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Financing Water

Financial Mechanisms for the Implementation of Integrated Water
Management in New Orleans

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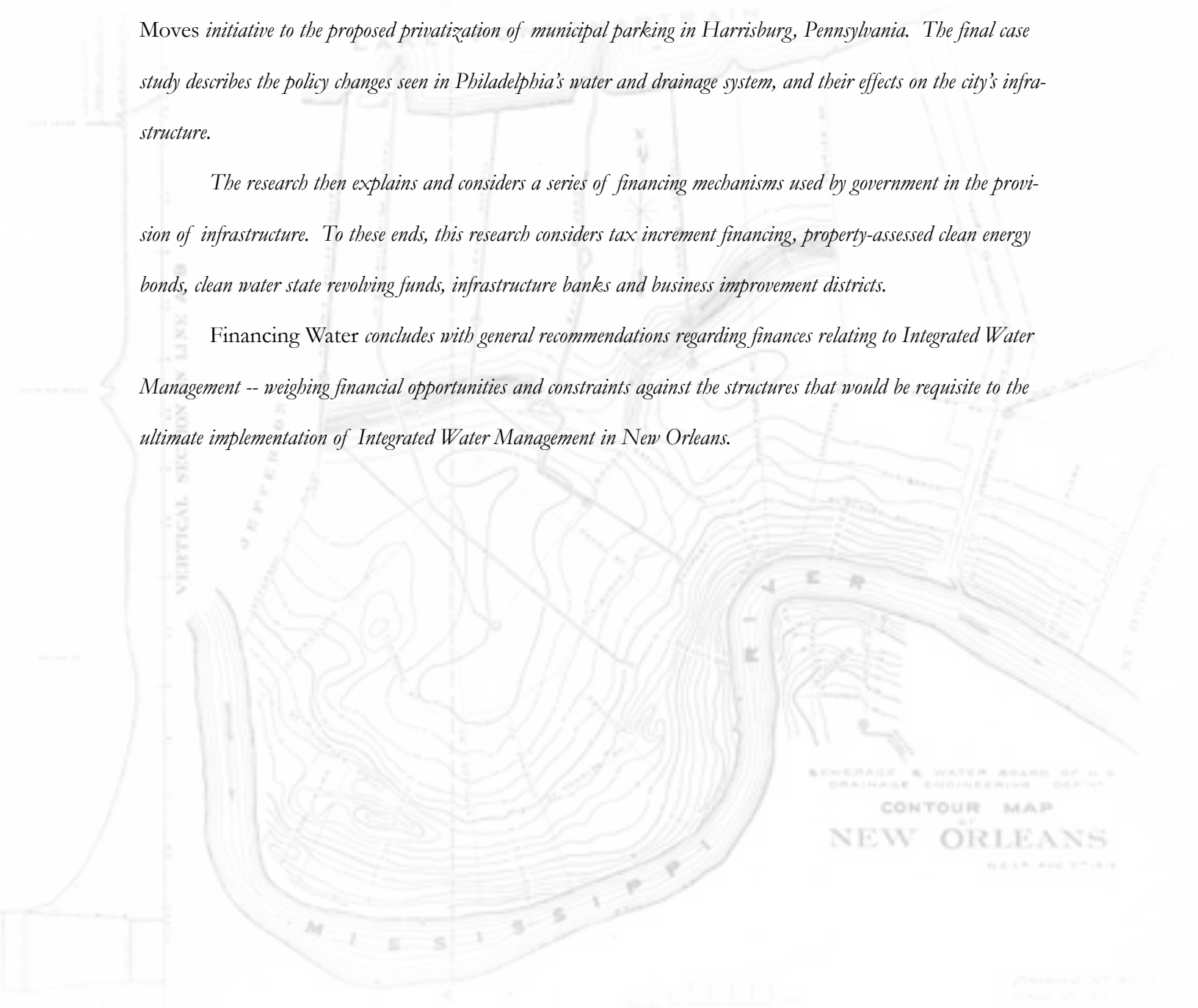
Abstract

Financing Water pertains to Integrated Water Management practices in New Orleans. The research explains these practices and their relation to water and drainage in New Orleans as a whole. More importantly, the research endeavors to identify financing mechanisms that could be used for the implementation of infrastructure projects called for in Integrated Water Management. To these ends, the body of this research is divided into three components.

It begins with a series of case studies that illustrate other large scale infrastructure projects and the financing structures behind them. This section includes an overview of the Central Artery and Tunnel project in Boston, a publicly financed project colloquially known as the Big Dig. The second case study details and compares Indiana's Major Moves initiative to the proposed privatization of municipal parking in Harrisburg, Pennsylvania. The final case study describes the policy changes seen in Philadelphia's water and drainage system, and their effects on the city's infrastructure.

The research then explains and considers a series of financing mechanisms used by government in the provision of infrastructure. To these ends, this research considers tax increment financing, property-assessed clean energy bonds, clean water state revolving funds, infrastructure banks and business improvement districts.

Financing Water concludes with general recommendations regarding finances relating to Integrated Water Management -- weighing financial opportunities and constraints against the structures that would be requisite to the ultimate implementation of Integrated Water Management in New Orleans.



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New Orleans, as measured by annual precipitation, is one the rainiest cities in America. It lies on a sliver of land embraced between the lakes, rivers and bayous of south Louisiana. As is the case with most cities of consequence, the founders of the city situated it in response to the surrounding waterways. What is now the French Quarter, and then the original city, was situated as to take advantage of a portage between the Mississippi River and Bayou Saint John. This allowed New Orleans to capitalize on access to the river and, by way of the Bayou, Lake Pontchartrain. New Orleans, then, is a rainy port both encumbered and encouraged by the bodies of water that surround it.

For two hundred years, the physical growth of the city conformed to constraints and demands placed upon it by the same river that was, and always has been, the *raison d'etre* of New Orleans. Even with development clinging to high ground along the river, New Orleans was subject to breaches in the river levees known as crevasses¹ and other flooding events. Such events would periodically inundate and cripple the city.

After the turn of the last century, however, A. Baldwin Wood² famously engineered the screw pump. The Tulane-educated engineer devised a pump that could counteract the natural flow of water to the lowest point and pump that water into a pipe or canal. This allowed the cypress swamps and wetlands in the back of town to be drained. These low-lying portions of the city were subsequently drained for subdivision into lots. With new land now available, the city grew increasingly further towards Lake Pontchartrain. Development eventually spread across parish lines to form the region as it exists today. The same screw pumps installed a century ago still serve to drain rainfall to this day.

¹ Multiple crevasses had effected the city throughout its history. One of the largest was Suave's Crevasse in 1849.

² In 1913, A. Baldwin Wood devised the screw pump. The effects on the health and drainage and politics of the city were substantively improved.

This detour into history is not meant to impart local history, but to illustrate the influence of water to New Orleans and to further reiterate how infrastructure is requisite to establishing a balance between them. Since the advent of the Wood screw pump, the nature of water infrastructure has meant that New Orleanians psychologically distance themselves from water. Water is channeled into pipes and canals, drawn through pumps and expelled behind levees -- water is never meant to be seen in the streets and neighborhoods of New Orleans.

Yet, as existing drainage infrastructure enters its eleventh decade of service and as the city continues on its recovery from Hurricane Katrina and subsequent flooding, it is increasingly apparent that such the standard of separation is unattainable. Water will be seen in New Orleans, whether during summer rainstorms or catastrophic flooding. For generations, the solution was to separate the systems. One for water and drainage, and another for the city and its people. It almost worked, but everybody knows its flaws.

The system pioneered by A. Baldwin Wood has fallen victim of disinvestment. The series of pipes, pumping stations and canals that comprise the system are quickly aging and the result is an overburdened system. Furthermore, the system was not engineered to cope with heavy rainfall.³ The screw pump system is able to drain approximately two inches of rain in the first hour of an event, and one inch per hour subsequently. A heavy summer rainfall will oftentimes overburden the system in place.

Life in Cleveland is predicated on systems of prompt snow removal. Phoenix would not be half the city it is but for air conditioning. New Yorkers depend on a subway system just as Angelinos rely on Mulholland's aqueducts every time they turn the water spigot. In this fashion, New Orleans must establish a relation with water that is sustainable.

³The geography of the city's basins, and their drainage capacity, are outlined in a report by the Gutter to Gulf project.

To this end local professionals and public officials, and their counterparts in the Netherlands, began the Dutch Dialogues.⁴ The Dutch Dialogues endeavor to better integrate water drainage into the city's landscape in a fashion long-established throughout the Netherlands. In short, the goal of the Dialogues is to create a system wherein water and water management becomes an asset instead of a liability.

When a proper system for drainage is devised, it will not only serve its primary purpose in draining water from neighborhoods and cities, but would do so in a fashion that is aesthetically pleasing. The aesthetic appeal in turn shifts the cultural association with water, drawing people closer to the systems that they depend on.

Many visitors to Venice yearn to take a gondola ride along the Grand Canal. The canals of Venice not only create an iconic image for the city, but serve as the main transit corridors and as a sewerage system carrying waste from the city. In this sense, the Venetians of centuries past created an integrated system for dealing with both their geographic situation and daily needs. The same can be said of Amsterdam, Saint Petersburg or Bangkok. These places have come to recognize that cities have different needs that are served through such infrastructure.

Thus, Integrated Water Management creates a system, or systems, that work alongside one another that provide multiple services. These services all have value that can generally be quantified. Following such logic, integrated water management more accurately describes not only the infrastructure itself, but strategies that can pertain to the financing of that infrastructure.

Consequentially, the term Integrated Water Management will henceforth be used to describe the system of infrastructure regarding drainage in New Orleans, as well as the individual components that comprise it. The Dutch Dialogues, then, can be thought of as a series of necessary infrastructure projects that will need to be financed. New infrastructure called for in the Dialogues will

⁴ For further information on this initiative, refer to the Dutch Dialogues website.

complement, and improve upon, existing pump and canal drainage in order to produce Integrated Water Management.

The ultimate goal of Integrated Water Management entails the creation of new infrastructure at a variety of scales. Such infrastructure would include everything from the reconfiguration of major outfall canals to the creation of retention pools that serve individual blocks and neighborhoods. Regardless of the variety of scales, the success of the Dutch-style system would be realized through a summation of its components that as a whole serves to reinforce existing drainage infrastructure.

It should furthermore be noted that overall plans for Integrated Water Management include the East Bank of Orleans and Jefferson parishes, as well as the portions of Saint Bernard Parish that lay within levee protection. However, in the interest of maintaining proper scope, this paper will involve itself only with the plans for Orleans Parish. Many of the financing mechanisms would presumably be applicable in these, as well as other, Louisiana jurisdictions.

Jurisdictional applicability pertains to another caveat of this research. While political feasibility and bureaucratic pathways are essential to implementation of Integrated Water Management, this paper yields to the complexity and fluidity of the local political system. Suffice to say, the success of plans for Integrated Water Management will be predicated on intergovernmental and intragovernmental cooperation.

Some of the proposed financing mechanisms would require legislative support. Where this is the case, it is clearly stated within the description of the financing mechanism. While myriad governmental entities will likely be involved, those with preexisting jurisdiction over drainage infrastructure will compose the core of the initiative. Realistically, a number of public, private and quasi-public entities will be fundamental to supporting realization of Integrated Water Management.

Lastly, even initial cost estimates for constructing new infrastructure, or retrofitting existing systems of drainage infrastructure will not be available until the fall of 2012.⁵ Hence, this paper is constrained to outlining financial mechanisms without advancing conversation about numbers or dollar values. While this can be seen as a shortcoming, it allows for the theoretical financial framework to be analyzed and conceptualized without concern for hard data. By avoiding the minutia of specific dollars and figures, readers can instead weigh the concepts and complexities fundamental to Integrated Water Management.

⁵ Cost estimates are currently underway, and are being led by the architecture firm of Waggonner and Ball of New Orleans.

This chapter will utilize case studies to illustrate the financing structure of large public works projects. As with all projects of this scale and nature, sound financing practices generally come in two parts -- quantifying the added value of the project to yield a cash flow and leveraging that cash flow through bonds to directly pay for the project. In the case of the Indiana Tollway, the state moved to privatize the road and based on toll revenue. In Philadelphia, compliance with municipal ordinance creates incentive to partake in retrofitting projects through private routes. Boston's "Big Dig" was largely predicated on federal funds and used creative financial structures to leverage those federal funds.

These particular case studies were chosen for their applicability to Integrated Water Management. The Indiana Tollway is included as an example of privatization of public infrastructure. Other examples of privatization, both proposed and initiated, are also included as part of the Indiana Tollway case study.

The Central Artery and Tunnel Project, colloquially known as the "Big Dig", is an example of public funding that invests directly in a project. Secondly, the reconfiguring of freeways through Boston had an important effect on daily life in the city beyond the scope of the project. These effects should be heeded in any conversation about Integrated Water Management in New Orleans.

While many examples exist for financing transportation infrastructure, the progressive initiatives undertaken to improve the effectiveness of the sewerage and drainage systems in Philadelphia have direct corollaries that should be familiar to New Orleanians.

If nothing else, the case studies that follow should impart the fact that each project is a unique entity. The singular nature of infrastructure projects is often highlighted as their scale increases. Just as the success of real estate investments or business models depends on a variety of factors, so too does the viability and success of infrastructure projects. When well-executed and successful, they are celebrated for their contribution to society. When ill-conceived and mismanaged, they have the ability to inflict severe damage on the finances of parties involved in their development.

The following case studies, then, provide precedents and best practices that should be aspired to and replicated. Equally as important, they reveal weaknesses and pitfalls that should be avoided.

The Central Artery/Tunnel Project remains unparalleled in size and scope among American road projects.⁶ Popularly known as the “Big Dig”, the project took a systematic approach to rerouting traffic patterns into, out of and around the downtown area of Boston. To these ends, the project included three major undertakings. It buried the Central Artery freeway in a three and a half mile trench as the freeway ran through the heart of downtown. It rerouted the main freeway to Logan Airport into the Ted Williams tunnel and away from downtown. Completion of the Central Artery/Tunnel Project also saw construction of the Leonard P. Zakim Bunker Hill Memorial Bridge, providing a new crossing for Interstate 93 as it spans the Charles River.

A comprehensive description of the project and its financing could constitute a thesis much longer than this. In short, planning for the CA/T project began with environmental and engineering planning in 1982 and work began in 1987⁷ Five years later, an act of Congress appropriated funding to the project. Unlike subsequent case studies in Indiana and Philadelphia, funding for the project at its conception was more or less backed by the federal government. Construction began in 1991.

By 1997, the CA/T was criticized for going over budget and falling behind schedule. That year, the Massachusetts legislature reassigned oversight of the project to the Massachusetts Turnpike Authority.⁸ Facing decreasing federal support, state officials were forced to devise mechanisms for filling a financing gap.

At the time, Charles Baker was Secretary of Administration and Finance for the Commonwealth of Massachusetts. Mr. Baker raised \$2.8 billion for allocation towards the initial funding gap. The first component of this plan was simple. The Massachusetts Turnpike Authority and the Massachusetts Port Authority sold \$1 billion and \$300 million worth of bonds, respectively. These bonds

⁶ The Central Artery and Tunnel project ultimately cost \$14.6 billion

⁷ Work began in 1987, even as President Reagan attempted to veto the project.

⁸ Mr. Baker’s plan was predicated upon the legislative reassignment of control over the project, and was a subject of controversy as motorists paid tolls on one road to pay for construction on another.

were collateralized based on a doubling of tolls on two roadways unassociated with the CA/T project.

Mr. Baker then produced an additional \$1.5 billion through Grant Anticipation Notes.⁹ Also known as GARVEEs, this structure sells bonds based on expectations of future federal highway grants. The sale of Grant Anticipation Notes had only been approved two years prior under section 122 of Title 23 of the United States Code. They were, and remain, uncollateralized -- the issuing agent remains liable for the debt whether or not the federal highway funding is disbursed as planned.

The lack of guarantee from the federal government, as well as the novelty of the bonding structure, likely led to the high interest rates for these particular GANs. The interest ballooned, jumping from \$550 million to upwards of \$840 million. Since the additional \$290 million in debt will be distributed over eighteen years and among taxpayers statewide, its substantive effect will be relatively nominal. If the same burden would have been placed on a local municipality or county, however, the result could have been catastrophic.

Two lessons should be learned here. Exotic financing mechanisms often hold higher risk, and that higher risk can result in higher interest rates. Exotic financing mechanisms can often be found as one component within an overall financial structure, and when they do should be employed with the utmost caution. The risk and worthiness of exotic financing components, however, need not be confused with the often elaborate and complex structures necessary to fund the project as a whole. Secondly, when devising the complex financing structures necessary for the financing of large infrastructure projects, it behooves governmental entities to understand their capacity and the scale of the project itself.

The “Big Dig” project is often cited as a mismanaged project. In some regard, this is true. The CA/T project went over budget and over schedule and the cost was ultimately the burden of taxpayers. The extent to which the project did go over budget can, however, be surprisingly subjective.

⁹ GARVEE bonds are used specifically for highway projects. Refer to United States Code.

In absolute terms, it exceeded costs by billions of dollars. Accounting for the price of inflation over the planning and construction timeline, the final cost of the CA/T project is closer to projections than many detractors would admit.

Part of the blame for cost overruns should be laid on the misjudgments made in the original financial structure of the CA/T project. The old Central Artery, alternatively known as the John F. Kennedy Expressway or Interstate 93, was an elevated structure originally completed in 1954. It was immediately recognized for its brutal effect on both the surrounding blocks and, more significantly, on the core of Boston. The Central Artery was blamed for light and air pollution. Additionally, it became as a barrier between downtown and the waterfront. The CA/T project corrected these problems, reconnecting previously divided neighborhoods and reintroducing the city to its waterfront.

The elevated structure was replaced by a linear park. This change helped to increase property values throughout the core of the city.¹⁰ The project, by virtue of design, not only remedied faulty traffic patterns but led to wide scale revitalization of surrounding areas. Bostonians experienced their city differently than they had in half a century. Individual property owners directly benefitted from this shift through upward pressure on surrounding property values, and the City of Boston has undoubtedly enjoyed the resulting increase in tax base.

The financing structure of the “Big Dig” did not account for this predictable result. The Central Artery runs through one of the nation’s most expensive real estate markets. Its burial has generated billions of dollars worth of development, especially along the south Boston waterfront. None of this value was captured for benefit of the CA/T. Consequentially, these costs were realized wholly by private land owners and developers. The project produced a tremendous public benefit that is accounted for by neither its detractors nor its creators.

¹⁰ Fan Pier, one of many developments to occur in Boston, is described in the *New York Times*.

The notion that infrastructure can create a public benefit beyond its stated public purpose is important when considering how to financially structure its cost. A simple tax increment financing district or value added tax could have raised millions considering the already high real estate values in the core of Boston. Instead, project leaders were subject to harsh criticism while property owners enjoyed windfall profits.

Mitch Daniels was elected as Governor of Indiana in 2004. The following year Governor Daniels proposed his transportation plan, “Major Moves”. In it, the governor proposed privatization of the Indiana Tollway. The tollway is jointly designated as Interstate 80 and Interstate 90, carrying both across the entirety of northern Indiana. The tollway is part of the preferred route between Chicago and the Northeast for drivers and teamsters alike.

After “Major Moves” passed the Indiana legislature in 2006, the tollway was leased for \$3.6 billion to a joint venture of Macquarie Atlas Roads of Australia and the Spanish company Cintra.¹¹ Macquarie and Cintra agreed to maintain, and pay for improvements to, the road as part of a 75 year lease. The Indiana Finance Authority maintains ownership of the tollway

As per the legislation that approved the transaction, the State of Indiana received an upfront “rent” totaling \$3.6 billion. Approximately \$750 million of the money was used to pay existing debt. An additional \$500 million was placed in an interest bearing account. The interest from this account is used for transportation projects across the state, with funds being disbursed every five years. In short, Governor Daniels had created an infrastructure bank through the privatization of the Indiana Tollway.

In the case of the Indiana Tollway, privatization has been generally successful. The success of the initiative owes itself, in part, to the terms of the lease. The State of Indiana received a favorable lease price and has no financial interest in the operation of the tollway. In fact the lease of the tollway has, since the onset of the recession, operated at a loss for the investment consortium.

¹¹ Terms of the lease are detailed by TollroadsNews

However, privatization of public assets does not always benefit the governmental entity entrusted to oversee them. Harrisburg, Pennsylvania is a municipality nearly \$300 million in debt¹², pushing it increasingly towards insolvency. A significant portion of this debt is a result of the city-backed construction of a trash incinerator which has since failed to yield the expected cash flows.

In response to this financial situation, the City of Harrisburg entertained bids for the city's parking system which includes municipally owned parking ramps as well as parking meters. The current parking system grosses approximately \$12 million annually. The debt service and other operating costs on the system totals approximately \$8 million. Thus, the City of Harrisburg nets \$4 million from their parking system while maintaining this revenue generating system within the public realm.

The offer made to the City of Harrisburg came with two options. One option would have paid Harrisburg \$215 million in exchange for control of the system for 75 years. The second option would have paid the city \$195 million for a 50 year lease. Both options would have allowed for the private operator to double parking rates semi-annually.¹³

While a lump sum payment would have contributed significantly towards paying municipal debt, the proposed agreement failed to adequately compensate the city for the value of the asset. The offer presumably values the parking system based on current parking rates. It considers neither inflation nor the potential for parking rate increases over the term of the lease. Such an agreement would also fail to consider its effects on drivers in Harrisburg. Over the first year of the proposed lease, parking rates could quadruple. The profit would be realized not by the city, but by a private third party. Harrisburg, then, could hypothetically maintain public control of parking and quadruple its parking rates. Under this scenario, the city would make an annual profit of approximately \$40 million. Based on the two offers made, Harrisburg chose to maintain their parking system as is.

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The dichotomy between the privatization of the Indiana Tollway and the proposed privatization of Harrisburg's municipal parking proffers the importance of sound financing practices. In Indiana, a sophisticated state government was able to use their capacity to broker a deal that benefits the state of its infrastructure and puts a governmental entity on a more sound financial footing. Harrisburg is a small municipality which lacks the capacity to arbitrate a similarly favorable deal.

The scale of these two deals should also be reiterated. The tollway lease is approximately seventeen times larger than the parking lease offer. The size of investors needed in most privatization transactions is large. It is oftentimes easier to attract large investors with larger deals.

Furthermore, the condition of the overall investment market has profound effects on the favorability of any particular agreement. Governor Daniels and Indiana leased their tollway at the apex of the economy in 2006. Three years into the lease, the tollway operated at a loss. At about the same time, 2008, Harrisburg sought offers for its parking system. In the interim, the economy had contracted and offers were less financially favorable. While the figures may be different, the phenomenon is little different than the residential mortgage market. It was harder to obtain attractive financing terms in 2008 than it was two years prior.

Unlike Harrisburg, Chicago did privatize the city's municipal parking. The lease agreement Chicago made with MorganStanley is generally cited for shortchanging the city.¹⁴ Closer study of the Chicago deal adds another level of nuance. The city lost control of its public right-of-ways. While it still owns them, the city can no longer create loading zones, add curb bump-outs, or even hold street festivals without compensating MorganStanley in some fashion. Parking fees are now, unprecedentedly, charged on Sundays. In short, Chicago and its citizens can no longer take any action that would remove any parking space from service at any time.

¹⁴ Streetsblog cites a 2009 report by the inspector general for Chicago claiming that up to \$947 million was left "on the table"

Ultimately, privatization is as much an business investment transaction as a financing mechanism. A governmental entity and an investor play a game that weighs the time value of money verses the risk of the investment. The government and the investor try to not bluff while a deal is constructed. In most cases, one of the two will lose their hand.

The Philadelphia case study begins twenty years ago. At that time, the Philadelphia Water Department embarked on a plan to restructure drainage fees. For the three decades prior, drainage fees were pegged to water usage.¹⁵ This created an unfair system that did not properly charge customers for their burden on drainage systems.

By 2002, the Water Department had began the transition to parcel-based drainage fees. At first, residential customers were charged a flat fee calculated using the average lot size. Six years later, the Water Department announced that commercial and residential parcels alike would be subject to the new fee structure.

In 2010 the plan was implemented for both publicly and privately owned parcels, except those with four or fewer residential units. The combined area of these parcels greatly exceeded the area that needed to be retrofitted to meet the goals of the *Green City, Clean Waters*¹⁶ plan. Approximately half of Philadelphia relies on combined sewerage systems that pollute area waterways during overflow events caused by storms. The plan was devised to comply with federal mandates placed on the combined system.

With the impervious area of commercial parcels identified, and with the new fee structure introduced, property owners were left with two options. They could pay the increased fees, or they could retrofit their properties to retain greater amounts of rainwater at their own expense. This structure seamlessly aligns public and private spheres, giving rate payers the responsibility for deciding on the

¹⁵ *Financing Stormwater Retrofits in Philadelphia and Beyond*

¹⁶ The *Green City, Clean Waters* plan was released in December 2011 by the Philadelphia Water Department.

best option for them. Many of the financial mechanisms that were privately used to leverage funds for property retrofits have applicability to the public sphere and to Integrated Water Management in New Orleans. Where applicable, they will be outlined, along with other financing mechanisms, in the subsequent chapter.

The power of the Philadelphia model should be noted for its political expediency. Faced with escalating fines stemming from federal consent decrees, Philadelphia was forced to act. The plan that was advanced took years to finally implement on account of the engineering and surveys necessary for its success. Even so, the Philadelphia model is a lesson in governing. No matter what, the cost of providing water and drainage to Philadelphians would increase. Instead of raising fees using the same antiquated and inefficient billing system, a more functional billing system was devised a realistic billing system that ceded important decisions property owners in a manner that is honest and transparent.

The Philadelphia model presents, on a substantive level, a prime example of systems thinking. It forces property owners to consider the effects that their properties have on drainage and provides the framework and incentives necessary to fix the causes of the problem. The sound framework approaches a sizable task through small scale solutions. This has powerful implications for Integrated Water Management in New Orleans. The design of the Dutch Dialogues plans for solutions on a variety of scales. Reconfiguration of major outfall canals, for instance, is a large step that will require investment beyond the scope taken in Philadelphia. Smaller scaled projects that populate the Dialogues, however, can be approached by individuals or small pools of property owners in the style outlined in this case study.

This chapter will consider a number of financial mechanisms used in the provision of infrastructure. Many have precedent, others remain hypothetical. In many cases, they can be used in conjunction with one another to establish funding incrementally. Furthermore, this chapter sides with brevity. The most germane aspects of each of these financing mechanisms are outlined and analyzed without delving deeply into any particular subject.

TAX INCREMENT FINANCING

Tax increment financing is a well known financing mechanism. It is a form of value capture, and is a financing tool allowed in forty-nine states -- Louisiana included¹⁷. While the notions and structure of tax increment financing (TIF) are generally similar from jurisdiction to jurisdiction, each state has added layers of technicalities and regulation. This passage shall later endeavor to explain them as they relate to Louisiana.

A tax increment financing district captures the increased value that a project will have, generally through increased property tax¹⁸, that would not be realized but for the construction of the project. That increased value, when captured, is used to pay for the improvement. Added value is evaluated and quantified based on a carefully devised geographic boundary.

In this way, cities and states can use TIFs to incentivize private development or to provide other public services and infrastructure. The structure of the tax increment financing will vary depending on the nature of the project to be financed. A city seeking to attract new commercial ventures may create a TIF district around a specific parcel and contribute a portion of the sales or property tax from the venture locating on that parcel towards its finance. Other projects have a wider geographic impact and consequentially produce upward pressure on property values across a wider geographic

¹⁷ TIF-enabling legislation is in place in 49 states and the District of Columbia. Only Arizona does not allow TIFs.

¹⁸ For more information on Tax Increment Financing, refer to *Tax Increment Financing Best Practices Reference Guide*

area. Once the area of impact is carefully defined, the value of multiple parcels is leveled through increased tax revenue corresponding to increased property values.

There exists, however, a level of complexity in the utilization of tax increments that increases their risk, especially when they are applied across a larger district boundary. The valuation of individual properties is as much an art as a science. Precedents are to be considered, but increased value is never guaranteed. As a result, the wording of tax increment legislation in many states places a cap on the proportion of value that can be applied to payments on the development bonds. The structure and legalities of tax increment financing in Louisiana suffer for lack of “statutory controls over the [TIF] process”.¹⁹

The geography of increased property values is also fluid and subjective. A property five blocks from the project may or may not realize the same benefits as the property across the street from the project. Therefore, any TIF district composed of multiple properties must be carefully planned and outlined as to accurately reflect economic realities. Louisiana law forces the boundaries of tax increment districts in the state to be reviewed prior to approval.

Regardless of their potential shortcoming, tax increment financing could prove to be a highly effective tool in the financing of Integrated Water Management. By nature, Integrated Water Management will have a tangible effect on properties throughout New Orleans. While small scale project would seldom justify the creation of a tax increment district, large scale projects would have an impact over many thousands of properties. Furthermore, the plans for many of the more notable projects calls for the production of infrastructure that will not only serve as infrastructure, but as public space. The effects that the latter has on property values lends itself well to the creation of tax increment districts. Louisiana tax structure, however, relies heavily on sales tax. Generally, most municipalities and jurisdictions maintain low property tax rates. Low property taxes, especially rela-

¹⁹ Tax Increment Financing Performance Audit, page 13.

tive to other states, continues to hinder widespread use of tax increment financing districts based on property values and property taxes throughout the state.

PROPERTY-ASSESSED CLEAN ENERGY BONDS

Property-assessed clean energy bonds are becoming an increasingly prevalent tool for green retrofits. Since the program was conceived in 2005, PACE legislation has passed in twenty-four states -- including Louisiana²⁰. The program works through the issuance of municipal revenue bonds. The funds generated through sale of the bonds is loaned to homeowners so that they may finance green retrofits. Instead of involving personal finance, the low-interest loan is attached to the property title²¹ and assessed through property taxes for a period not exceeding the usable life of the improvement.

When used for projects such as energy efficiency or photovoltaic systems, the property owner is not encumbered by any net increase in the net cost of living. The money paid to utilities instead is used to pay the increase in property taxes.

While such a structure is not directly applicable to public infrastructure initiatives, they were an important tool for Philadelphians who chose to retrofit their properties. Slight changes to the structure of PACE bonds, although it may require legislative action, may be able to fund small scale projects that could be considered public infrastructure. For instance, a block of homeowners may elect to fund a retention pond that collects their communal stormwater runoff.

CLEAN WATER STATE REVOLVING FUND

In 1987, the Clean Water Act was amended. The Clean Water State Revolving Fund was conceived to aid local and state governments in improving a cornucopia of water infrastructure projects. Under the program, funds are made available to all fifty states. States receiving grants must match

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²¹ Freddie Mac, Fannie Mae and Federal Home Loan Banks have taken issue to PACE maintaining senior debt on properties with federally-backed loans. A July 2010 press release details the issue.

20% of their allocation. The resulting fund is lent to initiatives and infrastructure projects that will ultimately improve water quality. Payments made on the loan are put back into the program, creating a revolving fund. Most loans are low interest.

In 2010, the sum of federal grants to the program totaled \$2.1 billion²². Louisiana was allocated just over \$22.5 million. Since 1990, approximately \$370 million has been lent to projects throughout the state. Public entities can apply for funds to maintain water and sewerage infrastructure. Individuals, organizations and public entities may apply for funds used to mitigate non-point source pollution²³.

While available funds are limited and competitive, this revolving fund is a well-modeled and well-understood program that can be directly leveraged for the benefit of Integrated Water Management.

While CWSRF is a specific program, a revolving loan fund can be initiated publicly or privately. They are useful financing tools in regards to Integrated Water Management infrastructure, especially considering the timeframe over which the infrastructure would be built. The same money that was used to build the first phase could later be used to build the third or fourth phase as the loans come to term.

INFRASTRUCTURE BANK

Many politicians and policy planners have recently supported the creation of an infrastructure bank. During his campaign, and again in 2010, President Obama called for the creation of a national infrastructure investment bank²⁴. Such an initiative is laudable, though details remain fluid.

²² \$2.1 billion was allocated to the CWSRF. A sister program, the Drinking Water State Revolving Loan Fund, was allocated \$1.38 billion.

²³ Louisiana Department of Environmental Quality

Although the United States lacks an infrastructure bank, the model has been used in Europe since the international collaboration that initiated the European Investment Bank (EIB) in 1958²⁵.

The Investment Bank functions as a publicly-owned bank overseen by a board of directors. The board of directors represents the various European Union states that collaboratively own the bank. The bank uses its leverage to loan to a variety of projects throughout Europe and developing nations across the world. There is no precedent for the bank loaning to an American project.

Loans amounting to up to half the total project cost are advanced by the bank. The EIB maintains a flawless credit rating²⁶, helping ensure that interest rates remain low. Furthermore, most loans exceed \$25 million.

In New York, Governor Cuomo has recently proposed a state infrastructure bank. In it, the governor proposes that state money, and federal money allocated to the state, be contributed to the creation of a \$25 billion state infrastructure bank wherein public funds can be used to leverage private financing. Investment bankers and firms will work closely with Albany to devise a more detailed structure in the coming months.

These infrastructure banks function much in the same manner as revolving loan funds, but at a generally larger scale. Ideally, this could be instrumental to the realization of Integrated Water Management. An infrastructure bank could pay for large capital improvements and one or more revolving loan funds could be used in the financing of smaller projects.

Yet, realistically, the weaknesses of infrastructure banks arise. Their creation instigates fundamental changes in how infrastructure is financed, the system fundamentally changes. Since the creation of any sort of infrastructure bank requires that billions of dollars be outlaid, the solvency of the bank requires that it makes continual and significant investment in a diversified set of projects.

²⁵ The EIB acts as the European Union's financing institution. Twenty-seven member nations contribute to it.

²⁶ The European Investment Bank self-reports an AAA credit rating.

This is the reason why the European Investment Bank only makes loans exceeding \$25 million. It is also the reason that New York, a large state with a wealth of financial knowledge and resources as well as a long list of infrastructure needs, has proposed the creation of an infrastructure bank before many other states.

Considering the state of Louisiana, the feasibility of creating a state-specific infrastructure bank as seen in New York is low. The reasons are both political and financial, and would likely require federal support.

INSURANCE RATE SAVINGS

Most New Orleanians know what streets and neutral grounds to park their cars on during heavy rain events in their neighborhoods. For those that don't, or who are caught by surprise, there is the threat of returning to a flooded car.

Local auto insurance rates are the third-highest in the nation²⁷. There are a number of reasons for these rates, most having nothing to do with infrastructure. For every flooded car, however, there is a corresponding insurance claim. This has an adverse effect on the insurance rates not only for the claimant, but for everyone who shares a zip code with them. While the data that would need to be acquired to quantify this effect is proprietary, actuarial tables contain precise data regarding this added cost. While such savings are not a financial mechanism in the truest sense, they present real opportunity for cost savings for drivers throughout New Orleans. Along the same lines as PACE bonds, the average taxpayer should not realize any increase in the cost of living through the increase in property taxes if the cost of other necessities decreases proportionally. The same can be said of flood insurance rates, through the realized savings would be less since the federally-backed program distributes risk over a wider pool of insured properties.

²⁷ New Orleans City Business cites insurance study from Runzheimer International.

BUSINESS IMPROVEMENT DISTRICTS

Business Improvement Districts (BIDs) are one of the oldest and most democratic financing mechanisms. These districts are self-imposed taxing districts created through a vote of affected parties. They are widely used in cities as a way of achieving common goals for the common good. In downtowns and older neighborhoods throughout the country, business improvement districts are entrusted to embark on projects using their power to generate revenue. Such projects generally entail beautification or marketing initiatives.

In New Orleans, business improvement or special assessment districts have been used for the provision of security districts. Many neighborhoods throughout the city submit to some level of extra millage to pay for off-duty officers or private security to patrol their streets. If approved, the district has a sunset date after which it must be voted on again.

Last year, an initiative in Lakeview would have used a similar self-taxing district to contribute resources to repair of the area's streets. It was rejected by voters. This partly illustrates the difficulty in relying on these districts for major financing. Such districts are also less feasible in disadvantaged neighborhoods.

This chapter will outline current and potential tax credit structures by explaining existing tax credit structures that directly impact development projects. The strengths and weaknesses of those structures will subsequently be analyzed for their applicability in illustrating the potential structure of an infrastructure tax credit.

Note that current tax credit structures ultimately use public money to leverage investment in a private project. A tax credit structure used for infrastructure would, in effect, privatize that infrastructure on a permanent or quasi-permanent timeframe.

Following such logic, an infrastructure tax credit would substantively function as a uniform channel for the privatization of infrastructure -- instead of investors closing on individual deals with individual governmental entities, investors could place their investments indirectly. This would serve to turn infrastructure investment into a more normalized and easily purchased good, its investment value could be more easily compared to other investments. In turn, more investors would be attracted and privatization of infrastructure would become increasingly sophisticated. When well-planned, an infrastructure tax credit could have effects on public works similar to the effect that investment trusts had on real estate fifty years ago. Most importantly, sophisticated and carefully planned programs would introduce a sense of fairness to privatization models that would be mutually beneficial to government and investors.

As they currently exist, each tax credit structure maintains a unique set of incentives, terms and technicalities that a recipient must adhere to. However, they maintain the same fundamental structure. The issuer, whether a state or federal government, agrees to lower the tax liability for a recipient. In exchange, the recipient makes a pointed investment in a project deemed to be in the public interest. Upon execution of the investment, a tax credit is allocated. In some cases, the recipient may have a large enough tax burden and choose to use the tax credit to directly lower that burden. Conversely, the recipient may elect to syndicate the credit through a third party. When syndicated,

the tax credit becomes an exchangeable good that can be purchased by another investor interested in lowering their tax burden, yielding cash income for the original recipient.

This simplistic outline of tax credit structures provides a framework for understanding the more complex structures behind specific tax credit programs. A variety of tax credits programs exist. A number of specialized tax credit programs exist for a variety of uses. State level tax credit programs change from state to state, and are used for a plethora of interests. Louisiana, for instance, is noted for its filming and solar energy tax credits. Like most tax credit programs, they have grown more sophisticated and more effective as they become ingrained and understood by investors and the public.

Federal programs are generally administered on a state level, although the credit still applies to federal tax burdens. On both the state and federal levels, programs exist that are guaranteed to disburse the credit upon adequate completion and continued compliance of a project. In other programs, the funds allocated to a tax credit programs are capped and allocation becomes competitive.

Historic tax credits are available federally, as well as in many states. In Louisiana, the state program is administered through the state's Historic Preservation Office.²⁸ A 25%, non-competitive tax credit is available on historic buildings within a downtown or cultural district. Upon completion of a renovation that meets historic renovation standards, the tax credit is allocated.

The federal program works much the same way. A 20%, non-competitive tax credit is available to historic buildings within a national historic district, or to those buildings individually listed on the National Register of Historic Places. To qualify, the rehabilitation of the historic building must "exceed the adjusted basis for the building"²⁹.

The design of both historic tax credit structures has implications that should be heeded when designing an infrastructure credit program. Support on both federal and state levels relieves the fi-

²⁸ Colloquially known as SHPO.

²⁹ More details of the Historic Tax Credit programs can be found on the SHPO website.

nancial burden of the credit on any one level of government. This benefits those entities in a powerful way, and is of relatively little consequence to the investor when the programs work in conjunction as is the case in the historic tax credit program. Oversight and stipulations within the program, especially on the federal level, ensure quality and substantive levels of investment.

The Low Income Housing Tax Credit, or LIHTC, is a federal credit intended to stimulate the production of affordable housing throughout the country. The amount of funding is calculated for each state on a per capita basis, and is administered through state housing agencies. Since the number of credits is capped, each state is entrusted to competitively allocate the credit. In Louisiana, the Louisiana Housing Finance Authority is responsible for the LIHTC allocation. A point system is devised annually, and is based on an ever-changing list of desirable characteristics. That point system is then used to judge the requests made by developers. Their projects are graded and ranked in order of performance. The tax credits are awarded based on this order until available funds have been exhausted.

The most widely used version of LIHTC credits 9% of the eligible basis of the project annually for ten years, eventually crediting 90% of the eligible basis. The non-competitive version of the program credits 4% annually for ten years³⁰. In exchange for the credit, housing developers consent to audits for at least fifteen years to ensure that the rent of LIHTC units meets requirements, and that a satisfactory number of the affordable units remains as such.

The housing development is owned by a joint venture of the developer and the investor who purchased the tax credits used to build it. Regardless, the affordable housing is privately held. The only implications of the ownership structures are legal. As long as the audits continue, the units will serve their intended purpose of providing affordable rental housing. After at least fifteen years of audits are completed there is no further oversight of the project, and therefore no incentive to maintain the affordability of the units.

Like most tax credit programs, the details of Low Income Housing Tax Credit model have far-reaching implications. The state administration of the program smartly awards credits to the best projects. While the government is leveraging private investment, it still manages to maintain control of how the money is spent. It can meet needs where they are not being met, and controls allocations in a fair and blind manner.

However, the shortcomings of the system are obvious. After a project has honored its compliance period, there is nothing that differentiates a property that was almost wholly subsidized by taxpayer money from any other property in a market. The developer would be free to do with the property as they desired. If the goal of LIHTC is to provide stable and affordable housing for citizens, this presents an existential threat.

Such a caveat would be even more threatening if applied to infrastructure. An infrastructure tax credit would presumably be awarded based on a project's ability to serve an important public function. Unless stipulations were made to the contrary, an infrastructure investor would have the ability to remove the infrastructure from service or maintain the infrastructure as a sort of monopoly. The future value of infrastructure is fundamental to its financing, it is expensive to build and its cost effectiveness is predicated upon the provision of many years of service. What the financial structure of the infrastructure looks like in fifty years is just as important as the initial financial structure used to construct or upgrade it.

The New Markets Tax Credit is meant to incentivize job creation in low income markets through the creation of new commercial business ventures. To this end, the federal government offers a 39% tax credit on new commercial ventures in qualified low income census tracts. The 39% tax credit is disbursed over a seven year compliance period. The credit is available to commercial and mixed use buildings as well as new commercial ventures. To qualify, the latter must derive a fifth of its revenue from a commercial venture.

The viability and utility of tax credit programs rests with the reliability of the structure and the legislation that creates it. The New Market Tax Credit, for instance, was included within the internal revenue code in the year 2000³¹. Unlike the Low Income Housing Tax Credit, the NMTC program required congressional reauthorization on a regular basis. Not only were New Market Tax Credits underutilized due to limited precedents, but the timeframe for reauthorizing them often conflicted with the timeframe of most development projects.

The vulnerability of surviving upon congressional whim was highlighted as the New Market Tax Credit program expired in December 2011. While the program may yet be reauthorized by Congress, investors are undoubtedly more reticent to utilize the credit.

The Louisiana motion picture tax credit is a contrasting example of this phenomenon. Depending on the source, Louisiana is poised this year to become the third largest market for the production of films and television in America³². The tax credit program, the first of its kind, was spearheaded by then state senator Jay Dardenne in 2002. It provides a 30% tax credit to filming productions. When originally passed into law, it was set to expire in 2008. The initial legislation had a positive effect on the number of productions choosing to film in Louisiana. Dozens of productions were filmed, productions which generally returned to Los Angeles or New York for final cut. The program had proven successful, and was sent to Baton Rouge in 2008. State legislatures would decide on its fate.

The program could have been abolished. Instead, it was made permanent and annual caps were removed. Since the time that Louisiana had initiated the motion picture tax credit, other states had followed suit. Many states now matched the credits available in Louisiana. Michigan went as far as

³¹ Community Renewal Tax Relief Act of 2000

³² According to Louisiana Economic Development

to begin a similar program offering a 42% tax credit³³. Those programs have found varying levels of success.

However, none have seen the same success as Louisiana. Since 2008, production companies have not only found the state's incentive programs useful for filming, but their permanent and unbridled nature have allowed many production companies to open permanent ventures throughout the state. Sound studios, set stages, costume houses and other auxiliary companies have been established since the credits were made permanent. Since productions now have less reason to return to Los Angeles or New York to finalize their productions, there is a sense that Louisiana has created a truly alternative production market.

Referencing existing tax credit programs, the potential structure of an infrastructure tax credit becomes increasingly clarified. Ideally, infrastructure credits would be issued on both the state and federal levels. A matrix should be devised to direct investment to where it is most needed. Long term oversight should be in place, ensuring both proper maintenance of the infrastructure and safeguarding against arbitrary rate or fee increases. Following the same logic, ultimate ownership of the infrastructure should be entrusted to the public sector. An infrastructure tax credit program should not include a sunset or expiration date, allowing institutional understanding of the structure to accumulate over time.

³³ The Michigan film tax credit offered a 40% credit with an additional 2% credit for projects filming in core cities. Previously uncapped, the state's film tax credits were annually capped at \$25 million in 2011. This has proven detrimental to the effectiveness of the program.

The ultimate goal of these financing mechanisms is to create a project that creates some sort of quantifiable value. Whether Integrated Water Management infrastructure is privatized or bonded, it should demonstrate a cash flow that contributes to its construction and maintenance. Without this cash flow, the cost of the infrastructure will be a burden that must wholly be paid for through increased taxes.

If Integrated Water Management infrastructure is not fully privatized, it will undoubtedly require some proportion of the project cost to be bonded. Municipally speaking, there are three varieties of bonding structures -- general obligation bonds, revenue bonds and assessment bonds. Each shall be explained discretely before weighing their relative benefits and risks.

General obligation bonds are backed by the full faith and credit of the taxing authority that issues them³⁴. If the project or initiative fails to meet projected cash flows, the issuing agency agrees to use their taxing authority to meet the debt service of the general obligation bond. Because the issuing authority guarantees repayment through taxation, they generally must be approved by voters. In this fashion, GO bonds can be issued to lower the interest rate on a bond used for the benefit of an income-generating project. Conversely, such bonds can pay for a use, such as a school, that does not produce income and is supported wholly through taxation. If approved, the added assurance should improve the investment rating of the bond by lowering the risk of default. This results in lower interest rates.

Revenue bonds are issued based on the cash flows of individual initiatives. Repayment of the revenue bond, therefore, is generally predicated on the success of the project. Revenue may be derived from “operation of the financed project, grants, excise or other specific non-ad-valorem

³⁴ Municipal GO bonds are issued on ad valorem taxation powers. State GO bonds are “based on appropriations...for the purposes specified.”

taxes”³⁵ Since they do not require the issuer to maintain taxing authority, they can be issued by a wider range of government organizations to serve the public good.

Recall the business improvement districts wherein a group of property owners votes to self-assess a new tax. The success of business improvement districts may include assessment bonds, alternatively known as a special assessment bond or special purpose bonds. Using assessment bonds, municipalities are able to assist a business improvement district, or similar organization of property owners who vote to raise their taxes, by bonding the increased taxes for provision of a public service. They have generally been used for street improvements, but the structure is applicable to the provision of any sort of infrastructure.

While general obligation bonds maintain more favorable interest rates on account of improved credit worthiness, they collateralize the issuer’s financial stability. This factor should be considered before their issuance. Recall the example of the privatization of municipal parking in Harrisburg. The \$300 million of municipal debt was a result of a failed garbage incinerator project, backed by the city, that was originally conceived as a profit-making venture. Excited by the prospects of the incinerator, Harrisburg issued general obligation bonds to pay for its construction. The financial solvency of the city was anchored to a project that ultimately failed.

The influence of scale should again be noted. \$300 million in debt is more than sufficient to bankrupt a city the size of Harrisburg. The effect of the same amount of debt would be markedly less in a larger city with a larger tax base. If the same incinerator were to be built in Chicago or New York, the lower interest rates of the general obligation bond may provide sufficient incentive to issue them in lieu of revenue bonds.

While Louisiana does not maintain a long list of state-specific financing mechanisms for infrastructure, revenue bonds have been increasingly issued by smaller municipalities and jurisdictions

³⁵ Municipal Securities Rulemaking Board definition

throughout the state for the improvement of water systems. The unnamed structure³⁶ issues revenue bonds based on potential water usage. Take, for instance, a discrete geographic area. Through engineering studies, water utility companies are able to determine both the amount of water delivered to the area and the amount of water delivered to each parcel before metering. They can then compare the data to the amount of water metered at each parcel. If the system is aged or otherwise dysfunctional, a discrepancy will usually appear between the amount of water used by each parcel and the amount of water that is pumped into underground pipes. In New Orleans, for instance, at least half of the city's water leaks back into the ground before it can be delivered to customers³⁷. The discrepancy is therefore quantified. Revenue bonds are issued to repair the water delivery system based on increased metering and the decrease in the amount it costs to treat and deliver potable water.

Since this structure requires engineering reports, it is readily employed in small towns and municipalities. Due to the complexity of the New Orleans water system, local engineers have thus far been reticent to undertake the studies necessary to use the program for the benefit of New Orleans.

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³⁷ A 2008 NPR story reports that between 50 million and 90 million gallons per day leak from the New Orleans water system. Before Hurricane Katrina, the Sewerage and Water Board "typically supplied 100 to 110 million gallons of water per day for 400,000 people" As the city remained submerged after the storm, up to 200 million gallons per day were pumped through the system to maintain pressurization and a potable water supply for the city.

Before concluding, this research will make a final recommendation regarding the most effective ways to finance Integrated Water Management based on opportunities and financial mechanisms currently available. While this paper has ventured into the possibilities of potential new financial structures, any sound recommendation for the implementation of Integrated Water Management cannot be predicated on what does not yet exist.

It is important to again note that final cost estimates for the construction of any new infrastructure remain forthcoming. Preliminary estimates are expected sometime in the last quarter of 2012. Thus, the following recommendation will propose avenues for obtaining funding sources without knowledge of their use. This ambiguity, for the time being, should not be seen as a shortcoming of the initiative.

As with any large infrastructure initiative, funding will not come from any one particular source. Establishing funding for the project will require a multitude of different financial mechanisms. To reiterate, the total costs of the project as well as the amount of money that can be raised through any one source remain unknown. In order to compensate for this ambiguity as much as possible, the sequence of mechanisms presented as part of this final recommendation will be important. The first mechanism presented will be the preferred route for establishing funding. Once it has been exhausted, the second mechanism presented should be seen as the second most preferable tool and so on.

The principal method of financing Integrated Water Management should be to identify and quantify the inefficiencies of the current drainage system. Parties associated with the current system of drainage -- chiefly the Sewerage and Water Board and the Department of Public Works -- should work alongside parties already working to advance Integrated Water Management in order to identify shortcomings within the current drainage infrastructure. Any system has problems that cost its operators time and money. In the case of New Orleans, factors have conspired to undermine the efficiency of the water infrastructure already in place. Inefficiencies cost money to fix, but cost more to

ignore. Integrated Water Management, if executed, has the ability to complement the current drainage system and consequentially alleviate burdens placed on the aging drainage infrastructure.

Consider, for instance, the use of revenue bonds described on page thirty. The structure of issuing revenue bonds based on future performance should be applied to a number of aspects of existing drainage infrastructure. The Sewerage and Water Board, for instance, is one of the largest consumers of electricity in Orleans Parish. Both drinking water intakes and drainage pumps consume tremendous amounts of power. This electrical usage is already paid for through usage bills. If Integrated Water Management strategies could decrease the need for power currently consumed by pumping stations, the realized savings could be quantified and leveraged to pay for infrastructure that will allow for decreased usage without increasing the relative costs associated with the system. In a system as large and as inefficient as the existing drainage infrastructure, these savings would undoubtedly prove a significant source of funding. As Integrated Water Management strategies eventually integrate with existing systems, this strategy has the ability to not only pay for new Dutch-style drainage infrastructure but to upgrade existing water delivery infrastructure.

Using similar structures, New Orleans should devise a system for monetizing the fines it could face in regards to the Clean Water Act³⁸. Like many older cities across America, New Orleans combined drainage system oftentimes overflows. System overflow emits untreated waste along with rainwater into waterways. Many cities using combined systems are under federal consent decree, and will eventually face large fines in the event they fail to comply with mandates. If New Orleans does not upgrade current infrastructure or build new infrastructure, fines will accumulate that will eventually cost the city millions of dollars. If the city does not act and is forced to pay these fines, it will

³⁸ In order to comply with the original 1998 consent decree, and the 2010 modified consent decree, the Sewerage and Water Board is working on completing the Sewerage System Evaluation and Rehabilitation Program. The goals of the program must be reached by 2015.

spend exorbitant sums of money and still be left with the decaying and outdated infrastructure that caused the city to be fined in the first place.

After these two options have been exhausted New Orleans should consider adoption of a program similar to the Philadelphia model. Some differences should be stipulated. In Philadelphia, property owners were given a choice between increased fees or retrofitting. The goal of the program in that city was not to mitigate flooding, but ultimately to comply with the Clean Water Act.

In New Orleans, the program must solve issues involving compliance and flooding alike. Thus, property owners should not be given an option between taking action and paying more. In the interest of the common good, New Orleanians should have an option between retaining water on their own properties and contributing financially to city-wide drainage infrastructure. In such a scenario, assessment bonds should be placed on property parcels that do not otherwise complete stormwater retrofits that retain rainfall on-site. The assessment bonds, collateralized using property taxes, would bear a favorable interest rate and, if initiated city-wide, would fairly distribute the tax burden among property owners. While this plan would raise taxes, value created external to the project would be realized by residents in the form of lower insurance rates and increased property values. These benefits would mitigate at least some of the added financial burden. A similar structure could issue revenue bonds based on increased drainage fees billed through the Sewerage and Water Board in place of assessment bonds. Similar outcomes would be produced.

Like any government, New Orleans must be cautious and judicious when raising taxes. Higher taxes can only be levied in so far as they do not produce an undo burden on citizens and local real estate markets. The cost to citizens must be weighed against the tangible benefits of any investment.

Ideally, the models already described will raise funds sufficient for the implementation of Integrated Water Management. If they fail to do so, it should be remembered that the filling the last gap in financing is generally the hardest. That said, revolving loan funds present opportunity for sound financing of infrastructure projects, Integrated Water Management included.

Financial plans relying on revolving loan funds could manifest in different ways. The Clean Water State Revolving Fund, described on page eighteen, could be utilized. Based on current allocations, they would be best leveraged in the service of smaller component projects. Larger CWSRF allocations could likely be established through political means.

The revolving loan model is not constrained to the Clean Water State Revolving Fund program. A fund could also be established using state or local money. This would pose a financial risk to the City of New Orleans or the State of Louisiana, but that risk would hopefully be small relative to the size of the infrastructure initiative.

Lastly, a case shall be made in support of implementation of Integrated Water Management that briefly outlines the benefits and effects of improved drainage infrastructure. Integrated Water Management will not only create an improved system of stormwater management, it will change how New Orleanians experience and utilize their environment. The cost analysis of the former is crucial to building infrastructure. When completed, however, Integrated Water Management will help New Orleans to mitigate the hazard of flooding in a fashion that adds intrinsic value to the urban environment and the daily lives of everybody who resides in it.

Like so many systems in New Orleans, drainage and water infrastructure have been victims of entropy and disfunction over many decades. All cities work as a system to provide services and opportunities to their population. The results of entropy, then, should come at no surprise. As the components of the overall urban system are allowed to wither, a city is no longer able to provide services at a satisfactory level. People and businesses leave, and the city is left in a situation even less able to solve the problem that faced it to begin with.

More recently, unprecedented strides have been made in remedying the broken systems -- physical and otherwise -- the New Orleans depends on. The strides the city have made should be an inspiration for other cities facing similar, existential predicaments. The efforts and collaboration of countless people and organizations have begun to break the paralysis that undermined the success of

New Orleans.

Yet, relative to drainage and water infrastructure, the system remains paralyzed. The current system struggles to meet its immediate needs, not for lack of effort but for lack of funding and innovation. Long term solutions, then, become secondary to ensuring the broken system meets the most basic of needs. Solutions will be costly and require the strong leadership of elected officials. The scale of this undertaking, however, is greater than the tenure of any one politician. City leaders must devise a self-sustaining system by which Integrated Water Management can become a reality -- a system that integrates oversight and the parties responsible for water infrastructure.

As New Orleanians know, the cost of doing nothing is immense. A city that cannot invest in its infrastructure cannot invest in itself in a sustainable way and thus commits itself, by default, to obsolescence. Necessary investments must be made. Otherwise the flooding and water problems of the city will remain and they will begin to erode the advances made in other arenas. There is an inherent futility to rebuilding a road that will be structurally undermined from above and below. There is no point in beautifying a park or front yard that will be submerged by the next rainfall. Fixing the problems that ail a city requires a comprehensive approach because the function of any one system relies on another.

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