Foundations for Establishing a Stormwater Utility in the State of Missouri

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Executive Summary

The 1987 Clean Water Act Amendments created an unfunded mandate for local communities to reduce pollution in stormwater runoff. The City of Lee's Summit, Missouri is a suburban community faced with the challenge of reducing localized flooding to satisfy local demands, implement new programs to comply with the Clean Water Act, but has no regular source of funding. Many states allowed communities to create stormwater utilities as a means to assess user fees to fund stormwater programs that were not subject to the tax limitations adopted by many states during the taxpayer revolts in the 1970s and 80s. Stormwater fees are typically assessed based on rate studies that establish user fees based on the impact of stormwater runoff on local infrastructure. As a utility, rates are set to cover the costs to operate, maintain, improve, and comply with regulations without drawing on general fund revenues. Studies regarding innovative approaches to managing stormwater found that sharing resources with other agencies or departments within an agency were common forms of innovation

In Missouri, the State Supreme Court ruled stormwater fees are taxes that had to be approved by a public vote, which limited the creation of more stormwater utilities in Missouri. Much of currently published literature does not account for need to take users fees to repeated votes to either establish a new utility or increase rates to cover increased costs as communities grow.

This study conducted a comparative analysis of three existing stormwater utilities in Missouri to identify typical services provided by a utility, staffing requirements and funding based on readily available demographic information. Using the City of Lee's Summit as an example, guidelines are used to present a proposed organization, staffing, funding options, and

resource sharing opportunities for a new utility. Actual rates should still be established by a consultant specializing in the field of stormwater rate studies. The findings and conclusion may be used as guidelines to help local community leaders in Missouri evaluate a rough estimate for budgeting and public discussions regarding the amount and types of fees that could be used to finance stormwater services. These initial discussions are necessary for local communities to build public support necessary to create a utility.

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Introduction

Many small communities lack the resources to comply with the 1987 Clean Water Act (CWA) Amendments that require communities to limit non-point source pollution associated with stormwater. The original CWA in 1972 addressed point source pollution, which is water collected through a sanitary sewer system, treated, and discharged back into natural streams from a single point leaving the treatment facility. Meanwhile, local stormwater systems were built to mitigate flooding with no considerations for stormwater pollution. Stormwater pollution bypasses sewage treatment plants and drains directly into streams, which prompted the CWA Amendments. Reducing stormwater pollution generally requires educating the public, reducing soil erosion, and changing urban development and construction practices to reduce the amount of rainfall discharged directly into streams. Compliance measures required by the unfunded mandates far exceed the local resources available to local governments.

One method to build local resources is to establish a stormwater utility. A stormwater utility "refers to three primary elements, namely a Program that defines stormwater operations and management, and Organization that is responsible for governance, and a Funding approach that provides dedicated financing" (Black & Veatch, 2014, p. 3). Five communities in the state of Missouri established stormwater utilities dedicated to managing and maintaining stormwater infrastructure. Evaluating the five stormwater utilities in Missouri may provide a potential road map to organize similar utilities in other communities throughout the State.

Lee's Summit, Missouri is classified by State and Federal Agencies as a National Pollutant Discharge Elimination System (NPDES) Phase II City, which means Lee's Summit will be forced to comply with the 1987 CWA Amendments within two to five years. The

NPDES requirements established six minimum control measures (MCMs) that must be implemented by local communities to mitigate stormwater pollution. Those six items are: (1) Public Education, (2) Public Involvement, (3) Detect and eliminate illicit discharges, (4) Construction site erosion, (5) Post-construction site restoration, and (6) Pollution prevention / good housekeeping (EPA, 2014).

The City of Lee's Summit may have the opportunity to form a stormwater utility in two years as part of a local sales tax election. This paper studies the existing stormwater utilities in Missouri to identify organizational concepts, funding strategies, and identify operational programs to establish a local stormwater utility. The stormwater utility operations and management, organization, and funding should facilitate both the local need to mitigate flooding and the regulatory need for compliance with the six minimum pollution control measures.

Research questions investigated in this paper are: What strategies can be used to organize stormwater utilities? What type of personnel and how many should be employed by a stormwater utility? What activities are required and how much do they cost? How can stormwater utilities be funded within in the legal constraints of Missouri public finance laws? This study will a collect and compare data from the five existing stormwater utilities in the State of Missouri. The utilities share a common purpose of managing stormwater quality and quantity, but they are considerably dissimilar in their size, funding mechanisms, and type of infrastructure. Local residents demand prudent flood control measures for public safety and preservation of private property, whereas federal clean water regulations mandate extensive pollution control measures. These competing demands are currently unfunded; therefore the city of Lee's Summit seeks a means to develop dedicated revenue streams for stormwater management. Creating a

stormwater utility may be a viable option to provide the organization and funding to provide programs that meet both local and federal demands.

Analytic Framework

A review of literature found that stormwater utilities were formed mostly by municipal political subdivisions and followed political boundaries. The CWA Amendments were enacted following the taxpayer revolts in the late 1970s and 80s that typically required public voter approval to raise taxes. However, user fees were not subject to these tax limitations. Creating stormwater utilities provided a way to raise revenues to support CWA compliance by charging user fees and not having to get voter approval.

Based on a nationwide survey, most utilities performed operations and maintenance of existing systems but lacked the resources to build capital improvements to the system. No general patterns were observed for the structure, operations, service goals, and funding for utilities because local agencies tended to form utilities to meet local needs within the context of the local political environment (Black & Veatch, 2014).

Eighty-seven percent of the stormwater in the Midwest region serve a city or town, instead of a regional watershed district (Black & Veatch, 2014). Stormwater utility serves towns ranging from 9,000 people to 2.5 million, with the median population supporting utilities is 19,200 (Campbell, Ph.D., Cymond, Ph.D., Kea, & Dritschel, 2014). The 2014 Western Kentucky University (WKU) Stormwater Utility Survey advocates that no town is too small, and allowing utilities to form at the municipal level allows the flexibility to meet local needs and provide politically acceptable levels of service. Figure 1 shows the number of stormwater utilities established in each state.

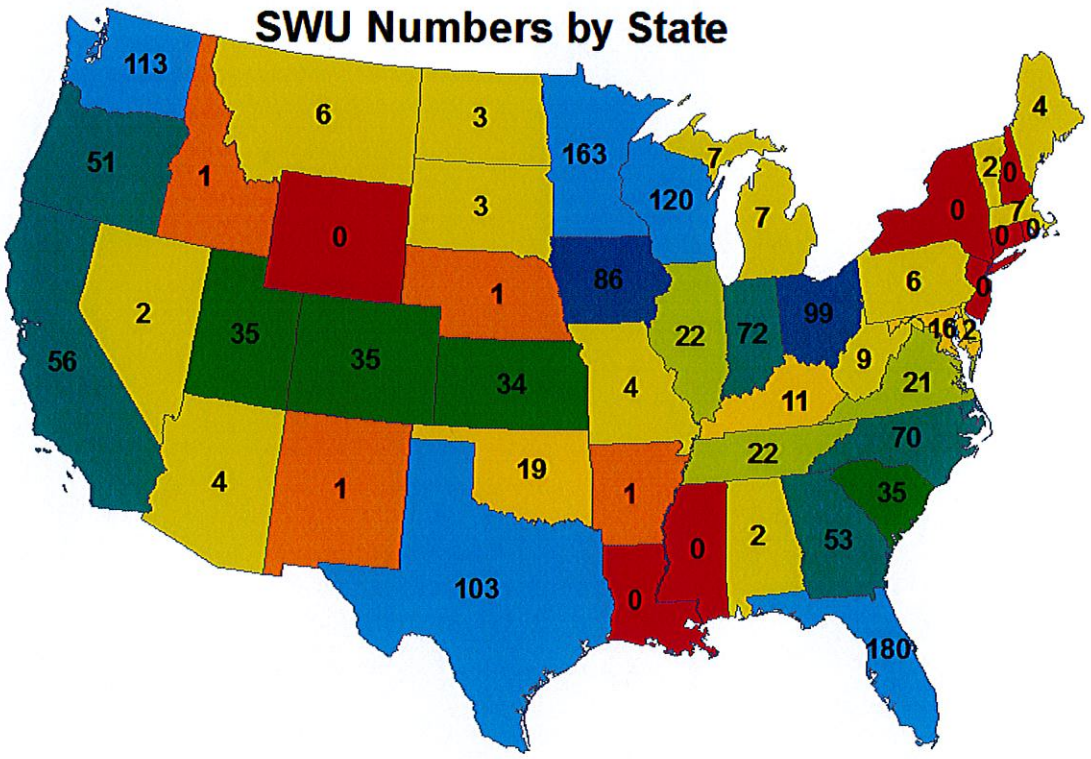

Figure 1: Number of stormwater utilities in each state reported in the 2014 Western Kentucky University Annual Stormwater Utility Survey

Vedachalam, Kay and Rija cite research that supports the WKU statements that public infrastructure is one of the key issues for taxpayers. When asked about the preferred means of delivering those services, people placed the most trust in local governments to provide those services. Federal agencies were rated the lowest, while state agencies and private sector contractors were preferred over federal agencies, but still trusted less than local agencies. Despite this trust and preference for local agencies, many people did not rate water, wastewater and stormwater infrastructure as a priority (Vedachalam, Kay, & Riha, 2014).

The challenge for local agencies is developing a locally sustainable and politically acceptable means to meet the local desires of flood control while meeting the federal clean water

requirements. The biggest problem facing stormwater systems is most the infrastructure is buried underground. This "out-of-sight, out-of-mind" perspective of underground utility services indicates the need for public information to be part of a local utility (Vedachalam, Kay, & Riha, 2014). NPDES permits issued under the CWA require public education, primarily to reduce pollution. Local agencies should include public information as part of their utility to help improve support for stormwater fees, improve service delivery, promote partnering with private property owners to mitigate flooding issues, and help change behaviors to reduce pollution.

The structure of the federal CWA places the burden of compliance squarely on cities. Therefore, most cities choose to form stormwater utilities to control their compliance efforts instead of relying on counties and states. Many cities had been partially complying with NPDES requirements that were manageable. Most cities met the minimum control measures for controlling illicit discharges by operating separate sanitary sewer systems, public information, and controlling erosion during construction (White & Boswell, 2007). The biggest challenge facing local agencies was providing adequate funding within the constraints of state tax limitations. This has led to innovation among communities through collaboration instead of forming special utility districts. Innovative agencies found ways to share knowledge, share personnel, share equipment, and other resources to provide more efficient services (White & Boswell, 2007). These agencies provided common services such as operating, maintaining, designing and building stormwater infrastructure.

Planning groups were not observed in most stormwater utility organizations. Urban planners were rarely used in support of stormwater utility organizations. The CWA post-construction / site restoration control measure provides a means to reduce stormwater runoff and improve water quality through innovative construction practices and urban planning. Some of

these methods include low impact development, rooftop gardens, pervious pavements and other means that reduce the need to stormwater infrastructure. These should be incorporated into local planning ordinances to proactively reduce stormwater volume and improve water quality by adopting land use planning practices that limit stormwater runoff in new development or re-development projects. They also noted that a most research on government innovation focused on state governments instead of local governments (White & Boswell, 2007). This research gap seems at the local level makes the local emphasis for organizing stormwater utilities more challenging at this time due to the lack of local information.

Grigg's work, coupled with the WKU survey, provided a more detailed methodology for local organization and financing of stormwater utilities. This guidance is conditioned on the understanding the "no single model will fit everywhere" (Grigg, 2013, p. 18). In order to fit the definition of a utility, fees or taxes must be approximately equal to the cost to operate the utility. Effective organization and financing are necessary to provide the public benefits of "storm drainage, water quality, mitigating land-use impacts, floodplain management, and open space amenities" (Grigg, 2013, p. 6). The traditional organizational model found mostly in the Midwest places stormwater services in the local public works department, and stormwater services are most commonly funded by general fund revenues. The pure utility modes combines stormwater services into an enterprise utility supported solely by user fees. Some organization split stormwater management responsibilities. Floodplain management and surface drainage may be managed by Public Works, while stormwater pipes and inlets are managed by the local water and sewer utility company (Black & Veatch, 2014).

The fundamental issue facing all utilities is developing an equitable fee structure that charges users an appropriate fee. Fees are typically charged to each property and range from

zero to $35 per month, with the median fee of $4.00 per month charged to a single family residence (Campbell, Ph.D., Cymond, Ph.D., Kea, & Dritschel, 2014). Common stormwater utility fee structures are flat rate for all properties, a variable rate base on land use, rates based on impervious area, and rates based on the size of a property. The intent of a fee is to charge the customer for the amount of stormwater runoff that leave the property and enters the public infrastructure. The Equivalent Residential Unit (ERU) was the most common type of fee. One ERU represents the runoff from a single family residence. The amount of runoff depends on the amount of rainfall, so the utility must select a "typical" storm to develop the fee. For example, one ERU is the amount of rainfall created during a storm creating one inch of rain in one hour on a residential lot averaging 3,200 square feet of impervious area. Thus choosing the intensity of a storm establishes the level of service for flood control. Commercial, industrial and other land uses may equal about 4.2 ERUs (Campbell, Ph.D., Cymond, Ph.D., Kea, & Dritschel, 2014).

The first requirement to allow cities to establish a stormwater utility is the State must adopt legislation that allows local agencies to form a stormwater utility. Legal challenges and hurdles have prevented forming stormwater utilities in some states. For example, New Jersey does not have legislation authorizing a stormwater utility. Missouri has passed laws allowing stormwater utilities, but faced other legal challenges. A state constitutional amendment, the Hancock Amendment, limits the power of state, county and local governments from raising taxes and requires a public vote to approve most taxes. The State Supreme Court ruled in 2013 that a stormwater user fee is actually a tax, so stormwater utilities fee increases must be approved by public vote, regardless of the method used to calculate the fee. To date, Missouri has four stormwater utilities, and all of them are operated by cities (Campbell, Ph.D., Cymond, Ph.D., Kea, & Dritschel, 2014).

Lee's Summit, Missouri has many options to structure a new stormwater utility. Following the most common pattern, the utility would operate and maintain the existing system, but have not funding for capital improvement. Funding would be mix of general fund revenues and a user fee based on ERUs. Staff would include maintenance personnel, engineers, a public communications expert, a floodplain manager, and a permit specialist located in the Public Works Department. An innovative approach would find ways to share resources already in other departments, modify urban planning standards to reduce runoff in new developments, adopt design practices the reduce runoff and remove pollutants, and implement a fee structure that would generate revenues for capital projects to expand and improve the stormwater system.

Methodology

Retrofitting existing stormwater systems and building new systems to mitigate flooding and meet the NPDES water quality standards require extensive planning, engineering design, maintenance and construction that is well beyond currently available resources in most communities. Evaluating the existing stormwater utilities in Missouri can provide a potential road map to organize similar utilities in other communities throughout the State.

The primary research question is "How should a city organize a stormwater utility to plan, build, operate and maintain a local stormwater system that meets CWA regulatory standards?" Under the primary question, this study will collect data to identify organizational structures, personnel requirements, and funding strategies to provide programs and services dedicated to stormwater management. Identifying services, programs and responsibilities is assumed to be the first process in organizing a utility. After identifying organizational goals, personnel and equipment needs should be evaluated. The funding strategy is assumed to follow

resource identification so the utility can develop strategies to provide the appropriate levels of funding to meet the personnel and equipment needs.

This study conducted a comparative analysis of existing stormwater utilities serving cities in Missouri that operate separate storm sewer systems. The two utilities serving St. Louis and Kansas City are unique because they are the only two cities in Missouri operating combined sewer systems and have been issued consent decrees by the EPA. The consent decrees mandated Kansas City and St. Louis to spend over $100 million per year for 25 years on capital construction projects to build new stormwater collections systems separate from their sanitary sewer systems (EPA, 2010) (EPA, 2013). The consent decrees imposed expenses on the order of $330 to $440 per housing unit, which far exceeds the median fee of $4.00 per household (Campbell, Ph.D., Cymond, Ph.D., Kea, & Dritschel, 2014). Therefore, St. Louis and Kansas City were not considered comparable cities for the purposes of this study.

The three remaining stormwater utilities operated by the cities of Arnold, Columbia, and Independence were used as comparators for this study. Data collected from the utilities were used to identify benchmarks to estimate typical funding, staffing and organization for stormwater utilities based on the size of community. The CWA regulations and state public finance laws are constants set the political environment and minimum regulatory standards. Services provided by the comparator cities were evaluated to validate that those stormwater utilities met the minimum conditions of the CWA.

The evaluation criteria compared stormwater utility staffing and funding against basic demographic data to develop guidelines for organizing a utility. Using readily available demographic data, a local agency should be able to develop a rough estimate of staffing, organization, and funding necessary to start up a stormwater utility. Many agencies hire

consulting firms that specialize in stormwater utility rate studies to develop detailed funding and organizational plans, which is beyond the scope of this study.

Total stormwater personnel may vary based on the functions, such as engineering or maintenance, based on the goals and organization of the utility. For example, how many personnel are needed to staff the operations section based on the size of a community? Personnel requirements will evaluate skill sets and numbers, such as how many engineers, how many laborers, and how many supervisors should be on staff to achieve the organizational goals. Funding will include operations costs, maintenance, capital improvement budgets, and overhead costs that include staff, equipment and facilities. Staffing levels establish annual operating budget needs required to meet the desired levels of service based for the various functions.

Several demographic characteristics were evaluated to avoid relying on only one piece of data that could vary widely when applied to communities not specifically studied in this report. For example, if revenue per capita, revenue per household, or revenue per mile of storm sewer produces similar staffing and funding levels, then those may provide benchmarks helpful in drafting a proposal to organize a new utility. Or would the funding forecast be more closely tied to the miles of wet streams in the utility's geographic unit cost based on the linear feet of stormwater infrastructure.

The utilities share a common purpose of managing stormwater, but they are considerably dissimilar in their size, funding mechanisms, and type of infrastructure. Qualitative data was collected to evaluate if utilities were meeting CWA compliance goals and identify regulatory goals for each community that may indicate a different level of service, which would in turn influence the organizational and funding requirements. Similar population densities may indicate similar types of pollution, similar levels of runoff associated with the differing levels of

man-made development in a community. Higher population densities may incur a higher cost per capita because of much larger impervious areas; therefore underground stormwater infrastructure would be significantly larger to mitigate flooding in dense urban areas. Methods to improve the water quality of storm runoff will vary because the pollutants from rural areas are significantly different in nature than those pollutants from urban areas. The primary pollutants from rural areas are soil erosion and nitrate runoff from agricultural activities. Urban areas typically introduce more industrial chemicals, salts, and hydrocarbons into stormwater. Despite the different pollutants, efforts to improve water quality include similar requirements for public education, public involvement, limiting illicit discharges and pollution prevention. Qualitative data will be collected from interviews using standard questions with key individuals in the existing stormwater utility organizations.

The quantitative data, such as revenues, expenses, and miles of infrastructure was collected for the study using public information published by each agency. Sources included Comprehensive Annual Financial Reports (CAFRs), annual budgets, MS4 Permit reports, and agency web site sites. Interviews were used to validate, clarify and update the data obtained from reports, identify functional areas and gather personnel data. The interview focused on four areas: confirm infrastructure data, identify goals and objectives of the utility, discuss the organization and staffing, and discuss financing for the utility.

Findings

The three stormwater utilities provided similar outcomes of mitigating local flooding problems, maintaining the existing system, conducting public education activities, improving water quality, and complying with permits. Each of the utilities held both NPDES permits for water quality compliance and MS4 permits to operate separated stormwater and sanitary

systems. The methodologies and allocation of resources varied based on local needs and local politics.

The demographic data, shown in Table 1, would indicate the City of Lee's Summit should be able to support a stormwater utility. The cities of Columbia and Independence have similar land areas when compared to Lee's Summit in terms of square miles. Arnold, Independence and Lee's Summit are suburbs near the metropolitan centers of St. Louis or Kansas City, MO. Columbia is a small urban area located in central Missouri.

Table 1: Demographic and Infrastructure Data of Comparator Cities

	Arnold, MO	**Columbia, MO**	**Independence, MO**	**Lee's Summit, MO**
Population	20,945	111,145	116,881	91,758
Area (sq. mi.)	12	63	76	63
Number of Housing Units	8,946	47,450	53,535	35,715
Median Income	$55,934	$43,262	$44,261	$77,285
Median Home Value	$151,500	$169,800	$101,400	$186,700
Population Density (people per sq. mile)	1,810	1,760	1,510	1,450
Housing Density	745	753	704	566
Miles of Storm Sewer	n/a	300	220	336
Number of Structures	n/a	12,000	13,000	15,000
Number of watersheds	3	15	22	11

The demographic data indicates the population density and housing density of these communities are somewhat similar in the context of population density and housing density. Lee's Summit, Columbia and Independence are very similar in population and the amount of infrastructure maintained. Most suburban areas in Missouri do not have issues with water quality. Older urban centers, such as Kansas City and St. Louis, have issues with combined sewer overflows. Conversely, agricultural land used for crop and livestock production is exempted from the water quality regulations because the combinations of fertilizer, animal wastes and soil erosion far exceed any regulatory limits. Enforcing stormwater quality standards

would essential shut down the agricultural industry (Blattner, 2015). So based on the demographic data, the three existing stormwater utilities provide good comparisons for similar communities, such as Lee's Summit.

The utilities hired staff based on organizational and functional requirements. The primary need for each utility was operations and maintenance, thus most employees were found in the operations and maintenance section (see Table 2). Each utility had four-person crews, with the cities of Arnold and Columbia staffing one field maintenance crew, while Independence staff two field crews. Common tasks for crews include regularly cleaning inlets, replacing corroded metal pipes, and clearing brush from culverts. Independence had the added task of maintaining 15, publicly-owned, regional stormwater detention basins (Blattner, 2015), (Keys, 2015) .

Engineering and public education were common among the utilities, but staffing varied. Engineering services were dictated mostly by the funding available for capital improvement projects. Columbia had a fairly aggressive capital improvement plan, so they employed a full time stormwater engineer. Independence had a moderate capital program, so they out-source engineering services with an on-call service contract (Meyers, 2015). Arnold had no funding for capital project, so stormwater engineering services were provided by city staff that worked mostly on transportation or other utility projects. Public Education is one of the mandatory minimum control measures for stormwater, but education is also required for sanitary sewer systems and solid waste operations. All the communities operated multiple systems requiring public education, so the public education efforts were generally shared among different activities (Blattner, 2015) (Keys, 2015) (Meyers, 2015).

Several of the functions in Table 2 show zero FTEs dedicated to the task. This indicates the stormwater utility did not fund, nor employ personnel in those positions. Those functions were provided by the larger department that oversaw the stormwater divisions. For example, Columbia had a call center to manage all Public Works customer service calls. All three of the communities used consolidated municipal billing to collect payments.

Table 2: Functions and Staffing of Stormwater Utilities in Missouri

	Arnold, MO	**Columbia, MO**	**Independence, MO**
Total Full Time Employees (FTE)	5	11	13
Maintenance FTEs	4	5	10
Engineering	0	1	0
Public Education	0	1	0
Call Center	0	0	2
Billing	0	0	0
Superintendent	1	1	1
Permitting and Enforcement	0	0	0
Department responsible for SW* management	SW division in Public Works	SW division in Utilities Department	SW Division in Water Pollution Control Department

When comparing the staffing to demographics information, no significant trend or benchmark was evident. Tables 3 and 4 show Columbia and Independence had similar ratios of staffing when compared to population or infrastructure. Mr. Blattner of Arnold, Missouri stated the current revenues paid for salaries, and the current equipment needed to be replace but was not budgeted. This would indicate the revenue per fulltime employee (FTE) from Arnold may be an indicator of actual personnel costs for operations and maintenance crews. Columbia's 2014 revenue summary report provided detailed personnel costs, which was used to calculate the cost per FTE for Columbia. Independence operates 2 crews, therefore they have more equipment to acquire and maintain, which would contribute to the higher expenses per FTE. The three utilities all stated organization and staffing of the utilities were adequate for maintenance, but each had various levels of capital project funding. Arnold, Missouri comparisons may serve as a

minimum revenue requirement per FTE to operate and maintain a system because they had no capital projects. Independence and Columbia both reported operational costs and capital outlays in annual financial reports.

Table 3: Staffing of Missouri Stormwater Utilities Compared to Demographic Data

	Arnold, MO	**Columbia, MO**	**Independence, MO**
Revenue per FTE	$ 120,000	$201,200	$301,500
Population per FTE	4,200	15,900	9,000
Population per Maintenance Crew	20,000	55,000	59,000
Square Miles per FTE	2.32	9.01	5.97
Housing Units per FTE	1,790	6,780	4,120
Cost per FTE	$80,000	$95,000	n/a

Table 4: Staffing of Missouri Stormwater Utilities Compared to Infrastructure Data

	Arnold, MO	**Columbia, MO**	**Independence, MO**
Revenue per Mile of Pipe	n/a	$4,670	$17,700
Revenue per Structure	n/a	$116	$300
Miles of Pipe per crew*	n/a	150	110
Structures per crew*	n/a	6,000	6,500
*NOTE: 1 crew consists of 5 FTEs composed of 1 supervisor and 4 laborers			

Typically, stormwater utilities had the power to assess user fees without requiring a public vote. Missouri is unique because of a 2013 Supreme Court ruling determined that stormwater utility fees were a tax and not a user fee, so all stormwater fee increases fall under Missouri's Hancock Amendment provisions requiring public votes for tax increases. The Court's rationale stated that a user fee implies a choice to use a facility or receive a service. Residents have no choice regarding rainfall; therefore they have no choice in using or benefiting from public storm sewer systems (Wilson, 2013).

Based on the Western Kentucky University's stormwater utility survey, the city of Independence does not meet the definition of a stormwater utility because a sales tax is not a true user fee assessed on properties based upon volumes of stormwater runoff entering the system. Independence would be classified as a utility based on the Black and Veatch survey definition

because it provides the three elements of operations, governance and dedicated funding. Based on the political realities in Missouri, sales taxes instead of stormwater fees have become a suitable option to provide a dedicated source of funding. Missouri's has legally equated stormwater fees to property taxes. Property taxes have been very unpopular in the State, and many property tax levy increases have failed to pass public votes since the taxpayer revolts that started in the 1980s. However, sales taxes in Missouri tend to be more successful when proposed for a dedicated purpose such as 911 services, transportation, law enforcement programs, or parks. Missouri statutes specifically allow local governments to levy up to 1/4-cent sales tax dedicated to stormwater programs and services (Edgar, 2015).

Both Columbia and Independence created their stormwater utility departments after a public votes in 1993 and 1991, respectively, so their stormwater utilities are protected under the public funding statutes of Missouri (Keys, 2015). The city of Arnold established its stormwater utility in 2006 by a local ordinance that was not placed on a ballot issue for public vote, so it may be subject to legal challenges. Arnold plans to ask voters to approve the 1/4-cent sales tax that should generate about $800,000 for stormwater (Blattner, 2015).The first sales tax approved by Independence voters was a temporary tax set to expire after ten years. The Independence Sales tax was re-approved as a permanent sales tax in 2011 (Bennetzen, 2013). Columbia voters approved a stormwater fee increase in 2015 that will increase fees by 100% over the next five years so that the typical fee will be $3.50 per single family residence (City of Columbia, 2015). All four of the stormwater elections received 70% voter approval ratings (Keys, 2015) (Bennetzen, 2013).

A summary of the revenues from each utility is shown in Table 5 on the following page, along with the functions of the utility, method of fee collection, and expenses related to the three

utilities. The information was collected from reviewing Comprehensive Annual Financial Reports, utility web sites, Capital Improvement Plans, and interviews with managers from the respective agencies.

Table 5: Funding of Missouri Stormwater Utilities Compared to Demographic Data

	Arnold, MO	**Columbia, MO**	**Independence, MO**	**Lee's Summit, MO**
SW funding sources	Utility fees and General Fund (scheduled Sales Tax Election in November 2015)	Utility fees; Development fees	Sales tax; Development fees	General fund; General Obligation Bond
Fee for Residential Unit	$3.00 / month	$1.44 / month	N/A (1/4 cent sales tax)	--
Fee for Commercial / Industrial Land Use	Calculated based on Impervious Area	$5.00 per lot, or $0.05 per 100 ft^2 of impervious area	N/A (1/4 cent sales tax)	--
Functions performed by utility	Maintenance Capital Outlays Education Water Quality	Maintenance Capital Outlays Education Water Quality	Maintenance Capital Outlays Education Water Quality	Maintenance; Capital Outlays
2014 SW Utility Revenue	$600,000	$1.4 million	$3.9 million	Varies
Revenues from Residential Units	$322,100	$820,000	n/a	
Percent of Revenues from Residential	54%	59%		
2014 SW Operations expense	$600,000	$994,000	$3.0 million	$30,000
2014 SW CIP budget	$0.00	$170,000	0 to $500,000	$1.7 million (one-time general. Bond issue)
Annual CIP Project Needs	$400,000	$2.2 million	$1.6 million	$1.9 million
SW revenue per capita	$19	$13	$34	--
SW revenue per household	$45	$30	$73	none
Holder of MS4 Operating Permit	Missouri Dept. of Natural Resources	City of Columbia	City of Independence	Missouri Dept. of Natural Resources
Holder of NPDES Permit	City of Arnold	City of Columbia	City of Independence	City of Lee's Summit

Notes: *the Missouri Department of Natural Resources holds a statewide MS4 permit for communities less than 100,000 people (Missouri Department of Natural Resources, 2013)

Collecting revenues is another factor in creating a stormwater utility. In Missouri, the systems to collect sales taxes are already in place, so it creates no additional administrative burden. User fees require a monthly billing system. Some cities operate a consolidated

municipal billing system, whereas others out-source billing, or individual departments within a city create their own billing. Collecting stormwater fees as part of a property tax would be easy to implement, but the cash flow would be problematic because property taxes are collected only once per year.

The general consensus from all the agencies was that storm sewer systems suffer from the being "out of sight and out of mind" until a large rainstorm creates flooding (Keys, 2015). The three cities that formed stormwater utilities did so shortly after major flooding events 3 created a public outcry for action. The cities acted quickly during a strong economic cycle when the public mood was fairly generous with spending. However, the root causes of urban flooding are not enough infrastructure or deteriorated storm sewers unseen by the general public. Generating public support, before catastrophic flooding, has been difficult despite extensive educational efforts by the local agencies.

Conclusions

The three communities in Missouri that formed a stormwater utility demonstrated feasible ways to staff and organize agencies that can meet the federal NPDES and MS4 permit requirements using local resources. Independence and Columbia have stormwater infrastructure systems and populations very similar to Lee's Summit, viable utilities that provide maintenance, and recently approved sustainable revenues to maintain and improve local stormwater systems. Therefore a stormwater utility in Lee's Summit could be very similar in structure. If placed in the Public Works Department, then the utility could share resources with that department for public education, administrative support, construction management, inspection, engineer technician support and customer service. Table 6 shows proposed organization for a stormwater

utility for Lee's Summit and the general guidelines derived from comparing the other utilities in Missouri.

Table 6: Proposed Staff and Revenue for a Stormwater Utility in Lee's Summit

Functions	Organization	Personnel	Equipment	Annual Cost to Utility
Maintenance Crews	2 Crews (1 crew per 50,000 residents)	Crew: 1 supervisor + 4 laborers	2 trucks; 1 Backhoe per crew 1 jet truck for Department	$450,000 per crew
Public Education	Share with Public Works for Stormwater, Solid Waste, Recycling Program and Permitting	1	Computer	$90,000 per year
Engineering	Project engineering, Capital Project Planning, Development Review, Permitting, Utility Supervision	2	2 computers	$225,000 per year
Inspections, enforcement, Project Management	Shared with Public Works Construction Management and Inspections Team	1.5	No additional equipment	Part of Capital Project costs
Administration support, Customer Service Call Center	Shared with Public Works Call Center	0	none	0
Billing	Finance Department collects and distributes revenues as part of normal sales tax collection process	0	0	0
SUBTOTAL FOR ANNUAL OPERATING EXPENSES				$ 1,215,000
Capital Improvements	Average Annual Cost Included in City's Capital Improvement Plan			$ 1.82 million
TOTAL ANNUAL EXPENSES for PROPOSED LEE'S SUMMIT STORMWATER UTILITY				$3.04 million

The funding requirements for Lee's Summit were estimated using the parameters observed from Columbia and Independence because of the similarities. Operating expenses were calculated based on the expenses of about $450,000 per crew that include equipment and personnel costs. The personnel cost of $112,500 per engineer and $95,000 for a public information employees include salary, benefits, and other overhead costs. Administrative support functions, billing, customer service and enforcement will be shared with other resources

already available in the Lee's Summit Public Works Department. Capital improvement costs were estimated based on averaging the typical annual expenses for Columbia and Independence that were reported in their financial documents and informational flyers from their recent elections to approve stormwater funding. Based on the proposed organization, two funding scenarios are presented in Table 7.

Table 7: Comparison of Projected Annual Expenses to Revenue Scenarios

Estimated Annual Expenses	$3.04 million
Estimated Annual Sales Tax Revenue from 1/4-cent Sales Tax	$3.10 million
Estimated Annual Revenue from $4.00 per Residential Unit: $1.74 million	
Estimated Revenues from Commercial Sites: $1.38 million	
Total Revenues Using Stormwater Fees	$3.12 million

Revenue from a sales tax was based upon current sales tax revenues reported by the Lee's Summit Finance department. A 1/4-cent local sales tax has typically generated about $3.1 million per year, but actual sales tax revenues fluctuate from year to year based on economic activity (City of Lee's Summit, Missouri, 2013). Sales tax revenues have generally increased as commercial development and new businesses are added to the community. A sales tax does not charge fees that are a direct result of stormwater runoff, which may explain why some literature does not include stormwater management systems funded by a sales tax to be a true utility. Conversely, the City of Lee's Summit believes that a sales tax is indirectly related to stormwater runoff because increased commercial development will increase both sales tax revenues and stormwater runoff. As noted by both Arnold and Independence, sometimes a sales tax may the only politically feasible option to secure dedicated stormwater funding in Missouri.

The annual fees that could be expected in Lee's Summit were based on Western Kentucky's median user fee of $4.00. Annual revenues were estimated using the revenues reported by Columbia and Arnold. The revenue collected from single family home was

estimated by multiplying the fee per residential unit times the number of residential units reported in the Census Update data. That value was then divided by the total revenue. The two percentage values were similar, with Arnold producing 56% of its stormwater revenue from residential units, and Columbia collected 59% of its revenue from residential areas. If Lee's Summit estimated that 55% to 60% of its revenue was collected from residential fees, the total revenues would range from $3.0 to $3.4 million per year.

The preferred method across the nation would be to adopt the user fee method (EPA, 2014). One advantage associated with user fees is the rates are usually adjusted to account for changes in expenses. If a user fee is to be used, a detailed rate study by an engineering consultant specializing in stormwater rate studies should be retained to develop a detailed method to assess and collect fees. However, the political landscape in Missouri may cause communities to pursue sales taxes to ensure a dedicated source of funding. Independence chose this course and has demonstrated an ability to sufficiently operate and maintain stormwater The City of Arnold plans to ask for a stormwater sales tax in the November 2015 election, and believes it will pass, and estimates funding will sustain its local stormwater infrastructure.

Either proposed sales tax or stormwater user fees should generate sufficient revenues for the propose stormwater utility in Lee's Summit. The flexibility in organizing and staffing utilities provide feasible alternatives to build an organization and dedicate funding in a manner that is politically acceptable, meets federal regulatory standards, and provides the locally desired levels of stormwater management.

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Appendix 1: Interview Questions

First set of questions is to confirm basic information on the stormwater utility's web site and the independent variables being evaluated in the study:

1. What is the area served by the stormwater utility (in square miles)?

2. How many people are served by the utility?

3. How many watersheds are within boundary area of the utility?

4. How miles of streams does the stormwater utility manage?

Second set of questions will gather information about the organization, staffing, functions of the utility, services provided, and how the utility addresses the Clean Water Act / NPDES Minimum Control Measures (MCMs)

Goals and Objectives of the Stormwater Utility

Of the major functions in stormwater management, how does the utility address the functions of:
- Storm Drainage
- Floodplain Management
- Water quality
- Mitigating Land Use
- Open Space amenities

What permits, such as MS4 or NPDES, are held by the utility?

How does the utility address the 6 NPDES Minimum Control Measures (MCMs):
- (1) Public Education
- (2) Public Involvement
- (3) Detect and eliminate illicit discharges
- (4) Construction site erosion
- (5) Post-construction site restoration,
- (6) Pollution prevention / good housekeeping

What areas does the utility currently comply?
What are the plans and priorities to improve?

For the Public Education Plan, what are the more important themes and Messages?

Organization

What department oversees the stormwater utility?

What divisions and functions are within the stormwater utility, such as operations, finance, billing and collections, operation, planning, engineering, etc.?

What support is provided from outside the utility, such as billing, human resources, or on-call contracts services, etc.?

How many personnel are in the stormwater utility?

What types skill sets do employees have that work for the utility, such as engineers, managers, support staff, laborers, etc.?

How much equipment and type of equipment is owned by the utility?

How many facilities are owned or leased by the utility?

Financing

How does the utility assess users?
What is the average fee per residential unit?

Does the local government provide any additional revenues, such as from the general fund?

Does the current level of funding meet the current needs, and what is the shortfall?

What are the more urgent funding needs?
- Capital improvements?
- System maintenance and repairs?
- Water quality?
- Flooding issues?