



Financial Issues in Stormwater Management

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Background

- | **Extensive body of work completed by Greg Lindsey, former director of the Center and now Associate Dean of SPEA Indianapolis**
- | **EPA/Watershed Management Institute project on financing stormwater programs including development of an on-line library (stormwaterfinance.urbancenter.iupui.edu)**
- | **Recent work with Indiana jurisdictions in Tippecanoe, Hendricks, and Allen counties that are addressing NPDES Phase II**

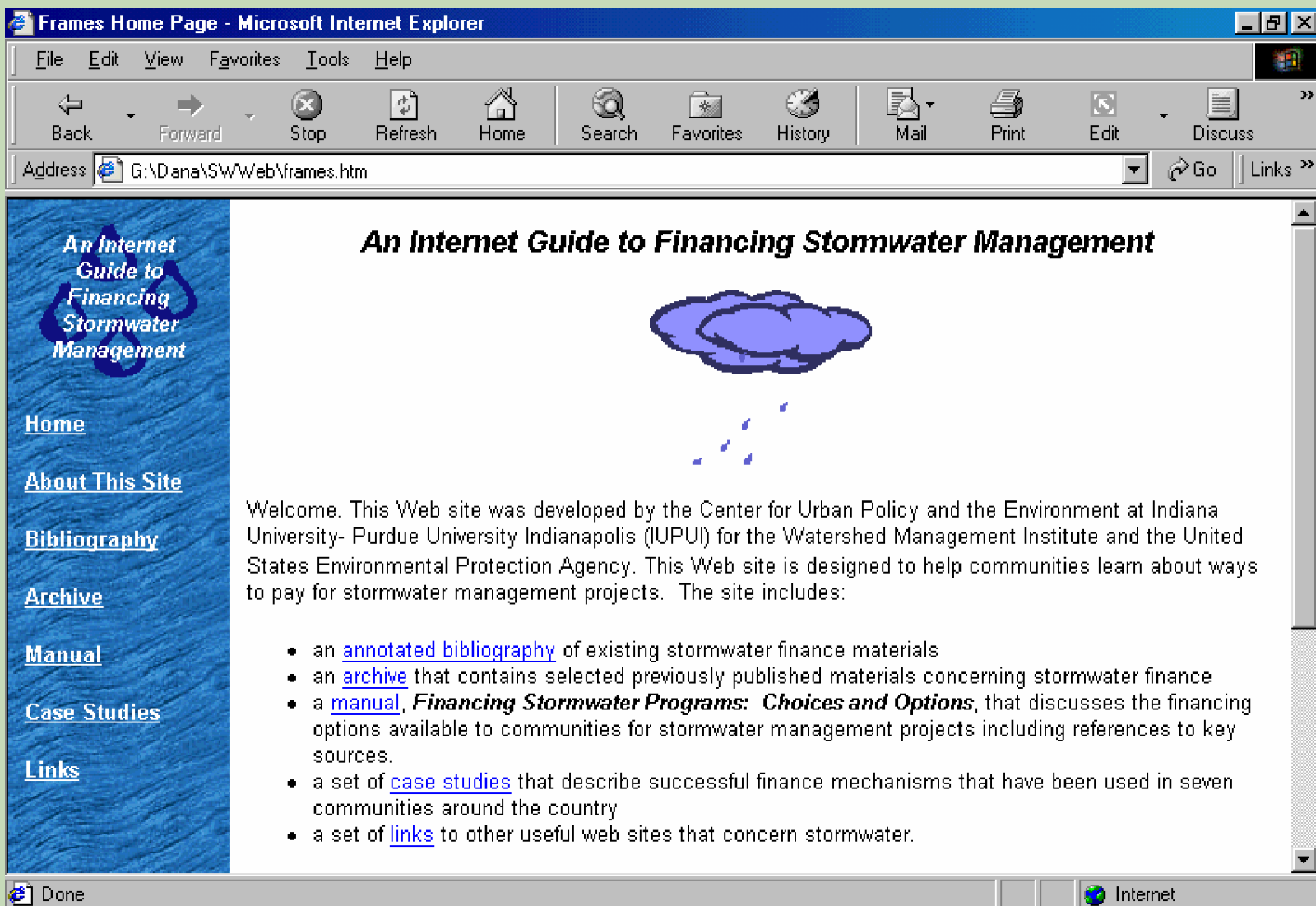
An Internet Guide to Financing Stormwater Management

- | **Synthesis of the literature**
- | **Many case studies**
- | **Addresses both technical and political issues**
- | **<http://stormwaterfinance.urbancenter.iupui.edu>**

Contents of Bibliography and Archive


- | **Approximately 100 resources listed in bibliography**
- | **Over 70% of bibliography posted on web-site**
- | **Several other resources available elsewhere on Web or provided free upon request from publisher**

Home Page



The screenshot shows a Microsoft Internet Explorer browser window. The title bar reads "Frames Home Page - Microsoft Internet Explorer". The address bar shows the local path "G:\Dana\Sw\Web\frames.htm". The browser interface includes a menu bar (File, Edit, View, Favorites, Tools, Help) and a toolbar with buttons for Back, Forward, Stop, Refresh, Home, Search, Favorites, History, Mail, Print, Edit, and Discuss. The main content area is a framed page with a blue textured sidebar on the left and a white main area on the right. The sidebar contains the following links: "An Internet Guide to Financing Stormwater Management", "Home", "About This Site", "Bibliography", "Archive", "Manual", "Case Studies", and "Links". The main area has the title "An Internet Guide to Financing Stormwater Management" and a graphic of a blue cloud with rain falling. Below the graphic is a welcome message and a list of site features.

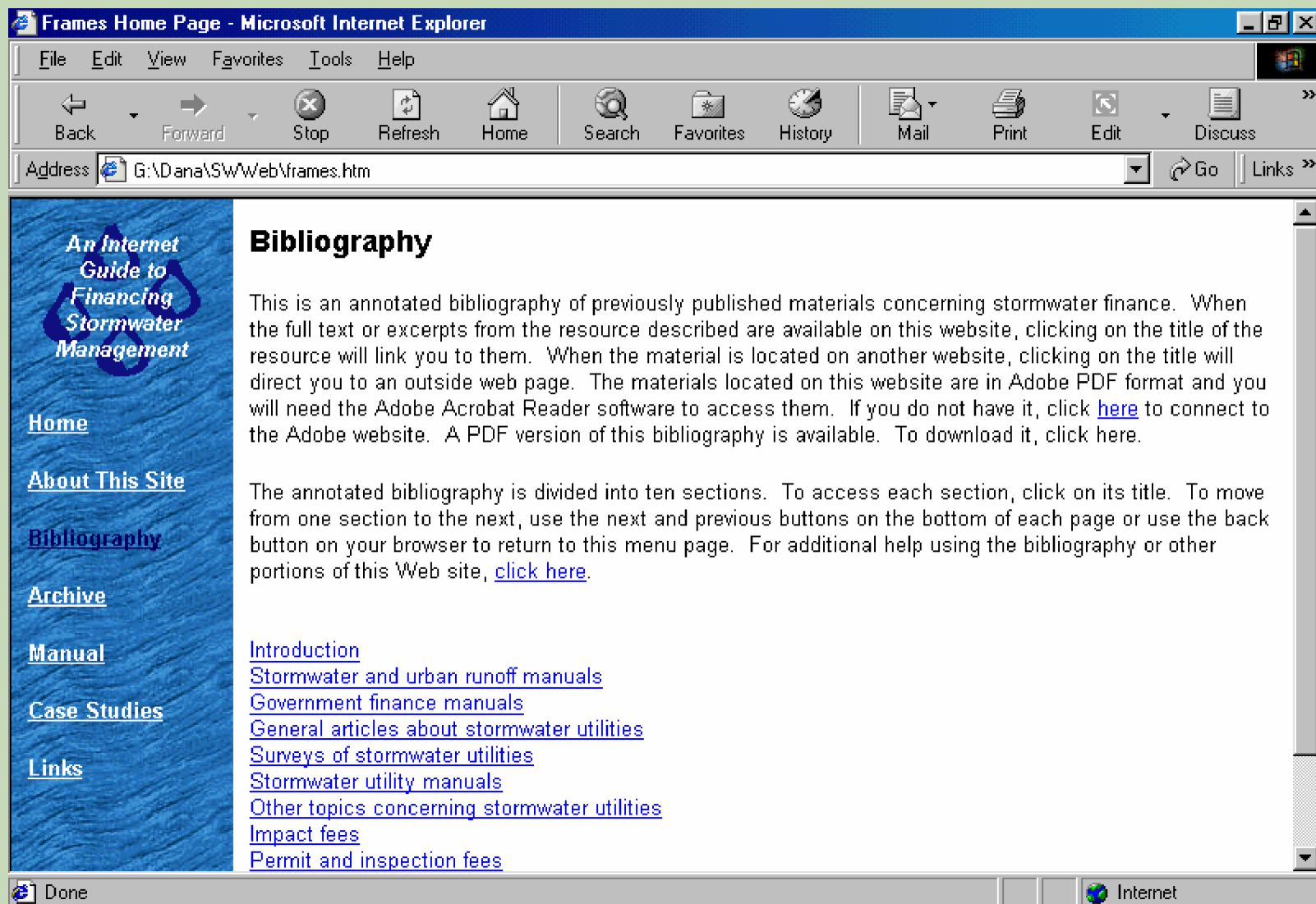
An Internet Guide to Financing Stormwater Management



Welcome. This Web site was developed by the Center for Urban Policy and the Environment at Indiana University- Purdue University Indianapolis (IUPUI) for the Watershed Management Institute and the United States Environmental Protection Agency. This Web site is designed to help communities learn about ways to pay for stormwater management projects. The site includes:

- an [annotated bibliography](#) of existing stormwater finance materials
- an [archive](#) that contains selected previously published materials concerning stormwater finance
- a [manual](#), *Financing Stormwater Programs: Choices and Options*, that discusses the financing options available to communities for stormwater management projects including references to key sources.
- a set of [case studies](#) that describe successful finance mechanisms that have been used in seven communities around the country
- a set of [links](#) to other useful web sites that concern stormwater.

Annotated Bibliography



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Bibliography

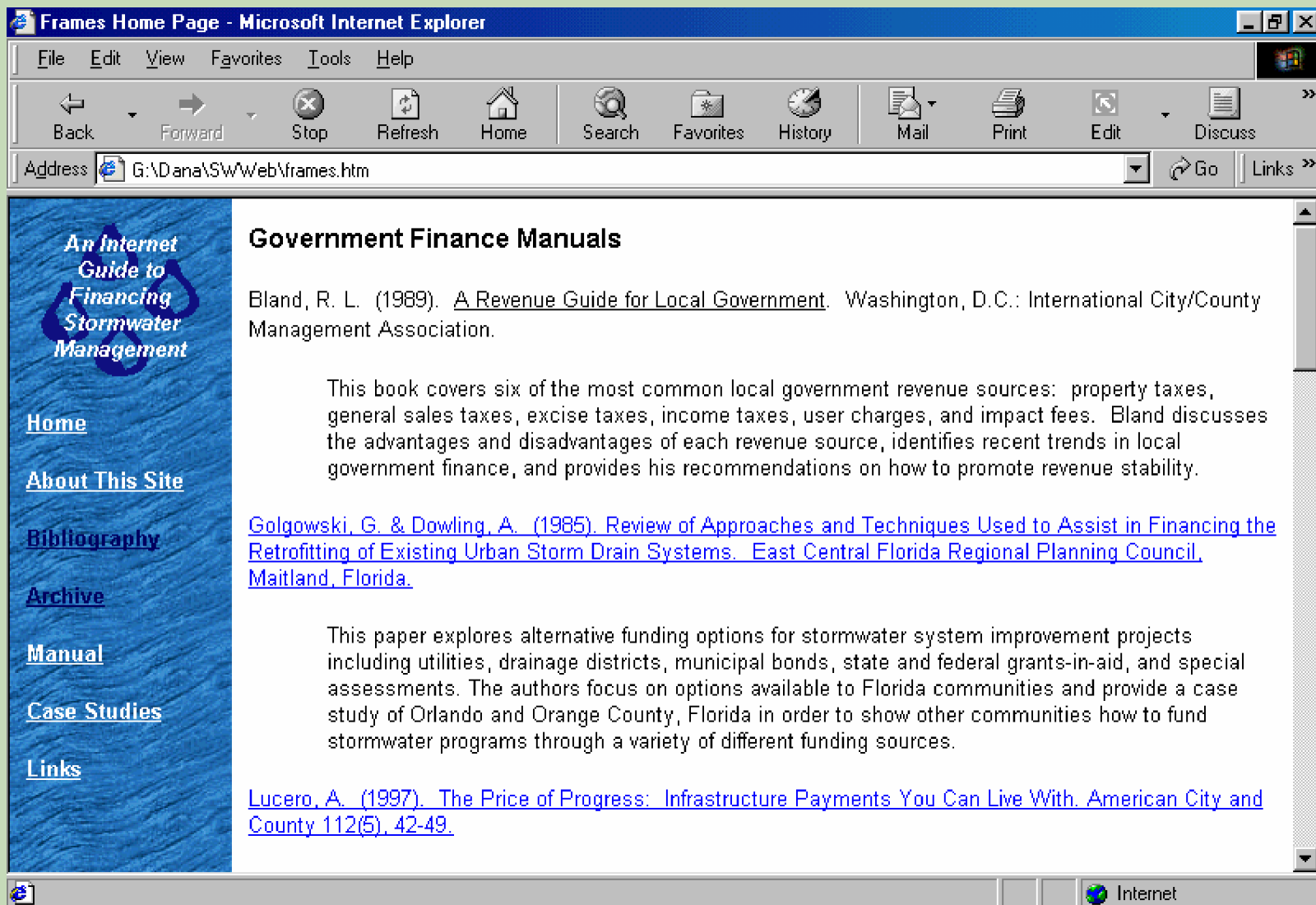
This is an annotated bibliography of previously published materials concerning stormwater finance. When the full text or excerpts from the resource described are available on this website, clicking on the title of the resource will link you to them. When the material is located on another website, clicking on the title will direct you to an outside web page. The materials located on this website are in Adobe PDF format and you will need the Adobe Acrobat Reader software to access them. If you do not have it, click [here](#) to connect to the Adobe website. A PDF version of this bibliography is available. To download it, click [here](#).

The annotated bibliography is divided into ten sections. To access each section, click on its title. To move from one section to the next, use the next and previous buttons on the bottom of each page or use the back button on your browser to return to this menu page. For additional help using the bibliography or other portions of this Web site, [click here](#).

[Introduction](#)
[Stormwater and urban runoff manuals](#)
[Government finance manuals](#)
[General articles about stormwater utilities](#)
[Surveys of stormwater utilities](#)
[Stormwater utility manuals](#)
[Other topics concerning stormwater utilities](#)
[Impact fees](#)
[Permit and inspection fees](#)

Bibliography Sections

- | **Introduction**
- | **Stormwater and urban runoff manuals**
- | **Government finance manuals**
- | **General articles about stormwater utilities**
- | **Stormwater utility surveys**
- | **Stormwater utility manuals**
- | **Other topics concerning stormwater utilities**
- | **Impact fees**
- | **Permit fees**
- | **Case studies**



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Government Finance Manuals

Bland, R. L. (1989). [A Revenue Guide for Local Government](#). Washington, D.C.: International City/County Management Association.

This book covers six of the most common local government revenue sources: property taxes, general sales taxes, excise taxes, income taxes, user charges, and impact fees. Bland discusses the advantages and disadvantages of each revenue source, identifies recent trends in local government finance, and provides his recommendations on how to promote revenue stability.

[Golgowski, G. & Dowling, A. \(1985\). Review of Approaches and Techniques Used to Assist in Financing the Retrofitting of Existing Urban Storm Drain Systems. East Central Florida Regional Planning Council, Maitland, Florida.](#)

This paper explores alternative funding options for stormwater system improvement projects including utilities, drainage districts, municipal bonds, state and federal grants-in-aid, and special assessments. The authors focus on options available to Florida communities and provide a case study of Orlando and Orange County, Florida in order to show other communities how to fund stormwater programs through a variety of different funding sources.

[Lucero, A. \(1997\). The Price of Progress: Infrastructure Payments You Can Live With. American City and County 112\(5\), 42-49.](#)

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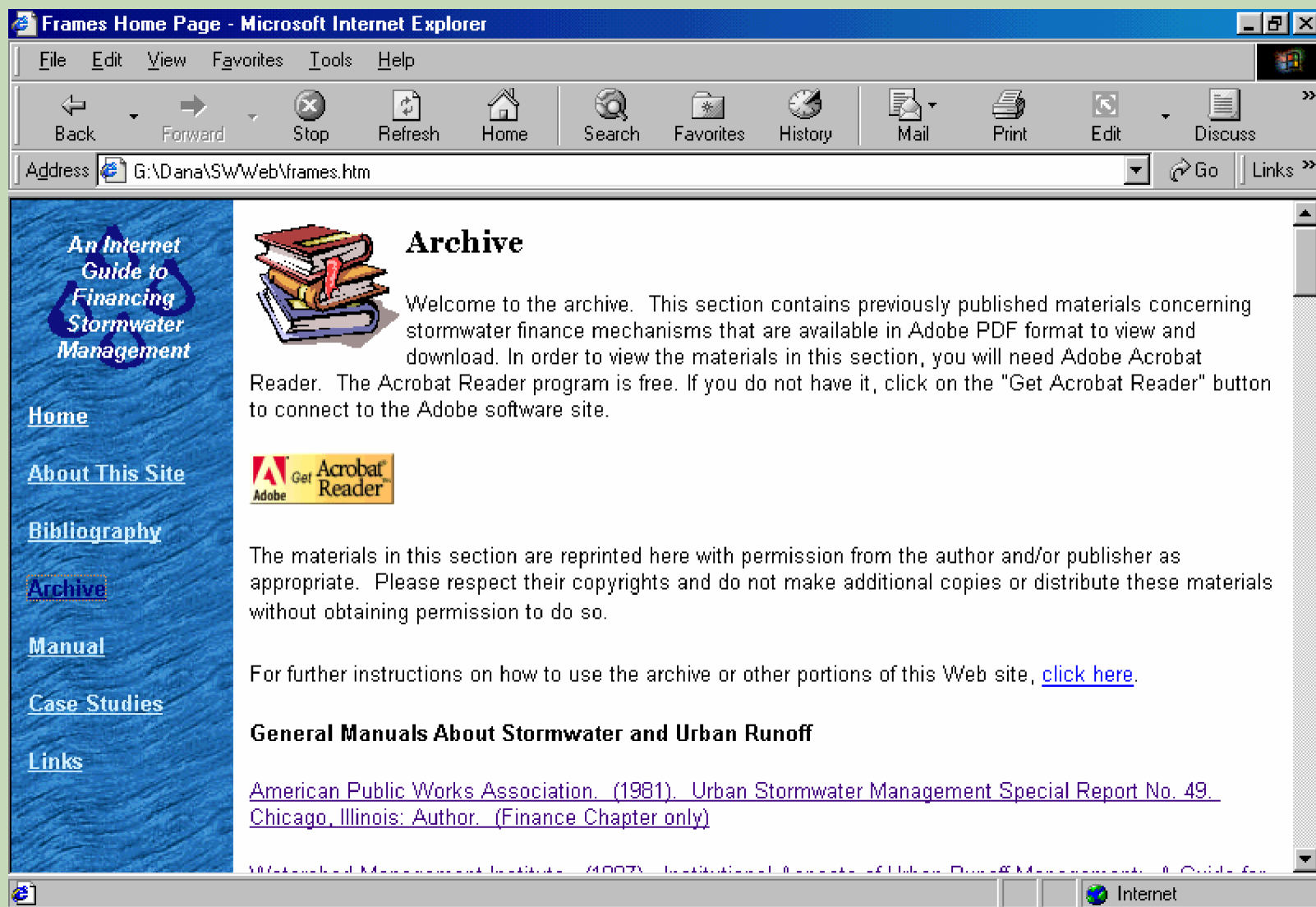
Stormwater Utility Manuals

The stormwater utility manuals that were reviewed for this work were found to have several common elements. The contents of each of the manuals are displayed in table form so that the reader can quickly find information about any aspect of the utility creation process.

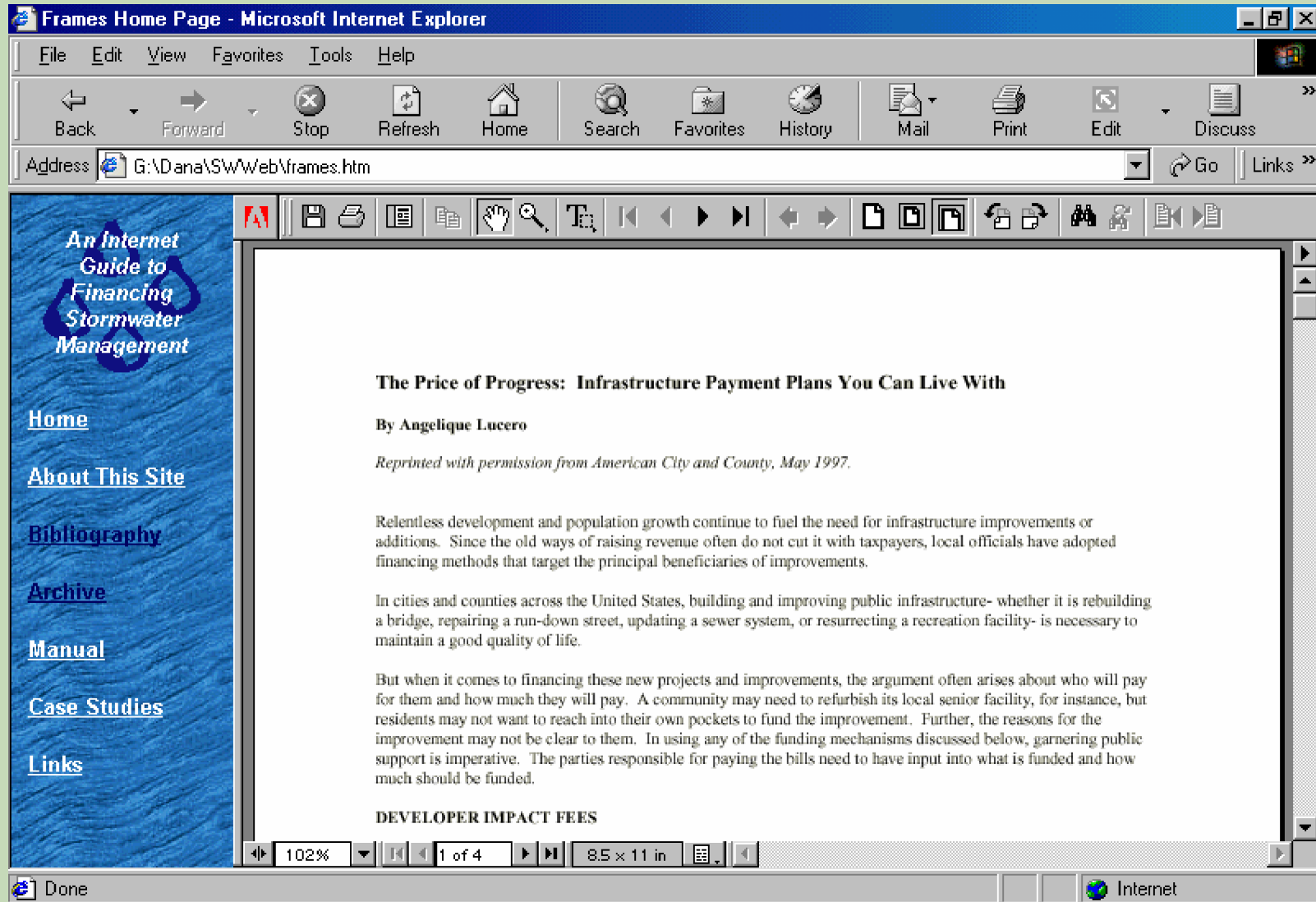
		Stormwater Utility Manuals									
Components	Cyre (1982)	Priede (1985)	Priede & Hobel (1986)	Lindsey (1988)	Water Pollution Control Federation (1990)	Institute for Water Resources (1991)	Apogee Research (1992)	Water Environment Federation (1994)	Water Resource Associates	Cyre (unknown)	Florida Association of Stormwater Utilities
User Pays Idea	x	x	x	x		x	x	x	x		x
Legal Requirements for Implementation				x	x	x	x	x	x		x
Needs Assessment	x			x	x	x		x	x	x	x
Methods of Determining Utility Costs	x			x	x	x		x	x		x
Stormwater Financing Options	x	x	x	x		x	x		x	x	x

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Archive



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The screenshot shows a Microsoft Internet Explorer browser window. The title bar reads "Frames Home Page - Microsoft Internet Explorer". The menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The toolbar contains icons for Back, Forward, Stop, Refresh, Home, Search, Favorites, History, Mail, Print, Edit, and Discuss. The address bar shows the path "G:\Dana\Sw\Web\frames.htm".

The main content area is a framed page with a blue sidebar on the left. The sidebar contains the following links: "An Internet Guide to Financing Stormwater Management", "Home", "About This Site", "Bibliography", "Archive", "Manual", "Case Studies", and "Links".

The main content area features the following text:

The Price of Progress: Infrastructure Payment Plans You Can Live With

By Angelique Lucero

Reprinted with permission from American City and County, May 1997.

Relentless development and population growth continue to fuel the need for infrastructure improvements or additions. Since the old ways of raising revenue often do not cut it with taxpayers, local officials have adopted financing methods that target the principal beneficiaries of improvements.

In cities and counties across the United States, building and improving public infrastructure- whether it is rebuilding a bridge, repairing a run-down street, updating a sewer system, or resurrecting a recreation facility- is necessary to maintain a good quality of life.

But when it comes to financing these new projects and improvements, the argument often arises about who will pay for them and how much they will pay. A community may need to refurbish its local senior facility, for instance, but residents may not want to reach into their own pockets to fund the improvement. Further, the reasons for the improvement may not be clear to them. In using any of the funding mechanisms discussed below, garnering public support is imperative. The parties responsible for paying the bills need to have input into what is funded and how much should be funded.

DEVELOPER IMPACT FEES

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Lessons learned: Implementing a storm water public education program

By Nancy E. Gray

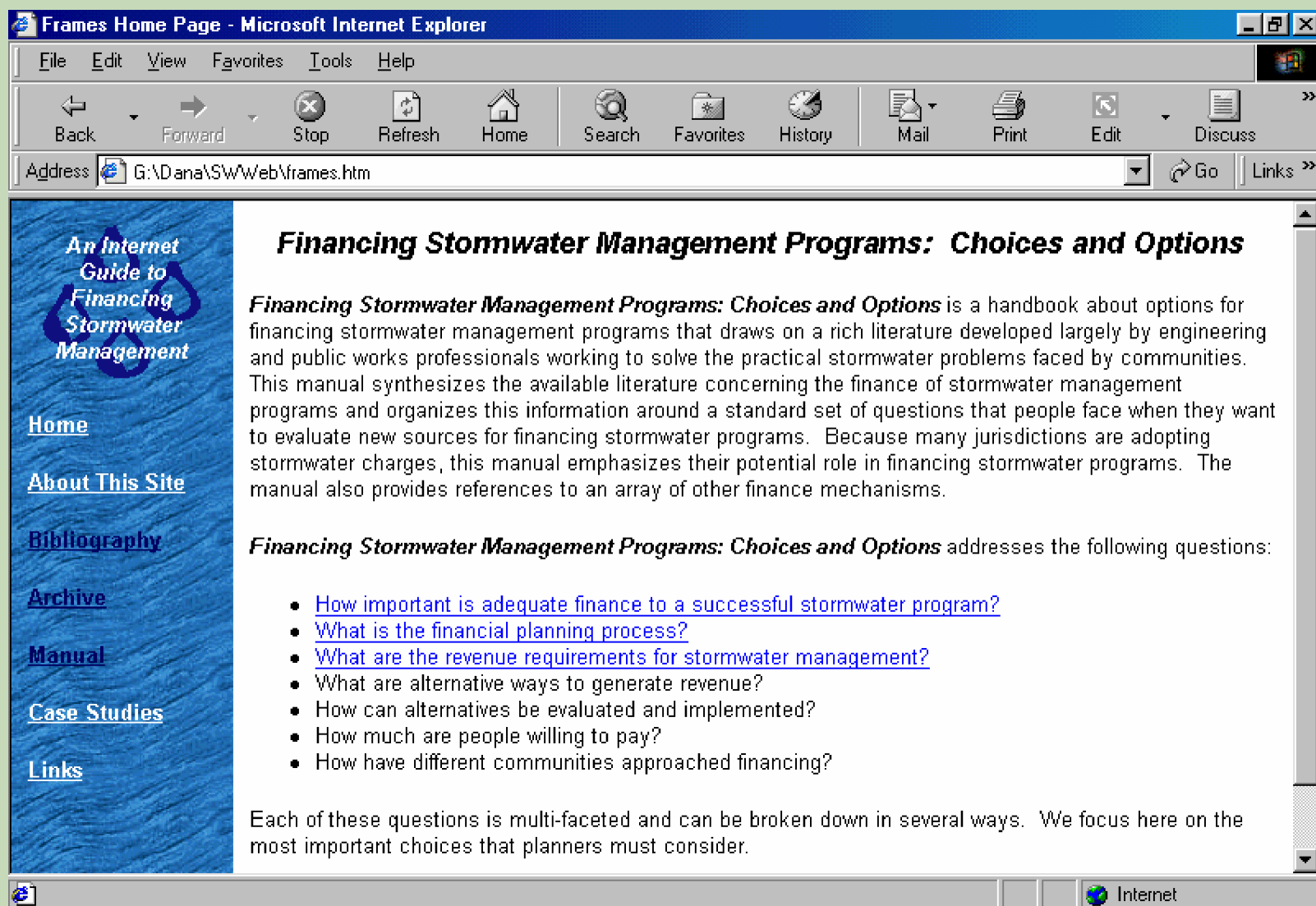
As part of a campaign to promote the reduction of pollution, children colored educational posters at the Ocean View Beach Festival.

ith the advent of the National Pollutant Discharge Works on July 1, 1991, combining management and disposal of used motor oil and toxic materials (which

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Manual



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Financing Stormwater Management Programs: Choices and Options

Financing Stormwater Management Programs: Choices and Options is a handbook about options for financing stormwater management programs that draws on a rich literature developed largely by engineering and public works professionals working to solve the practical stormwater problems faced by communities. This manual synthesizes the available literature concerning the finance of stormwater management programs and organizes this information around a standard set of questions that people face when they want to evaluate new sources for financing stormwater programs. Because many jurisdictions are adopting stormwater charges, this manual emphasizes their potential role in financing stormwater programs. The manual also provides references to an array of other finance mechanisms.

Financing Stormwater Management Programs: Choices and Options addresses the following questions:

- [How important is adequate finance to a successful stormwater program?](#)
- [What is the financial planning process?](#)
- [What are the revenue requirements for stormwater management?](#)
- What are alternative ways to generate revenue?
- How can alternatives be evaluated and implemented?
- How much are people willing to pay?
- How have different communities approached financing?

Each of these questions is multi-faceted and can be broken down in several ways. We focus here on the most important choices that planners must consider.

Internet

Case Studies

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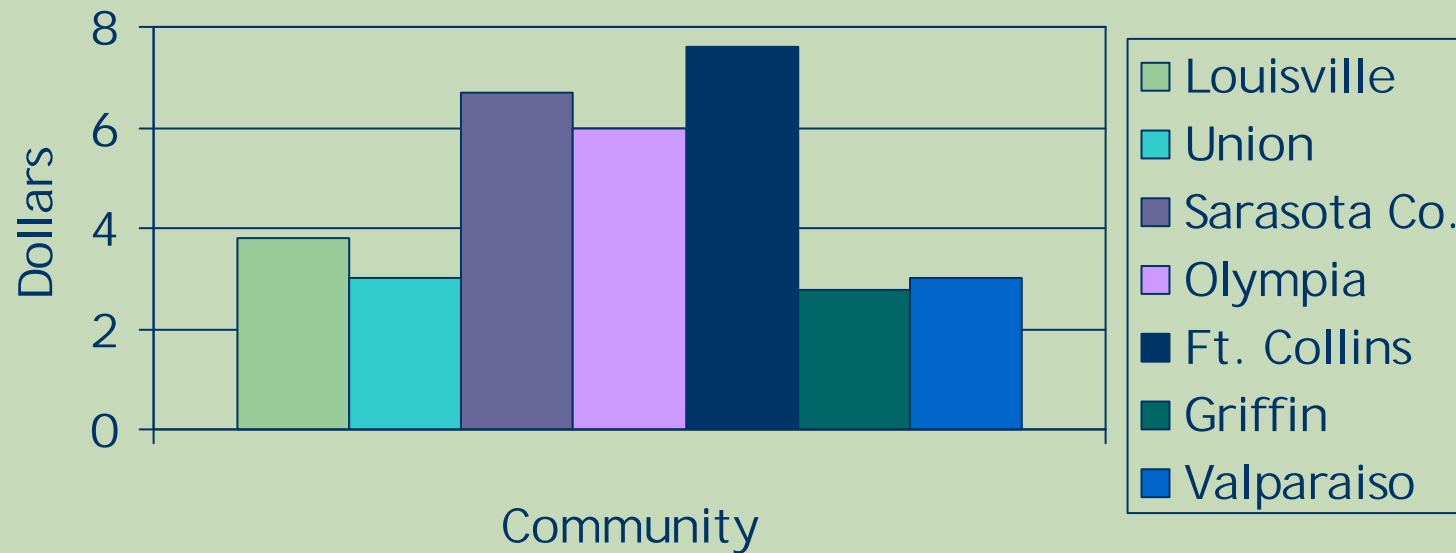
Case Studies

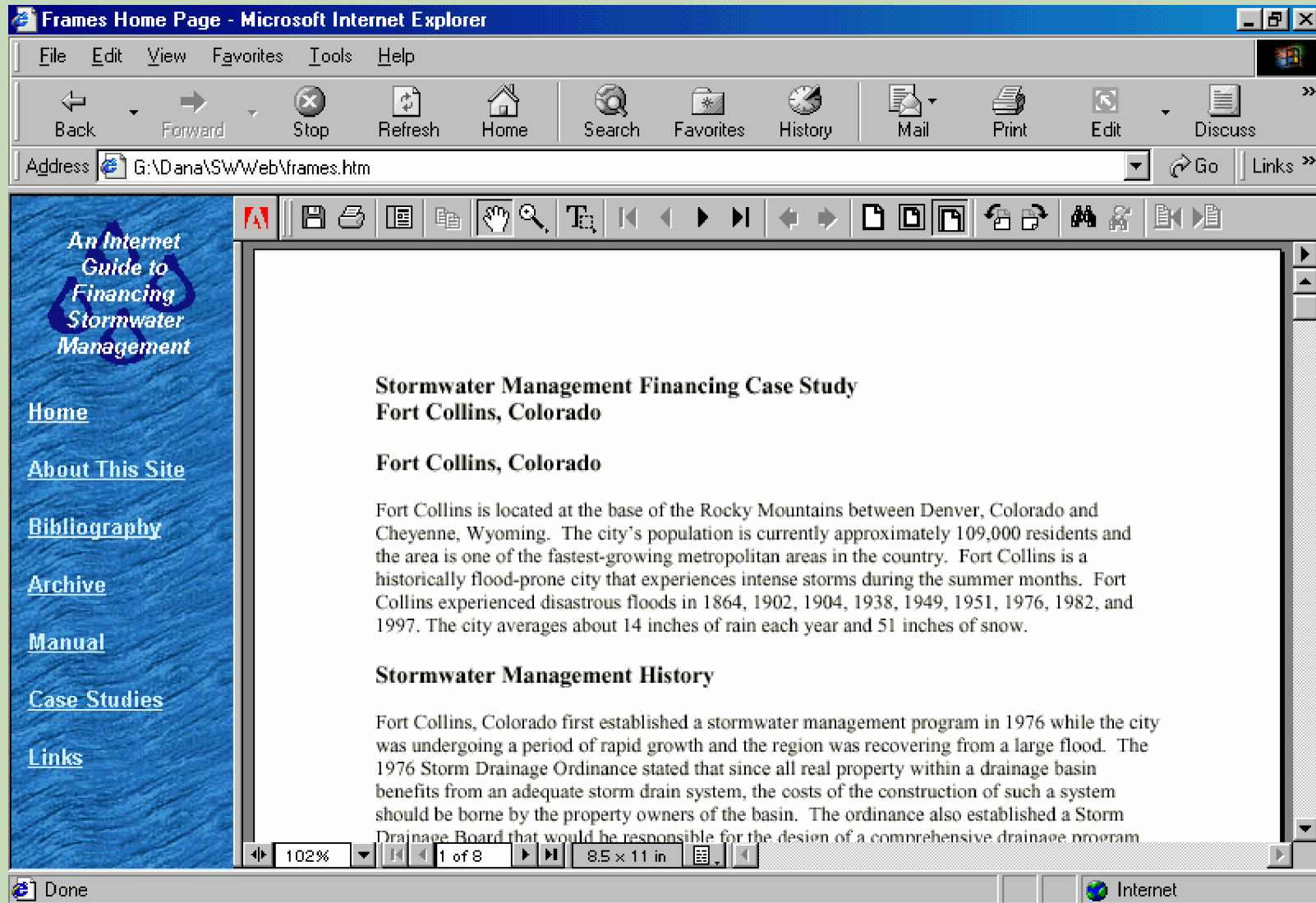
This section includes case studies about seven communities' unique stormwater financing strategies. The table below lists some of the characteristics of each case study community and its stormwater management program. To access the individual case studies, click on the name of the community you want to read about and the PDF file will open in this window. To come back to this screen after reading a case study, use the back button on your browser.

Characteristics of Case Study Communities							
Community Name	Population Served	Location	Program Start	Organization	Billing System	Average Monthly Charge for SFR*	Annual Income from User Charges
Fort Collins, CO	108,000	base of Rocky Mountains	1980	part of Utilities Dept	sent with utility bill	\$7.44	\$5.6 million
Griffin, GA	23,500	south of Atlanta	1989	Storm Water Dep't	sent with utility bill	\$2.95	\$1.2 million
Louisville: Jefferson County, KY	600,000	Ohio River	1987	part of Metropolitan Sewer District	sent with sewer bill	\$3.31	\$17.3 million

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Average Single Family Residence Monthly Stormwater Charge






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Stormwater Management Financing Case Study Fort Collins, Colorado

Fort Collins, Colorado

Fort Collins is located at the base of the Rocky Mountains between Denver, Colorado and Cheyenne, Wyoming. The city's population is currently approximately 109,000 residents and the area is one of the fastest-growing metropolitan areas in the country. Fort Collins is a historically flood-prone city that experiences intense storms during the summer months. Fort Collins experienced disastrous floods in 1864, 1902, 1904, 1938, 1949, 1951, 1976, 1982, and 1997. The city averages about 14 inches of rain each year and 51 inches of snow.

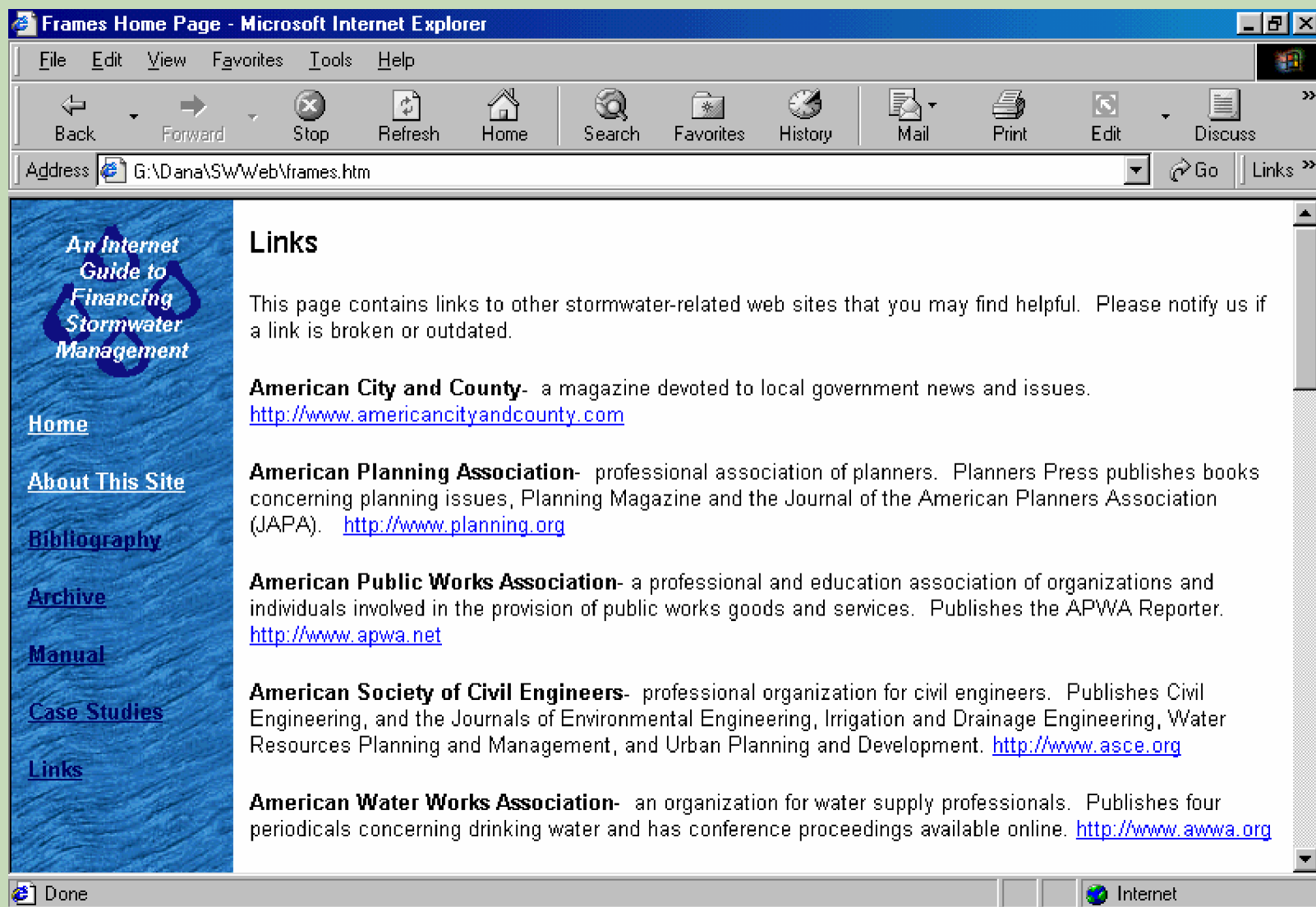
Stormwater Management History

Fort Collins, Colorado first established a stormwater management program in 1976 while the city was undergoing a period of rapid growth and the region was recovering from a large flood. The 1976 Storm Drainage Ordinance stated that since all real property within a drainage basin benefits from an adequate storm drain system, the costs of the construction of such a system should be borne by the property owners of the basin. The ordinance also established a Storm Drainage Board that would be responsible for the design of a comprehensive drainage program.

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Links

This page contains links to other stormwater-related web sites that you may find helpful. Please notify us if a link is broken or outdated.

American City and County- a magazine devoted to local government news and issues. <http://www.americancityandcounty.com>

American Planning Association- professional association of planners. Planners Press publishes books concerning planning issues, Planning Magazine and the Journal of the American Planners Association (JAPA). <http://www.planning.org>

American Public Works Association- a professional and education association of organizations and individuals involved in the provision of public works goods and services. Publishes the APWA Reporter. <http://www.apwa.net>

American Society of Civil Engineers- professional organization for civil engineers. Publishes Civil Engineering, and the Journals of Environmental Engineering, Irrigation and Drainage Engineering, Water Resources Planning and Management, and Urban Planning and Development. <http://www.asce.org>

American Water Works Association- an organization for water supply professionals. Publishes four periodicals concerning drinking water and has conference proceedings available online. <http://www.awwa.org>

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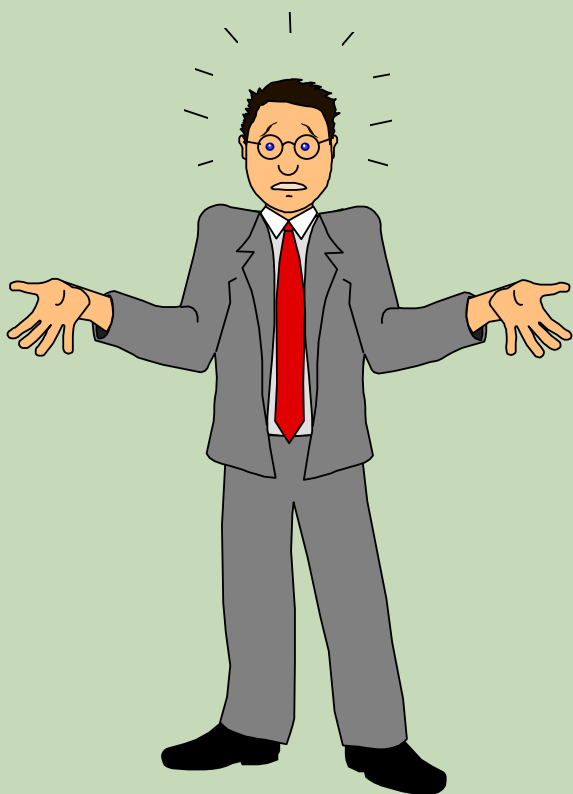
Phase II Underway: 6 Control Measures

- | Public education and outreach
- | Public participation/ involvement
- | Illicit discharge detection and elimination
- | Construction site runoff control
- | Post-construction runoff control
- | Pollution prevention/ good housekeeping

Local Context: Where the water hits the ditch

- | **Some issues in implementation**
 - **Permit compliance**
 - **Watershed planning**
 - **Development regulation**
 - **Design and construction of capital projects**
 - **Maintenance of infrastructure**
 - **Funding for compliance, planning, regulation, construction, and maintenance**

Local Context: How to Pay for New Permit Programs



- | **Limited federal and state funding for infrastructure**
- | **Competing demands for local revenues**
- | **Taxpayers against tax increases**
- | **General fund money inadequate**
- | **Spatial mismatch: watershed boundaries cross jurisdiction boundaries**

Some Key Questions in Financing

1. How important is adequate financing to a successful stormwater program?
2. What is the financial planning process?
3. What are revenue requirements for stormwater management?
4. What are alternative ways to generate revenue?
5. How can alternatives be evaluated and implemented?
6. How much are people willing to pay?
7. How have different communities approached financing?

How important is adequate financing to a successful stormwater program?

I Perspective

- funding is essential, programs are costly

I Evidence (national, regional, local)

- EPA (1998) cost for 266 Phase I permits for 850 municipalities: \$7.4 billion, excluding O&M
- Menomonee Watershed, SE Wisconsin: \$110-\$200 million to decrease loadings of sediment, phosphorus, and lead from 35% to 70%
- Indianapolis, Indiana: increase yearly stormwater budget from \$3 million to \$16-23 million just for deferred drainage maintenance

What is the financial planning process?

I Perspective

- Stormwater finance is specialized sub-field of public finance
- Most manuals overly technical and underestimate importance of political context and issues

I Approach

- Describe and illustrate idealized process
- Illustrate complexity of actual decision-making processes

What is the financial planning process?

(Raftelis 1989)

1. Evaluate economic factors affecting capital and financial planning.
2. Develop a comprehensive facility master plan.
3. Determine and schedule capital requirements and evaluate alternative financing methods.
4. Determine annual operating and capital revenue requirements.
5. Calculate fees and charges.
6. Evaluate impact on customers.
(repeat as necessary)

What are revenue requirements for stormwater management?

I Perspective

- Managers need both rule-of-thumb measures and more detailed approaches to assess revenue needs

I Approach

- Use literature and case studies
- Include standardized engineering estimates for program costs, categorical or function costs, detailed facility or activity costs for management practices

Level of Service Costs Per Acre

(Treadway and Reese, APWA Reporter, 02/00)

Level of Service	Cost (Acre/Yr)	Features of Programs
Incidental	\$15-30	Reactive, incidental maintenance, regulation part of other programs
Minimum	\$30-60	... plus ROW maintenance, regulation, erosion & sediment control
Moderate	\$60-90	... plus more maintenance, regulation and inspection, minor capital projects
Advanced	\$90-120	... system maintenance, master planning, regional, some water quality programs, data collection, development controls, utility funding
Exceptional	> \$120	... plus stormwater quality, advanced flood control, levels of service, aesthetics

What are alternative ways to generate revenue?

I Perspective

- Most programs use multiple sources of revenue
- Consensus among stormwater professionals on utility approach
- No one-size fits all; approaches must be tailored to community

I Approach

- Consider different rationales for approaches
- Charges calculated different ways
- Technical choices matter

A Functional Approach to Stormwater Financing

BMP	Option
Watershed planning	General revenues (property, income taxes; stormwater user charges)
Source controls •Enforce ordinances •Development regulation	General revenues •Plan review and inspection fees
Maintenance (e.g. street sweeping)	General revenues
Capital projects •New development •Retrofit existing areas	•Developer exactions, fees-in-lieu •Bonds, sinking funds (general revenues)

*Choices among methods are important because burden for payment differs

Stormwater User Charges and the Utility Approach

Stormwater user charges

- Fees based on impervious area or other indicator of runoff volumes
- Charges must be fair and reasonable and bear a substantial relationship to the cost of service and facilities

Stormwater utilities

- Local government enterprises that provide stormwater services and are financially separate from other government functions

Users

- Owners of properties that discharge water to publicly managed systems

Calculation of Stormwater Charges

- 1. Estimate revenue requirements.**
- 2. Estimate total service or runoff units in service area (e.g., municipal boundary).**
- 3. Estimate charge per service unit.**
- 4. Estimate charges for individual parcels.**

Structures are Flexible and Reflect Local Objectives

- | Most charge federal, state, and local government property.
- | Most charge tax exempt property (e.g., universities, hospitals, churches). Some give partial credit to these uses.
- | Most give credits against charges for on-site controls.
- | Some have separate charges for capital facilities and O&M.
- | Some give exemptions for properties that drain directly to surface waters.
- | Some charge streets and rights-of-way, agricultural land, and undeveloped land.
- | Some offer rebates for elderly, schools.
- | Some communities establish a maximum percentage for credits; they don't credit 100%.

How can alternatives be evaluated and implemented?

I Perspective

- Criteria and procedures for evaluation well established
- Implementation requires leadership or political champion

I Approach

- Apply criteria used for evaluation of financing alternatives
- Stress importance of agreement on criteria before application

Advantages and Disadvantages of Charges and Taxes

Criteria	Charges	Taxes
Cost of implementation	-	+
Ease of implementation	-	+
Deductible by property owner	-	+
Elasticity of revenues	-	+
Stability of revenues	+	-
Fairness		
User (polluter) pays	+	-
Ability to pay	+	-
Incentives for on-site controls	+	-

How much are people willing to pay?

I Perspective

- Political assumptions about the public's willingness to pay guide decisions and determine outcomes

I Approach

- Use direct estimates of willingness to pay: surveys
- Use implicit estimates: judgments based on experience of other jurisdictions and range of charges across the U.S.

How have different communities approached financing?

I Perspective

- No single approach works in all places
- Useful to study experience of different places

I Approach

- Learn from others ...

Tippecanoe County Example: Participation

- | MS4 area includes Lafayette, West Lafayette, Dayton, Battleground, Shadeland, portions of Tippecanoe County, Ivy Tech, and Purdue.
- | With the exception of Shadeland, all others are working together on planning for Phase II

Tippecanoe County Example: Cost of Phase II Compliance

- | CBBEL estimated that Phase II compliance would cost at least \$3.2 million for years 3-5 of the first permit period.
- | Current expenditures on Phase II activities were estimated to be about \$1.5 million per year.
- | Leaves at least \$1.7 million annually. CUPE and CBBEL agree that this is likely an underestimate.

Tippecanoe County Example: Current Funding Sources

- | None of the municipalities currently has a stormwater utility. Until very recently, Tippecanoe County did not even have the statutory authority to establish a utility.
- | Stormwater activities (quantity and quality) are funded through a combination of general funds, county option income taxes, road monies, wastewater utility revenues, cost recovery mechanisms, grant funds, and fees for service.

Tippecanoe County Example: Stormwater Utilities?

- | General agreement from project partners that there is a need to establish stormwater utilities
- | Interviews with project partners and other stakeholders indicate that residents would accept a stormwater charge of \$2-\$4.
- | Estimated revenues from these charges will cover the cost of Phase II, but not the cost of all stormwater activities.
- | These jurisdictions will have to rely on a combination of funding sources.

Tippecanoe County Example: Next Steps/Recommendations

- | Legislative decisions to implement charges
- | Administrative and engineering decisions in developing stormwater charges
 - Assemble parcel information, aerial photography, and GIS capacity to develop database
 - Choose specific procedure for measuring impervious area
 - Develop database
 - Consider system of credits
 - Choose billing method
- | Establish funding needs more specifically (plan)
- | Choose level of funding and mix of revenues

Indiana Experience:

- | An increasing number of municipalities have adopted stormwater utilities or stormwater rates as part of their wastewater utilities.
- | The ability of county governments to adopt stormwater utilities is very new. Our research has not uncovered a county in Indiana that has yet adopted a utility.
- | Average stormwater rates for 29 communities is \$3.50 (median) and \$4.56 (mean).
- | Rates range from \$1.25 per month (Indianapolis-Phase I community) to \$21.00 per month (Berne- small community with unaddressed CSO issues).

Indiana Experience:

- | Most rate systems use a system of ERUs (Equivalent Runoff Units) or a tiered system based on a hierarchy of land uses and relative proportions of impervious surface
- | Mean ERU for 13 communities was ~2,800 square feet.
- | Indiana communities give rate credits for non-profit status, detention/retention, direct discharge, and for stormwater education efforts.

Indiana Experience:

- | Indiana Legislature continues to constrain property tax revenues, making other revenue sources more attractive and increasingly important.
- | Indiana ratepayers' willingness to pay for new stormwater rates probably will not cover the entire cost of water quantity and quality activities.
- | Phase II is particularly burdensome for small communities. Without collaboration with other jurisdictions, they are finding it difficult to comply on their own. Public education, public participation, ordinance development, inspector training, software purchasing, and mapping are some of the activities Indiana communities have been able to do collectively.

Indiana Experience:

- | County governments will have to wrestle with a very different system of infrastructure. Legal drains are the primary system for public maintenance and repair of county drains. Legal drains are not universal within counties. In a number of cases, counties are having to add quality to a distribution system that was built at the turn of the century and is now in need of significant repair.



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