Municipal Procurement: Competitive Bidding for Pipes Demonstrates Significant Local Cost-Savings

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MAYOR'S BRIEFING

In today's American cities, adopting the use of advanced technology and better approaches to clean water and sewer are common and often required by law. Cities providing public water delivery have not only grown in population size and in number, but also in their attitudes toward public health, and innovations involving system designs, technologies and accepted practices. In the 19th century cast iron was added to the common use of clay, lead and wooden pipes by cities to convey water and wastewater. In the 20th century, continued innovation carried ductile iron, concrete and cement, and plastic pipes into the market. In the 21st century, new generations of plastics, advanced composites, and other materials are being added to a long list of viable piping materials. Technological advancements in pipe materials have helped to support a growing national population while continuing to improve on cost and performance and achieve public health protection goals to guard against waterborne parasites and toxic contaminants.

The daunting challenge cities face today is the urgent need to replace hundreds of thousands of miles of aging and failing pipe. Pipes are the single most costly water and sewer capital investment category. Mayors want efficient solutions that make the best use of limited resources without compromising the performance or safety of their water systems. One solution that municipalities can no longer afford to overlook is opening-up their procurement processes so that managers have the freedom to consider all suitable project materials. Adopting practices and policies that encourage standardized comparisons of different pipe materials for water, sewer, and stormwater projects provides mayors with an opportunity to reduce the local cost of pipes and maintain equal or better public safety and material performance levels. A review of new information reveals standardized cost comparisons demonstrate significant price point differences and updating procurement policies can save as much as 30% of capital costs.

Background and Purpose

In 2013 the Mayors Water Council (MWC) released "*Municipal Procurement: Procurement Process Improvements Yield Cost-Effective Public Benefits*", a report examining procurement practices in the water infrastructure sector. The report made a business case for considering alternative pipe material so local governments could realize public benefits (e.g., cost, performance, safety). The report suggested the need to change outdated procurement policies, and that the biggest impediment to adopting these changes stemmed from the reluctance of local procurement officials to break from convention.

This report presents information from new research that demonstrates the merits of adopting open procurement policies and new practices that apply competitive consideration of alternative pipe materials. These policies will help local officials maximize resources and practice good governance.

There are three critical factors to consider when procuring water and sewer pipes: cost, materials performance, and public safety. This paper examines each of these factors relying on new standardized comparisons for alternative pipe material cost, and recent surveys reporting on pipe performance characteristics. Based on standard cost comparisons between different pipe materials, it can be estimated that applying such analysis in an open procurement process can yield substantial cost-savings without having to sacrifice performance or safety.

Local Governments and the Affordability Crisis

Local governments are struggling to deal with historically high costs to provide water and sewer infrastructure and services. Census estimates from 2015 suggest that cities and counties spent over $118 billion in the water and sewer sectors, and recovered $114 billion (or 96 percent) through rates, charges and fees. Despite recent improvement in customer revenues, the unrelenting increases in total costs are fueling household affordability impacts that are both significant and widespread. Federal and State financial assistance has been on the wane for over 30 years, but the U.S. Environmental Protection Agency (EPA) and State regulators continue to require greater levels of local spending to accomplish national goals by imposing unfunded mandates on local utilities. Cities are also facing a challenge to add as much as 25 percent to current water and sewer capacity to service the expected 80 million new Americans the Census predicts by 2051. These factors converge at the local level where cities are seeking efficiencies, innovation and other cost-savings measures to take the pressure off rapidly rising rates.

The American Water Works Association estimates that it will cost over $1.3 trillion to replace our nation's water infrastructure. There are an estimated 240,000 water main breaks/year, $2.6B wasted on lost water and sewer overflows due to aging pipes, and at least 17% of potable water lost to leakage.

Residential water rates have gone up by 137% since 2000. A 2017 Michigan State University study projected that water could be unaffordable for 1/3 of Americans in five years. A 2016 US Government Accountability Office report surveyed ten mid and large-sized cities with declining populations and found that the cost for water and wastewater service is almost twice the affordability threshold for low-income customers in 40 percent of the cities it reviewed, with further rate increases on the way. To make matters worse, these communities typically have some the oldest infrastructure and receive the least amount of funding for infrastructure repair projects.

The Magnitude and Trajectory of Local Investment in Water and Sewer Pipes

Local government spent over $359 billion between 1993 and 2017 on underground assets. Material failure and replace/repair programs may be poor to excellent based on factors such as asset management, implementation of best practices, and budget constraints. Cost and performance over time are critical elements of system design decisions, so the magnitude of local pipe investments invites interest in procurement decisions.

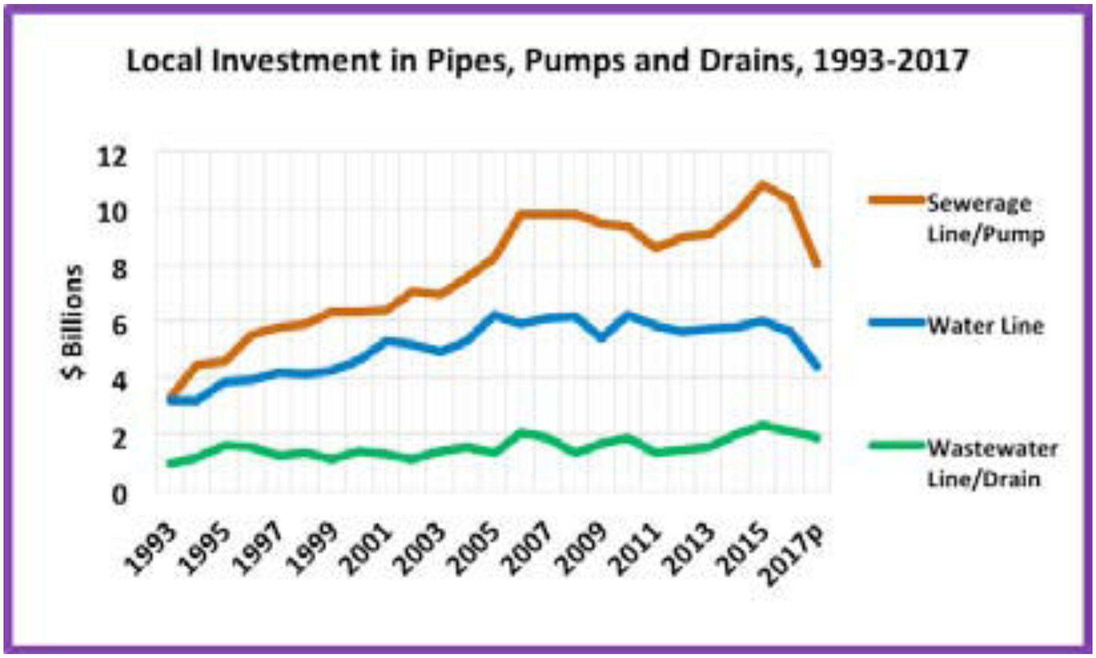
A 25-year period (1993-2017) provides a long-term frame of reference and estimate of cumulative investment. Construction investment in sewer line and pumps and wastewater line and drains from 1993 to 2017 was $359 billion, while construction investments in water and sewer/wastewater plants was $313 billion during that same period.

Table 1

INDICATOR – PIPES, PUMPS AND DRAINS	SEWER	WATER	WASTEWATER	TOTAL
CUMULATIVE 25-YEAR INVESTMENT 1993-2017 ($ BILLION)	192.4	127.5	39.2	359.1
2017 INVESTMENT ($ BILLION)	8.0	4.4	1.89	14.29
25-YEAR AVERAGE ANNUAL GROWTH RATE (%)	4.34	1.76	4.9	
2016 TO 2017 GROWTH RATE (%)	-21.7	-21.4	-12.6	

SOURCE: U.S. Census, State and Local Government Construction Spending

Figure 1



THE COST OF PIPE PROCUREMENT

Pipes are one of largest single cost components of water and sewer/wastewater systems (EPA estimates that pipes are 60% of project costs). The continual need for local investments in pipes adds up over time. Spending on pipes can vary widely, (Figure 1 and Table 1), and there is an expectation that a large replacement cost is imminent as existing pipes, especially cast iron pipe, approaches the end of its design life. The pipes provide such a basic service in the community that they must perform with certainty, and that is why the pipe materials in use have undergone dramatic change. For example, in the drinking water market, the pipes in use today (Table 2) have displaced most wooden and lead pipes and cast iron and asbestos cement water mains are phasing out. Similar changes have occurred in sewer and storm pipe markets where other materials such as clay were once predominant.

"As mayor, it is my responsibility to explore options that will get our rate payers the best bang for the buck. The open procurement process, allowing the bidding of different pipe materials, not only forced suppliers to sharpen their pencils, it ended up saving the city of Burton over $2 million by using PVC pipe instead of ductile iron (DI) pipe on our five-phase $25 million watermain replacement project. Even if we would have chosen to use DI pipe, the open procurement process forced the cost reduction of the DI materials that would have saved about $200,000 in the project."

~ Burton (MI) Mayor Paula Zelenko

Piping is remarkably inter-changeable and many of today's modern water systems use a variety of materials. However, many systems restrict themselves to a single material for all uses (e.g. "all storm pipes must be concrete") or some categories of use (e.g. "all water pipes 12" and larger must be ductile iron"). These restrictions are often written into a city or county specification or ordinance and prevent engineers and contractors from considering otherwise acceptable materials. These restrictions create a 'closed' system, while expanding old standards to include alternative materials provides for 'open' competition.

A sensible local procurement approach can take advantage of changes in pipe materials not only on a cost basis, but also on their performance characteristics. This section summarizes several consultant studies recently released that examine cost differentials of the major pipe materials based on pipe size and length.

Table 2

WHAT KIND OF WATER PIPES ARE UNDERGROUND IN YOUR CITY?

Folkman (2018) estimates that four types of pipe materials make up 91 percent of water mains

- Cities often utilize them in combination

The four commonly used pipes:

- cast iron (CI) 28 %
- ductile iron (DI) 28%
- polyvinyl chloride (PVC) 22%
- asbestos cement (AC) 13%

The remaining 9% of pipes used

- high density polyethylene (HDPE)
- steel
- molecularly oriented PVC (PVCO)
- concrete steel cylinder (CSC)
- other materials

Source: Folkman, Steven Ph.D., P.E., (March 2018)

These studies have found that communities with open procurement policies have been able to lower their costs for purchasing pipes even in cases where the same material is used. In fact, going from a closed to open policy on average can save local governments 30 percent in capital costs on pipe, or roughly $100,000/mile.

BCC Research and Datahawks reviewed bid documents and interviewed local water officials in 14 communities (cities and counties). They looked at the use and cost of different pipe materials and different lengths of pipe commonly used by cities, notably ductile iron and plastic pipe (primarily HDPE and PVC).

Here is what the research found:

- An estimated 78% of systems allow for only one type of material in certain applications ("closed competition") leading to virtual monopolies.
- The average cost to replace drinking water pipes in an "open competition" system is 26% per mile less expensive than in "closed competition" regions.
- For stormwater, the savings from "open competition" average 39% per mile.
- Nationally, "open competition" could save an estimated $20.5 billion for drinking water and $22.3 billion for storm water in pipe material costs alone over the next 10 years.

Researchers found evidence of the added cost 'closed' procurement policies impose on local governments. The costs result not from any difference of materials, but rather from a difference of procurement policy:

> *"Furthermore, ductile iron pipe of the same diameter was found to be less costly in open bid cities than in closed bid cities: 8-inch ductile iron pipe cost, on average, $71.69 per foot in Port Huron (closed) and $62,39 in Grand Rapids*

(closed), in comparison to $58.60 in Livonia (open) and 55.64 in Monroe (open). Therefore, even when ductile iron is considered by itself, 8-inch pipe costs in closed bid cities were up to $16.05 higher than in open bid cities, equivalent to a pipe cost inflation of up to 29%," (BCC 2017).

A summary table included in the appendix presents selected information for each of the research reports. The key information includes: pipe material, annual installation in linear feet, pipe diameter and cost per foot, and while the information presented in the studies covers 2013 to 2015, we focus on the 2015 cost per foot information, the latest year of report availability.

Reevaluating the status quo and conducting cost comparisons can lead to choices that yield benefit to the community and system users. These findings should be of great interest to local officials that are looking for better options to upgrade their water systems, stretch resources and keep rates down.

Because the savings accrue at the project level, competition will speed the upgrading of water infrastructure and enable innovation to help provide clean, safe water and reduce ongoing maintenance costs.

Pipe Performance Expectations

The American Water Works Association (AWWA) and the American Society for Testing of Materials (ASTM) established outer diameter wall thickness standards for pipes made of Cast Iron (CI), Ductile Iron (DI), Poly Vinyl Chloride (PVC), High Density Polyethylene (HDPE) and Molecularly Oriented Poly Vinyl Chloride (PVCO). The standards establish a threshold of performance that all pipes are expected to meet. Thus, pipes that meet these mechanical performance criteria, regardless of pipe material, satisfy the standards. The standards are broken down by grouping pipe diameter sizes.

The AWWA standards have governed outer diameter (OD) sizes for pipes used in municipal water systems since the 1970s. OD pipe size standardization for water systems enable compatibility with connections for valves, hydrants, services and fittings for different pipe materials and assures complete interchangeability with a minimal amount of inventory required for operations and maintenance activities. The outer wall diameter (wall thickness) is the most direct metric of pipe suitability for a project and includes consideration of hydrostatic design stress (psi).

Table 3

NUMBER OF REPORTED BREAKS	NUMBER OF CITIES	PERCENTAGE OF CITIES
1-25	101	35.8
26-50	54	19.1
51-100	47	16.7
101-200	42	14.9
201-300	7	2.5
301-500	11	3.9
> 500	20	7.1
TOTAL	282	100

SOURCE: Anderson, R. 2007, US Conference of Mayors

These standards address many concerns such as meeting firefighting requirements: "Fire flow standards require a minimum residual water pressure of 20 pounds per square inch gauge (psig) during flow. It is common practice to maintain pressures of 60 to 75 psig in industrial and commercial areas and 30 to 50 psig in residential areas. Distribution system mains and pipes must be designed to withstand these pressures." (National Academies Press (US), 1982).

Why are pipes failing despite established standards for performance? Standards describe the mechanical performance necessary for an application, or in the case of the ANSI/NSF 61 Standard, that the pipe complies with all health regulations for materials that contact drinking water. But pipe standards do not specify what pipe to procure or the environmental factors that may cause a pipe to fail prematurely such as the local soil corrosivity, seismic conditions, or use. For existing pipe, age is also an important factor.

There is a growing body of information that characterizes the general decline of infrastructure, and more specifically, breaks in water mains and sewer pipes. The AWWA (2012) released a landmark report on underground infrastructure (pipes) that unveiled the extent of decline and the urgency of addressing it. An AWWA follow-up survey expressed this, "The top concern in the AWWA surveys for 2016 and 2017 is 'renewal and replacement (R&R)' of aging water and wastewater infrastructure", (AWWA 2017). Additionally, the American Society of Civil Engineers (ASCE) has opined that water and wastewater infrastructure in America gets a D- grade in 2009, (ASCE 2009); and a slight improvement to a D grade in 2017, (ASCE 2017). The EPA has similar findings.

Two surveys provide local-government oriented findings: a 330-city survey conducted by the Conference of Mayors, (2007); and, a more recent survey of 308 utilities conducted by Utah State University, (2018).

The Conference of Mayors released results of a 330-city survey examining the status of asset management and condition assessments of water and sewer pipes and pipe failures (Anderson, 2007). The findings demonstrate that pipe breaks are common (See Table 3). Asset management programs were more likely to be found in larger systems.

Utah State University recently reported results from a survey of water main breaks, (Folkman, March 2018). The survey included 308 drinking water utilities in the USA and Canada with details from 281 on water main break data covering 170,569 miles of pipe. This survey is an important contribution to the literature because it provides estimates of pipe performance by type of pipe material.

Among the major findings of the Utah State University survey, several are important because they directly address pipe performance in general and performance by pipe material (adapted from Folkman, March 2018):

- Water main break rates have increased 27% from 2012 to 2018; raising from 11 to 14 breaks on average for every 100 miles of pipe per year.
- The 308 water supply systems surveyed found that 82% of cast iron (CI) pipes are more than 50 years old and experiencing a 46% increase in break rates.
- Among the utilities surveyed, it was found that using asset management and operations optimization (for example, pressure reduction and leak detection), help extend the useful asset life.
- Only 45% of Utilities conduct condition assessment of water mains.
- PVC pipe had the lowest failure rate in the surveyed utilities compared to cast iron, ductile iron, concrete, steel and asbestos cement pipes.
- Cast iron and ductile iron pipes experience high failure rates in corrosive soils.
- Most utilities have moderate to high soil corrosion risk.

A substantial portion of the current pipe inventory is cast iron and it is nearing the end of its design life. Water and sewer system managers regularly consider whether to repair or replace pipes. If repair, how, where, and for what linear measure? If doing a replacement, also consider what pipe material has the best value.

The local government utility surveys confirm the constancy of breaks. Earlier in this report we noted that even with a downturn in pipe expenditures by local government, pipes, the underground infrastructure, and their immediate system connectedness, drains, lines, etc., continue to be among the top annual construction expenditures in the public water and sewer sectors.

The repetitive nature of the repair and replace procurement activity adhering to entrenched or convenient procurement policies is a direct impediment to cost-savings by stifling innovation. Mayors should instead view it as an opportunity to try new approaches and new pipe materials. If different pipe materials meet recommended mechanical standards, then they should also have equal consideration in an open bid process. This will introduce competition and should result in lower prices, even for incumbent materials.

There are many claims and counterclaims about the efficiency, durability and safety of pipes. Local procurement officials can obtain reliable information by contacting various industry trade associations and state and federal agency resources. Officials can also rely on consulting engineers for information.

PUBLIC SAFETY AND THE ENVIRONMENT

Advances in drinking water treatment technologies have been tremendous since 1900, but the public health benefits are sometimes diminished with pipe failure. Cities with major urban drinking water systems like Jersey City, NJ, Baltimore, MD and Louisville, KY implemented best practices in the early 1900s – filtration and chlorination – and achieved an immediate decline in infant and childhood morbidity and mortality related to parasitic water borne pathogens. Since then, the invention and incorporation of many new treatment technologies in the late 1900s has further enhanced public safety. Yet breakage, which includes corrosions and leaks, of any pipe, regardless of material, has the potential to reintroduce waterborne pathogens to the consumer through infiltration of the pipe. Similarly, breaking sewer pipes and wastewater pipes are a concern for the environment and potential human impact (basement backups and contaminated streams).

Chronic health impacts are important to recognize, and they may be associated with broken or fully functional pipes. Chronic health impacts have been related to chemicals or contaminants in drinking water that may be carcinogenic. For example, some of the drinking water treatments applied can result in potential public health impacts. The EPA sets drinking water standards that regulate the allowable levels of substances of concern; and, the EPA has an action-forcing mechanism to consider new substances for regulation on a regular basis.

The literature on acute and chronic public health impacts from contaminated water is well established and not the primary concern of this report. While somewhat dated, a National Research Council publication provides a good foundation in listing and describing some of these adverse health impacts and their drinking water causes, (National Research Council (US) Safe Drinking Water Committee. Washington (DC): 1982). Drinking water safety is important, and it is local government that provides some of the safest drinking water to hundreds of millions of people daily. Providing 24-hour service all the time is an expensive proposition and local government invested over $65 billion in 2015, and still it is a challenge to ensure uninterrupted service.

Until the late 1980s, EPA was responsible for testing and certifying that materials were safe to be used for both drinking water and waste water pipes. Following a decision by the EPA to no longer do this work, the EPA (through a regulatory process) passed the responsibility to the National Sanitation Foundation (NSF). Since then the NSF has done all of the testing and retesting of piping materials that go into water infrastructure projects. It is important to note that all materials, from the new and innovative to the traditional, are tested and retested to ensure their safety.

The ANSI/NSF 61 Standard ensures that drinking water pipes are safe for use and that all pipes are tested for safety equally. The materials are tested before the pipes are used commercially, by subjecting them to multiple tests, including if the pipes leach chemicals or other substances into the water. Once the materials are certified, the testing does not stop. Materials used in pipes are continuously tested throughout production by NSF. These audits are done randomly twice each year and also ensure that quality control tests are being done by the manufacturer.

The Conference of Mayors adopted policies urging cities to consider environmental impacts using life cycle analysis (LCA) when available and appropriate. LCAs have become more widely available, and the Conference of Mayors provided an example in relation to pipe materials (Anderson, 2013). It is important for mayors to weigh public safety (including environmental externalities) as well as cost and performance of pipes.

Typically, an LCA considers several stages: production/extraction, construction process, use, and end of life. Each stage of an LCA identifies inputs and outputs to assess energy use, wastes, emissions and their environmental impact. The LCA provides "…transparent disclosure of environmental impact and is used to standardize industry comparisons" (Sustainable Solutions Corporation, Royersford, PA). Standardized comparisons provide a good tool to assess competing product claims technically and analytically. Local procurement officials may have authority to request the results of an LCA for a single pipe material or multiple pipe materials. This report will not address the claims and counterclaims on pipe material environmental impacts. However, we encourage local officials to consider LCAs when making water infrastructure decisions.

The pipe industry is moving towards providing more transparent and higher-quality information on their environmental performance that may be of use to local officials. For example, Uni-Bell PVC Pipe Association commissioned an LCA on potable water, gravity storm water, and sanitary sewer pipe systems that was reviewed in accordance with ISO 14044 (a standardized review protocol ensuring the accuracy of an LCA). The LCA led to a PVC pipe Environmental Product Declaration (EPD), which complies with ISO 14025 standards and was independently certified by NSF International.

There are many good resources that local officials can use to determine the safety of piping materials and whether or not they are appropriate for their specific project. These safety standards are based on data collected over long periods of time and are reliable.

CONCLUSION

We reported in our 2013 review of local government water and sewer pipe procurement practices that closed procurement that prohibits competition among different pipe materials is prone to inefficiencies and the potential for substantial lost opportunity costs. Cities invest significant resources in water and sewer pipes, then and now. The case for considering alternative pipe materials that might perform as good or better than conventional pipes used today, and cost less, is compelling. In the 2013 report several communities provided anecdotal cases where alternative (PVC) pipe materials were chosen, and cost savings were achieved. A business case approach made possible through open bid procurement was suggested to compare competitive pricing and overall value, and the local procurement official could find assistance from knowledgeable consulting engineers, or develop the tools needed to make accurate cost and performance comparisons.

Five years later, 2018, the case for open competition is stronger. Closed procurement and low bid policies may be state law in some cases but there is often an opportunity for exception. Whether state law or local policy, the fact is that new information (both knowledge and analytic tools) on cost, performance, public health and environmental impact is readily available. Mayors and their departments can use this information to lower or stabilize their pipe capital costs while meeting safety and performance requirements.

A standardized cost per foot analytical tool such as the BCC and Datahawks research used is of practical utility to local officials who make procurement decisions and seek efficiencies and cost savings. The AWWA reports and Folkman's survey make a compelling case for the magnitude of the challenge to maintain and upgrade the underground infrastructure. Folkman specifically emphasizes the increasing number of local systems making decisions about replacing legacy pipes, such as cast iron, that are aging out and the importance of comparing pipe cost, performance and environmental impacts when procuring new pipes. These decisions will have a 50 to 100-year design life expectation.

Public health impacts are substantially mitigated when potable water pipes are maintained and operated properly. The potential for health impacts increases when pipes fail, and sometimes when treatment and/or biofilm protocols are changed or modified. Pipe failure can result in the introduction of waterborne parasites and inorganic elements to the tap. Testing frequently detects organic contaminants in pipes with no- or interrupted-flow. For example, stalled water and residual chlorine in drinking water pipes broken by an earthquake have resulted in detection of tri-halo-methane (THMs) at the tap when service continued. Asset management best practices as well as detection technology can effectively address pipe failure.

Public safety includes environmental impacts as well as public health. Reports and testing results on all materials used in water infrastructure for public health are widely available for review from accredited third parties, including NSF. We stated in 2013, and restate here, the use of Life Cycle Analysis helps differentiate the environmental impacts of pipe materials according to a standard method of comparison. Some pipe providers seek additional differentiation through an Environmental Product Declaration, which requires third party verification of ISO certification. This sets a high bar for comparing environmental impacts.

Discussion Questions

As this paper points out there is plenty of evidence to show that open procurement and bid processes are the future of "good government." The big question is why is there still substantial local resistance to making any change? Is the resistance due to a lack of information and training of local procurement officials? Are consulting engineers being allowed to share new ideas or are they limited by the existing norms or local/state ordinances or laws? Are the cost, performance and safety information presented in a way that is amenable to local procurement processes?

Changing behavior relies on changing attitudes, and the transparent and accountable processes of open bid competition can lead the way. Mayors are strategically positioned to play the leading role.

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APPENDIX:
BCC RESEARCH AND DATAHAWKS SUMMARY FINDINGS

Ohio Communities

The two Ohio communities with closed bid systems paid average cost 32%-35% higher per foot for pipe ($51.83), compared to the one open bid county that had a near even blend of DI and plastic pipe ($33.33).

Carolina Communities

The one open bid community procured a near even blend of DI and plastic and had categorically lower cost except for Spartanburg/Greenville 4″ to 6″ pipe. For 12″ pipe, closed systems paid an additional 50% markup ($57.73 per foot compared to $28.21).

Michigan Communities

Two open bid communities in Michigan utilized DI and plastic blends, and where the blend was near even the cost was considerably lower than the two no bid communities using DI only. The report also found clear evidence of the added cost 'closed' procurement policies impose on local governments:

"Furthermore, ductile iron pipe of the same diameter was found to be less costly in open bid cities than in closed bid cities: 8-inch ductile iron pipe cost, on average, $71.69 per foot in Port Huron (closed) and $62,39 in Grand Rapids (closed), in comparison to $58.60 in Livonia (open) and 55.64 in Monroe (open). Therefore, even when ductile iron is considered by itself, 8-inch pipe costs in closed bid cities were up to $16.05 higher than in open bid cities, equivalent to a pipe cost inflation of up to 29%."

Michigan also demonstrated similar savings, with closed systems paying 27% to 34% more in capital costs.

Arkansas Communities

Arkansas communities exhibit some cost complexity. The one open bid community procured plastic pipe, but DI pipe in one of the closed bid communities was slightly less costly.

The other two closed communities procuring DI pipe had a cost nearly twice that of plastic, except for 8″ pipe procured in Hot Springs.

OHIO COMMUNITIES

LOCAL UNIT	OPEN-BID CITY	PIPE MATERIAL	2015 AVERAGE COST PER FOOT	PIPE DIAMETER (INCHES")
COLUMBUS, OH *$4.6 MILLION INVESTMENT* *80,621 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	\$26.73 \$53.39 \$82.98	4" TO 6" 6" TO 12" OVER 12"
DELAWARE COUNTY, OH *INCLUDES: DELAWARE, DUBLIN, WESTERVILLE, & POWELL* *$7.9 MILLION INVESTMENT* *150,700 FEET OF PIPE INSTALLED*	YES	DUCTILE IRON 44% PLASTIC 56%	\$15.23 \$33.65 \$80.83	4" TO 6" 6" TO 12" OVER 12"
DAYTON, OH *$1.8 MILLION INVESTMENT* *37,033 FEET OF PIPE INSTALLED*	NO WITH PLASTIC PIPE EXCEPTIONS IN NEIGHBORHOODS	DUCTILE IRON 90% PLASTIC 10%	\$31.49 \$51.71 \$122.73	4" TO 6" 6" TO 12" OVER 12"

Reference - BCC, February 15, 2016

CAROLINA COMMUNITIES

LOCAL UNIT	OPEN-BID CITY	PIPE MATERIAL	2015 AVERAGE COST PER FOOT	PIPE DIAMETER (INCHES")
CHARLOTTE, NC *$1.2 MILLION INVESTMENT* *37,800 FEET OF PIPE INSTALLED*	YES	DUCTILE IRON 47% PLASTIC 53%	\$22.15 \$25.18 \$65.87	4" TO 6" 6" TO 12" OVER 12"
RALEIGH, NC *$1.76 MILLION INVESTMENT* *30,021 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	\$29.77 \$57.73 \$127.11	4" TO 6" 6" TO 12" OVER 12"
SPARTANBURG/GREENVILLE, SC *$4.6 MILLION INVESTMENT* *185,443 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON 98.6% PLASTIC 1.4%	\$19.98 \$33.68 \$85.28	4" TO 6" 6" TO 12" OVER 12"

Reference - BCC, February 15, 2016

MICHIGAN COMMUNITIES

LOCAL UNIT	OPEN-BID CITY	PIPE MATERIAL	2015 AVERAGE COST PER FOOT	PIPE DIAMETER (INCHES")
LIVONIA, MI *$1.5 MILLION INVESTMENT* *26,000 FEET OF PIPE INSTALLED*	YES	DUCTILE IRON 6% PLASTIC 94%	$57.37 N/A	8" 12"
MONROE, MI *$1.76 MILLION INVESTMENT* *30,021 FEET OF PIPE INSTALLED*	YES	DUCTILE IRON 44% PLASTIC 56%	$29.77 $57.73	8" 12"
GRAND RAPIDS, MI *$0.69 MILLION INVESTMENT* *9,779 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	$70.88 $74.39	8" 12"
PORT HURON, MI *$2.8 MILLION INVESTMENT* *27,075 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	$104.33 $107.74	8" 12"

Reference – BCC Research, November 3, 2016

ARKANSAS COMMUNITIES

LOCAL UNIT	OPEN-BID CITY	PIPE MATERIAL	2015 AVERAGE COST PER FOOT	PIPE DIAMETER (INCHES")
HOT SPRINGS, AR *$236,080 MILLION INVESTMENT (2014 & 2015)* *26,000 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	$32.23 $122.60	8" 12"
CENTRAL ARKANSAS WATER: *LITTLE ROCK, NORTH LITTLE ROCK, SHERWOOD, MAUMELLE* *$1.76 MILLION INVESTMENT* *30,021 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	$119.41 $161.71	8" 12"
SPRINGDALE, AR *$0.38 MILLION INVESTMENT* *7,655 FEET OF PIPE INSTALLED*	NO	DUCTILE IRON	$35.77 $58.16	8" 12"
FAYETTEVILLE, AR *$109,069 MILLION INVESTMENT* *1,825 FEET OF PIPE INSTALLED*	NO	PLASTIC	$38.40 $61.02	8" 12"

The Mayors Water Council

The Mayors Water Council (MWC) assists local governments in providing high quality water resources in a cost-effective manner.

MWC provides a forum for local governments to share information on water technology, management methods, operational experience, and financing of infrastructure development.

MWC monitors and responds to federal legislative, regulatory or policy proposals affecting the delivery of municipal water services.

MWC also provides a forum to assist local governments in exploring competition and public-private partnership approaches, and alternative methods of financing water infrastructure development.

Mayors Water Council Co-Chairs 2018

Mayor Jill Techel, City of Napa CA

Mayor David Berger, City of Lima OH

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