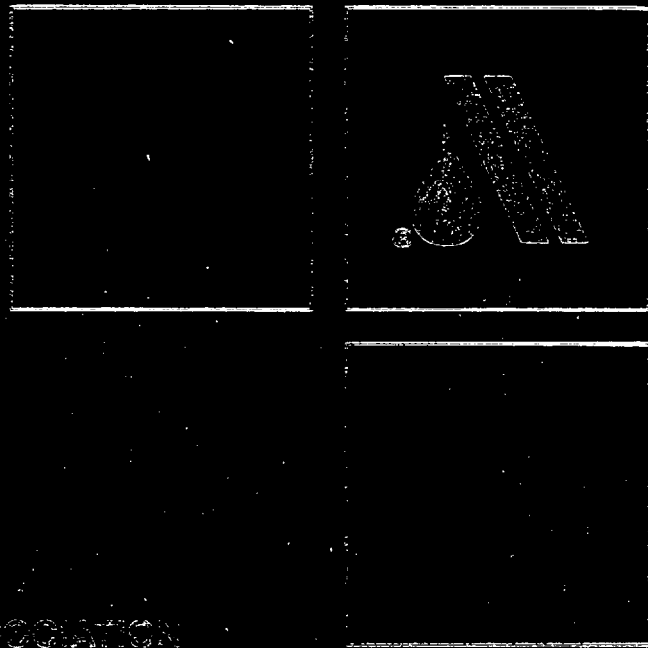




AMERICAN WATER WORKS ASSOCIATION

MANUAL OF WATER SUPPLY PRACTICES

Water Rates and Related Charges

AWWA M26

Water Rates and Related Charges

AWWA MANUAL M26

Second Edition



American Water Works Association

MANUAL OF WATER SUPPLY PRACTICES—M26, Second Edition
Water Rates and Related Charges

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Project Manager: Kathleen Faller
Editor: Constance Hardesty
Production: Twenty-First Century Communications

Printed in the United States of America

American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235

ISBN 0-89878-817-X



Printed on recycled paper.

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Foreword

Water Rates and Related Charges was first published in 1986 to provide guidance in the consideration of some of the unique services, e.g., fire protection and ancillary, associated with the design of a total system of water rates and related charges. The first edition of the manual also addressed the design of dedicated capacity fees as well as system development charges associated with the capital costs required for extension of water service to new customers.

This second edition expands on and updates the development of rates for fire protection and ancillary services and includes a new section about ratemaking considerations associated with wholesale water service. The manual also significantly amplifies the consideration of charges for the extension of water service, including system development charges, connection charges, and customer facility fees.

Acknowledgments

The Rates and Charges Subcommittee of the Financial Management Committee, appointed by the Management Division of the American Water Works Association, prepared and reviewed the second edition of *Water Rates and Related Charges*. In developing this manual, the subcommittee has addressed the need for improved methods of assigning costs to special rates and charges for water service.

Appreciation is extended to the authors of the original draft, including subcommittee members Robert Barker, Don Clark, Michael Day, Rowe McKinley, Thomas McKittrick, Allen Mullins, Kathy Pape, Ronald Smith, Clarence Warnstaff, Richard West, and Christopher Woodcock, as well as an outside contributor, Robert Reed. These individuals researched the relevance of technical issues and prepared the initial drafts of the manual.

In addition, the contributions of Don Clark, Michael Day, Rowe McKinley, Thomas McKittrick, Richard West, and Christopher Woodcock, who collectively served as the editorial group, is acknowledged. They were responsible for developing subsequent drafts, integrating subcommittee input, resolving substantive issues, and finalizing the technical content. The editorial committee was essential in producing a useful reference that will complement and extend the authoritative guidance available in other AWWA rate manuals, such as M1, *Water Rates*; M34, *Alternative Rates*; and M35, *Revenue Requirements*. Special appreciation is extended to Don Clark for his significant efforts in coordinating the process, in-depth review, and his tenacity in keeping the project on schedule.

The Management Division is indebted to the entire subcommittee for its time, expertise, and exchange of views, which is evident in this second edition.

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Introduction

The American Water Works Association (AWWA) policy statement "Financing and Rates," first adopted by the AWWA Board of Directors on Jan. 25, 1965, revised on Jan. 31, 1982, and reaffirmed on Jan. 25, 1987, states in part: *"The AWWA believes the public can be served best by self-sustained enterprises adequately financed with rates based on sound engineering and economic principles."*

AWWA Manual M1, *Water Rates*, outlines the basic elements involved in the determination of the revenue requirement and in the allocation of the costs of providing service to the various classes of customers served by a water utility. AWWA Manual M35, *Revenue Requirements*, elaborates on the developmental methods recognized for establishing the revenue requirement. Basic rate forms developed in AWWA Manual M1 enable an equitable recovery of water service costs from all classes of customers based on principles that have been generally accepted and widely applied throughout the industry. AWWA Manual M34, *Alternative Rates*, considers currently used alternative rate forms that also may enable equitable cost recovery. The reader is encouraged to consider the methods and rate theory addressed in these companion manuals as they may apply to the water rates and charges presented in this manual, particularly in considering the development of rates for fire protection or wholesale service, or the development of miscellaneous service charges.

MANUAL ORGANIZATION

The manual is organized by topic as follows:

Section I: Water Service Extension Charges. The first four chapters of the manual describe charges for extending water service.

Chapter 1, Connection and Customer Facility Fees. This chapter discusses the assessment of charges designed to (1) offset the capital costs associated with connecting a new service to the distribution main (connection fees), and (2) recognize the capital costs associated with installing the service line, meter, and related facilities from the curb stop (property line) to the house or designated point of service (customer facilities fees).

Chapter 2, Policies and Procedures for Water Service Extension. This chapter discusses policy and procedural matters relating to the responsibility for design, construction, and financing of local facilities—including booster pumping, system storage, and distribution mains—under various circumstances.

Chapter 3, System Development Charges. The underlying criteria important to the selection and development of system development charges are described.

Chapter 4, Dedicated-Capacity Charges. This chapter discusses the application of dedicated-capacity charges, namely, the availability charge and the contract demand charge.

Section II: Fire Protection and Wholesale Water Service Rates. General discussions of rates and charges for fire protection and wholesale water service have been incorporated in AWWA Manual M1. However, both types of rates involve distinctions and complexities influencing cost allocation and rate design that are not adequately described in general discussion. Thus, separate discussions of each subject are included in this section to expand upon the considerations for appropriate ratemaking.

Chapter 5, Rates for Fire Protection Service. This chapter discusses the development of rates for fire protection service. The information is based on the revenue requirement and cost allocation procedures described in AWWA Manual M1, and is expanded to consider the distinction between rates for public and private fire protection service.

Chapter 6, Rates for Wholesale Water Service. The discussion of the determination of wholesale revenue requirements and cost allocation presented in AWWA Manual M1, is expanded in this chapter to consider the factors influencing the design of rates and charges for wholesale service. The reader also should consider the rate design alternatives described in AWWA Manual M34, for mechanisms that may be appropriate, depending on the local utility's wholesale pricing objectives.

Section III: Miscellaneous and Special Charges. Two chapters discuss miscellaneous service and special charges.

Chapter 7, Charges for Miscellaneous Services. This chapter examines factors important in unbundling the costs of certain ancillary services from the total cost of water service. Unbundling costs associated with ancillary services benefiting specific customers can be translated into charges to those customers, thus lightening the burden on the general rate payer. This chapter discusses the cost allocation procedures that should be recognized in unbundling certain services and describes the types and variety of miscellaneous service charges currently employed by water utilities.

Chapter 8, Special Charges. The special charges that may be necessary from time to time to account for special customer services and individual program initiatives are examined. Two issues important to a utility's strategic planning—standby service and demand-side management (DSM) credits—are described.

Appendix A, Sample Language for Ordinance Implementing Charges for the Extension of Water Service. Illustrative language that depicts the form for instituting system development charges is presented to assist the water provider in constructing a municipal ordinance. Though the reader is cautioned to consider other potential influences on the framing of a local ordinance, e.g., state statute, prior case law, and regional practice, the sample ordinance may provide a useful, albeit not all-encompassing, framework with which to initiate a draft of language for further modification to consider other externalities.

Glossary. Finally, a glossary is provided to help the reader understand the terminology in this manual. This glossary supplements the glossaries in other AWWA manuals.

The AWWA Manuals M1, M26, M34, and M35, *Revenue Requirements*, offer guidance to procedures and practices generally recognized as acceptable for establishing revenue requirements, allocating costs of service, and designing rates and charges. However, the influence of local conditions; legal, political, and regulatory constraints; and other factors that may limit or alter the applicability of the methodologies in a particular setting must be considered. Thus, this manual provides guidance in the development of capital, fire protection, wholesale, and miscellaneous service charges but does not purport to encompass all local, state, and regulatory policies or interpretations of tax regulations.

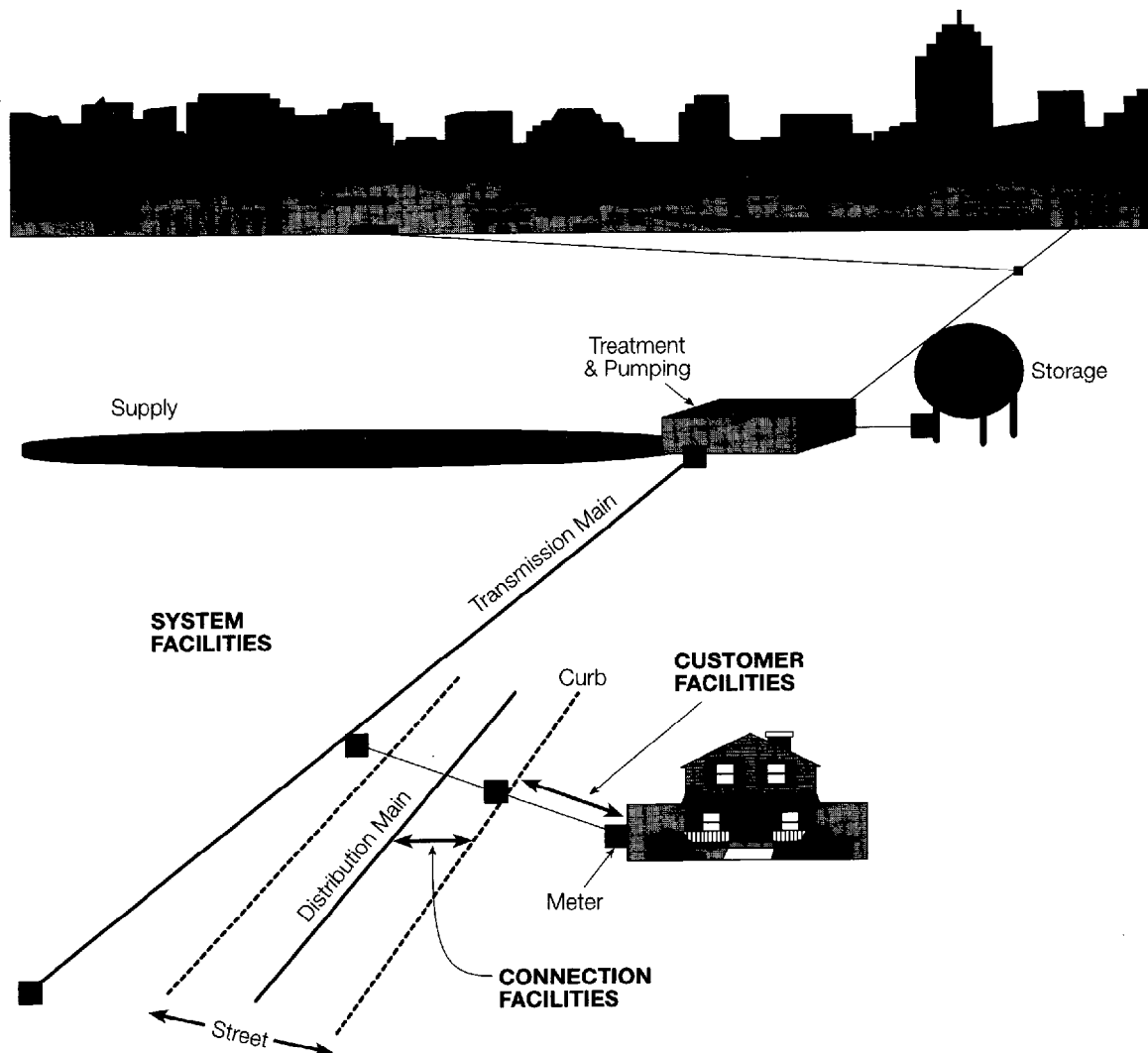
Water Service Extension Charges

The costs incurred in constructing lines and facilities to dedicate, expand, or extend service capability and to connect new properties to a water system are appropriate to recoup through capital cost recovery mechanisms. Over the years and throughout the United States, capital cost recovery has been handled in various ways. Charges to dedicate a portion of the capacity to future and existing customers in the form of an *availability charge* or a *contract demand charge* are used in certain settings. *Connection and customer facilities fees* are assessed by many water utilities to offset the costs of connecting new properties to the water system. A growing number of water utilities employ *system development charges* to harness and assign the capital cost responsibility of future customers for existing reserved capacity in the system or for future expansion. Finally, *contributions in aid of construction and customer advances* are assessed by utilities to cover the construction of specific lines and facilities.

In viewing capital charging practices of a water system, the source of supply, treatment plant, system storage, mains, and other facilities can be classified as customer facilities, connection facilities, and system facilities as shown in Figure I-1. Customer facilities include the service line, meter, and other facilities that must be constructed on the property to be served, from the installation site (house or building) to the property line or curb stop. Customer facilities fees, which address this portion of capital cost recovery, are discussed in chapter 1. Connection facilities are defined as the line, tap, and other facilities that must be constructed from the property line or curb stop to the main in the street or right-of-way. Connection fees also are discussed in chapter 1.

The balance of the plant and equipment as components of the water system can be collectively referred to as system facilities. System facilities include source of supply, production, transmission, storage, and distribution facilities. Separate discussions of capital charge practices related to system facilities and capacity are included in this section. Policies and procedures for extension of water service to new areas or to areas under redevelopment are discussed in chapter 2. System development charges applicable to both existing system capacity and to incremental system expansion are discussed in chapter 3. Dedicated-capacity charges, which describe the

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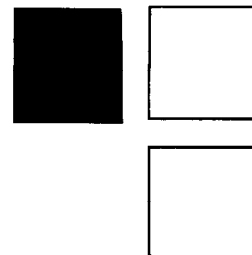
Source: D. Clark, Clark and Clarke Associates, Ingomar, Penn.

Figure I-1 Typical water system components

use of an availability charge and the application of a contract demand charge, are discussed in chapter 4.

At the time of publication, fully half of the states have in effect statutes that govern the system development and impact fee practices of municipal agencies. Some state public utility commissions have rules of practice concerning capital cost recovery for the jurisdictional rate-making purposes of investor-owned utilities (and, in certain states, for publicly owned water systems). The reader should

- study state statutes or state public utility commission rules of practice
- review the relevant case law for docket decisions influencing capital charge practices
- consult legal authority when litigation risks are uncertain
- evaluate the underlying criteria important to a specific water system or jurisdictional environment when considering the pertinence of standard or recommended practices



Chapter 1

Connection and Customer Facility Fees

As water rates increase because of inflation, new plant investment requirements, and more stringent environmental regulations and water quality standards, separate capital charges are often considered as a way to relieve, reduce, or forestall general rate increases. Typically, capital charges are used where costs and revenues are significant, specific beneficiaries or customers can be clearly identified, and associated costs can be reasonably and accurately determined. Examples of special capital charges include fees related to costs for facilities installed between the water main and property line or for facilities located on the customer service site.

It is common policy for government-owned utilities to recover directly from the customer the costs of installing a tap or connection to a water main, the service line to the property, and the water meter. Many utilities have developed a standard connection and customer facility fee schedule based on meter or connection size. Other utilities develop customized charges based on site-specific costs. Still other utilities use a combination of standard and customized fees. In most cases, the fee is assessed when the customer or agent applies for new or expanded water service. In general, such fees increase with the size of the meter or connection and, in the case of customized charges, with the complexity and conditions of the service site.

This chapter addresses policy, cost, and pricing assumptions and concerns related to establishing customer facility and connection fees in the following areas:

- allocation of costs
- capital cost component
- calculation of charges

A key step in determining customer facility fees is the appropriate allocation of costs. In most cost-of-service analyses, the basis for allocating costs is cost causation, by recognition of the key parameter or parameters most influencing the level of cost incurred. Determining the appropriate method of cost recovery, whether through the

4 WATER RATES AND RELATED CHARGES

general rate structure or an up-front charge, is critical. Also, costs associated with appurtenances that are on site, or customer specific (rather than off site, or common to all customers), need to be considered in the allocation process.

When identifying the capital cost to be recovered through customer facility and connection fees, the utility needs to define what portion of the cost of the installation of the facilities between the utility main and the customer's property is allocable to the utility and what portion is allocable to the customer. Also, the utility needs to determine the variation in capital costs of installation due to the differences in material costs and methods of construction.

Example calculations of a basic model for both a connection fee and a customer facilities fee are provided. The specific method of calculating these fees, however, will vary from one utility to another because of the unique circumstances of each utility. When fees are established for an investor-owned utility, the taxable nature of fee revenues needs to be recognized.

ALLOCATION OF COSTS

The purpose of a cost allocation process in rate setting is to assign, as much as is practical, costs to the customers who benefit from or cause those costs to be incurred. In allocating costs associated with installing customer connections, the utility must first address these questions:

- Should the costs of connecting new customers be included in the system revenue requirements for allocation to all customers through general water rates?
- Should these costs be allocated specific to a customer class and recovered through rates for that class?
- Should the cost be recognized as an incremental capital cost and recovered directly through a specific customer connection fee?

Utilities may choose to allocate and recover all, or a portion, of such costs through the general water rates rather than through a specific connection or customer facilities fee.

To determine whether a specific capital fee should be established for a new connection, the utility should consider the following issues:

- Frequency—Is the number of occurrences significant enough to justify a specific connection fee?
- Data availability—Is there reasonable and sufficient information available to support a charge for the installation?
- Justification—Are costs sufficient to justify creating such a fee?
- Affordability—Is the magnitude of the calculated charge cost-prohibitive to customers who are economically disadvantaged?
- Consistency and predictability—Are the material costs and labor requirements relatively consistent and uniform?
- Equity—Would isolating of customer-connection costs significantly increase equity among customers?

After evaluating these key issues, the utility may determine that a separate capital fee to recover the cost of new connections is not needed. Alternatively, the utility may determine that a policy for collecting all or some of the costs associated with new connections is justified through either a standard or a customized system of charges. Or, the utility may determine that a separate standard fee is justified only for residential, small business, and other small service connections. The policy for

customers with larger connections, on the other hand, may require customized fees or, alternatively, recovery of the actual cost of installing customer facilities.

Standard Versus Customized Fees

Connection and customer facility fees for small customers are standard because the installation of smaller connections tends to be more frequent; thus, the cost is generally affordable and relatively consistent from one installation to another. These fees can be standardized with limited financial risk to the utility and without undue equity burdens on individual customers. However, the utility may determine that certain large connections do not satisfy the criteria for standard fees. In such cases, it would be more appropriate to charge the customer for the actual cost of the service connection and meter installation, thereby customizing the fees based on site-specific conditions. Because of the high cost often associated with larger installations, it also may be appropriate to require payment of an advance deposit based on the estimated cost of installation. A similar deposit may be required of a developer who is concurrently applying for service to several smaller properties.

CAPITAL COST COMPONENT

After a utility has determined the need for separate capital fees to recover new connection costs, it needs to delineate the capital costs to be included in such fees at the point where responsibility for installation shifts from the utility to the customer. Factors that may affect the actual cost of a service connection include the size of the service connection, requirements for backflow or cross-connection protection, and meter location (on a public right-of-way or private property). In addition, building restrictions, such as local building code requirements or pressure problems related to a building's height, may have a cost impact.

Another important consideration is whether it is necessary to install water meters. Measuring water consumption is essential to the financial planning of many water utilities and is usually required for new service connections. Metered services provide:

- an equitable basis to charge customers for services
- a history of water consumption
- the means to evaluate growth and changes in water use patterns
- the means to measure conservation
- an indication of water loss or leaks
- a method of establishing long-term consumption trends
- a method of establishing seasonal consumption trends

Nonetheless, some utilities do not currently meter individual customer water consumption. The decision to install a metered service connection may have ramifications when establishing connection and customer facility fees. The cost of metering needs to be balanced against the benefits and the increased equity in billing customers. In some cases, regulatory orders, local ordinances, or resolutions require the installation of meters for all customers.

Additional factors related to the installation of service line appurtenances may have a significant bearing on the proposed installation pricing structure. One factor is determining where the utility's responsibility for the cost of the installation ends and where the customer's responsibility begins. Often, the responsibility shifts at the customer's property line. The issue of cost responsibility is not so clear if the utility must

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incur significant costs to extend the existing system to the customer's property line. In this case, it is likely that the customer would bear a portion or all of the costs to extend the system to the property line. After the responsibilities of the utility and the customer are determined, it is relatively simple to calculate the associated fee or charge.

Typically, a residential service connection involves the installation of connection facilities (including a corporation stop, service line, curb stop, and miscellaneous fittings) and customer facilities (including the meter box, meter, and miscellaneous fittings). It is common practice for utilities to install this equipment in the road right-of-way up to the customer's property line. This delineates a clear point of cost responsibility and establishes a level of consistency relative to the average cost of a service connection. Utility systems in areas that experience freezing temperatures may require meters to be installed inside the customer's facility.

In contrast to the basic installation of a residential service connection, large, complex service connections that serve high-rise buildings, shopping centers, industrial sites, and high-density apartment complexes involve far greater capital investment. In these situations, capital costs typically vary significantly from one location to another.

It is important to determine the portions of the connection and customer facilities that will be capitalized, rather than expensed, by the utility. This has specific ramifications for utilities that calculate general water rates according to the utility method of developing revenue requirements, where the calculation of rate base is required.

CALCULATION OF CONNECTION AND CUSTOMER FACILITY FEES

Direct Costs

The first step in the process of determining connection and customer facility fees is to collect data on both direct and indirect costs. Individual work orders provide a primary source of direct-cost data. By examining historical work orders, one can determine the consistency in the cost and type of materials used, the amount of time and cost for labor, and the cost associated with equipment. Analysis of work orders as well as inventory reports also may yield information about how these costs fluctuate with the size of the connection. Average costs for each component of the installation can be calculated from an examination of the direct-cost data. Because future costs often vary from historical costs, it is appropriate to use an allowance for inflation when forecasting costs for parts and materials. This escalation may be appropriate when fees are being set for several subsequent budget years.

Direct labor rates also need to be examined to determine the average labor cost of installation. Often, this is done by considering the staff positions required and is based on personnel cost records and related pay rates for these positions. Typically, estimated hourly labor costs are forecast based on expected salary increases. Total labor costs are based on estimated hourly salaries in conjunction with expected hours of labor.

Equipment costs can be developed based on accounting data, including depreciation and maintenance records. The average cost of renting similar equipment is sometimes used for these estimates.

Indirect Costs

Indirect costs should also be factored into the development of appropriate connection fees. These costs are not directly attributed to one specific cost center and generally

Table 1-1 Calculation of connection and customer facility fees

	Labor Costs		
	Current Direct Labor Cost, \$/h	Adjusted Direct Labor Cost (3 years),* \$/h	Fully Loaded Rate,† \$/h
Crew foreman	11.00	11.88	23.76
Crew member	8.00	8.64	17.28
Engineering technician	10.00	10.80	21.60
	Materials Costs		
	Current Cost by Meter Size		
	¾ in., \$	1 in., \$	1½ in., \$
<i>Connection Facilities</i>			
Asphalt repair (25 ft ²)	136.25	136.25	136.25
Service line (30 ft)	6.62	14.80	16.00
Corporation stop (1)	8.61	15.99	20.95
Miscellaneous fittings	6.00	12.00	18.00
Total current cost	157.48	179.04	191.20
Adjusted cost (3 years)‡	170.08	193.36	206.50
<i>Customer Facilities</i>			
Meter box (1)	41.15	106.20	125.00
Meter (1)	31.00	94.90	210.00
Saddle (1)	10.50	12.75	18.90
Total current cost	82.65	213.85	353.90
Adjusted cost (3 years)‡	89.26	230.96	382.21
	Equipment Costs		
	Current Cost, \$	Adjusted Cost (3 years),‡ \$	
Compressor	9.00/h	9.72/h	
Backhoe	22.00/h	23.76/h	
Service truck	0.35/mi	0.38/mi	

*Reflects salary inflation allowance—1.08.

†Indirect cost rate multiplier to include all applicable administrative and general and overhead related costs—2.00.

‡Reflects material and equipment inflation allowance—1.08.

include, but are not limited to, such overhead items as administrative salaries, administrative supplies, and employee fringe benefit programs. Both direct labor costs, as well as materials, supplies, and equipment expenses, should include an allowance for indirect costs. Typically, an indirect cost multiplier, obtained by relating the indirect costs as a percentage of direct costs, is used to establish a "fully loaded" cost.

Tables 1-1 through 1-3 illustrate the calculation of a connection fee and a customer facility fee for a projected three-year period. The tables show the determination of average current cost, inflated for expectations of direct costs, and the use of an indirect cost multiplier to account for all indirect costs as a function of direct labor.

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State commissions may not allow the projected three-year method to be used for investor-owned or regulated government-owned utilities. The method allowed by a particular state commission should be followed in determining appropriate costs for use in that particular jurisdiction. Also, if an inside meter setting is used, costs associated with that type of installation would be applicable; this would eliminate the outside meter box but would include a meter yoke and possibly installation of a remote reading device.

A summary of the information obtained when gathering data to determine indirect costs is provided in Table 1-1. The table is divided into three sections. The top portion lists applicable utility staff positions, current average hourly salaries, and projected average hourly salaries. Projected hourly salaries are based on the current hourly salaries multiplied by an expected average wage increase. In addition, an indirect overhead multiplier is applied to compensate for fringe benefits and other costs related to administrative, general, and indirect overhead.

The middle section of Table 1-1 lists typical materials and their per-unit cost. In the example, costs are escalated by applying an estimated allowance for inflation.

The current equipment costs shown in the third section of the table are based on average unit costs for the types of equipment required. Future equipment costs are estimated based on the same inflation allowance used for materials costs.

Based on historical records obtained during the data gathering phase, the average time required for each crew member to install a new connection was multiplied by the hourly labor rates from Table 1-1 to determine total labor costs (see the labor costs sections of Tables 1-2 and 1-3). It is assumed that the number of hours

Table 1-2 Calculation of connection fees

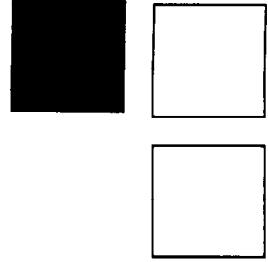
		Connection Fee by Meter Size		
	Quantity, <i>h</i>	$\frac{3}{4}$ in., \$	1 in., \$	$1\frac{1}{2}$ in., \$
Labor Costs				
Crew foreman	1.5	35.64	35.64	35.64
Crew members (2)	3	51.84	51.84	51.84
Engineering technician	0.5	10.80	10.80	10.80
Subtotal		98.28	98.28	98.28
Materials Costs				
Subtotal		170.08	193.36	206.50
Equipment Costs				
Compressor	1.5	14.58	14.58	14.58
Backhoe	1.5	35.64	35.64	35.64
Service truck	10.0 mi	3.80	3.80	3.80
Subtotal		54.02	54.02	54.02
Total Connection Fee		322.38	345.66	358.80

Table 1-3 Calculation of customer facilities fees

		Customer Facilities Fees by Meter Size		
	Quantity, <i>h</i>	$\frac{3}{4}$ in., \$	1 in., \$	1½ in., \$
Labor Costs				
Crew foreman	1.0	23.76	23.76	23.76
Crew members (2)	2.0	34.56	34.56	34.56
Engineering technician	0.5	10.80	10.80	10.80
Subtotal		69.12	69.12	69.12
Materials Costs				
Subtotal		89.26	230.96	382.21
Equipment Costs				
Compressor	1.0	9.72	9.72	9.72
Backhoe	1.0	23.76	23.76	23.76
Service truck	10.0 mi.	3.80	3.80	3.80
Subtotal		37.28	37.28	37.28
Total Customer Facilities Fee		195.66	337.36	488.61

required for each crew member is the same for all three meter connection sizes. This may vary for each utility, and actual field experience should be relied on in establishing charges for a particular utility.

The total average materials costs as developed in Table 1-1 are further developed in Tables 1-2 and 1-3. Similarly, Tables 1-2 and 1-3 state the expected equipment cost, obtained by applying the required number of hours or miles to the equipment rates developed in Table 1-1. Finally, all costs are totaled and the connection and customer facility fees are shown in Tables 1-2 and 1-3, respectively.

*Chapter* **2**

Policies and Procedures for Water Service Extension

Policies and procedures regarding cost responsibility for providing distribution mains and other local facilities for water service extension vary considerably in the utility industry. Such variations may result from local conditions and factors that relate to growth and levels of service provided by the utility. Policies also differ between investor-owned and government-owned utilities. This chapter provides general guidance in establishing cost responsibility for local facilities.

The provision of water service is characterized by several distinct functions:

- water supply (surface supplies and groundwater)
- source water conveyance through source water transmission lines and source water pumping
- purification and treatment facilities, including clearwell storage and high-service pumping
- treated water transmission mains
- booster pumping
- treated water storage (elevated and ground)
- distribution mains
- connection facilities
- customer facilities

Generally, it is the responsibility of the utility to design and build facilities that meet customer water supply needs. As discussed in chapter 3, the financing of these facilities may be shifted, in part, to new customers through the assessment of system development charges.

12 WATER RATES AND RELATED CHARGES

In the design and construction of local facilities, there is often a partnership between a utility and a developer or applicant for service. It is difficult to frame generalizations about the construction requirements associated with a request for new service. Growth will likely occur as speculative in fringe areas, developmental in suburban areas, or individualized within the core of a community. Individualized growth may require only construction of the metering, service line, and related facilities necessary to tap into an existing water main. A new housing development will require an approach main and on-site development of facilities within the plan. Additional off-site facilities, such as storage and pumping, may be needed. Backbone facilities may be necessitated by developmental growth and required by speculative growth. Speculative ventures are more likely to occur in areas where water service is not currently available. Thus, comprehensive development of off-site facilities, that is, transmission, pumping, storage, and even treatment and supply, often is necessary to extend water service to a speculative area.

The capital-intensive nature of the design and construction of on-site and off-site facilities to serve developmental and speculative growth, in particular, necessitates consideration of a number of related policy issues. First, the issue of who pays and when must be addressed. As water providers have become burdened with capital requirements for renewal, replacement, or water quality compliance, sometimes little additional investment capital remains for expansion. At the same time, growth may be beneficial for leveraging the fixed costs of providing water service to the community. Thus, an equitable basis for cost sharing between the utility and the developer may be appropriate. Many communities have adopted service extension policies that establish uniform requirements and procedural standards for the amount and timing of up-front payments as well as any developer design and construction responsibilities. State commissions have instituted rules of practice concerning advances for construction or contributions in aid of construction (CIAC) as they relate to the extension of service by regulated water utilities. A standard review and approval process is activated with each request for new service. Typically, mandatory connection to the water system is required.

Determining responsibility for the construction of certain facilities is an important issue relating to the extension of service. A water utility may choose to share the construction of certain facilities with the developer. For example, it may be necessary to design and construct elevated storage to serve a new development. In some instances, the developer may be responsible for the construction of the storage tank based on the specifications and subject to the final inspection of the utility. Other utilities may require the developer to advance the monies required for utility construction of the facility.

A number of related issues are important to this process. The basis for cost determination (that is, actual cost, pre-established unit costs, or bid costs) and its uniformity or application needs to be addressed. Performance and warranty bonds may be required, and an appropriate basis for assessing a proportionate share (or all) of the cost of the added facility must be determined. In certain cases, credits may be provided to the developer based on the number of new connections completed over a period of time.

Utilities often require facilities to be oversized to provide for expected increases in demand that may result from the initial development. For instance, a developer may require only an 8-in. distribution main to serve the incremental resident and fire demand of the current development. However, the utility may choose to require a

12-in. line in anticipation of subsequent development extending off the same line over a planned future period. In such instances, the cost of oversizing should be delineated and borne by the utility.

To summarize, the following issues should be addressed as a part of the service extension process:

- cost responsibility for design and construction
- basis for cost sharing between the utility and the developer or applicant for service
- basis for cost determination (actual cost incurred, pre-established unit prices, or estimated cost)
- responsibility for the construction of facilities
- need for performance bonds and warranty bonds
- basis for assessments on the properties (e.g., total cost of new facilities or a portion of the cost)
- credits provided (to a developer) based on the number of new connections for a defined period of time
- oversizing of facilities to accommodate system demand beyond what is needed for the immediate extension. If oversizing is implemented, cost responsibility for the oversizing should be established.
- review and approval process for the development plan
- mandatory connection to the water system

EXTENSIONS FOR NEW DEVELOPMENT

For new developments on parcels of land that are undeveloped or where no infrastructure improvements have been made (i.e., no streets, water system, sanitary sewer system, electric, gas, telephone, or storm drainage facilities), it is common practice for water utilities to require a developer to pay the full cost associated with the design, construction, and testing of water distribution system facilities. A utility may require the developer to design the improvements and submit the engineering design to the utility for review and approval. Often, the developer is then required to construct the water system extensions subject to inspection by the utility.

Often it is necessary to distinguish between on-site and off-site water facilities. On-site facilities are defined as water facilities located within a new development. Off-site facilities are water facilities that must be designed and constructed to provide water to the boundary of the new development. Typically, the developer (applicant) is responsible for all or most of the costs of on-site facilities. The cost of developing off-site facilities is just as likely to be borne by the utility or the developer or both, depending on the water provider's jurisdictional control.

The jurisdictional authority rests with the regulatory body empowered to govern the territory served by the water provider. Most municipal water utilities are regulated under municipal ordinance or resolution. Independent authorities may be empowered to serve by state statute. Investor-owned utilities and municipalities serving areas outside of the municipalities jurisdictional limits may be subject to regulation by the state public utility commission.

Local governments typically require the developer to construct all on-site facilities to specification and contribute those facilities to the municipality. In contrast, state public utility commissions generally require a regulated water utility to participate in an on-site distribution system investment to serve new customers.

However, public utility commission practice varies by state, and there are exceptions. Some commissions base the amount of distribution system capital to be contributed by the water utility on a revenue test—that amount of additional revenue to be produced on a per-customer basis. Differences may exist among states on the recording of up-front payments made as either contributions in aid of construction or advances for construction. The taxability of the developer contribution must be addressed by utilities regulated by state commissions; taxability of contributions may be subject to varying treatment by various state commissions.

A utility should not risk public capital investment in supporting private development (unless such action has been specifically authorized by the utility's governing body). Therefore, on-site facilities are the responsibility of the developer, and off-site facility investment by the utility should be limited to improvements that clearly benefit, either now or in the near future, the utility and its customers.

Off-site investment can be delineated as:

- facilities that predominantly or exclusively benefit the applicant
- facilities that benefit the system (i.e., common-to-all facilities)

Utility investment in off-site facilities that predominantly or exclusively benefit the applicant should be limited to an amount that the utility can reasonably expect to recover through additional revenue within a reasonable period of time. Utility investments in off-site improvements that benefit the system as a whole can be economically justified. An allocation of costs must be made to determine which off-site expenditures principally benefit a new development and which off-site improvements principally benefit the system. If the off-site improvements benefit both the developer and the system, then cost sharing is appropriate.

If the developer is required to finance off-site facilities that generally benefit the entire system, the utility may provide a mechanism to reimburse the developer. Generally, reimbursement is limited to a portion of revenues received from connection charges or from a portion of water sales revenues from customers in the new service area. As new connections are made, the developer receives (at the end of each year) reimbursement equal to a specific dollar amount per connection multiplied by the number of new connections made during the year. A time limitation for the reimbursement is generally established (e.g., 10 years) beyond which, if the developer has not been fully reimbursed, no further reimbursement is provided. The dollar amount per connection and the length of time to provide reimbursement would be established by the utility or by the regulatory authority for regulated utilities based on local conditions and policies. If the utility makes an investment in the off-site facilities, the utility may reimburse itself (again based on new connections) before providing reimbursement payments to the developer. Other reimbursement arrangements are possible.

Performance Bonds

If the developer or applicant for service proceeds with the construction of water facilities, it is recommended that the developer provide performance bonds to ensure that construction of the water facilities is completed. A performance bond protects both the utility and the customer who will connect to the system. If the developer is financially unable to complete the extension of service, then the utility can exercise the provisions of the performance bond and require the construction be completed. Upon completion of the distribution facilities, final testing is conducted in accordance with the standards of the utility.

Oversizing Facilities

In certain instances a utility may require a developer to oversize water distribution facilities beyond what is needed to serve the particular development. This requirement for additional capacity ensures that the new facilities are compatible with overall system planning requirements. Requiring additional capacity (oversizing) reduces overall utility investment by eliminating the potential need for duplication of facilities to serve future development.

To determine how much additional capacity is needed, a hydraulic analysis must be undertaken to define the size of facilities (storage, pumping, and mains) for the new development. Then, the results are compared with the water distribution master plan for the utility's service area. Utilities should have the authority to require the developer to build oversized facilities; however, an appropriate portion of the oversizing costs should be paid by the utility.

The requirements for additional capacity often are defined through formal agreements between the utility and the developer. In some cases, there may be a three-way contract among the utility, the developer, and the contractor. Compensation to the developer for building the additional capacity falls into three categories based on:

- the actual cost of work performed
- an agreed-on unit price for actual quantities placed in service
- a dollar amount agreed to in advance of construction

Often, when the developer is required to provide the initial, or up-front, financing for oversizing, there is a reimbursement contract established between the developer and the utility. Under such a contract, as additional customers outside of the developer's subdivision area connect to the oversized main extension, the original developer is paid an established unit cost per customer connected until the developer is fully reimbursed for the cost of oversizing. There is typically a time limit (e.g., 10 years) established for these types of reimbursement contracts.

Before the utility enters into these contractual agreements, appropriations for such work must be authorized by the utility's governing body. Additionally, a source of funds for the utility's cost participation must be identified. The sources of funding generally are:

- pay-as-you-go funding (often referred to as equity funding or the use of current earnings produced from general water rates)
- bonds (typically revenue bonds)
- retained earnings

The process described ensures that capital costs associated with extending service to new development are carried by the entities that will directly benefit from the service. The developer pays the cost of design and construction of water main extensions and recovers the cost through the sale of the land to a builder, homeowner, or water customer. Additionally, requiring that engineering plans be reviewed by the water utility and other appropriate regulatory agencies ensures that (1) main extensions are consistent with the utility's design, construction standards, regulatory policy, and the long-range water distribution master plan; and (2) the main extensions can be fully integrated with the existing water system.

DESIGN AND CONSTRUCTION OF WATER MAINS FOR REDEVELOPMENT

For areas that are changing dramatically in land use and density, local policies dictate whether the utility is obligated to provide an enhanced water distribution system. In situations where a developer has purchased many individual parcels and a new subdivision is being platted with street closures and utilities abandoned in place, the developer may be assessed costs associated with the design and construction of water mains to serve the redeveloped area. The process of determining both the developer's and the utility's responsibilities for this type of redevelopment is the same as if the redevelopment were a new development. (Refer to previous section on extensions for new development.)

Redevelopment usually occurs where there is a change in land use and density but streets are not necessarily closed and utilities are not abandoned. In some jurisdictions, the developer may be required to design and build new, upgraded facilities to serve the redevelopment if the existing mains do not have sufficient capacity or reliability to serve the redeveloped area. Some jurisdictions strongly encourage redevelopment of areas (such as a downtown area), and in those instances the utility may be obligated to upgrade facilities and absorb the cost. The trade-off for such investment could be an increased revenue base for the utility and an increased tax base for the municipality.

EXTENSIONS TO SERVE DEVELOPED AREAS SERVED BY INDIVIDUALLY OWNED WELLS

The design and construction of water distribution facilities to serve areas that are essentially fully developed but are served by individual private wells may be the responsibility of the utility. Policies vary greatly regarding the conditions under which the local utility is required to extend service to such areas.

The utility may elect to extend service to such previously developed areas to respond to some or all of the following:

- abandonment of contaminated wells (usually documented or required by the local or state health department)
- unacceptable supply or insufficient flow of well water
- property owners' petition for service
- property owners' offer to contribute to the cost of the extension

In almost all cases, property owners petition the utility to extend service because of either water quality or quantity problems associated with their individual wells. The local or state health department should provide documentation to support claims of poor water quality or quantity. For residential usage in an area served by individual wells, both water quality and quantity can vary. For that reason, the local health department and the utility should obtain a representative sample of water from area wells to decide whether extension of public water service is justified. Many problems with individual wells can be corrected by the construction of a new well, redevelopment of an old well, or addition of treatment facilities for the existing well.

A utility may develop a policy for extending service by simply requiring that a certain percentage (i.e., 50 percent) of the property owners in an area petition for

public water service. Such a policy may be supported by the utility's mission to provide public water service to all customers in its service area.

When a utility decides to extend service, several significant policy issues should be addressed:

- requirement for all property owners to connect to the public system (For example, does the utility have a mandatory connection policy or ordinance, or does it have authority to require a connection?)
- handling later connections if all property owners are not required to connect to the new distribution main
- authority of the utility to assess property owners for water system improvements
- responsibility for the cost for extending service
- assessment of fees for new connections and timing of collection
- requiring cross-connection control, such as backflow prevention devices, to protect the integrity of the public water supply

Mandatory Connection Policy

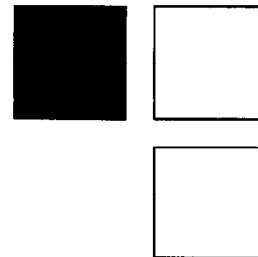
Some government-owned utilities have a mandatory connection policy that applies to cases in which the utility may not be able to afford to extend service to a developed area without assurance that new connections will be made. A master resolution that authorizes revenue bonds may contain language that requires the utility to have a mandatory connection ordinance. A policy or ordinance that requires all existing properties to connect to the system can create public relations difficulties for the utility. Not all property owners may have petitioned for the provision of public water service. With a mandatory connection policy, all property owners would be required to connect with the extension of service.

The requirement to connect can be mitigated by allowing a period of time, perhaps 12 months, for customers to connect after the service has been provided. Also, the utility may offer financing for new connections. For example, the utility may allow fees or assessments to be paid over a number of years with a nominal interest rate.

Who Pays the Extension Cost?

Generally, the utility provides the necessary funds to pay the cost of both design and construction of such extensions, but it is common practice for the benefited property owner to share in the cost. Local policies dictate the amount of cost sharing and the method of cost recovery. Policies vary from 100 percent of the extension cost assessed to the property owner to no assessment. Both of these extremes may appear unreasonable, and consequently, it may be appropriate to provide for some cost sharing between the utility and the property owner to reflect the relative benefits received.

Some government-owned utilities have the authority under state law to establish a special assessment district and recover the cost of extending service through the levy of special assessments. A special assessment may be paid in a lump sum or by installment in accordance with terms of the authorizing ordinance and state law.



Chapter 3

System Development Charges

The construction and financing of infrastructure are traditional utility functions. Customers expect their local water utilities to provide safe and reliable water service and facilities. Utilities use many different methods for funding. Five sources of water utility capital are pay-as-you-go financing through user rates, debt financing, system development charges (SDCs), up-front reimbursement from developers, and stock issuance. Debt financing requires future repayment from revenues, primarily through user rates, and stock issuance is available only to investor-owned utilities.

Throughout the United States, SDCs (also referred to as impact fees, plant investment fees, and various other names) are used to finance some capital improvements. Special charges for new developments date back to the 1930s. SDCs are more frequently used as a source of capital financing in large- and medium-sized urban areas or in high-growth locations. Existing customers in regions with extensive growth or potential growth may benefit greatly from these charges. SDCs permit the cost of growth to be carried, at least in part, by those causing the growth rather than being entirely recovered from existing customers.

Though new development in a water utility's service area is generally viewed as positive, the appropriate source of funding for system expansion is a recurring issue. During times of extensive system growth, the utility must expend funds to provide service to the new development. An SDC is one method of funding new facilities. Those facilities most commonly financed with SDCs include backbone facilities, such as source of supply, source water transmission, treatment facilities, high-service pumping, and major transmission mains. Depending on local circumstances or applicable state statutes, the costs of distribution mains and other facilities also may be recovered by the SDC.

SELECTING A METHOD BASED ON FINANCIAL GOALS AND OBJECTIVES

The first step in implementing SDCs should be identifying the objectives to be achieved by the management of the water utility's services. These objectives might include

- have new development pay its own way
- fund major system expansion
- generate sufficient cash to fund a portion of capital improvements
- minimize debt
- equitably recover capital costs from current and future customers
- maintain appropriate level of retained earnings and cash reserves to meet the system's needs

Though SDCs can be used to minimize the amount of debt financing required for capital expansion, these charges may not entirely eliminate the need for future debt issues. The decrease in debt financing needed will, however, reduce debt service costs included in utility rates. Additionally, SDCs may allow a utility flexibility in timing debt issuance. For example, with sufficient funds from SDCs, the utility may be able to delay a debt issuance to avoid a period of high interest costs. In most situations, the utility will not collect sufficient funds from SDCs in the short term, or perhaps even in the long term, to fully fund a major system expansion.

Some groups have opposed the implementation of SDCs. Frequently opposition results from a lack of understanding of the purpose and use of the charges. Builders and developers have opposed the charges because they add to up-front development costs. However, in some communities, builders and developers support SDC implementation because the utility could not otherwise finance the facilities needed to accommodate growth of demand.

The implementation of SDCs should be guided by

- financial objectives of the utility
- generally accepted water utility industry financing and pricing practices
- compliance with any local and state legal and regulatory requirements
- equity
- uniform and consistent methodology

An SDC is a financial commitment on the part of both the utility and the development community. Developers are committing funds to provide for utility expansion; the utility is committing to ensure the utility's services are available when they are needed.

LEGAL ISSUES RELATED TO METHODOLOGY

The preliminary planning to establish an SDC should include a review of the legal authority and issues associated with capital recovery in the utility's operating environment. Legal authority may be granted through enabling legislation, state statutes regarding general law or home rule authorities, local charter, utility operation permits, utility service certifications, or judicial rulings.

At the time of this writing, 30 separate pieces of legislation related to SDCs and impact fees in 25 states have been identified. A brief description of this legislation is included in Table 3-1. Some of the states, e.g., Pennsylvania, Texas, New Jersey, and

Table 3-1 Survey of legislation related to system development charges (SDCs) and impact fees

State	Statute	Effective Date	Description
1 Arizona	Rev Statute Ann. § 9-463.05 (Supp. 1988)	1982	Cities and towns empowered to assess impact fees for development of public services that result in a beneficial use to the development. Fee must bear a reasonable relationship to burden imposed in providing the additional public services.
2 California	Calif. Gov. Code § 66477, 65970, 66483, 66484.4, 66484.5 (West-1983)	1983	Municipalities authorized to assess fees for parks, recreation, schools, drainage, sewer, roads, bridges, and recharge facilities to the extent that there is a relationship between the exaction and the needs of the subdivision.
3	CPUC Rules for Regulated Utilities serving 2,000 or fewer customers	—	CPUC empowered to permit regulated utilities to impose a facilities fee to cover proportionate share of the production, storage, and distribution facilities needed to provide new service.
4 Colorado	Colo. Statute, Title 29, Part B	1991	Land development charges broadly applicable to local governments for construction, redevelopment or conversion of land use resulting in an increase in the number of service units.
5 Florida	Fla. Stat. § 163.3202(3)	1989	Statute providing general endorsement of the imposition of impact fees by municipal governments.
6	Fla. Stat. § 367.101	—	Empowerment of FPSC to set just and reasonable charges for public utility service availability.
7 Georgia	Georgia Development Impact Fee Act Ga. Code Ann. § 36-71-1-13 (Supp. 1990)	1990	Development impact fees imposed upon development as a condition of approval to pay for a proportionate share of the cost of new public facilities needed to serve new growth and development.
8 Hawaii	Ha. Stat.—formerly H.B. No. 3787 (1992 New Laws, p. 2849)	1992	Counties authorized to assess impact fees to develop public facilities identified in a needs assessment study. Specific formulation for collection and refund is required.
9 Idaho	Development Impact Fee Act (1992 New Laws, H.B. No. 805, p. 995)	1992	Governmental entities empowered to impose impact fees as a condition for development approval. Specific formulation of the fee for collection and refund is required.
10 Illinois	Ill. Rev. Stat. Chapter 121, para. 5-901	1991	Local power to assess impact fees for road improvements.
11 Indiana	Series of Statutes (1991 New Laws, H.B. No. 1467, p. 903)	1991	Governing units are authorized to impose a single and unified fee on new development contingent upon comprehensive planning.
12 Maine	Me. Rev. Stat. Ann. Title 30-A § 4354 (Supp. 1991) (Supp. 1991 New Laws, H.B. No. 44, p. 245)	1989	Impact fees may be enacted by municipalities under ordinance to recognize the reasonable share of the cost of expansion or replacement of infrastructure facilities related to a development. Recent amendment permits municipalities to assess the entire cost of the improvement to the developer benefiting from its development even if the improvement was completed prior to development.
13 Maryland	Md. Rev. Stat. Chapter 0559 (H.B. 883)	1993	System development charges authorized to be assessed by Washington Suburban Sanitary Commission under specific formulation and regulated by the Montgomery and Prince George's County Council.

Table continued next page

Table 3-1 Survey of legislation related to SDCs and impact fees (continued)

State	Statute	Effective Date	Description
14 Massachusetts	Chapter 716 of the Mass. Acts of 1989, Section 2 (m)	1989	Empowerment of Barnstable County to impose fees to offset the impacts of the creation or improvement of streets, sewers, water supplies, parks, schools, affordable housing, and similar capital facilities.
15 Nevada	Nev. Rev. Stat. § 27813.010-320	1989	Cities and counties empowered to assess impact fees on new development to finance public capital improvement or facility expansion reasonably necessitated by and attributable to new development.
16 New Hampshire	N.H. Rev. Stat. on Impact Fees (New Laws, H.B. No. 391, p. 933)	1991	Authorizes municipalities to use impact fees as land-use control device in conjunction with building permits or appropriate approval. Fees designed to mitigate development impacts of public facilities and services, including roads, schools, recycling, library facilities, and water and sewer systems.
17 New Jersey	N.J. Rev. Stat. § 40:14B-21 [Excerpted from Municipal Utilities Authorities Law]	1986	Municipal authorities empowered to collect tapping fees under specific formulation for direct or indirect connection or use of the water or sewerage system. Charges may include actual connection costs and debt service and must be recomputed annually.
18 New Mexico	N.M. Development Fees Act (S.B. 361)	1993	Municipal and county governments empowered to impose impact fees on new development to recognize the costs of capital improvements or facility expansion necessitated by and attributable to new development. Specific formulation is required under statute.
19 North Carolina	Formerly H.B. 690, Chapter 357 Article 4. Impact Fees	1985	Towns empowered to impose fees on developments bearing a reasonable relationship to that development's fair share of the costs of capital improvements needed in part due to that development.
20 Oregon	Ore. Stat. § 223.297-314	1989	Municipalities empowered to impose system development charges at issuance of permit or connection to the capital improvement. Act applies to water, wastewater, drainage, transportation, and parks and recreation. Future system users to contribute no more than an equitable share of the cost of existing facilities.
21 Pennsylvania	Pa. Act 203 Revising Pa. Municipal Authorities Act Section 4, § (t) as Amended	1991	Municipal authorities empowered to impose tapping fees (composed of capacity, distribution/collecton, special purpose, and reimbursement components) to individuals and developers for the extension of water and wastewater facilities to provide new service. Specific formulation is stipulated under the Act for determination of the permissible level of the charge for local enactment. The Act recognizes the cost of both existing and new facilities required to provide new service.
22	Pa. Rev. Municipal Planning Code as Amended	1989	The amendment authorizes use of transferable development rights with provisions for subdivision ordinances such as nonconforming lots and uses, mediation, police power, and fees for various improvements outside development.
23	Pa. Rev. Stat. (1990 New Laws, H.B. No. 1361, p. 1945)	1991	Municipalities empowered to impose impact fees under ordinance for off-site transportation capital improvements. Statute requires completion of construction within 3 years or subject to refund.

Table continued next page

Table 3-1 Survey of legislation related to SDCs and impact fees (continued)

State	Statute	Effective Date	Description
24 Tennessee	Public Acts 1988 (H.B. 1956, Chapter 1022)	1988	Metropolitan governments with populations of 450,000 to 600,000 are authorized to assess an impact fee to pay for a proportionate share of the public facilities required to serve applicable developments. A needs assessment must distinguish between existing deficiencies and new development requirements.
25 Texas	Tx. Stat. § 395.001-395.025 (S.B. 336)	1989	Political subdivisions with capital improvements planning evidencing the need for system expansion or improvements necessitated by and attributable to new development are empowered to impose impact fees to finance the construction of off-site facility expansions for water, sewer, road and drainage facilities. All revenue collections from this source must be earmarked to retire the cost of the capital improvement originally designated. Impact fee proceeds must be expended within 10 years or are subject to refund.
26 Vermont	Vt. Stat. Ann. Title 24, § 5200-5206 (Supp. 1989)	1975	Enabling legislation enacted explicitly to permit agricultural conversion fees.
27 Virginia	Va. Code Ann. § 15.1-498.1 (HB. 1485)	1989	Empowered certain counties, cities, and towns to impose impact fees to offset the cost for road improvements attributable to the development if supported by needs assessment and road improvement plan.
28 Washington	Wash. Rev. Code § 39.92.010 to 39.92.901 (S.B. No. 6013)	1989	Metropolitan municipal corporations providing trunk, treatment, and disposal of sewage are authorized to impose a capacity charge on their facilities' users when the user connects to system.
29	Wash. Rev. Code § 36.73.120)		Authorized transportation districts to adopt impact fees.
30 West Virginia	W.Va. Code § 7-20-1-10 (Supp. 1990) Local Powers Act	1990	Counties with an average population growth of at least one percent per year over the prior five years are permitted to impose impact fees for water works; wastewater treatment and disposal; sanitary and storm water; drainage; public primary and secondary school; public road; park and recreation; police, fire and emergency facilities. Comprehensive planning must be prepared every 5 years accompanied by comprehensive zoning and subdivision control ordinances. Impact fees assessed against new development may not exceed the actual proportionate share of any benefit realized relative to the benefit to the resident taxpayers.

Source: Clark (1994).