | | | | | | | | | | | | y | | | | | | | | |
| 653 | Hagan, Joseph | 826 | Lindell Ave | | MB-1 | 231-0446 | y | 2 | n | | n | n | | B | | | D | | | | | | | n | b | | | | | | | |
| 654 | Durst Construction | 3333 | Market St | | B-8 | 221-7002 | y | 12 | y | 5 | y | n | A | b | | | | | | | H | | | n | i | f | d | c | d | | | |
| 655 | Hudson, Joshua | 1521 | Booker St | | M-3 | 795-1981 | n | 4 | n | | n | n | | | | | | | | | | | | n | d | h | i | b | d | | | |
| 656 | Hubbard, Gary | 1622 | Westover Rd | | B-9 | 221-5079 | y | 10 | n | | n | y | | | | | | | | | | | | n | b | g | i | c | | | | |
| 657 | Hiddendorf, J.R. | 4 | Sunny Slope | | MB-10 | 221-8625 | y | 25 | n | | n | n | | | | | D | | | | | | | n | d | e | i | b | | | | |
| 658 | Selterberg, Donna | 407 | Fourth St, North | | M-4 | 221-3733 | y | 17 | n | | n | y | | | | | | | | | | | | n | e | i | i | c | d | | | |
| 659 | Morton, Debra | 4012 | Green Meadow Dr. | | M-9 | 248-0166 | y | 1 | y | 5 | y | n | A | | | | | | | | | | | n | a | d | g | c | d | | | |
| 660 | Bell, David | 1213 | Sierra St | | M-2 | 231-0272 | y | 1 | n | | n | n | | B | | | | | | | | | | n | i | i | a | c | | | | |
| 661 | Brinkley, Lewis | 1727 | 36th St | | B-8 | 221-0681 | y | 11 | n | | n | | | | | | | | | | | | | n | d | f | j | | | | | |
| 662 | Tucker, R.W. | 303 | Virginia St | | MB-3 | 248-3883 | y | 12 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 663 | Reddick, Sandra | 802 | Arch St, South | | B-6 | 248-3030 | y | 12 | y | 1 | n | n | | | | | | E | | | | | | n | i | | | c | d | | | |
| 664 | Blecha, Kae | 4015 | Pushmatala | | MB-10 | 231-0457 | y | 4 | y | 5 | y | y | A | | C | | | | | | I | | | y | i | g | f | a | d | | | |
| 665 | Hickman, Linda | 568 | Virginia St | | MB-3 | 221-7832 | y | 11 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 666 | Sohn, Helen | 2612 | Bell Ave | | MB-8 | 221-0166 | y | 50 | n | | | n | | | | | D | | | | | | | | d | | | d | | | | |
| 667 | Holliday, A. | 901 | Central Ave. | | MB-9 | | n | | n | | n | n | | B | | | | | | | | | | n | c | d | e | c | d | | | |
| 668 | Moore, Dennis | 213 | Arch St, South | | B-6 | | n | 9 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 669 | Early Hannibal, Inc. | 208 | Fifth St, North | | M-4 | 406-4818 | y | 22 | n | | n | y | | | | | | | | | | | | | | | | | | | | |
| 670 | Schattgen | 14 | Orchard Point Rd | | M-8 | 221-1000 | y | 3 | n | | n | n | | | | | | | | | | | | n | | | | c | d | | | |
| 671 | Gideon, Marilyn | 1917 | Orchard Ave | | B-8 | 248-0342 | y | 1 | y | 3 | n | n | A | | | | | | | | | | | n | a | d | i | a | c | | | |
| 672 | Douglas-Asti, Nancy | 523 | Rock St | | M-6 | 221-8449 | y | 22 | n | | n | y | | | | | | | | | | | | n | c | i | i | d | | | | |
| 673 | Cunningham, Chad & Lisa | 305 | Levering Ave, South | | MB-3 | 406-0042 | y | 0.5 | n | | n | y | | B | | | | | | | | | | n | i | i | d | c | d | | | |
| 674 | Roach, Richard & Marilyn | 119 | Sheperd Dr | | MB-8 | 221-7128 | y | 33 | n | | n | n | | | | | | | | | | | | n | b | i | i | d | | | | |
| 675 | Davidson, Charles | 3303 | Pershing St | | MB-9 | 221-7776 | y | 50 | y | 5 | y | n | | | | | | F | | | | | | y | b | e | i | d | | | | |
| 676 | Hultgen, Janet | 3231 | St. Mary | | MB-6 | 221-3555 | y | | n | | y | y | | B | C | | D | | | | | | | y | d | | | a | | | | |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|-----------------------|-----------|-----------------|---------|-----------|----------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 677 | Broemmmmer, Don | 1304 | 36th St | | B-8 | 248-3373 | y | 8 | n | | n | | | | | | | | | | | | | n | d | e | l | c | d |
| 678 | Mills, Loren | 4914 | Prospect | | M-9 | 221-5122 | y | | n | | n | | | | | | | | | | | | | n | g | b | e | c | d |
| 679 | Amelt, Adrienne | 1502 | Rinker | | MC-1 | 221-8168 | y | 27 | y | 3 | n | y | A | b | | | E | | | | | | | y | i | d | h | c | a |
| 680 | Lampton, Janet | 1609 | Stuart St | | B-4 | 221-0605 | y | 26 | n | | y | y | | | | | | | | | | | | | | | | | |
| 681 | Brashears, J.V. | 405 | Broadway | | B-1 | 221-0110 | | 15 | n | | n | n | | | | | | | | | | | | n | h | l | c | c | |
| 682 | Lowary, Holly | 719 | Ben Lomond | | M-3 | 231-0185 | y | 0.6 | n | | n | n | | | | | | | | | | | | | b | j | l | d | |
| 683 | McNeal, Eric | 412 | Rock St | | M-6 | 231-0320 | y | 7 | n | | n | y | | | | | | | | | | | | n | d | l | l | | |
| 684 | Budd, Daniel | 1212 | Hill St | | B-4 | 221-5351 | y | 1 | n | | n | y | | | | | | | | | | | | n | b | d | g | c | |
| 685 | Booker, Harold | 1212 | Fulton Ave | | M-2 | 221-5983 | y | 37 | y | 5 | y | y | A | b | | | F | | | | | | | n | e | i | f | b | c |
| 686 | Davis, David | 4042 | Sunset | | MB-10 | 221-4812 | y | 19 | n | | n | y | | | | | | | | | | | | y | e | g | i | a | d |
| 687 | Ham, Harry | 2700 | Hope St | | MB-1 | 221-6935 | | 43 | n | | n | | | | | | | | | | | | | n | e | g | i | a | d |
| 688 | Nelson, Gary | 1601 | Fulton Ave | | M-2 | 221-0253 | y | 21 | y | 5 | | n | | B | | | | | | | | J | | n | d | | | | |
| 689 | Nelson, Mary Jo | 2113 | Chestnut St | | MB-3 | 221-3112 | | 10 | | | | | | | | | | | | | | | | n | e | l | | c | |
| 690 | Hendrix, Samuel | 2211 | Ford St | | MB-9 | 221-8343 | y | 34 | n | | n | n | | | | | | | | | | | | n | e | l | | b | d |
| 691 | Cunningham, Bill | 110 | Sheperd Dr | | MB-8 | 221-3124 | y | 41 | y | 1 | n | n | | | | | | | | | | | | y | a | f | i | d | |
| 692 | Wienhoff, Linda | 3 | Newell Lane | | MB-5 | 221-6094 | y | 12 | y | 5 | y | y | A | b | | | E | | | | | | | y | a | f | i | d | |
| 693 | Battler, Patty | 1831 | Broadway | | MB-1 | 248-0481 | y | 0.3 | n | | n | n | | | | | | | | | | | | n | d | b | a | a | |
| 694 | Cohon, Fred & Kathryn | 1629 | Broadway | | MB-1 | | | | n | | n | n | | B | | | | | | | | | | n | d | b | a | a | |
| 695 | Utterback, Jason | 2704 | St. Mary | | MB-6 | 221-8263 | y | | y | 5 | y | | A | b | | | | | | | | | | n | c | e | j | c | d |
| 696 | McEntire, Earl | 2707 | Hope St | | MB-1 | 221-5481 | y | 43 | n | | n | n | | | | | | | | | | | | n | c | e | j | c | d |
| 697 | Durand, Rebecca | 208 | Tenth St, South | | B-3 | 221-4483 | n | | n | | n | n | | | | | | | | | | | | n | c | e | j | c | d |
| 698 | Vermeer, malt | 545 | Flora Ave | | MB-7 | 231-0514 | y | 2 | n | | n | y | | B | C | | | | | H | | | | y | b | d | i | c | d |
| 699 | Kilby, Mark | 502 | Summer St | | M-6 | 248-2095 | y | 10 | n | | n | y | | | | | | | | | | | | n | a | i | h | a | c |
| 700 | Montasue, Larry | 214 | Sixth St, South | | B-2 | | | | n | | y | y | | B | | | E | | | | | J | | n | e | i | h | c | |
| 701 | McClendon, Michael | 215 | Summit | | B-4 | 406-0498 | y | 2 | n | | n | n | | | | | | | | | | | | n | b | e | i | c | a |
| 702 | Mann, Clayton & Janet | 8 | Orlando Dr | | M-9 | 795-2337 | y | 6 | n | | y | n | | B | | | | | | | | | | | b | e | i | c | a |
| 703 | Yancey, John | 2732 | Market St | | B-12 | 221-4161 | y | 20 | y | 5 | y | y | A | b | | | E | | | | | | | n | l | g | l | a | b |
| 704 | Lefort, Lisa | 1205 | Fulton Ave | | M-2 | 221-2435 | y | 0.5 | n | | y | y | | B | | | | | | | | | | n | h | d | i | d | |
| 705 | Conner, Phillip | 2410 | Palmyra Rd | | MB-10 | 221-1086 | y | 2 | n | | n | n | | | | | | | | | | | | n | e | i | j | | |
| 706 | Cosgrove, Rebecca | 410 | Arch St, North | Apt 4 | B-4 | | n | 3.5 | n | | n | n | | | | | | | | | | | | n | e | i | j | | |
| 707 | Jensen, Max | 312 | Fifth St, North | | M-4 | 221-4569 | y | 35 | y | 3 | y | y | | B | C | | | F | | | | | | y | e | f | h | d | |
| 708 | Lee, Diane | 5001 | College Ave | | M-9 | 221-1619 | y | 32 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 709 | Harrison, Dorothy | 3840 | Ely Rd | Apt 116 | B-10 | 221-1748 | y | 4 | n | | n | y | | | | | | | | | | | | | e | g | l | a | b |
| 710 | Baumgartner, Wilbur | 3840 | Ely Rd | Apt 212 | B-10 | 221-5534 | y | 12 | n | | n | | | | | | | | | | | | | n | a | h | d | | |
| 711 | Carroll, Elijah | 205 | Tenth St, North | | B-3 | 221-5389 | n | 0.5 | y | 1 | n | n | | B | | D | | | | | | | | n | a | h | d | | |
| 712 | | | | | | | | | n | | n | n | | | | | | | | | | | | n | i | d | | c | |
| 713 | Charlton, Robert | 1620 | Arch St, South | | B-6 | 248-2194 | y | 16 | n | | y | n | | B | | | | | | | | | | n | i | d | | c | |
| 714 | Lennox, R.E. | 2714 | Hope St | | MB-1 | 221-3784 | y | 50 | n | | n | n | | | | | | | | | | | | n | i | e | j | c | |
| 715 | Norfolk, Dennis | 3305 | Pershing St | | MB-9 | 221-0628 | y | 17 | y | 5 | y | n | A | | C | | | F | | | | | | y | f | h | l | a | d |
| 716 | Paine, Scott | 28 | Sherwood Est Dr | | MB-11 | 248-1046 | y | 3 | y | 5 | y | n | | | | | | F | | | | | | n | e | i | l | a | d |
| 717 | Brooks, Norma | 1107 | Carr St | | MC-2 | 221-1813 | y | 4 | y | 5 | y | y | A | b | | | E | | | | | | | y | k | g | i | c | d |
| 718 | Stendebach, Klaus | 3821 | Tilden St | | B-8 | 221-5212 | y | 20 | y | 5 | y | n | A | b | | | | | | | | | | n | a | i | d | | |
| 719 | Cary, Welch & Hickman | 1000 | Center St | | B-3 | | n | | n | | n | n | | | | | | | | | | | | | | | | | |
| 720 | Richardson, Mrs Harry | 1809 | Hope St | | MB-1 | 221-7937 | y | 40 | n | | | | | | | | | | | | | | | n | | | | | |
| 721 | Logal, Mary | 3 | Meadowbrook Dr | | MB-5 | 221-8284 | y | 13 | n | | n | y | | | | | | | | | | | | n | | | | a | |
| 722 | Taylor, Terry | 1905 | Collison | | B-8 | 221-5763 | y | 27 | n | | y | y | | | | | | | | | | | | n | f | l | e | a | c |
| 723 | Miller, Jennifer | 3101 | Market St | | B-8 | 221-8701 | y | 8 | n | | n | n | | | | | | | | | | | | y | d | l | b | | |
| 724 | | 30xx | Market St | | B-8 | | | | y | 5 | y | | | B | C | | | | | | | | | | | | | | |
| 725 | Wisehart, Shaun | 808 | Vermont | | B-6 | 231-0466 | y | | | | y | y | | | | | | | | | | | | n | i | e | j | | |
| 726 | Flecher, Randy | 3401 | Skialook St | | MB-10 | 221-0918 | y | 15 | | | y | n | | B | | | | | | | | | | n | i | d | g | c | d |
| 727 | Meter, Daniel | 523 | Magnolia Ave | | MB-3 | 406-0865 | y | 8 | y | 5 | y | n | A | | | | | F | | | | | | y | l | e | j | c | d |
| 728 | Moore, Dora | 1524 | 30th St | Apt 107 | B-8 | 221-6673 | y | 11 | n | | n | y | | | | | | | | | | | | n | l | h | e | c | d |
| 729 | Harris, Catherine | 917 | Reservoir St | | M-6 | 406-2197 | y | 10 | n | | n | n | | | | | | | | | | | | | | | | | |
| 730 | Murphy, Diana Lynn | 2710 | St. Mary | | MB-6 | 248-0444 | y | 7 | y | 5 | y | y | | B | | | | F | | | | | | | d | e | l | d | |
| 731 | Peters, Russell | 9 | Wauweta Place | | MB-10 | 221-7181 | y | 22 | n | | n | n | | | | | | | | | | | | n | g | b | c | c | |
| 732 | Stoa, Ryan | 140 | Jupiter | | MB-11 | 221-4379 | y | 1.5 | n | | y | n | | | | | | | | | | | | n | l | f | l | c | d |
| 733 | | | | | | | | | | | | | | | | | | | | | | | | n | | | | | |
| 734 | Diamond Car Wash | 9 | Diamond Blvd | | M-9 | 248-4522 | y | 19 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 735 | Rice, Krista | 547 | Head Lane | | MB-11 | 406-5554 | y | 1 | y | 5 | y | n | A | | | | E | | | | | | | | d | e | a | a | d |
| 736 | Smoot, Kim | 2560 | Pleasant St | | MB-9 | | n | 8 | n | | n | y | | | | | | | | | | | | | | | | | |
| 737 | Jones, Joyce | 1305 | Elm St | | B-4 | 231-0660 | y | 2 | n | | n | n | A | b | | | | | | | | | | | d | k | l | a | |
| 738 | Riey, Sherry | 404 | Munger St | | B-4 | 221-6836 | y | 15 | y | 1 | n | n | | B | | | E | | | | | J | | n | d | j | l | a | d |
| 739 | Behymer, James | 3306 | St. Charles St | | B-8 | 221-6407 | y | 17 | y | 5 | y | | | B | C | | | | | H | | | | y | f | e | c | a | |
| 740 | Dean, John | 455 | Head Lane | | MB-11 | 248-3537 | y | 1 | n | | n | n | | | | | | | | | | | | n | g | i | d | c | |

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| General Information | | | | | | | | | | Q-1 SW Prob? | Q2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|--------------------------|-----------|----------------------|---------|-----------|----------|----------|-------------|-------------|--------------|------------|-----------|---------------------|---|---|---|---|---|---|---|---|---|---|------------|----------------|------|------|-------------|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 641 | Bowen, Lillian | 118 | Arch St, South | | B-6 | | | 34 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 642 | Ranabarger, Cletus | 2321 | Chestnut St | | MB-3 | 221-4757 | y | 17 | n | | n | y | | | C | | | | | | H | I | | n | i | b | d | c | d |
| 643 | Howard, Bess | 1705 | 36th St | | B-8 | 221-5580 | y | 25 | n | | n | n | A | | C | | | | | | | | | y | b | e | i | c | b |
| 644 | Fantz, George | 13600 | Orchard Hill Place | | | 248-0211 | y | 2 | n | | n | n | | | | | | | | | | | | y | e | i | g | a | d |
| 645 | Greenwall, Orin & Sandra | 1925 | Stevens Dr | | B-8 | 221-5032 | y | 8 | y | 5 | y | y | A | b | | | E | | | | | | | y | i | g | b | c | |
| 646 | McClaren, Gladys | 2116 | Grace St | | MB-4 | 221-3550 | y | 60 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 647 | Cox, Rebecca | 220 | Griffith St, North | | MB-4 | 248-0681 | y | 2 | n | | n | n | | | | | | | | | | | | n | | | | | d |
| 648 | Willett, Connie | 814 | Hazel St | | B-4 | 221-3413 | | 21 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 649 | Kilby, Charles | 2 | Sunflower Lane | | MB-11 | 248-0079 | y | 3 | y | 5 | y | | A | | | | | | | | | | | | | | | | |
| 650 | Noonan, Joel | 2515 | Pleasant St | | MB-9 | 221-4410 | y | 12 | n | | n | n | | | | | | | | | | | | n | d | e | h | | |
| 651 | Druse, Betty | 805 | Webb St | | M-6 | 248-9890 | y | 5 | y | 5 | y | n | A | b | c | | | | | | | | | n | i | d | | | |
| 652 | Maple, Bill | 1900 | Owens Ave | | MC-1 | 221-7145 | y | 30 | y | 5 | y | y | A | b | c | | | | | | | J | | y | i | e | k | a | |
| 653 | Bollinghouse, Cecil | 1402 | Paris Ave | | B-4 | 248-3136 | y | 37 | n | | y | | | B | | | | | | | | | | n | b | e | | | d |
| 654 | White, Sonja | 2002 | Spruce St | | MB-1 | 221-7411 | y | 13 | n | | n | n | | | | | | | | | | | | n | b | e | | | c |
| 655 | Reutenaues, Charles | 3205 | Sunnyside | | MB-9 | 221-8392 | y | 5 | n | | n | y | | | | | | | | | | | | n | d | i | l | b | d |
| 656 | Tallman, Lonnie | 2821 | Market St | | B-12 | 231-1853 | y | 32 | n | | y | n | A | | | | | | | | | | | n | d | i | l | b | d |
| 657 | Treaster, A. | 109 | Sheperd Dr | | MB-8 | 221-7580 | y | 4 | n | | n | n | | | | | | | | | | | | n | b | | | a | |
| 658 | Seals, Axie | 2924 | McKinley St | | MB-8 | 406-1560 | n | 3 | n | | n | n | | | | | | | | | | | | n | i | e | c | c | d |
| 659 | Johnesse, C. R. | 4924 | College Ave | | M-9 | 221-6235 | | 40 | n | | | | | | | | | | | | | | | n | g | c | e | d | |
| 660 | Sultzman, Mrs Harold | 10 | Hamlin Heights Dr | | M-9 | 221-6824 | y | 36 | n | | n | y | | | | | | | | | | | | n | i | d | b | b | d |
| 661 | Minor, Fannie | 214 | Levering Ave, South | | MB-3 | 248-3701 | y | 5 | n | | y | n | | | | | | | | | | | | n | i | g | l | a | |
| 662 | Gregg, Donna | 1701 | Darr St | | B-8 | 221-0225 | y | 29 | n | | y | n | | | | D | | | | | | | | n | g | h | a | c | |
| 663 | Griffen, Loren & Carrie | 2315 | Pleasant St | | MB-9 | 248-8261 | y | 4 | y | 5 | y | n | A | | | | | F | | | | | | n | d | e | j | c | d |
| 664 | Scarbrough, James | 2000 | Hope St | | MB-1 | 221-0408 | y | 35 | n | | n | n | | | | | | | | | | | | n | d | e | j | c | d |
| 665 | Stuenkel, Steven | 210 | Tenth St, North | | B-3 | 221-2681 | n | | n | | y | n | | B | | | | | | | | | | n | a | e | l | a | |
| 666 | Griffin, Ronald | 1820 | Owens Ave | | MC-1 | 221-6596 | y | 50 | y | 3 | y | n | A | | | | | | | | | | | n | e | i | l | a | |
| 667 | Griffin, Ronald | 2530 | Lakenan | | B-12 | 221-6596 | y | 28 | y | 3 | n | n | A | | | | | | | H | I | | | y | f | i | e | a | c |
| 668 | Reagan, Norman & Judy | 313 | Fifth St, North | | M-4 | 221-0774 | y | 5 | n | | y | n | | | | | | | | | | | | y | d | h | k | c | |
| 669 | Timbrook, W. C. | 3331 | St. Mary | | MB-7 | 221-4833 | y | 64 | y | 5 | y | n | | | C | | | | | | | | | y | d | h | k | c | |
| 670 | | | | | | | | 7 | y | 1 | y | y | | | | | | | G | | | J | | n | i | j | l | c | b |
| 671 | Ward, Robert & Dorothy | 1714 | Ruby Ave | | B-8 | 248-0732 | y | 17 | y | 5 | y | n | A | b | c | | | | | | | | | n | i | j | l | c | b |
| 672 | Utterback, Neil | 4910 | Prospect | | M-9 | 221-8108 | y | 30 | n | | n | y | | | | | | | | | | | | n | f | e | i | d | |
| 673 | Rose, Betty | 420 | Hafner St | | B-4 | 221-7307 | y | | n | | n | n | | | | | | | | | | | | n | | | | c | |
| 674 | Bueler, Bernice | 7 | Riverpoint Rd. | | M-8 | 221-6250 | y | 7 | n | | n | n | | | | | | | | | | | | | b | j | e | | |
| 675 | Brown, Charles & Janet | 4906 | Wyaconda Ave | | M-9 | 221-4455 | n | 2 | n | | n | y | | | | | | | | | | | | | e | k | i | c | d |
| 676 | Doran, Louise | 214 | Shepherd Place | | MB-8 | 221-5344 | n | 20 | y | 5 | y | n | | B | | | | | | | | | | y | d | a | h | | |
| 677 | Rimi, Steve | 725 | Clifford St | | B-4 | 248-2111 | y | 2 | y | 3 | y | y | A | b | c | | | | | | | | | n | b | i | d | c | d |
| 678 | Sheffield, Thomas | 2230 | Chestnut St | | MB-3 | 406-0418 | n | 10 | n | | y | y | | B | | | | | | | | | | n | b | i | e | b | |
| 679 | McCorkle, Louis | 107 | Sheperd Dr | | MB-8 | 221-0947 | y | 20 | n | | n | n | A | | C | | | | | | | | | n | | | | | |
| 680 | Bunte, Daryl | 3120 | Market St | | B-8 | 248-3312 | y | 2 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 681 | Martin, Donald | 703 | Olive St | | B-4 | | | 38 | n | | n | n | | | | | | | | | | | | n | i | d | l | a | |
| 682 | Miller, Dawn | 815 | Hazel St | | B-4 | 221-8013 | y | 6 | n | | y | y | | B | | | | | | | | | | n | i | e | f | c | |
| 683 | McToll, Jan & John | 5 | Sunny Slope | | MB-10 | 248-3073 | y | 10 | n | | n | n | | | | D | | | | | | | | y | i | e | f | c | |
| 684 | Waelder, Jackie | 571 | Flora Ave | | MB-7 | 248-3756 | y | 6 | n | | n | y | | | | D | | | | | | | | n | i | g | l | b | d |
| 685 | Keat, Keith | 1108 | Union St | | M-2 | 795-3371 | y | 0.5 | n | | y | y | | B | | | | F | | H | | | | n | i | g | l | b | d |
| 686 | Williams, Mona | 2710 | Rackliffe St | | MB-6 | 248-1161 | y | 15 | y | 5 | y | | A | b | c | | | | | | | | | n | h | d | a | c | |
| 687 | Smashy, Jaime | 1216 | Vermont | | B-6 | 231-0273 | y | 2 | y | 1 | n | n | A | b | | | | | | | | | | y | b | d | | c | |
| 688 | Porter, James | 2017 | Broadway | | MB-4 | 248-3895 | y | 25 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 689 | Lewenczuk, George | 6 | Meadowbrook Dr | | MB-5 | 248-0308 | y | 30 | y | 5 | y | y | A | | | | | F | | | | | | n | a | e | f | d | |
| 690 | Herrin, Susan | 34 | Luther Lane | | M-9 | 248-1878 | y | 0.5 | n | | n | y | | | | | | | | | | | | n | d | e | d | | |
| 691 | Hughes, Harry | 2425 | Hyacinth Ave | | MB-9 | 221-5929 | y | 3 | n | | n | y | | | | | | | | | | | | n | g | d | i | c | |
| 692 | Fletcher, Julia | 3840 | Ely Rd, West | Apt 114 | B-10 | 221-4849 | | | n | | n | n | | | | | | | | | | | | n | | | | | |
| 693 | Adams, Christy | 2112 | Pleasant St | | MB-9 | 221-3896 | y | 3 | n | | n | y | | B | | | | E | | | | | | n | b | d | c | c | |
| 694 | Roberts, Linda | 809 | Lindell Ave | | MB-1 | 231-1004 | y | 2 | y | 5 | y | y | | | | | | | | | | | | n | | | | | |
| 695 | Newell, Cloyd | 22 | Luther Lane | | M-9 | 221-9951 | y | 15 | n | | n | n | | | | | | | | | | | | n | | | | | d |
| 696 | Hedges?, Mark & Gail | 4220 | McMasters Ave | | MB-10 | 221-5329 | y | 6 | y | 5 | n | | A | | C | | | F | | | | | | n | a | d | g | a | d |
| 697 | Freeman, Dale | 1125 | Sierra St | | M-2 | 248-1037 | y | 20 | n | | n | y | | | | | | | | | | | | n | | | | | c |
| 698 | Jones, George | 3907 | New London Gravel Rd | | xx | 221-6702 | y | 32 | n | | y | y | A | b | | | | | | | | | | n | a | d | e | | |
| 699 | Drazba, Dick | 2120 | Grace St | | MB-4 | 221-2070 | y | 35 | n | | n | n | | | | | | | | | | | | n | i | l | d | c | a |
| 700 | King, Jamie & Sherry | 2612 | Bird St, West | | B-4 | 221-0992 | y | 6 | n | | n | y | | | | | | | | | | | | n | | | | | |
| 701 | Hood, Jane | 3604 | Branham Ave | | MB-5 | 221-0214 | y | 4 | y | 3 | y | y | | | C | | | | | | | | | y | l | f | l | c | d |
| 702 | Sanders, Kurtis | 2200 | Broadway | | MB-4 | 221-2134 | y | 6 | n | | n | y | | B | | | | | | | | | | n | e | d | c | c | d |
| 703 | | 2617 | Laclede | | MB-7 | | | | n | | n | n | | | | | | | | | | | | n | | | | | |
| 704 | Jones, Robert G | 2319 | Broadway | | MB-3 | 221-1551 | y | 10 | n | | | y | | B | | | | | | | | | | n | d | g | l | c | |

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| General Information | | | | | | | | | | | | | Q-1 SW Prob? | | | | | | | | | | | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|------------------------------|-----------|----------------------|--------|-----------|----------|----------|-------------|-------------|------------|------------|-----------|--------------|---|---|---|---|---|---|---|---|---|---|------------|------|---------------------|------|-----|-----|--|--|--|--|--|--|--|-----|----------------|--|--|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | | | | | | | | | | | | |
| 705 | Dobson, Michael | 510 | Magnolia Ave | | MB-3 | 221-4646 | y | 3 | y | 5 | y | y | A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 706 | Wood, Branson | 1001 | Center St | | B-3 | 221-4255 | y | 13 | n | | n | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 707 | Rouse, Cathy | 2301 | Fulton Ave | | M-2 | 221-2878 | y | 31 | y | 3 | y | | A | b | | | E | | | | | | | n | i | i | e | | | | | | | | | | | | | | | |
| 708 | Hill, Leo | 6 | Wauneta Place | | MB-10 | 221-3968 | y | 47 | n | | n | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 709 | Spencer, Angela | 106 | Dowling | | MB-1 | 231-0552 | y | 0 | n | | n | y | | | | | | | | | | | | n | d | j | b | | | | | | | | | | | | | | | |
| 710 | Robinson, helen | 4907 | Prospect | | M-9 | 221-7375 | y | 5 | n | | n | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 711 | Murphy, Pat | 1909 | Broadway | | MB-1 | 221-9920 | y | 43 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 712 | Schoonover, Dean | 4906 | Prospect | | M-9 | 221-5606 | y | 18 | n | | n | y | | | | | | | | | | | | n | f | i | d | c | d | | | | | | | | | | | | | |
| 713 | Latta, kathy | 3111 | Pleasant St | | MB-8 | 221-0882 | y | 14 | n | | n | n | | | C | D | | | | | | | | n | i | h | f | | | | | | | | | | | | | | | |
| 714 | Park United Methodist Church | 2335 | Palmyra Rd | | MB-10 | 221-4522 | y | | n | | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 715 | Meyer, Amy | 2808 | Hubbard | | MB-6 | 406-0050 | y | 4 | n | | n | n | | | C | D | | | | | I | | | n | b | i | d | a | c | | | | | | | | | | | | | |
| 716 | Cowlerman, Barry | 700 | Hickory | | M-2 | 248-1861 | y | 10 | y | 1 | y | y | | B | C | | | F | | | | | | y | d | i | g | d | a | | | | | | | | | | | | | |
| 717 | Palmer, James | 2705 | Hope St | | MB-1 | 221-5650 | y | 1 | n | | n | y | | | C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 718 | Booth, Aleca | 221 | Fifth St, South | Apt 3N | B-1 | 248-8387 | n | 1 | n | | n | n | | | | | | | | | | | | n | j | e | b | b | c | | | | | | | | | | | | | |
| 719 | Maple, Russell | 1900 | Missouri St | | M-6 | 221-8211 | y | 41 | n | | n | y | | B | C | | | | | | H | | | n | i | f | h | c | d | | | | | | | | | | | | | |
| 720 | Wilson, sarah | 1100 | Hill St | | B-4 | 406-0032 | y | 8 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 721 | Walker, Shawn | 3307 | Market St | | B-8 | 248-5064 | y | 2 | y | 3 | y | y | A | b | | | | F | | | | | | n | d | i | e | a | d | | | | | | | | | | | | | |
| 722 | Darr, Bev | 4913 | Wyconda Ave | | M-9 | 221-7426 | n | 7 | n | | n | n | | | | | | | | | | | | n | c | e | | | | | | | | | | | | | | | | |
| 723 | Murphy, Rachel | 3019 | Kenwood Ave | | B-8 | 541-5939 | y | 1 | n | | n | n | | B | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 724 | Foster, Kevin & Jennifer | 1104 | Paris Ave | | B-4 | 221-4225 | y | 6 | n | | n | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 725 | Large, Mark | 4300 | Paris Gravel Rd | | xx | 224-2522 | y | 1 | n | | y | n | | B | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 726 | Lewis, nancy | 3 | Stillwell Place | | B-4 | 248-2124 | y | 11 | y | 5 | y | y | | | C | | | | | | H | | | n | h | i | d | | | | | | | | | | | | | | | |
| 727 | Sharp, Don | 230 | Magnolia Ave | | MB-3 | 221-5673 | y | 30 | n | | n | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 728 | Powell, Marjorie | 3904 | New London Gravel Rd | | xx | 221-2750 | | 9 | | | y | | A | b | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 729 | Williams, R | 1510 | Paris Ave | | B-4 | 221-1348 | y | 22 | n | | n | n | | | | | | | | | | | | n | b | d | h | a | | | | | | | | | | | | | | |
| 730 | Webb, Wilma | 4920 | Pulliam | | M-9 | 221-6964 | y | 25 | n | | | y | | | | | | | | | | | | n | e | g | b | c | | | | | | | | | | | | | | |
| 731 | Bean, Joseph & Lisa | 1 | Orchard Point Rd | | M-8 | 406-1564 | n | 2 | n | | n | y | | | | | | | | | | | | | b | j | h | c | d | | | | | | | | | | | | | |
| 732 | Craig, Bob & Margie | 411 | Sixth St, North | | B-2 | 221-3301 | y | 29 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 733 | Mickels, Carla | 2810 | Hill St | | MB-6 | 406-5661 | y | 4 | y | 3 | y | n | | | C | D | | | | | | | | n | d | e | i | c | | | | | | | | | | | | | | |
| 734 | McWilliams, Crystal | 625 | Virginia St | | MB-3 | 231-0257 | y | 2 | y | 3 | n | n | A | | | | D | | | | | | | | | | | | | | | | | | | | | | | | | |
| 735 | | | | | | | | 18 | n | | n | n | | | | | | | | | | | | | | d | i | f | | | | | | | | | | | | | | |
| 736 | Ogle, Erika | 206 | Sheperd Place | | MB-8 | 795-1319 | y | 1 | n | | y | n | | | | | | | | | | J | | n | e | i | g | | | | | | | | | | | | | | | |
| 737 | Martin, John | 46 | Forest Hill Rd | | MB-4 | 248-1049 | y | 7 | n | | n | n | | | | | | | | | | | | n | i | e | g | c | d | | | | | | | | | | | | | |
| 738 | Nelson, Tom & Shelly | 519 | Fourth St, North | | M-6 | | | 34 | n | | n | n | | B | C | | | | | | | | | n | d | e | h | c | d | | | | | | | | | | | | | |
| 739 | Wojcik, Mike | 107 | Earl St | | MB-8 | 221-7624 | y | | | | y | n | | | | | E | | | | | | | n | c | d | g | a | b | | | | | | | | | | | | | |
| 740 | Davis, Melissa | 321 | Grand Ave | | B-4 | 406-0775 | y | 2 | y | | y | n | A | b | | | | F | | | | | | n | d | i | a | a | d | | | | | | | | | | | | | |
| 741 | Silva, Richard | 616 | Pine St | | | 248-1202 | | 20 | n | | n | n | | | | | | | | | | | | n | b | d | | c | | | | | | | | | | | | | | |
| 742 | Brittman, LaDonna | 620 | Ninth St, North | | B-2 | | n | | y | 3 | y | n | A | | C | | | | | | H | | y | | | | | | | | | | | | | | | | | | | |
| 743 | Acheampong, Ramonda | 407 | Griffith | | MB-1 | 221-4848 | y | 3 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 744 | God's House | 925 | Lyon St | | B-3 | 221-5920 | y | 2 | n | | n | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 745 | Welch, Vicki | 2601 | Bell Ave | | MB-8 | 406-1053 | y | 8 | y | | y | | A | | C | | | | | | I | | y | a | d | e | | | | | | | | | | | | | | | | |
| 746 | Hooley, Chris | 19 | Luther Lane | | M-9 | 406-0490 | y | 0.5 | y | 3 | y | y | | B | | | | F | | | | | | n | i | d | a | a | | | | | | | | | | | | | | |
| 747 | Rodgers, Herbert | 3909 | New London Gravel Rd | | xx | 221-3449 | y | 32 | y | 5 | y | | A | b | c | | | | | | | | | y | e | h | i | a | d | | | | | | | | | | | | | |
| 748 | Milam, Pamela | 1621 | Darr St | | B-8 | 231-0458 | y | 4 | y | 3 | y | n | A | | C | | | | | | I | | n | i | e | h | e | a | | | | | | | | | | | | | | |
| 749 | Kaylor, Earnest & Judy | 26 | Gemini Dr | | MB-11 | 221-0920 | y | 13 | y | 5 | y | n | A | | | | E | F | | | | | | n | i | e | i | a | c | | | | | | | | | | | | | |
| 750 | Whaley | 238 | Levering Ave, South | | MB-3 | 248-3890 | y | 11 | n | | n | n | | | | | | | | | | | | n | i | g | b | c | d | | | | | | | | | | | | | |
| 751 | Volkmr, harold | 2107 | Crescent Dr | | B-4 | 221-0042 | y | 3 | n | | n | n | | | | | | | | | | | | n | d | g | i | c | d | | | | | | | | | | | | | |
| 752 | Nichols, Frank | 208 | Rock St, East | | M-6 | 221-0493 | y | 27 | y | 5 | y | n | A | b | c | | | | | | | | | y | e | | | | | | | | | | | | | | | | | |
| 753 | Freeman, Ruth | 4008 | McMasters Ave | | MB-10 | 221-2737 | | 55 | n | | n | y | | | | | | | | | | | | n | d | h | k | d | | | | | | | | | | | | | | |
| 754 | Keller, Jamie | 3322 | Bradley St | | MB-8 | | | 3 | n | | n | n | | | C | | | | | | | | | n | b | i | d | c | | | | | | | | | | | | | | |
| 755 | Humphreys, Susan | 1500 | Riverside | | M-1 | 248-1084 | y | 20 | y | 5 | y | y | | | | | | F | | | | | | y | i | e | c | b | | | | | | | | | | | | | | |
| 756 | Cull, Russell | 400 | Euclid Ave | | MB-3 | 221-0437 | y | 48 | n | | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 757 | Graff, Patricia | 1905 | Lincoln | Apt A | B-4 | | | 7 | y | 3 | y | y | A | b | c | | | | | | | | | y | i | d | e | c | | | | | | | | | | | | | | |
| 758 | Roach, Keith | 2614 | Hope St | | MB-1 | 221-0325 | y | 13 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |
| 759 | Wilson, Donna | 5 | Kronke | | MB-11 | 231-0754 | y | 0.5 | y | | y | y | | | C | D | | | G | | | | | | | | | | | | | | | | | | | | | | | |
| 760 | de LaPorte, Darrin | 502 | Magnolia Ave | | MB-3 | 248-3489 | y | 3 | n | | y | y | A | | | | | | | | | | | y | d | i | | a | | | | | | | | | | | | | | |
| 761 | Vaughn, Carol | 516 | Euclid Ave | | MB-3 | 221-2978 | y | 21 | y | 5 | y | y | A | | | | | F | | | | | | y | e | a | i | | | | | | | | | | | | | | | |
| 762 | Dehaporre, Catherine | 3825 | Apache Trail | | MB-10 | 221-2501 | y | 30 | n | | n | n | | | | | | | | | | | | n | d | f | i | c | | | | | | | | | | | | | | |
| 763 | Barton, Jennifer | 21 | Hamlin Heights Dr | | M-9 | 248-2155 | n | 9 | n | | y | y | | | C | | | | | | | | | n | i | d | i | b | c | | | | | | | | | | | | | |
| 764 | Gudeh, Geraldine | 118 | Hawkins Ave, South | | MB-6 | | n | 0.5 | n | | n | n | | | | | | | | | | | | n | | | | c | d | | | | | | | | | | | | | |
| 765 | Castleberry, Diane | 524 | Hawkins Ave, North | | MB-6 | 231-0326 | n | 1 | n | | y | | | | C | | | | | | J | | n | d | g | i | c | d | | | | | | | | | | | | | | |
| 766 | Forbis, Krystle | 213 | Tenth st, North | | B-3 | 231-5835 | y | 2 | n | | n | y | | | | | | | | | | | | n | i | f | c | c | d | | | | | | | | | | | | | |
| 767 | Rhodes, Daniel Jr | 1307 | Collier | | B-5 | | n | 16 | n | | n | n | | B | | | | E | | | | | | n | d | j | i | c | d | | | | | | | | | | | | | |
| 768 | Griggsby, Estel | 1913 | Settlers Trail | | MB-5 | | | 60 | n | | n | n | | | | | | | | | | | | n | | | | | | | | | | | | | | | | | | |

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| General Information | | | | | | | | | Q-1 SW Prob? | Q2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | | |
|---------------------|-----------------------------|-----------|--------------------|-----|-----------|----------|----------|-------------|--------------|------------|------------|---------------------|---|---|---|---|---|---|---|---|---|---|-----|----------------|------|------|-------------|-----|-----|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-Hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 |
| 769 | Dietle, Jeff & Lori | 314 | North St | | M-6 | 221-7990 | y | 3 | n | | n | n | | | | | | | | | | | | n | b | e | i | b | c |
| 770 | Sapp | 4908 | Prospect | | M-9 | 248-0828 | y | 18 | n | | n | y | | | | | | | | | | | | y | | | | | |
| 771 | Spaun, Robert | 2703 | Hubbard | | MB-6 | 221-8723 | | 25 | n | | n | y | | | | | | | | | | | | y | | | | | |
| 772 | Rittle, Ben | 12 | Riverpoint Rd. | | M-8 | 248-2934 | y | 14 | n | | n | n | | | | | | | | | | | | | c | e | h | c | d |
| 773 | Wiehl, Shaun | 808 | Vermont | | B-6 | 231-0466 | y | 26 | n | | | | | | | | | | | | | | | | | | | | |
| 774 | Shanks, Travis | 3115 | St. Mary | | MB-6 | 221-1937 | n | 1 | n | | n | y | | | | | | | | | | | | n | i | h | i | c | d |
| 775 | Verrant, Jane | 25 | Holiday Dr | | M-9 | 221-0965 | y | 42 | n | | n | y | | | C | | | | | | | | | n | d | | | | |
| 776 | Crew, Lisa | 1915 | Stuart St | | B-4 | 248-2540 | y | 5 | n | | n | n | | | | | | | | | | | | y | | | | | |
| 777 | Wilson, Earl | 5211 | Wyaconda Ave | | M-9 | 221-5625 | y | 16 | n | | n | n | | | | | | | | | | | | | d | e | i | a | d |
| 778 | Mangrum, Earl | 3 | Orlando Dr | | M-9 | 221-8150 | y | 9 | n | | y | n | | | | | | | | | | | | | | | | | |
| 779 | Cardiff | 33 | Holiday Dr | | M-9 | | n | 15 | n | | | y | | | | | | | | | | | | | e | f | d | a | |
| 780 | Hope house Homeless Shelter | | | | | | | | n | | n | n | | | | D | | | | | | | | | | | | | |
| 781 | Nofzinger, Verna | 360 | Arapaho | | MB-10 | | | 12 | n | | n | n | | | C | | | | | | | | | n | e | i | k | | |
| 782 | Schmidt, Lana | 900 | Reservoir St | | M-6 | 406-0850 | y | 1 | n | | n | y | | | | | | | | | | | | n | g | i | i | c | |
| 783 | Jones, Lillian | 2125 | Hope St | | MB-1 | | | | n | | n | y | | | | | | | | | | | | | d | i | c | | |
| 784 | Bunditt, Jeff | 2001 | Orchard Ave | | B-8 | 248-2084 | y | 30 | n | | n | n | A | | | | | | | | | | | n | a | b | i | | |
| 785 | Long, Frances | 2604 | Bird St, West | | B-4 | 221-5974 | y | 17 | n | | n | n | | | | | | F | | | H | | | n | | | | | |
| 786 | Hamilton, Rexie | 3804 | Cache Ct | | MB-11 | 221-0124 | y | 16 | y | 5 | y | y | A | | | | | | | | | | | y | e | f | d | d | |
| 787 | Weg, Donald & Virginia | 2205 | Pleasant St | | MB-9 | 248-0415 | y | 8 | y | 5 | y | n | A | | | | | | | | | | | y | a | g | h | d | |
| 788 | Smith, George | 312 | Magnolia Ave | | MB-3 | 221-3778 | y | 50 | n | | n | n | | | | | | | | | | | | | | | | | |
| 789 | Thorpe, Karen | 4316 | McMasters Ave | | MB-10 | 221-8509 | y | 6 | | | | y | | | | | | | | | | | | | | | | | |
| 790 | Ron's Tire Inc | | | | | 248-1977 | | 1 | n | | n | n | | | | | | | | | | | | n | | | | c | d |
| 791 | Smith, Mark | 4924 | Pulliam | | M-9 | 221-7263 | y | 5 | n | | n | y | | | | | | | | | | | | n | | | | c | |
| 792 | Walden, Brad | 1634 | Market St | | B-6 | 248-6730 | y | 2 | y | 5 | y | y | A | | | C | | | F | | | | n | d | b | g | c | | |
| 793 | Gadsden, Kelly | 3421 | St. Charles St | | B-8 | 221-2987 | y | 1 | y | 1 | y | y | A | | | | | | | | | | | n | i | j | e | c | d |
| 794 | Waack, Kevin | 3910 | Cheyenne | | MB-11 | 231-0333 | y | 4 | n | | n | n | | | | | | | | | | | | n | e | i | g | c | d |
| 795 | Schanbacher | 3212 | Pleasant St | | MB-8 | 221-6435 | y | 38 | n | | y | y | | | | | | | | | | J | | n | e | i | g | c | d |
| 796 | | | | | | | | 4 | n | | y | n | | | | | | | | | | | | | | | | | |
| 797 | Duncan, Gwenda | 711 | Pine St | | | 248-0255 | y | 9 | n | | y | n | | | B | | | | | | | J | | n | d | i | g | c | d |
| 798 | Crowell, Donald | 3402 | Greenway | | MB-10 | 221-5995 | | 0.5 | n | | n | n | | | | | | | | | | | | | | | | c | d |
| 799 | Lewis, Cindy | 1308 | Collier | | B-5 | 406-1127 | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | Hooper, Tina | 712 | Hill St | | B-2 | 231-0358 | y | 4 | n | | n | y | | | | | | | F | | | | | n | b | | | | |
| 801 | Harvey, Angela | 1501 | 29th St | | B-12 | | | 1 | n | | n | n | | | | | | | | | | | | | | | | | |
| 802 | Freeman, A., & Wheeler, Ann | 2217 | Chestnut St | | MB-3 | 221-8190 | y | | n | | n | n | | | | | | | | | | | | y | e | i | j | c | d |
| 803 | Hoover, Gina | 518 | Olive St | | B-4 | 221-0062 | y | 18 | n | | | n | | | | C | | | | | | | | n | b | e | f | a | c |
| 804 | Fitzpatrick, Mary | 415 | Bird St | | M-4 | 221-1528 | y | 1 | | | | | | | | | | | | | | | | | | | | | |
| 805 | McClellan, Leon | 215 | Sixth St, North | | B-2 | 248-1218 | y | 8 | n | | n | n | | | | | | | | | | | | n | | | | | |
| 806 | Sammons, Jorita | 2112 | Spruce St | | MB-1 | 406-1567 | y | 2 | n | | n | y | A | | | | | F | | | | | | n | g | | | b | d |
| 807 | Spalding, Jim | 408 | Grand Ave | | B-4 | 221-7337 | y | 12 | y | 5 | y | n | A | | | C | | | | | | I | J | | | | | | |
| 808 | Wetton, Steve, Karen | 10 | Luther Lane | | M-9 | 221-0924 | y | 1 | | | y | y | | | | B | | | | | | | | n | c | d | e | a | b |
| 809 | Reeves, Wilma D | 1903 | Chestnut St | | MB-3 | 221-6318 | y | 10 | n | | n | n | | | | | | | | | | | | n | c | e | i | c | d |
| 810 | Scheiter, David | 414 | Fifth St, North | | M-5 | 221-3453 | | 12 | n | | n | y | | | | | | | | | | | | n | e | i | j | c | |
| 811 | Bensman, Claire | 415 | Fifth St, North | | M-5 | 248-0750 | y | 7 | n | | n | y | | | | | | | | | | | | n | f | e | g | c | d |
| 812 | Estes, William | 3602 | Mohawk Ave | | MB-11 | 221-6189 | y | | n | | n | n | | | | | | | | | | | | n | b | c | d | b | |
| 813 | Hanvelt, Kathy J | 1000 | Hill St | | B-4 | 221-2630 | | 18 | n | | n | n | | | | | | | | | | | | n | i | i | e | c | d |
| 814 | Smith, Donald | 300 | Sheperd Place | | MB-8 | 248-0984 | n | 14 | y | 3 | n | n | | | | B | C | D | | | | | | n | i | i | e | a | d |
| 815 | Hudson, James | 1700 | Grape | | M-2 | 221-5244 | y | | n | | n | n | | | | | | | | | | | | n | e | i | k | c | d |
| 816 | Johnston, Kim | 3605 | Arapaho | | MB-10 | 221-3833 | y | 23 | y | 3 | y | y | A | | | C | D | | | G | H | | | y | h | a | i | d | |
| 817 | Bull, Sally | 200 | Sheperd Place | | MB-8 | 221-2826 | y | 28 | y | 3 | y | n | A | | | C | | | F | | H | | J | y | e | d | i | a | d |
| 818 | Howell, Bruce | 4109 | Commanche | | MB-10 | 248-1117 | y | 5 | y | 1 | y | n | A | | | b | | | F | | | | | n | g | f | i | c | d |
| 819 | Haydon, Ron | 2605 | Chestnut St | | MB-3 | 221-3799 | | | n | | n | y | | | | | | | | | | | K | | a | b | h | c | |
| 820 | Williams, Mary A | | | | | 406-0885 | y | 2 | n | | n | | | | | | | | | | | | | n | | | | | |
| 821 | Reeves, Ellen Jean | 2711 | Hope St | | MB-1 | 221-9085 | y | 11 | n | | n | n | | | | | | | | | | | | n | e | | | | |
| 822 | McCarter, Joseph | 3307 | Brookside | | MB-10 | 221-2189 | y | 48 | y | 1 | n | n | | | | C | D | | | | | | | n | i | f | i | d | |
| 823 | White, Debra | 608 | Mound | | M-6 | 248-2080 | y | 13 | y | 5 | y | y | | | | B | | | F | | H | | J | y | i | d | i | a | |
| 824 | Watkins, Mary | 743 | Grand Ave | | B-4 | 221-4517 | y | 2 | n | | n | n | | | | | | | | | | | K | y | g | i | h | a | |
| 825 | Calvert, Michael H | 3722 | Ely Rd, West | | B-10 | | n | 3 | n | | n | n | | | | | | E | | | | | | n | j | d | e | | |
| 826 | Hull, Terry | 3430 | St. Mary | | MB-7 | 221-3694 | y | 17 | n | | y | y | | | | B | | | | | | | | y | f | i | e | c | d |
| 827 | Denton, Lori | 3228 | Bradley St | | MB-8 | 231-0668 | y | 14 | n | | n | n | | | | | | D | | | | | | y | d | | | c | |
| 828 | Sweets | 5005 | Wyaconda Ave | | M-9 | 221-9029 | y | 20 | n | | n | | | | | | | | | | | | | n | f | d | a | d | |
| 829 | Dewey Howe, Elaine | 2422 | Chestnut St | | MB-3 | 248-9809 | n | 6 | n | | n | n | | | | C | D | | | | | | | y | i | g | b | c | d |
| 830 | Keefe, Victor | 2701 | Hope St | | MB-1 | 221-4570 | y | 17 | n | | n | | | | | | | | | | | | | | | | | | |
| 831 | Winn, John | 609 | Hawkins Ave, North | | MB-6 | 221-4264 | y | 14 | n | | n | n | | | | | | | | | | | | y | | | | | |
| 832 | | | | | | 221-5353 | y | 47 | n | | n | n | | | | | | | | | | | | n | h | a | i | c | d |

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| General Information | | | | | | | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | |
|---------------------|-----------------------------|-----------|---------------------|-----|-----------|-------------|----------|-------------|-------------|------------|------------|-----------|--------------|-----|-----|---------------------|---|---|---|---|---|---|---|------------|------|------|------|----------------|-----|--|-------------|--|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | | |
| 833 | Grubb, Darcy B | 1812 | 29th St | | B-12 | 248-0151 | y | 1 | n | | n | y | | | | | | | | | | | | n | d | h | e | d | | | | |
| 834 | Tischer, Julie | 2810 | McKinley St | | MB-8 | 221-4201 | y | 14 | n | | n | n | | | | | D | | | | | | | n | j | i | f | a | c | | | |
| 835 | Taylor, Barbara | 200 | Rock St, East | | M-6 | 406-0646 | y | 1 | n | 5 | y | | A | | C | | | | | | H | | | n | f | g | i | c | d | | | |
| 836 | Parker, George M | 319 | Levering Ave, North | | MB-3 | 221-2424 | y | 56 | n | | n | n | | | | | | | | | | | | n | e | | | | | | | |
| 837 | Riney, Aleeta M | 3200 | Roosevelt | | MB-9 | 221-0184 | y | 44 | y | | y | n | | | | | | | | | | | | n | | | | | | | | |
| 838 | Brown, Sharon S | 3215 | St. Mary | | MB-6 | 248-3048 | y | 9 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 839 | Jameson, Maranda | 611 | Pine St | | | 221-3980 | y | 2 | n | | n | n | | | | | | | | | | | | n | c | i | i | c | d | | | |
| 840 | Calcuttawala, Kaizar | 174 | Gemini Dr | | MB-11 | 221-2019 | y | 18 | y | 3 | y | y | A | b | | | | F | | | | | | n | a | b | c | c | d | | | |
| 841 | Gregory, Mary Jane | 3701 | Ely Rd, West | | B-10 | 221-3463 | y | 42 | n | | n | y | | | | | | | | | | | | n | | | | | | | | |
| 842 | Oleksy, Matt | 56 | Brook Drive | | MB-11 | 221-4292 | | 3 | n | | n | | | | | | | | | | | | | n | | | | | | | | |
| 843 | Bixler, Robert | 4115 | Commanche | | MB-10 | 248-1711 | y | 9 | n | | y | | | B | | | | | | | | | | n | | | | | | | | |
| 844 | Thompson, Donald | 3517 | Ely Rd, West | | B-10 | 231-1063 | y | 3 | y | 1 | n | y | A | b | | | E | | | | | | | n | e | b | i | c | d | | | |
| 845 | Atkins, Catherine | 4217 | Wildwood Ct | | MB-11 | 248-3528 | y | 6 | y | 5 | n | | A | | | | | | | | | | | y | e | f | h | d | | | | |
| 846 | Fazio, Edward, Sara | 2020 | Broadway | | MB-4 | 248-0653 | y | 3 | n | | n | y | | B | | | | | | | | J | | y | g | i | e | a | c | | | |
| 847 | Frick, William M | 1300 | Country Club Dr | | MB-3 | 221-4343 | y | 27 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 848 | Varni, Carolann | 3600 | Navajo St | | MB-11 | 217-228-614 | y | 2 | y | 5 | y | y | A | B | | | | F | | | | J | | n | e | i | i | d | | | | |
| 849 | Brown, Leona | 3840 | Ely Rd, West | | B-10 | 221-2198 | y | 1 | n | | n | n | | | | | | | | | | | | n | j | h | d | a | c | | | |
| 850 | McElroy, Dorothy | 614 | Pine St | | | 248-0397 | y | 37 | y | 5 | y | y | | B | C | | | F | | | | | | y | e | f | i | c | d | | | |
| 851 | Sim, Pat | 3203 | St. Mary | | MB-6 | 221-7855 | y | | n | | n | | | | | | | | | | | | | y | d | g | i | c | | | | |
| 852 | Pribhoff, Jason | 320 | Hawkins Ave, North | | MB-6 | 248-0741 | y | 6 | n | | n | n | | | | | D | | | | | | | y | i | g | d | | | | | |
| 853 | Brown, Jeff, Brea | 130 | Sheperd Dr | | MB-8 | 221-4547 | y | 5 | y | 5 | y | | A | B | C | | | | | H | | | | n | e | f | i | a | d | | | |
| 854 | Ledford, Edward J | 2924 | Market St | | B-12 | 248-3723 | y | | n | | n | n | | | | | | | | | | | | n | b | i | | c | d | | | |
| 855 | Kane, Jean | 556 | Flora Ave | | MB-7 | 221-6712 | y | 32 | y | 1 | | n | | | C | D | | | | | | | | n | | | | | | | | |
| 856 | Tate, Mark, Andrea | 503 | Hawkins Ave, North | | MB-6 | | y | 10 | n | | n | n | | | | | | | | | | | | n | | | | | | | | |
| 857 | Stewart, Keith, Rita | 3804 | Choclaw Pl | | MB-11 | 406-0611 | y | | y | 5 | y | n | | | | | | F | | | | | | y | i | h | a | a | d | | | |
| 858 | Smith, Pat & Nett, Jennifer | 2611 | Bell Ave | | MB-8 | 221-0254 | y | 15 | y | 5 | y | y | A | | C | | | F | | H | I | J | | n | i | d | e | c | d | | | |
| 859 | Candidi, Lillie | 21 | Luther Lane | | M-9 | 248-8266 | y | 3 | n | | n | n | | | | | | | | | | | | n | e | i | j | c | | | | |
| 860 | McDowell, Tom | 42 | Pioneer Trail | | | | n | 12 | n | | n | | | | | | | | | | | | | y | b | f | e | d | | | | |
| 861 | Forshie, Don, Grace | 3825 | Cache Ct | | MB-11 | 221-5291 | y | 2 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 862 | Zupan, Patsy | 3905 | Cheyenne | | MB-11 | | n | 16 | n | | y | y | A | | | | | | | | | | | | b | d | i | a | c | | | |
| 863 | Bonnell, Melissa J | 2816 | Rackcliffe St | | MB-6 | 248-3493 | y | 4 | n | | n | n | | | | | | | | | | | | n | b | i | h | c | d | | | |
| 864 | Ingram, Joseph | 2108 | Spruce St | | MB-1 | 406-0108 | y | 5 | n | | | | | | | | | | | | | | | n | d | | | | | | | |
| 865 | Riedel,Bill & Riedel, Doris | 3209 | Brookside | | MB-10 | 221-4737 | y | 54 | n | | y | y | | | | | | | | | | | | | e | i | | c | | | | |
| 866 | Unfleet, Dolores Gay | 3517 | Ely Rd, West | | B-10 | 221-7628 | y | 11 | n | | n | y | | | | | | | | | | | | | e | i | d | c | d | | | |
| 867 | Sim, Pat | 838 | Country Club Dr | | MB-3 | 221-7855 | y | 4 | n | | n | y | | | | | | | | | | | | | d | | | c | | | | |
| 868 | Givan, Travis | 233 | Griffith St, North | | MB-4 | 248-3761 | y | 6 | n | | n | y | | | | | | | | | | | | n | g | j | d | a | d | | | |
| 869 | McKinley, Dawn | 610 | Hayden St, South | | B-12 | 406-0563 | y | 4 | n | | y | y | | | | | | | | | | | | n | d | g | i | a | d | | | |
| 870 | Williams, Glessie E | 2018 | Spruce St | | MB-1 | | n | | n | | n | y | | | C | D | | | | | | | | n | b | d | i | | | | | |
| 871 | Moffitt, Debra | 2824 | Bird St, West | | B-4 | 221-4567 | y | 5 | | 5 | y | | | | | | | F | | | | | | n | i | d | f | | | | | |
| 872 | Lankford, Phyllis J | 2207 | Hope St | | MB-1 | 221-4045 | y | 18 | n | | n | y | | | | | | | | | | | | n | i | l | e | a | c | | | |
| 873 | Anderson, Bill | 10299 | Tanglewood Ln | | | 221-7203 | y | 6 | n | | y | | A | | | | | | | | H | | J | | y | e | h | k | b | | | |
| 874 | Bonvillian, David Jr | 1724 | 35th St | | B-8 | 406-1375 | y | 2 | n | | y | n | A | b | | | | | | | | | | y | d | b | g | b | c | | | |
| 875 | Powers, Jean | 37 | Holiday Dr | | M-9 | 221-9003 | | 17 | n | | n | | | | | | D | | | | | | | | i | f | c | a | d | | | |
| 876 | Fohay, Mary E | 2501 | Chestnut St | | MB-3 | 221-6979 | y | 39 | n | | n | n | | | | | | | | | | | | y | | | | | | | | |
| 877 | | | | | | | | 29 | y | 5 | | | A | | C | | | F | | | H | I | J | | i | h | e | a | | | | |
| 878 | Smith, Patricia L | 2701 B | Marion St | | B-12 | 248-8225 | y | 1 | y | | y | | A | | | | | | G | | | | | n | a | | | c | d | | | |
| 879 | Riggs, Doris G | 9 | Westbrooke Dr | | MB-11 | 221-8056 | y | 2 | n | | n | n | A | | | | | | | | | | | n | a | b | d | a | b | | | |
| 880 | Yarbrough, Leona | 4117 | Commanche | | MB-10 | 541-9898 | y | 3 | y | 5 | y | n | | B | | | | | | | | | | | | | | | | | | |
| 881 | Keith, James H | 2520 | Bird St | | M-4 | 221-0816 | | 43 | n | | | n | | | | | | | | | | | | | e | i | | c | | | | |
| 882 | Shaw, Alberta | 3901 | Cheyenne | | MB-11 | 221-2381 | y | 38 | n | | n | y | | | | | | | | | | | | n | | | | | | | | |
| 883 | , Adrienne | 3602 | Navajo St | | MB-11 | | y | 3 | n | | n | n | | | | | | | | | | | | | d | e | f | | | | | |
| 884 | Shannon, Laurence E | 3202 | Pleasant St | | MB-8 | 321-0698 | y | 1 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 885 | Riechord, Jack | 2515 | Chestnut St | | MB-3 | 221-5936 | y | 40 | n | | n | n | A | b | c | | | | | | | | | n | d | i | j | c | d | | | |
| 886 | Maddox, Walter | 224 | Magnolia Ave | | MB-3 | 221-2227 | y | 25 | y | 3 | y | y | | | | | | | | | | | | y | e | f | g | c | d | | | |
| 887 | Walden, Ronald, Wilma | 5033 | College Ave | | M-9 | 221-0663 | y | 17 | n | | n | n | | | | | | | | | | | | | i | | | d | | | | |
| 888 | Thompson, Doris L | 3840 | Ely Rd, West | | B-10 | 221-6436 | | 8 | n | | n | n | | | | | | | | | | | | | i | e | c | c | | | | |
| 889 | Richardson, Lola | 1915 | Settlers St | | MB-5 | | | 50 | n | | | | | | | | | | | | | | | y | | | | | | | | |
| 890 | Lewis, William | 2034 | Broadway | | MB-4 | | | 51 | n | | | | | | | | | | | | | | | n | | | | | | | | |
| 891 | Boggs, Eva | 4 | Country Estate Dr | | M-6 | 248-1927 | y | 14 | y | 5 | y | y | | B | C | D | | | | H | I | | y | b | c | d | a | c | | | | |
| 892 | Hooper, G. | 1449 | Vesper | | M-6 | | | 12 | y | 5 | y | | | B | | | D | | F | | | | | y | | | | | | | | |
| 893 | Kroencke, Cecil | 3724 | Ely Rd, West | | B-10 | 221-4592 | y | 14 | y | 3 | y | | | B | | | D | | | | H | | | y | i | i | | a | | | | |
| 894 | McBride, Sally | 3115 | Pleasant St | | MB-8 | 248-0713 | y | 15 | n | | n | n | | | | | | | | | | | | n | b | d | i | | | | | |
| 895 | Horstroeyer, Dora | 901 | Central Ave. | | MB-9 | 221-2163 | y | 3 | n | | n | y | | | | | | | | | | | | | | | | | | | | |
| 896 | Dehner, Donald | 20 | Hamlin Heights Dr | | M-9 | 221-0772 | | 31 | n | | n | n | | | | | | | | | | | | | | | | | | | | |

Database
City of Hannibal Stormwater Questionnaire

September 2005

| General Information | | | | | | | Q-1 SW Prob? | Q-2 | Q-3 | Q-4 Type of Problem | | | | | | | | | | | | | Q-5 | Q-6 Priorities | | | Q-7 Funding | | | | | |
|---------------------|---------------------------------|-----------|--------------------|-----|-----------|----------|--------------|-------------|-------------|---------------------|------------|-----------|-------|-------|-------|-------|-------|-------|------|------|-------|------|------|----------------|------|------|-------------|-------|-------|-------|-------|-------|
| No. | Name | Street No | Street Name | Apt | Watershed | Phone | Call OK? | Years there | Impact? Y/N | Freq 1/3/5 | N-hood Y/N | Other Y/N | A | B | C | D | E | F | G | H | I | J | K | Fixes? Y/N | Q6-1 | Q6-2 | Q6-3 | F-1 | F-2 | | | |
| 897 | Anderson, Vicky | 2100 | Crescent Dr | | B-4 | | n | 14 | n | | n | n | | | | | D | | | | | | | Y | | | | | | | | |
| 898 | Poore, Gisela | 3605 | Atoka | | MB-11 | 248-0024 | y | 20 | y | 5 | n | n | A | | C | D | | F | | | | | n | a | b | c | | | | | | |
| 899 | Strickland, Sarah M | 502 | Olive St | | B-4 | 406-0153 | y | 7 | n | | n | n | | | | | | | | | | | n | b | d | h | a | | | | | |
| 900 | Crane, Harold R | 480 | Country Club Dr | | MB-3 | 221-1771 | y | 40 | n | | n | y | | | | | | | | | | | y | d | j | k | c | d | | | | |
| 901 | Morton, Ray | 3238 | Helen | | MB-7 | 406-0771 | y | 4 | n | | n | y | | | | | | | | | | | y | b | i | | a | | | | | |
| 902 | Kaplan, Lee | 24 | Wauneta Place | | MB-10 | 221-2351 | y | 14 | y | 5 | y | y | | | | | | | | | | | y | | | | a | | | | | |
| 903 | Chapman, Charlotte | 3909 | Choclaw Pl | | MB-11 | 248-3524 | y | 10 | n | | n | n | | | | | | | | | | | n | | | | a | c | | | | |
| 904 | Golden, Grances | 375 | Head Lane | | MB-11 | 221-4582 | y | 10 | n | | n | n | | | | | | | | | | | n | | | | b | | | | | |
| 905 | Kline, Earl, Trudy | 61 | Meadows Rd | | MB-11 | 406-0645 | y | 4 | n | | n | n | | | | | | | | | | | n | | | | c | d | | | | |
| 906 | Elder, Genia | 240 | Virginia St | | MB-3 | 406-0040 | y | 1 | n | | n | n | | | C | | | | | | | | n | d | | | c | d | | | | |
| 907 | Hicks, Edith | 46 | Holiday Dr | | M-9 | 221-5847 | y | 40 | n | | n | n | | | | | | | | | | | n | | | | c | d | | | | |
| 908 | Bunn, | 3200 | Pleasant St | | MB-8 | | | 15 | n | | n | n | | | C | | | | | | | | y | | | | c | d | | | | |
| 909 | Quinn, Kathy | 210 | Sheperd Dr | | MB-8 | 221-8619 | y | 8 | n | | n | n | | B | C | | | | | H | | | n | e | g | b | c | d | | | | |
| 910 | Keigbaum, Mildred | 317 | Hawkins Ave, South | | MB-3 | 221-5498 | y | 40 | y | 5 | y | y | | B | C | | E | | | | | y | a | i | j | | | | | | | |
| 911 | Hildreth, Haydon | 2025 | Hayden Pk Ln | | M-6 | 221-3867 | y | 30 | y | 1 | y | y | A | | C | | | | | | | y | | | | a | | | | | | |
| 912 | Pedersen, Ruth F | 613 | Grand Ave | | B-4 | | n | 20 | n | | n | y | | | | | | | | | | | n | e | f | g | a | c | | | | |
| 913 | Pipkin, Harold L | 2416 | Chestnut St | | MB-3 | 221-2931 | y | 31 | y | 3 | y | n | A | | C | | | | | | J | n | i | a | b | | | | | | | |
| 914 | Jackson, David | 2 | Orchard Ave | | B-8 | 248-1188 | y | 7 | n | | n | y | | | | | | | | | | | n | e | a | l | b | c | | | | |
| 915 | Schuenke, Ryan, Destiny | 308 | Hawkins Ave, North | | MB-6 | 231-0596 | y | 2 | n | | n | n | | | | | | | | | | | n | c | e | k | c | | | | | |
| 916 | Maune | | | | | 221-0617 | n | 8 | n | | n | n | | | | D | | | | | | | n | | | | | | | | | |
| 917 | Thomas, Alice | 312 | Seventh St, South | | B-2 | 221-2091 | | 3 | n | | n | n | | | | | | | | | | | n | | | | | | | | | |
| 918 | Earnest, Nancy I | 711 | Center St | | B-2 | 541-4019 | y | 10 | y | 5 | y | n | A | B | | | | | | H | I | J | | a | b | e | b | c | | | | |
| 919 | Kane, Blanche | 2913 | McKinley St | | MB-8 | 221-5591 | y | 45 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 920 | Rouse, Clara | 3 | Wauneta Place | | MB-10 | 221-3805 | | 1 | n | | n | | | | | | | | | | | | | | | | | | | | | |
| 921 | Sapp | 1703 | D St | | MC-2 | | n | 19 | y | 5 | y | y | | B | C | | E | | | | | | y | d | i | l | | | | | | |
| 922 | White, Becky | 2918 | Garfield St | | MB-7 | 221-5359 | y | 1 | n | | n | y | | | | | | | | | | | n | d | i | h | c | | | | | |
| 923 | Cort, Mary | 113 | Hawkins Ave, South | | MB-6 | 221-9049 | y | 60 | n | | n | y | | | | | | | | | | | n | b | e | i | c | | | | | |
| 924 | | | | | | | | 32 | n | | n | y | | | | | | | | | | | n | e | i | l | c | d | | | | |
| 925 | McAree, Janna | 506 | Willow St | | MB-1 | 406-1315 | y | 1 | n | | n | n | | | | | | | | | | | | h | d | i | | | | | | |
| 926 | Nicholson, Pollyann | 1 | Meadowbrook Dr | | MB-5 | 406-5544 | y | 1 | n | | n | | | | | | | | | | | | y | b | d | e | | | | | | |
| 927 | Garcia, Joseph | 125 | Sheperd Dr | | MB-8 | | n | 2 | n | | y | n | | B | | | | | | | | | n | b | e | j | b | c | | | | |
| 928 | Waddell, George | 1902 | Chestnut St | | MB-3 | 221-0451 | n | 24 | n | | | | | B | | | | | | | | | | | | | | | | | | |
| 929 | Whitey, Tim | 4017 | Pushmataha | | MB-10 | 248-3149 | y | 2 | y | 5 | y | y | | B | | | | | | | | | | | | | | | | | | |
| 930 | Chadwick, Elizabeth | 4 | Adams Dr | | MB-6 | 221-1520 | y | 2 | | 5 | y | n | A | | | | | | | | | | y | d | e | | | | | | | |
| 931 | Fogle, James & Woolfolt, Maxine | 1605 | Rinker | | MC-1 | 221-7415 | y | 15 | | | y | | A | | | | E | | | | | | | e | a | i | a | | | | | |
| 932 | Jackson, Susan | 3914 | Cheyenne | | MB-11 | 221-3985 | n | 25 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 933 | McClour, John H Jr | 3800 | Tilden St | | B-8 | 221-2587 | y | 18 | y | 5 | y | n | A | B | | | E | F | | | | | y | e | d | a | a | d | | | | |
| 934 | Dauma, R. W. | 5006 | College Ave | | M-9 | 221-6399 | y | 34 | n | 1 | n | y | | | | | | | | | | | y | c | d | i | b | c | | | | |
| 935 | Alvey, Richard | 412 | Seventh St, North | | M-6 | 248-0316 | y | 17 | y | 5 | n | n | | | | | | F | | H | | | y | b | e | j | c | d | | | | |
| 936 | Harder, E. W. & Helen | 17 | Orchard Ave | | B-8 | 221-3101 | y | 10 | n | | n | n | | | | | | | | | | | n | b | e | j | d | | | | | |
| 937 | Parker, Chester, Brenda | 3700 | Leonard Ave | | B-7 | 406-0602 | y | 2 | y | 3 | y | n | A | | C | | E | F | | | | | y | a | d | i | a | d | | | | |
| 938 | Lambert, Debra J | 4100 | Commanche | | MB-10 | 221-5582 | y | 7 | y | 1 | y | | A | B | C | D | | | | | I | | n | h | g | e | a | | | | | |
| 939 | Gospel Lighthouse of Hannibal | 3512 | St. Charles St | | B-8 | 221-2989 | y | 7 | y | | n | n | | | | | | | | | | | | b | j | h | a | c | | | | |
| 940 | Kealmeyer, George | 1907 | Harrison Hill | | M-6 | 221-8019 | y | 12 | n | | n | y | | | | | | | | | | | | h | d | c | b | c | | | | |
| 941 | Pashia, Rev Ronn | 508 | Eighth St, North | | B-2 | 221-7316 | y | 17 | y | 1 | y | y | | B | | | | F | | H | | | n | b | c | d | a | c | | | | |
| 942 | Taylor, Kent | 921 | Center St | | B-3 | 221-6228 | y | 15 | y | 5 | y | y | A | B | C | | | F | G | H | I | J | K | n | h | d | c | d | | | | |
| 943 | Speedee Print LLC | 516 | Broadway | | B-1 | 221-1514 | y | 1 | n | | n | n | | | | | | | | | | | n | d | h | i | | | | | | |
| 944 | Hannibal Regional Hospital | 6000 | Hospital Dr | | B-9 | 248-5384 | y | 12 | n | | n | n | | | | | | | | | | | | f | g | i | d | | | | | |
| 945 | Robertson, Jim | 1889 | Bay Ave | | M-9 | 221-0693 | y | 7 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 946 | Georing, Ryan | 2821 | Pleasant St | | MB-8 | | | 1 | n | | n | n | | | | | | | | | | | | | | | | | | | | |
| 947 | Broccille, Lloyd | 4243 | Stardust Dr | | MB-11 | 221-3658 | y | 15 | n | | | n | | B | | | | | | | | | Y | | | | | | | | | |
| 948 | Batenhorst, Tom | 10 | Bier Lane | | MB-6 | 248-2586 | y | 15 | y | 1 | n | n | | | C | D | | | | H | I | | | i | e | h | b | c | | | | |
| 949 | Smashey, Wallace | 1 | Meadowbrook Hts | | MB-5 | 221-7860 | y | 33 | n | | n | | | | | | | | | | | | | c | e | f | d | | | | | |
| 950 | Carson, Robert | 221 | Hayden St, North | | MB-4 | 231-0990 | y | 1.5 | n | | n | | | | | | | | | | | | | | | | | | | | | |
| 951 | Wilson, Thelma | 28 | Luther Lane | | M-9 | 221-4436 | y | 11 | y | 5 | | | | | C | D | | F | | H | | | y | | | | a | | | | | |
| 952 | Calhoon, Ray & Edie | 1612 | Catherine Dr. | | B-8 | 248-3944 | y | 8 | y | 5 | y | n | A | B | | | | F | | | | J | y | g | e | d | a | b | | | | |
| Count | | 935 | 928 | 931 | | 868 | 852 | 891 | 910 | 270 | 872 | 809 | 212 | 240 | 153 | 59 | 61 | 120 | 12 | 70 | 51 | 81 | 15 | 666 | 630 | 589 | 552 | 569 | 330 | | | |
| | | 98.2% | 97.5% | | | | | | 91.2% | 89.5% | 93.6% | 95.6% | 28.4% | 91.6% | 85.0% | 22.3% | 25.2% | 16.1% | 6.2% | 6.4% | 12.6% | 1.3% | 7.4% | 5.4% | 8.5% | 1.6% | 70.0% | 66.2% | 61.9% | 58.0% | 59.8% | 34.7% |

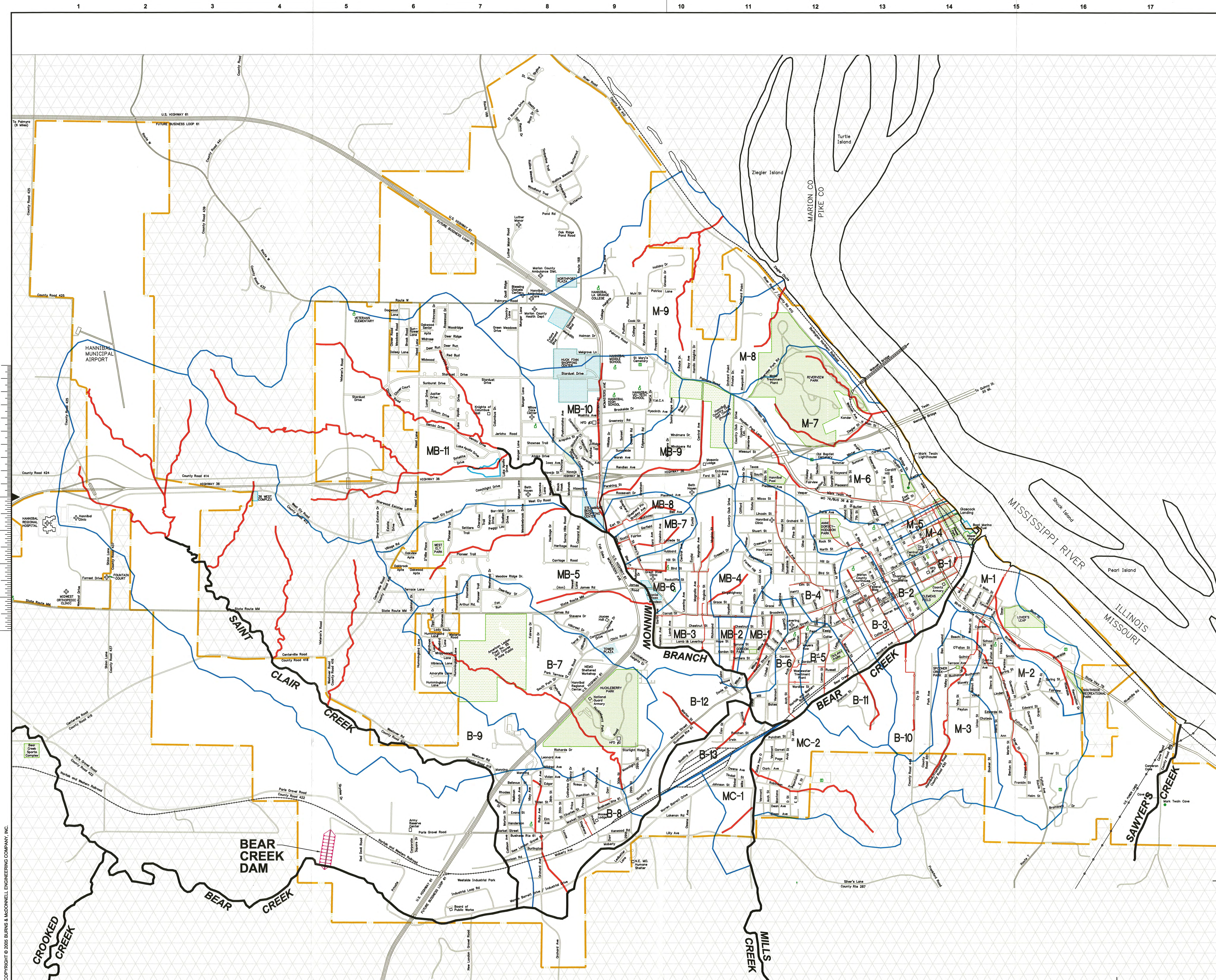
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| Count | 935 | 928 | 931 | | 868 | 852 | 891 | 910 | 270 | 872 | 809 | 212 | 240 | 153 | 59 | 61 | 120 | 12 | 70 | 51 | 81 | 15 | 666 | 630 | 589 | 552 | 569 | 330 |
| | 98.2% | 97.5% | 97.8% | 0.0% | 91.2% | 89.5% | 93.6% | 95.6% | 28.4% | 91.6% | 85.0% | 22.3% | 25.2% | 16.1% | 6.2% | 6.4% | 12.6% | 1.3% | 7.4% | 5.4% | 8.5% | 1.6% | 70.0% | 66.2% | 61.9% | 58.0% | 59.8% | 34.7% |

952 Total responses

Appendix C

Figure C—Principal Storm Sewers & Open Channels in Hannibal





| no. | date | by | ckd | description |
|--|--------------------------------|---------------------------|-----|-------------|
| <div> SCALE IN FEET 1 Inch = 1,000 Feet</div> | | | | |
| LEGEND | | | | |
| | OUTSIDE CITY LIMITS | | | |
| | SCHOOL | | | |
| | HOSPITAL, CLINIC AND AMBULANCE | | | |
| | CEMETERY | | | |
| | POINT OF INTEREST | | | |
| | CITY LIMITS | | | |
| | CREEK | | | |
| | STORM SEWERS | | | |
| | OPEN CHANNELS | | | |
| | SUB-BASIN LIMITS | | | |
| NOTES: (1) OPEN CHANNELS CONSIST OF CREEK, DITCH, GUTTER OR OPEN FIELD FLOW. | | | | |
| | | | | |
| date 6/03/05 | | designed D. KOSCIELSKI | | |
| detailed D. KOSCIELSKI | | checked D. MIZELL | | |
| Hannibal, Missouri America's Hometown | | | | |
| HANNIBAL STORMWATER MASTER PLAN | | | | |
| PRINCIPAL STORM SEWERS AND OPEN CHANNELS IN HANNIBAL | | | | |
| project 38204 | | contract --- | | |
| drawing | | rev. | | |
| FIGURE C | | | | |
| sheet 1 of 1 | | sheets | | |
| file: I:\HANNIBAL\38204\CADD\EXHIBITS\Updated_FigureC.dwg | | | | |