

# NCHRP

## SYNTHESIS 459

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

### Using the Economic Value Created by Transportation to Fund Transportation



***A Synthesis of Highway Practice***

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## NCHRP SYNTHESIS 459

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# Using the Economic Value Created by Transportation to Fund Transportation

### *A Synthesis of Highway Practice*

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**Cover figure:** Funding and financing of urban investments: Tapping land development.  
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## FOREWORD

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, “Synthesis of Information Related to Highway Problems,” searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

## PREFACE

*By Jo Allen Gause  
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This report presents information on financing mechanisms used by transportation agencies to capture a portion of the economic value created by public investment in transportation infrastructure to fund transportation improvements. The report provides an overview of ten types of “value capture” mechanisms and presents case examples of how transportation agencies have used these mechanisms to help fund specific highway projects.

Information used in this study was acquired through a review of the literature and interviews with agency staff involved with implementing value capture mechanisms presented in the case examples.

Sharada R. Vadali, Texas A&M Transportation Institute, College Station, Texas, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable with the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

## ACKNOWLEDGMENTS

The research reported herein was performed under NCHRP Project 20-05 by the Texas A&M Transportation Institute, a member of The Texas A&M University System. The author would like to acknowledge Dr. Rafael Aldrete for his initial contributions to this research study. Thanks are extended to Juliet Valejo, who helped in survey coding. The development of the case examples in chapter three and the findings in chapter four would not have been possible without the cooperation of knowledgeable state transportation personnel. Nineteen responses to the synthesis screening survey helped guide the selection of case examples. The author is indebted to those state DOT offices listed in Appendix B that participated in the screening survey and to those who participated in the follow-up interviews or responded directly via e-mail. Their

responses to the follow-up interviews reflected the degree of their understanding of the importance of this synthesis topic. Officials in the case example agencies took the additional time to define and describe their proposed case, send documentation of relevant information including project maps and signed agreements, participate in follow-up telephone interviews, and review drafts of their respective cases. Members of the Missouri Department of Transportation and the Virginia Department of Transportation went the extra mile in providing all the relevant information and providing contacts. The author thanks all respondents from all agencies for their extensive cooperation.

The author would like to thank the positive contributions and insights of all topic panel members as well as the project director, Ms. J.A. Gause.



# CONTENTS

1	SUMMARY	
5	CHAPTER ONE INTRODUCTION	
	Background, Motivation, and Study Objectives, 5	
	Methodology and Study Approach, 5	
	Value Capture Defined, 6	
	Value Capture—Key Issues, 8	
	Synthesis Organization, 8	
	Summary, 8	
10	CHAPTER TWO OVERVIEW OF METHODS TO CAPTURE VALUE CREATED BY TRANSPORTATION INVESTMENTS— VALUE CAPTURE MECHANISMS	
	Literature Review of Value Capture Mechanisms, 10	
	Impact Fees, 11	
	Special Assessment Districts, 17	
	Sales Tax Districts, 21	
	Negotiated Exactions and Contributions—Description, 22	
	Air Rights—Description, 23	
	Joint Development—Description, 25	
	Land Value Tax—Description, 26	
	Tax Increment Finance—Description, 27	
	Transportation Utility Fees—Description, 28	
	Other Mechanisms—Description, 30	
	General Efficiency, Equity, and Other Considerations, 31	
	Summary, 32	
35	CHAPTER THREE CAPTURING THE VALUE: STATE-OF-THE-PRACTICE CASE EXAMPLES	
	Screening Survey Motivation and Criteria for Selection of Case Examples, 35	
	Preview of Case Examples Grouped by Geographic Scale, 35	
	Site- and Project-Level Mechanisms, 37	
	Corridor-Level Mechanisms, 53	
	District or Areawide Mechanisms (Programmatic Approaches), 70	
	Other Areawide or Regional Examples (Project and Programmatic Approaches), 82	
	Summary, 86	
87	CHAPTER FOUR SUMMARY OF FINDINGS AND COMMON THEMES	
	Findings from the Study, 87	
	General Implementation Findings, 87	
	Common Themes, 93	
	Summary, 97	

98	CHAPTER FIVE	CONCLUSIONS
		Study Objectives and Case Examples, 98
		Value Capture as a Net Generator of New Funds, 98
		Choosing a Value Capture Mechanism as Part of a Funding Mix, 98
		Challenges to Wider Implementation, 99
		Future Research Suggestions, 99
		Summary, 100
101	ACRONYMS	
102	REFERENCES	
107	APPENDIX A	SURVEY QUESTIONNAIRE
109	APPENDIX B	SCREENING SURVEY PARTICIPANTS/RESPONDENTS
110	APPENDIX C	INTERVIEW GUIDE
111	APPENDIX D	RESEARCH PROBLEM STATEMENT

# USING THE ECONOMIC VALUE CREATED BY TRANSPORTATION TO FUND TRANSPORTATION

**SUMMARY** Transportation agencies today face increasing challenges. Demands on the transportation system capacity continue to increase while public revenues dedicated to developing and maintaining that system are decreasing. In addition, capital and maintenance costs are rising. The inevitable result is a shortfall between available funds and revenues needed to maintain the system and a consequent deceleration of the implementation of needed transportation improvements.

State departments of transportation (DOTs) and other agencies charged with improving and maintaining the transportation network have had to become creative thinkers. Essentially, they are constantly trying to answer these questions:

- How can we do more with less?
- What efficiencies can we achieve by changing how we manage our assets?
- Are there other funding methods to help make up the shortfall?

Value capture (VC) is one mechanism for helping agencies meet these challenges. VC combines the concepts of measuring the aggregate benefit to stakeholders of a capital investment in a given transportation asset (e.g., a newly expanded roadway) and recapturing a portion of that benefit for the entity that funded the asset's development. In other words, determining VC involves quantifying, in dollars, the expected return to long-term stakeholders (e.g., landowners, developers, public agencies) on the capital investment and ongoing maintenance costs required to improve and sustain a discrete aspect of the transportation system. With that information, agencies can justify and employ various funding mechanisms (e.g., fees, taxes, etc.) to capture the value created by the investment, and use these funds to finance additional needed system improvements.

Transportation system stakeholders may be direct beneficiaries (travelers benefiting from the new facility or service) and indirect beneficiaries (those receiving benefits other than improved travel, such as landowners). Capturing a fair estimate of how indirect beneficiaries should be assessed to help fund system improvements has been difficult in the past. Value capture has evolved into an umbrella term denoting a wide range of mechanisms to fund transportation investments based on levying charges or fees on indirect beneficiaries. Doing so allows agencies to assess development costs on beneficiaries of the system and recoup those costs in a fair, accountable way.

This synthesis documents the current state of the practice with respect to how agencies capture the economic value created by transportation to fund the transportation system. This report examines the following aspects of VC in detail:

- Methodology underlying the concept.
- Legal framework enabling methods to be used for highway funding.
- Ways local partnerships facilitate the process.
  - Benefit areas using each mechanism.
  - Cost efficiency of each mechanism in terms of revenues raised compared with project needs and costs.
  - Challenges to be expected when adopting each strategy.

Value capture can, for example, help agencies assess project expansion benefits for justifying cost-recovery methods or identifying opportunities for private-sector participation in a construction project. To help practitioners better understand the context and uses for different kinds of VC mechanisms, this report uses case examples to discuss the implementation aspects, challenges, and benefits involved in adopting each of the 10 mechanisms, which are listed here.

- **Impact fees (IF):** one-time charges collected by local governments from developers to finance new infrastructure and services associated with new development.
- **Special assessment district (SAD):** an additional fee assessed on properties projecting a benefit owing to the geographic proximity of a new highway or transit facility. Typically, a vote of the district is needed for fees to be applied to an improvement. No projects can be undertaken without the district vote.
- **Sales tax district (STD):** a kind of SAD that requires those benefiting from the project to pay a limited sales tax instead of a property tax.
- **Negotiated exaction (NE):** one-time charges similar to IFs but not determined through a formal, formulaic process. Exactions can take the form of in-kind contributions to local road networks, parks, or other public goods as a condition of development approval, or they can be requested in the form of in-lieu fees.
- **Air rights (ARs):** a form of joint development in which development rights above or below highway or transit facilities are used to generate and capture an incremental increase in land value.
- **Joint development (JD; or public-private partnership):** development of a transit facility and adjacent private real estate wherein a private-sector partner either provides the facility or makes a financial contribution to offset its construction costs.
- **Land value tax (LVT):** a tax imposed on the value of land benefiting from transportation infrastructure.
- **Tax increment financing (TIF):** a mechanism allocating any increase in total property tax revenues toward public investment within a designated district.
- **Transportation utility fees (TUFs):** utility fees assessed on characteristics thought to be more closely related to transportation demand than property taxes.
- **Other mechanisms [e.g., transportation corporations (TCs)]:** funding tools used to build stakeholder support for any funding strategy.

Chapter two provides an overview of these mechanisms, including a discussion of the four purposes for using them: (1) recovering costs, (2) capturing project expansion benefits, (3) capturing opportunity for value creation and cost recovery, and (4) capturing opportunity for revenue sharing with the private sector. All mechanisms strive to support the principles of benefit equity and to signal appropriate pricing levels if well-defined boundaries of a benefit zone for a given project can be established. Little is known about cost-efficiency related to VC mechanisms or the ability of mechanisms to generate returns to cover project costs, so this synthesis provides new and important information in that regard.

Each mechanism is exemplified in chapter three by a case example that explores an agency's real-world experience. Other mechanisms, such as sales tax rebate agreements, are also explored. Chapter four summarizes findings of the synthesis, discusses benefits of employing VC mechanisms, and details future research needs in the field.

The methodology and study approach for this synthesis feature two primary components: a literature review and seven detailed and 15 short case studies of VC related to highway capital-cost funding. The case examples are based on the literature review, responses from a screening survey, and interviews with key staff involved in implementing mechanisms in their areas. Case examples were also identified from a screening questionnaire, which was sent to state DOT representatives on the Standing Committee on Finance and Administration (SCOFA) and the Standing Committee on Planning (SCOP), both AASHTO committees.

This synthesis groups VC mechanisms by scale of application (e.g., at the site/project level, corridor level, or county/city/regional level) and by whether or not they are applied as part of project-based funding or on a programmatic basis. The case examples document various elements of the mechanisms in terms of:

- Political acceptability.
- Transaction costs (including implementation-related costs to agencies) and general cost-efficiency.
- Practicality (e.g., design and implementation) considerations, including benefit zones.
- Roadway ownership (e.g., local or on the state system).
- Local partnerships involved.
- Equity with regard to burden across different income groups and equity of revenues and costs.

The studies also demonstrate macro- and micro-level variability in terms of pragmatic and technical aspects of implementation. Each example application presented in chapter three addresses the development, context, and implementation of a given project and showcases some or all of the considerations noted here:

- Background and context for the project and funding.
- Legal authority.
- Implementation issues, including design aspects of each mechanism (e.g., duration, revenue potential in relation to project needs defined by costs, performance, and consideration of equity), levy basis (who pays, the kind of funding mechanism involved, and what percentage is devoted to transportation), and area relevant to the project (boundary/service areas).
- Local partnerships, including the beneficiaries and, where possible, the project initiator(s).
- Lessons learned, as reported by respondents.

This report does not offer advice on the adoption of any specific mechanism or set of mechanisms. Each approach has its advantages and disadvantages, and not all mechanisms are equally applicable in all situations.

Based on the experiences of survey respondents and the findings of the state-of-the-practice review, VC mechanisms can be a helpful part of a mix of capital budgeting tools to fund infrastructure improvements. As noted by respondents, VC mechanisms are particularly valuable as short- to medium-term complementary funding solutions, especially when getting a project off the ground. Most mechanisms also demonstrate a moderate to high cost-efficiency factor. Mechanisms—such as assessment districts, TIF, and sales taxes that rely on healthy real estate markets and economies—require risk-management planning in the event that a decreasing market generates lower-than-expected tax revenues needed to meet debt or loan obligations. Many of the implementation considerations discussed are interconnected and typically are approached by feasibility assessments or studies conducted in early stages of adoption. This study provides examples that showcase how real estate risk can be handled in the planning process.

As discussed in chapters three and four of this report, several factors could facilitate or hinder the ability of agencies to adopt a mechanism, including:

- Coordination between multiple jurisdictions.
- Support from private developers and property owners.
- Project location and design.
- Macroeconomic conditions.
- Legal considerations.

Still, after multiple mechanisms' applications by all levels of agencies were studied, some common findings became evident:

- The need for a legal framework (which might require political will to implement) supporting the VC mechanism chosen.
- The need for a high level of collaboration and cooperation among stakeholders combined with a vision for the project area.
- The need for creative thinking regarding which mechanisms might be useful for a given project.
- The need for a vision to use these mechanisms as part of a strategy to complement a larger set of funding tools.
- The need to consider these mechanisms in the context of long-range plans, where possible.

There are three primary categories of VC mechanism benefits:

- **Accelerated delivery.** VC mechanisms facilitate project delivery by making investments available earlier in the development process.
- **Local funding matches.** In three of the case examples, revenues provided local fund-matching opportunities to finance project costs.
- **Getting a project off the ground.** VC mechanisms can identify scarce seed funding through revenue streams, such as loan or bond financing, and can become part of resource pooling strategy for most critical projects.

Topics addressed by the report's research recommendations include the following:

- Ways to engage stakeholders and identify beneficiaries.
- The need to more fully understand VC mechanism costs and benefits and how to integrate VC more effectively into planning processes.
- The impacts of example projects presented that have been under way for a while.

## INTRODUCTION

### BACKGROUND, MOTIVATION, AND STUDY OBJECTIVES

In recent years, smaller state and local budgets combined with growing transportation capital and maintenance costs have resulted in substantial shortages in transportation funding. With the growing realization that the cost of transportation will not be met sufficiently with existing funding mechanisms, new methods to aid the current system have been studied. This synthesis captures current state-of-the-practice mechanisms with respect to how agencies capture the benefits and seize the opportunities presented and created by transportation to fund transportation with a focus on value capture (VC) mechanisms. This synthesis is intended to provide transportation professionals and other practitioners interested in applying such mechanisms with insights into considerations in adopting some of these mechanisms for the purpose of funding transportation investments. Although the focus in this synthesis is on highway investment funding and finance, some of these mechanisms are common and equally applicable to transit. Through narrative and visual descriptions and discussions of the mechanism in general and in the context of case examples drawn from within the United States, this synthesis serves to inform the planning practice on the key points noted here:

1. It documents the state-of-the-practice VC mechanisms for capturing a portion of the economic value generated by public investment in transportation infrastructure to fund transportation improvements (with a focus on highway investments).
2. It identifies how the specific features of the ideal VC system are realized and furthers the understanding of the implementation of the mechanisms with respect to:
  - a. Who is the value realized for and how will that be captured?
  - b. What mechanism is used to capture that value?
  - c. How will the VC mechanism be structured and designed? VC mechanisms involve the determination of many factors as part of a feedback loop. These in turn may be broken down into design aspects and implementation aspects, each of which will be addressed in the synthesis:
    - How is the boundary area determined?
    - What is the duration of arrangement?
    - What is the rate basis for capturing value? What, if any, are the issues in rate setting?
    - How is equity considered in the context, if at all?

- How much is the revenue potential, and how is revenue collected?
  - What has been the performance of the approach used?
  - What are the special features of the mechanism adopted, if any?
- d. What is the legal framework that allows the methods to be used for highway funding?
  - e. What are the local partnerships, and who are the key players implicit in the arrangements?
  - f. What are challenges in the adopted VC mechanisms?

This synthesis is not intended to provide any recommendations or to serve as a guidance document. It is intended to be merely a compilation of the state of the practice with respect to the adoption and implementation of VC mechanisms. The American Planning Association (APA) and National Association of Home Builders provide guides on one of these mechanisms—impact fees (IFs). Similarly, some states provide guidance on the development of special assessments. However, this synthesis is intended to clarify some prevailing issues in the practice with respect to these mechanisms.

### METHODOLOGY AND STUDY APPROACH

The study approach for this synthesis featured two primary components: a literature review and telephone/e-mail interviews with key staff involved with or aware of the development or implementation of practices that were adopted and noted by them as successful. The literature review included searching and reading professional journals and publications from the Transportation Research Board—Transportation Research International Documentation (TRB-TRID) database, professional journal articles, Proquest Dissertation databases, National Technical Information Service database, and other articles published by FHWA, AASHTO, and APA, as well as project-related websites.

For practices that were identified and noted as successful via initial conversations, additional targeted review was conducted to collect information on the development and implementation of these practices. Three main additional considerations were used to aid in the subsequent review. These were:

- Availability of web links, supporting documentation for case examples, and whether the contacts were willing to discuss examples/mechanisms in greater detail.



- Availability of enough information to showcase and inform the planning practice on how the procedure or mechanism was implemented in its context, including any enabling legislation.
- Mechanisms considered more recently, have some highlighting features, such as being used to advance long-term plan projects, showcase ways to deal with risk, or allow multimodal equity in service provision.

Case examples were sought for 10 categories of mechanisms from the survey respondents. These mechanisms and examples were subsequently categorized following a typology developed as part of this synthesis. Telephone and e-mail interviews were conducted with professionals involved in the development or implementation of these practices. After the ability and willingness of the subjects to take part in an interview were assured, the subjects were provided with the background information on this study and a detailed list of questions tailored to their specific context based on the initial review and survey responses. The survey and interview guide are included in Appendix A and Appendix C. Interviews focused primarily on the background of the case examples, as well as implementation and process-oriented questions.

Discussion topics included the motivation for the use of a mechanism, the various stages of the mechanism implementation, the success of the mechanism in funding the project(s), the specific context for the project in terms of vision for the region, as well as any benefits, challenges, and keys to success. Telephone interviews lasted 20 to 30 minutes. In some cases, participants shared responses directly through e-mail or telephone discussions. Next, documentation when provided by respondents was reviewed and used in addition to the interviews to inform the practice narratives found in chapter three and the findings in chapter four. The case narratives included in this synthesis offer vignettes that describe the background, context, adoption, and development of each mechanism in the context of highway project funding and finance. If a transit example is provided in this synthesis, it is only within the broader context of mutual applicability to highway project funding and finance. Some mechanisms may be multimodal in their application.

## VALUE CAPTURE DEFINED

The VC concept has a long history in local government finance, and its origins are rooted in the benefit principle of taxation. The term “value” in VC refers to added value or benefit accrued by the landowner or developer as a consequence of an investment. The term “capture” relates to the local entity or agency capturing some of those gains as a way of recouping the costs of those investments. Therefore, the concept lies at the juncture of both benefit principle and equity principle of taxation: that is, the governments can recoup costs according to benefits received and no private individuals/corporations are entitled to reap windfall gains (Dalvi 1998). Many methods can be used to capture the economic value of transportation investments to fund trans-

portation. All the methods/mechanisms seek revenues from beneficiaries of transportation improvements.

From the transportation funding standpoint, the economic value of highway and transit investments can be traced to two sources and related beneficiaries:

- Direct user benefits that are normally observed in travel time improvements, accident and emissions reductions, vehicle operating cost savings, and savings in energy/fuel consumption. The beneficiaries of direct user benefits are direct beneficiaries. Transportation funding mechanisms based on direct beneficiaries are many and include user fees, tolls, and congestion charges. These benefits also coincide with the measures and metrics used in traditional cost–benefit analysis.
- Indirect user benefits (or affected community benefits). The discussion of indirect user benefits is seen in economic impact analysis, and these are otherwise known as the indirect beneficiaries. VC is an umbrella term for capturing the value of transportation investments to fund transportation and is based on charges or fees on indirect beneficiaries. These indirect impacts coincide with measures/metrics that are captured in economic and land development impact and benefit–recovery analysis.

The set of mechanisms that can be used to fund transportation can be shown on a direct–indirect, public–private beneficiary scale with increasing levels of direct interaction toward the center, as shown in Figure 1.

This synthesis focuses on an investigation of the VC mechanisms to capture the economic value of transportation. VC has been discussed as a supplemental approach to fund surface transportation in many studies (Rybeck 2004; Smith and Gihring 2006). It is an innovative public finance method in which the increases in property or land value owing to public infrastructure improvements are captured through land-related taxes or other means to pay for such improvements (Batt 2001). Smith and Gihring define VC in a slightly different way, as “the appropriation of land-value gains resulting from the installation of special public improvements in a limited benefit area. It is a betterment levy, based on ad valorem assessments of ordinary property taxes, and is similar in conception to development exactions and impact fees. The aim is to finance all or part of the costs of local transportation projects. Based on the ‘benefits received’ rationale for public taxation, it proposes to recapture what is essentially publicly created value.” The Lincoln Institute and United Nations define VC as “the process by which all or a portion of increments in land value attributed to ‘community interventions,’ rather than landowner actions, are recouped by the public sector and used for public purposes. These ‘unearned increments’ may be captured indirectly through their conversion into public revenues as taxes, fees, exactions or other fiscal means, or directly through on-site improvements to benefit the community at large” (United Nations Conference on Human Settlements 1976).

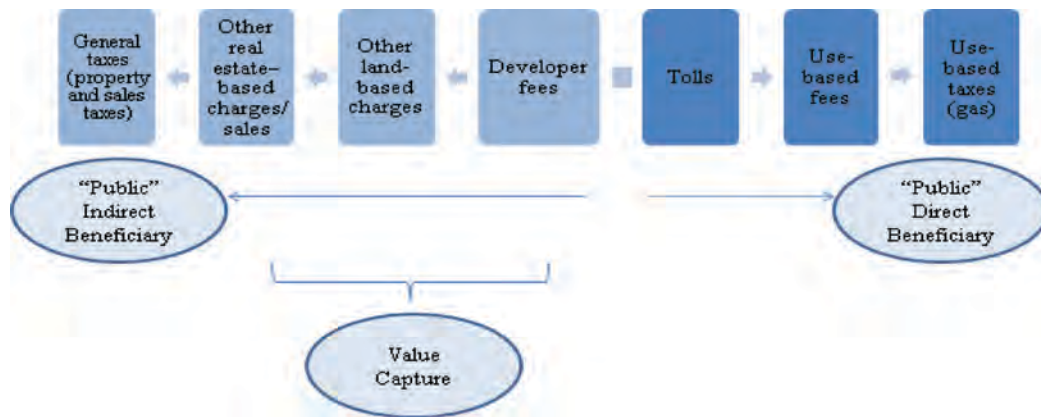


FIGURE 1 Value capture mechanisms in the context of transportation funding and public/private beneficiaries.

These definitions serve to highlight the common features of VC, each of which will be discussed in turn:

- The use of land-related or other taxes, charges, fees.
- The capture of the increment in the value of land or the value of property created or made possible by the transportation improvement or public intervention. The identification of the specific increases in value resulting from investments enables governments to seek a commensurate financial contribution from the beneficiaries.
- Occurrence in defined area.
- The levy on those who benefit from investments—the beneficiaries, which include owners, developers, and community at large.
- The recovery of cost.

No definition explicitly refers to the increase in post-construction sales from real estate as an indirect benefit or sales

taxes. The increased sales may lead to changes in land use and land values, and some methods may serve to capture the value of enhanced sales from transportation access as a general benefit. The strictest definitions of VC refer to it as capture of the increment created in the value of land, whereas other processes are referred to as “value transfers” (Rybeck 2004).

An ideal VC mechanism (Figure 2) is typically thought to have four key features, although not all features may be distinguishable in all mechanisms. These features form a feedback loop (Huxley 2009) or a virtuous cycle (Levinson and Istrate 2011).

#### Value Creation

This stage refers to the increase in the potential value of underutilized assets (land, structures, or other) as a result of a public-sector intervention to stimulate demand from the private

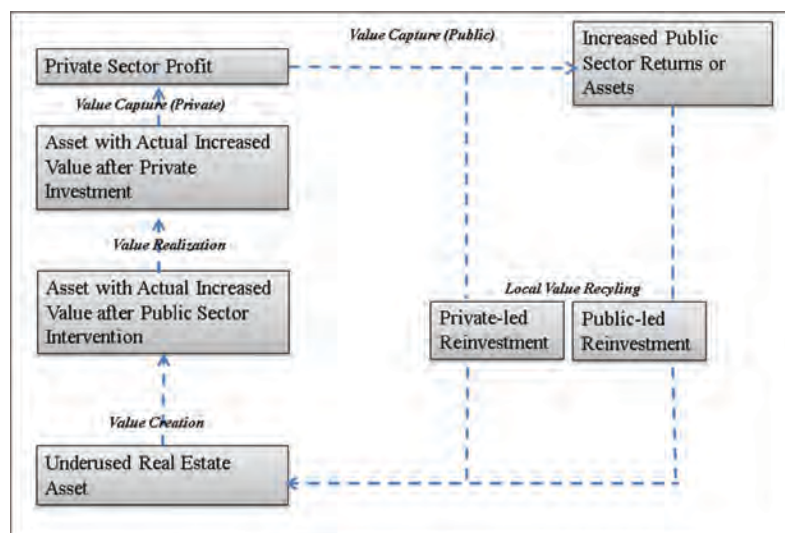


FIGURE 2 Feedback loops in VC finance. (Source: Adapted with permission from Huxley 2009, Urban Land Institute.)

sector. Marked accessibility changes that brought about transportation improvements have been cited as leading to the creation of value (Levinson 1997; Iacono et al. 2009). However, Huxley (2009) suggests that there are other ways that value can be created, including zoning changes.

### Value Realization

The value of assets can be realized through subsequent investment and development from the private sector, which ensures that a potential asset value increase is realized. Direct investments in the asset are one way in which this asset value can be realized, which may be accompanied by other mechanisms.

### Value Capture

Value capture refers to arrangements by the public sector for the acquisition of a proportion of private-sector returns for local reinvestment. This can take the form of monetary or in-kind contributions from the private to public actors.

### Revenue Recycling

Recycling refers to reinvestment of acquired monetary or in-kind contributions from the private sector within the same development site or scheme (Huxley 2009). Mechanisms for VC may include land value taxes (LVTs), special assessments, tax increment financing (TIF), transportation utility fees (TUFs), negotiated exactions (NEs), development impact fees (IFs), joint development (JD), air rights (ARs) development, sales tax districts (STDs), and other mechanisms (see Iacono et al. 2009; Levinson and Istrate 2011; Mathur and Smith 2012; State Smart Transportation Initiative 2012.)

## VALUE CAPTURE—KEY ISSUES

Some of the persistent and leading issues in VC research include basic issues, technical and implementation issues, and more pragmatic issues, some of which were brought out in a recent report (Smolka 2013). Among those are:

- Basic issues that refer to understanding of the process itself and research into the same. On one hand, there is a clear need for better understanding of the legal basis for VC methods, as well as the roles states play in facilitating such tools. On the other hand, there are larger questions raised by new or higher charges on real estate that some tools/methods may involve. Smolka notes that there are also questions on the balance in the extent to which there are equally applicable analyses for situations when there is land value diminution to protect against arbitrary takings. In essence, this latter set seeks to justify the balance between capture of enhanced value and protection of value loss.

- Implementation and technical issues, such as (a) distinguishing land value increments attributed to specific public investments or planning decisions from other more general sources or factors that influence land markets; (b) identifying beneficiaries, beneficiary areas, and geographic scale of these areas; (c) establishing rate setting and valuation methods and procedures; (d) designing the VC method in a context; (e) determining the revenue potential; (f) determining the cost-efficiency of mechanisms; and (g) determining equity.
- Pragmatic challenges that arise in selecting the right instrument for the right circumstances, the timing of the instrument, and the processes to facilitate the choices.

To gain a better understanding of VC, this report summarizes the state of the practice in highway-related VC using a case example approach with respect to the technical, implementation, and practical issues noted previously.

## SYNTHESIS ORGANIZATION

This synthesis report is organized as follows: chapter two includes a state-of-the-practice review of mechanisms and tools that are related to VC and methodological issues that arise in the context and application of VC mechanisms, including references to useful texts. Chapter three presents a series of case examples illustrating the application of these methods to a range of highway investment decisions in the United States. Each case includes agency-level context as well as context for the decision or project, relevant data and process of establishing the mechanism, the local partnerships involved, the boundaries or service areas developed in the context, the revenue considerations, and key lessons learned from that example. Chapter four discusses the main findings and conclusions from the review in promoting a better understanding of these mechanisms as well as factors instrumental in creating a more successful culture of usage. It discusses cross-cutting and recurring themes regarding challenge and contextual variation among practices. Appendix A contains the questionnaire used in the screening survey. Appendix B lists survey respondents: AASHTO representatives of both the Standing Committee on Finance and Administration (SCOFA) and Standing Committee on Planning (SCOP). Appendix C contains the interview guide used in case example development.

## SUMMARY

Decreasing budgets and increasing maintenance and construction costs have created a growing gap between available transportation funding and needed dollars. This synthesis documents how agencies employ VC mechanisms to fund the transportation system. VC combines the concepts of defining the aggregate benefit to stakeholders of investing in a given asset (e.g., a newly expanded roadway) and recapturing a portion of that cost for the entity that funded development of the

asset. In other words, determining VC involves quantifying, in dollars, the expected return to long-term stakeholders (e.g., landowners, developers, public agencies) on the capital investment and ongoing maintenance costs required to improve and sustain a discrete aspect of the transportation system.

Focusing on highway investments, the synthesis documents the following aspects of VC in detail:

- The methodology underlying the concept.
- The legal framework enabling methods to be used for highway funding.

- The way in which local partnerships facilitate the process.
- The areas that benefit by using the mechanism.
- The cost-efficiency of the mechanism in terms of revenues raised compared to project costs.
- The challenges to be expected when adopting different mechanisms.

A literature review of current practices and interviews with key agency staff explored the pros and cons of 10 types of mechanisms. Case examples show the mechanisms applied in real-world situations and the lessons learned by agencies implementing them.

## OVERVIEW OF METHODS TO CAPTURE VALUE CREATED BY TRANSPORTATION INVESTMENTS—VALUE CAPTURE MECHANISMS

### LITERATURE REVIEW OF VALUE CAPTURE MECHANISMS

The VC funding and finance approach has a wide audience in the United States and across the world. The literature in this area is large and comprehensive, and there are numerous applications around the world for highways and transit (Andelson 2000; Bowes and Ihlanfeldt 2001; Fensham and Gleeson 2003; Smith and Gihring 2006; Iacono et al. 2009; Mathur and Smith 2012; Kemp et al. 2013).

#### Mechanisms and Practices

Communities across the country have adopted practices to fund and finance transportation projects. To assist in the discussion of these methods, this section provides a brief overview of the top VC mechanisms listed from a compilation of recent studies as ways local governments, communities, and entities have approached transportation funding with respect to highways. Each of these mechanisms is discussed in subsequent sections of this chapter, and case examples of these mechanisms are discussed in chapter three. Recent documents that provide a broad overview of VC-related mechanisms include AECOM 2007, Iacono et al. 2009, Levinson and Istrate 2011, Mathur and Smith 2012, and Kemp et al. 2013. The mechanisms listed are applicable to both highway and transit, and mechanisms that have been discussed in recent literature and used in the country are documented in Figure 3.

In addition to the nine listed, there are other mechanisms and tools that may be used across the country. Thus, this synthesis is aimed at discussing 10 broad categories—the nine shown in Figure 3 and one additional category of “other” mechanisms to include categories such as transportation corporations (TCs). The mechanisms discussed in Figure 3 and Table 1 are equally applicable to highways and transit, with the exception of the TUF. This synthesis focuses on highways predominantly, as will be seen in the case example chapter. A few transit examples are considered to the extent that the knowledge and application may be transferable to highways. For each mechanism, this review will focus on five broad elements:

- Description of the mechanism;
- Critical implementation considerations duration, fees or levies, service areas;

- Legal considerations;
- Applicability to transportation; and
- Other implementation considerations.

In all cases, procedural implementation considerations are typically investigated as part of initial feasibility studies.

#### Geographic Scale and Conceptual Basis of Value Capture Mechanisms

This synthesis focuses on covering the geographic scale and implementation considerations among other features of mechanisms discussed in Figure 3, starting with the review included in this section and followed by the cases in the following chapter. A distinguishing feature or benefit of VC mechanisms is the geographic scale or dimension with respect to their implementation. It will be seen that some VC mechanisms can work at the micro level geographic scale (a site, miles within a locality, across localities) or even at the meso scale, such as region-wide applications.

The conceptual basis or general applicability to transportation and benefit basis of each mechanism listed in Figure 3 is different and is shown in Table 1. Table 1 also presents a summary of the examples included in this chapter. These are assimilated from several studies, including a Center for Transportation Studies legislative summary report and other sources (Lari et al. 2009; Mathur and Smith 2012). Lari et al. (2009) also present other features of a subset of VC mechanisms covering (a) coordination, (b) timing of levy, (c) allocation of revenues to specific costs (capital versus operations and maintenance), and (d) level of applicable government (local or state). All mechanisms are local government tools (Lari et al. 2009); however, many tools require enabling support by way of accompanying legislation.

#### Value Capture Mechanisms—General Trends

An examination of revenue source national data for year 2010 from FHWA shows that states fund their highways using a mix of revenue sources ranging from federal transfers such as fuel taxes, user fees such as gasoline taxes, toll revenues, and local government sources. Local government sources are a small percentage (2%) of overall state funding (Figure 4). Local government revenue sources for funding roads in 2008



Impact Fees (IF)	•One-time charges levied on development projects designed to finance new infrastructure and services associated with new development.
Special Assessments—Property Tax (SAD)	•Members of the benefiting district pay a small property tax directly for the cost of improvement.
Sales Tax Districts (STD)	•Members of the benefiting district pay a small sales tax directly for the cost of the improvement.
Negotiated Exactions (NE)	•Similar to IF, with the exception that they are not typically applied to off-site infrastructure provisions but to contributions to local roads, etc.
Air Rights (AR)	•Establishment of development rights above (or below or adjacent) infrastructure asset that generates an increment in land value.
Joint Development (JD)	•Private partner provides facility or financial contribution for spatially coincidental infrastructure and adjacent private real estate development.
Land Value Tax (LVT)	•Separate taxation of land portion of property to better capture the benefit of infrastructure investments, typically through split rate property tax.
Tax Increment Finance (TIF)	•Using the prospect of increased property increments resulting from the project to secure bonds; tax increment above baseline level is used to repay loan.
Transportation Utility Fees (TUF)	•Fees assessed on properties based on amount of trips generated/use.

FIGURE 3 Most discussed VC mechanisms in the context of transportation funding.

showed a national reliance of 17% on the property tax type mechanisms for local roads (Figure 5).

### IMPACT FEES

Impact fees seek revenues from beneficiaries. They are a part of an evolving toolbox of financing mechanisms. An IF is a form of development exaction or a charge on new development to pay for the construction or expansion of infrastructure that is necessitated by and benefits new developments. In practice, IFs are noted as mechanisms to bridge the gap between the cost of new municipal infrastructure and available funds. More specifically, they are exactions that are:

- In the form of a predetermined money payment.
- Assessed as a condition to the issuance of a building permit, an occupancy permit, or a plat approval.
- Pursuant to local government powers to regulate new growth and development and provide for adequate public facilities and services.
- Levied to fund large-scale, off-site, public facilities, and services necessary to serve new development.
- In an amount that is proportionate to the need for the public facilities generated by new development (Pershing 2008).

They are usually implemented to help reduce the economic burden on local jurisdictions that are trying to deal

with growth within the area. IFs were pioneered by local governments in the absence of enabling legislation (Mullen 2012). Consequently, such fees originally were defended as an exercise of local government's broad police power to protect the health, safety, and welfare of the community. Eventually, courts developed guidelines for constitutionally valid IFs based on the rational nexus that must exist between the regulatory fee or exaction and the activity that is being regulated.

Antecedents to IFs were in-kind exactions, land dedications, or build/install requirements for the construction of specific facilities. IFs paid as monetary instead of in-kind contributions came into wide use beginning in the 1970s, providing a more efficient and flexible means of local infrastructure financing than negotiated or ad hoc exactions. The cities and counties of some states such as California, Colorado, Florida, and Texas have widely adopted IFs as a means of financing not only on-site but off-site infrastructure development. Their use and popularity quickly spread throughout the Sunbelt and Western states. According to recent national surveys, about 60% of all cities with more than 25,000 residents and almost 40% of all metropolitan counties use some form of IFs. In California and Florida, the extent of cities and counties using IFs is at 90% and 83%, respectively (Nelson and Moody 2003; AECOM 2007). Nelson and Moody also note that IFs have become more common as a practical means of funding in large part because new infrastructure development has lagged under political and financial constraints, resulting in deteriorating infrastructure quality, congestion

TABLE 1  
APPLICABILITY OF VALUE CAPTURE MECHANISMS TO TRANSPORTATION AND EXAMPLES  
FROM LITERATURE REVIEW

Mechanism	Conceptual Basis and Benefit or Levy Basis	Applicable Purpose	Highway-Related Examples (United States)
IF	<ul style="list-style-type: none"> <li>New development to pay for facility use.</li> <li>One-time developer charges when permits are issued.</li> <li>Levied before and after an improvement.</li> </ul>	Cost recovery	Oregon TSDC for existing and new capacity (multimodal) and examples from Washington, New Jersey
SAD	<ul style="list-style-type: none"> <li>Local benefit accruing to all property due to transport access.</li> <li>Annually levied property owner charges in the service area before and after an improvement.</li> </ul>	Capture of project expansion benefits	Virginia and Ohio TID, Illinois SSA
STD	<ul style="list-style-type: none"> <li>Local benefit accruing to all property due to transport access.</li> <li>Annually levied sales in the service area before and after an improvement.</li> </ul>	Capture of project expansion benefits	Illinois SSA; Missouri and Kansas TDD
NE	<ul style="list-style-type: none"> <li>One-time ad hoc developer agreements before or after the improvement (discontinuous spot treatment).</li> </ul>	Capturing opportunity for value creation and cost recovery	Virginia proffer
AR	<ul style="list-style-type: none"> <li>Air space utilization above, below, under, and nearby/adjacent highway right-of-way for public and private benefit via transfer of rights and joint development.</li> <li>One-time developer-related opportunity typically after an improvement (on-site developments—discontinuous spot treatment).</li> </ul>	Capturing opportunity for value creation and cost sharing and revenue sharing with private sector	Massachusetts Turnpike and several other examples such as Interstate 5, Washington State
JD	<ul style="list-style-type: none"> <li>Public and private partnership in relation to land (works with air rights or by itself).</li> <li>One-time developer-related opportunity typically after an improvement (on- and off-site developments).</li> </ul>	Capturing opportunity for value creation and cost sharing and revenue sharing with private sector	Massachusetts Turnpike and Washington Metropolitan Transit Authority
LVT	<ul style="list-style-type: none"> <li>Land value capitalization due to access, incentivize development.</li> <li>Annually levied property owner charges before and after an improvement—taxes on value of land and a separate tax on value of buildings.</li> </ul>	Capture of project expansion benefits	Pennsylvania counties
TIF	<ul style="list-style-type: none"> <li>Increment in property values due to capitalization of access and amenity values. Annually levied property owner charges before and after an improvement.</li> </ul>	Capture of project expansion benefits	Texas TRZ TIF-like mechanism
TUF	<ul style="list-style-type: none"> <li>Public good nature of transport.</li> <li>Annually levied property owner charges before and after an improvement. This charge has been used only for defraying operating expenses as opposed to capital costs of projects.</li> </ul>	Cost recovery—operating and maintenance costs	Oregon TUF for pavement maintenance
Other—TC	<ul style="list-style-type: none"> <li>Funding tool only to aid value capture.</li> </ul>	Stakeholder support	Missouri, Texas, Florida

of existing facilities, and inadequate infrastructure to accommodate new development.

### Implementation Considerations

#### *Beneficiary Basis (Who Pays?) and Incidence*

In an obvious sense, the developer pays the IF, at least in the short run. However, in the long run the developer may strive to shift the cost of the IF. This occurs as forward shifting

to higher purchase prices or rents paid by the consumers of development, or as backward shifting to the original owner as a lower price for undeveloped land (National Association of Home Builders 2008). When the demand for buildable land is inelastic (relatively insensitive to changes in price) and the supply of raw land is elastic (relatively sensitive to market change), forward shifting is likely to occur, and it will be the home buyer who pays much of the fee. When the demand for buildable land is elastic and the supply of raw land is inelastic, backward shifting is likely to occur, and it will be the seller of



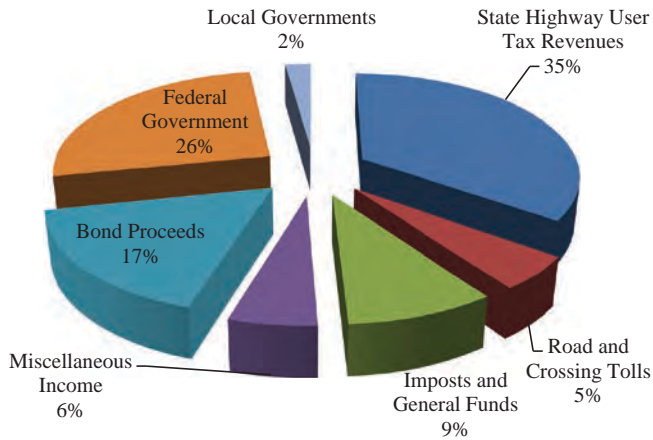


FIGURE 4 Sources of state highway funding in the United States in 2012. (Source: FHWA 2012.)

raw land that pays the fee in the form of lower prices. Thus, it is surmised that the IF final incidence will always be split between all the players in the development process.

#### *Geographic Scale or Area of Applicability*

From a planning and implementation perspective, IFs can be levied or targeted to a specific geographic area or boundary area, also called service area, overlay area, or beneficiary area. These typically are geographic areas served by the transportation improvements. This provision is sometimes included or specified within legal requirements for establishing IFs. IFs can also be levied on an areawide basis, such as for an entire municipality. In such a case, the geographic area is referred to as the assessment district, as distinctly separate from the beneficiary area or benefit district. This synthesis covers examples of both types of scenarios. Many of the state acts require that the local government identify the scale or specific area where the IFs will be collected based on the service provided to new development from a common set of facilities. Most acts require that IFs collected within a service area must be spent on capital improvements within that same service

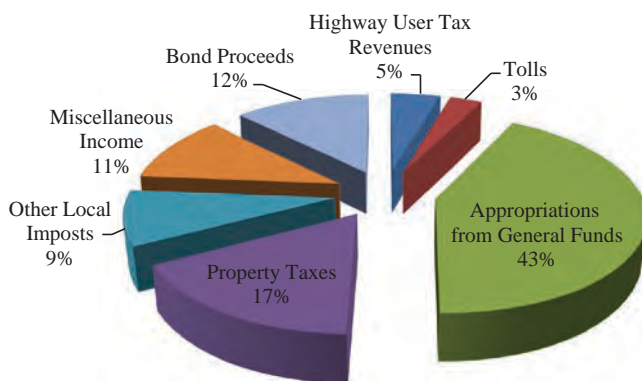


FIGURE 5 Sources of local highway funding in the United States in 2008. (Source: FHWA 2008.)

area. In general, local governments are allowed broad discretion in defining service areas, which can cover the entire jurisdiction or only a subarea of the city or county. An exception is the Texas act that limits service areas for transportation IFs to no more than 6 miles (Mullen 2012). Mullen notes that as of 2012, 15 states specify an implementation requirement for a geographic service area.

#### *Duration, Land Uses, and Modal Coverage*

Impact fees are one-time developer charges, applied to new developments/construction only, such as when permits are issued (Libby and Carrion 2004). The fees require cash payments in advance of the completion of development. They can be limited to specified land uses, such as commercial or residential, or include all uses. The charges can be used to defray capital costs for all modes, including highways specified in the statutes, as well as operating and maintenance expenses.

#### **Legal Considerations**

When it comes to implementing IFs, there is a legal basis that must be considered. IF legislation identifies facilities in each state that are eligible uses. Highways and roads are considered eligible uses. A 2011 review conducted by the National Governors Association in collaboration and support of the AASHTO Center for Excellence in Project Finance finds that 25 states have provisions to allow the use of IFs (State Smart Transportation Initiative 2012; Rall et al. 2011). Mullen (2012) provides a legal overview of states with IF provisions and notes that as of 2012, 27 states had adopted IFs enabling legislation for roads as an eligible category. A listing of these states is provided in Table 2.

Figure 6 shows that IFs are currently not authorized in many states in the Midwest and East South Central using standard Bureau of Economic Analysis region classifications. Fees should follow the rational nexus and roughly proportional rules or guidelines (Mullen 2012). There must be a connection between the new development and the need for the new facilities in the region.

Florida is the only state seen to have used IFs without enabling legislation until 2006. Maryland lacks a general enabling act, but such legislation is in place in the six home rule counties. Virginia imposes road IFs and a form of developer exactions known as cash proffers. Under this proffer system, there is no published fee schedule or required nexus. Instead, developers voluntarily offer land dedications, capital improvements, or cash payments as part of their application of rezoning, but the decision to accept or reject the proffer remains entirely in the hands of the local governing body. Depending on the region or state, IFs can be classified under different types of names. Early on they were known as capital recovery or expansion fees. In some states, such

TABLE 2  
IMPACT FEE LEGISLATION BY STATE

	Roads	Year	Citation
Arizona (cities)	x	1988	Arizona Revised Statutes Annotated § 9-463.05 (cities), § 11-1102 et seq. (counties)
Arizona (counties)	x	1988	Arizona Revised Statutes Annotated, § 9-463.05 (cities), § 11-1102 et seq. (counties)
Arkansas (cities)	x	2003	Arkansas Code, § 14-56-103 (cities only)
California	x, Multimodal	1989	California Government Code, § 66000 et seq. (mitigation fee act); § 66477 (Quimby Act)
Colorado	x	2001	Park dedication/fee-in-lieu; § 17620 et. seq. (school fees)
Florida	x	2006	Florida Statutes, § 163.31801
Georgia	x	1990	Georgia Code Annotated, § 36-71-1 et seq.
Hawaii	x	1992	Hawaii Revised Statutes, § 46-141 et seq.; § 264-121 et seq.
Idaho	x	1992	Idaho Code, § 67-8201 et seq.
Illinois	x	1987	605 Illinois Compiled Statutes Annotated, § 5/5-901 et seq.
Indiana	x	1991	Indiana Code Annotated, § 36-7-4-1300 et seq.
Maine	x	1988	Maine Revised Statutes Annotated, Title 30-A, § 4354
Montana	x	2005	Montana Code Annotated, Title 7, Chapter 6, Part 16
Nevada	x	1989	Nevada Revised Statutes, § 278B
New Hampshire	x	1991	New Hampshire Revised Statutes Annotated, § 674:21
New Jersey	x	1989	New Jersey Permanent Statutes, § 27:1C-1 et seq.; § 40:55D-42
New Mexico	x	1993	New Mexico Statutes Annotated, § 5-8-1 et seq.
Oregon	x, Multimodal	1991	Oregon Revised Statutes, § 223.297 et seq.
Pennsylvania	x	1990	Pennsylvania Statutes Annotated, Title 53, § 10502-A et seq.
Rhode Island	x	2000	General Laws of Rhode Island, §45-22.4
South Carolina	x	1999	Code of Laws of South Carolina, § 6-1-910 et seq.
Texas (cities)	x	1987	Texas Local Government Code Annotated, Title 12, § 395.001 et seq.
Utah	x	1995	Utah Code, § 11-36-101 et. seq.
Vermont	x	1989	Vermont Statutes Annotated, Title 24, § 5200 et seq.
Virginia	x	1990	Virginia Code Annotated, § 15.2-2317 et seq.
Washington	x, Multimodal	1991	RCW, § 82.02.050 et seq.
West Virginia	x	1990	West Virginia Code, § 7-20-1 et seq. (counties)
Wisconsin (cities)	x	1993	Wisconsin Statutes, § 66.0617

Note: Adapted from Mullen (2012) and Duncan Associates (2012).

as Oregon, they are known as system development charges, whereas in North Carolina, they are known as facility fees. No matter what they are called, they all function on the same premise (Mullen 2012).

#### Applicability to Transportation—Some Specific Examples of Roadway-Related Impact Fee Statutes

##### *Justification of IFs*

Local jurisdictions have at their disposal many potential sources of revenue that can fund new infrastructure. These revenues come in three basic forms: general, user, and shared. General funding involves the use of general (rather than dedicated) taxes, typically property taxes but also sales and income, to build and maintain nonutility infrastructure, such as roads,

parks, public safety, and schools. The burden falls on the entire base of taxpayers. IFs are noted as a category of user fees to finance infrastructure and include all forms of exactions on new development (Alterman 1988). Cost sharing occurs when this revenue source is leveraged with other funds, such as when IFs pay the local share of facility costs with the rest coming from the state through its general fund or user fees.

According to APA's IF policy guide (APA 1997), when based on a comprehensive plan and used in conjunction with a sound capital improvement plan (CIP), IFs can be an effective tool for ensuring adequate infrastructure to accommodate growth where and when it is anticipated. It is important that communities rely on zoning and other land use regulations, consistent with a comprehensive plan, to influence

## States with Impact Fee Legislation 2012

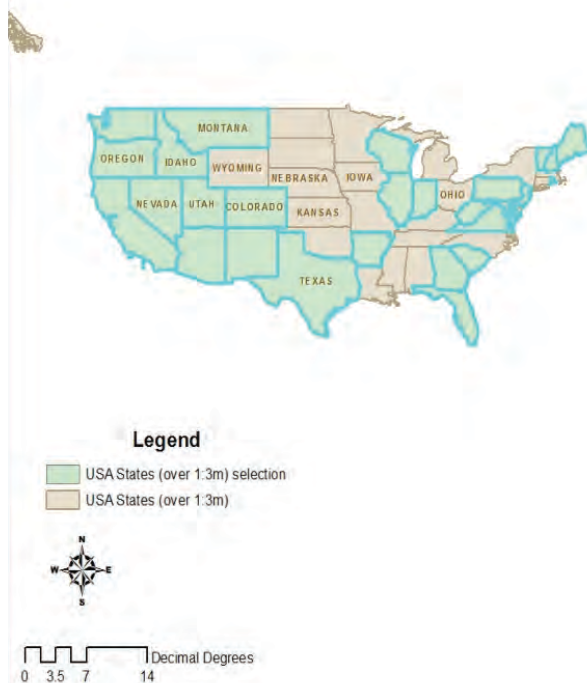


FIGURE 6 States allowing IFs in 2012. (Source: Recreated with data from Mullen 2012.)

patterns of growth and more accurately predict new infrastructure needs. The guide also notes that IFs should not be considered a panacea for the funding of general capital improvements.

The applicability to transportation stems from the beneficiary principle that the beneficiaries who receive the service pay for the service. Table 1 shows the applicability of IFs to transportation from a legal standpoint. Transportation and roads are statute-enabled eligible categories for which fees can be levied. Among them, three states have options to cover roads as part of a multimodal transportation funding plan. Those examples, in Washington, Oregon, and New Jersey, are discussed here. New Jersey's legislation is discussed in greater detail because it points to the evolutionary process of the legislation, the long lag in implementation since it was first passed in 1990, the emphasis on a joint planning process (JPP), and some of the hurdles it has faced with regard to planning costs. The examples of IF statutes from Washington, Oregon, and New Jersey all require a geographic service area to be identified as part of implementation.

**Washington.** The primary enabling mechanism for imposing IFs in Washington State is the Growth Management Act [GMA; Municipal Research and Services Center of Washington]. The GMA, passed in 1990, added Revised Code of Washington (RCW 82.02.050–100 regarding IFs and spe-

cifically authorized the use of IFs for municipal jurisdictions planning under the GMA. The GMA allows IFs for system improvements that reasonably relate to the impacts of new development and specifies that fees are not to exceed the proportionate share of the costs of improvements generated by the development. The transportation IFs under GMA are to be spent on system improvements, which can include physical or operational changes to existing roads and streets and new roadway connections that are built in one location to benefit projected needs at another location. These are generally projects that add capacity to accommodate growth in traffic volumes (new streets, additional lanes, widening, and signalization) and also may be pedestrian or transit related. Under the GMA, the county needs to meet specific provisions, including but not limited to:

- The county must have an ordinance authorizing IFs.
- Fees may apply only to improvements identified in a capital facilities plan.
- One or more geographic service areas must be established for fees.
- A formula or other method for calculating IFs must be established.
- The fees cannot be used to finance the portion of improvements needed to pay for existing capacity deficiencies.
- The fees can be used to recoup the cost of improvements already made that address the needs of future development.
- The county cannot rely solely on IFs to pay for needed improvements.

**Oregon.** Oregon Transportation System Development Charge (TSDC)—In 1989, the state of Oregon adopted the Oregon Systems Development Act [Oregon Statute (ORS) 223.297-223.314] to “provide a uniform framework for the imposition of system development charges by local governments.” Since 1989, under Oregon law, jurisdictions can implement TSDCs for five types of infrastructure: water, wastewater, storm drain, transportation, and park systems. System development charges are defined under ORS 223.297-223.314 as “a uniform framework for the imposition of system development charges by local governments, equitable funding for orderly growth and development of Oregon’s communities, and that the charges may only be used for capital improvements.”

As described in the ORS, there are two types of TSDCs:

- **Reimbursement:** a fee for costs associated with capital improvements already constructed or under construction when the fee is established, for which the local government determines that capacity exists.
- **Improvement:** a fee for costs associated with capital improvements to be constructed. The system development charges are applicable for all modes of transportation in Oregon.

**New Jersey.** N.J. STAT. ANN. 40:55D-42. The Transportation Development District Act of 1989 allows the creation of transportation improvement districts (TIDs) and transportation development districts (TDDs). The districts are formed by the New Jersey Department of Transportation (DOT) on petition of local officials. The legislation provides for the development of a master traffic plan to measure the extent of existing deficiencies and the impact of future development. IFs may then be charged to new development based on specific impacts and any projects necessary to offset the impacts. The legislature recognized that growth corridors and growth districts were heavily dependent on the state's transportation system for current and future development yet placed enormous burdens on the existing transportation infrastructure contiguous to new development and elsewhere. The legislature determined that it would be "appropriate for the State to make special provisions for the financing of needed transportation improvements in these areas, including the creation of special financing districts and the assessment of special fees on those developments which are responsible for the added burdens on the transportation system" (N.J. STAT. ANN. § 27:1C-2[c]; Pershing 2008).

The Transportation Development District Act authorizes the governing body of any county to apply to the state transportation commissioner for the designation of a TDD. Following any such designation, a county is required to initiate a JPP for the TDD with opportunity for participation by the state, all affected counties and municipalities, and private representatives. A transportation project is broadly defined to include "public highways and public transportation projects, any equipment, facility or property useful or related to the provision of any ground, waterborne or air transportation for the movement of people or goods."

As of July 2000, only four counties had engaged in a TDD planning process under the TDD Act. They include Mercer County, which had a TDD plan approved in 1992 that is operational; Atlantic County, which had two former TIDs grandfathered under the TDD Act; and Hunterdon County and Union County, which had TDD applications approved in the 1990s but had no approved TDD plan and the TDDs are not operational. The New Jersey Legislature was concerned about the underutilization of the TDD Act and in 1998 made recommendations for modifications to the TDD Act "which would encourage regional and intergovernmental transportation concerning transportation planning decisions" (Pershing 2008). Some findings, which are applicable for purposes of this report, are as follows:

- The TDD requires coordination and cooperation between municipalities, counties, the New Jersey Department of Transportation (DOT), New Jersey Transit, and the private sector during the JPP.
- The costs associated with the TDD planning process are high for counties and municipalities. There is no clearly defined source of funding to support TDD plan-

ning efforts, and the TDD funds cannot be used to recoup costs incurred during the planning and implementation process.

- Transportation decision making with regard to new development proposals is fragmented at various levels of government.
- Transportation planning is not a well-developed practice as part of the municipal planning process. Very few master plans and zoning codes have been adequately tested for their impact on transportation infrastructure.
- The role of counties in the transportation planning process limits the opportunities for them to facilitate the intergovernmental cooperation needed to balance competing local, regional, and state interests with regard to transportation (Pershing 2008).

### *Comprehensive Improvement Plans*

Rappa (2002) notes that even when statutes allow for transportation infrastructure, they do not stipulate an applicable service area, nor do they always require a CIP or a long-term plan that identifies current and future needs. As of 2002, 14 states required both service areas and CIPs to be satisfied. Some states, such as Texas, Utah, and Wisconsin, allow fees to be used only for existing infrastructure affected by new development. Mullen (2012) notes that as of 2012, 20 of 27 states required that projects be based on a CIP. Some of these capital plan requirements simply mandate that a list of projects be developed on which fees will be spent.

### *Some Examples of IF Use*

In 1998, a Congressional Budget Office study discussed the use of IFs in the funding and financing of two toll roads in the country: Colorado's E470 and Orange County, California's Transportation Corridor Agencies. The report discusses the Colorado DOT agreement to lend as much as \$20 million (subject to annual appropriations) to match contributions from local governments. The E470 authority also has the power to assess and collect highway expansion fees from developers of land within 1.5 miles of the center line of the highway. For businesses, the fee is based on square footage and distance to an interchange; for residential property, the fee is based on an estimate of relative use of the project by residents. The charges are one-time and generally are levied on both residential and nonresidential development within the established area of benefit of a roadway.

### **Other Implementation Considerations**

#### *Rational Nexus Between IFs and System Improvements*

Across the nation, as IFs have been challenged in court cases, a principle known as the rational nexus test is used to determine



the legitimacy of an IF. IFs may be imposed only for capital expenses necessitated by and directly attributable to the cost of system improvements needed to serve new growth and development. The three nexus tests of IFs developed in the courts to meet constitutional challenges to IFs include (1) the reasonable relationship test, which requires a reasonable connection between the fee charged the developer and the needs generated by that development; (2) the specifically and uniquely attributable test, which confirms that the fee charged to the developer is directly and uniquely attributable to the development; and (3) the rational nexus test, which requires rough proportionality between the amount charged to the developer and the type and amount of facilities demand generated by the development and that there be a reasonable connection between the use of fees and the benefits accruing to the development (*Nollan v. California Coastal Commission* 1987; *Dolan v. City of Tigard* 1994; Pershing 2008). The APA sets out the following 11 standards for IFs that were ratified by the Board of Governors in Cincinnati and San Diego.

1. The imposition of a fee must be rationally linked (the rational nexus) to an impact created by a particular development and the demonstrated need for related capital improvements pursuant to a CIP and program.
2. Some benefit must accrue to the development as a result of the payment of a fee.
3. The amount of the fee must be a proportionate fair share of the costs of the improvements made necessary by the development and must not exceed the cost of the improvements.
4. A fee cannot be imposed to address existing deficiencies except where they are exacerbated by new development.
5. Funds received under such a program must be segregated from the general fund and used solely for the purposes for which the fee is established.
6. The fees collected must be encumbered or expended within a reasonable time frame to ensure that needed improvements are implemented.
7. The fee assessed cannot exceed the cost of the improvements, and credits must be given for outside funding sources (such as federal and state grants and developer-initiated improvements for impacts related to new development) and local tax payments that fund capital improvements, for example.
8. The fee cannot be used to cover normal operation and maintenance or personnel costs but must be used for capital improvements or, under some linkage programs, affordable housing, job training, child care, or such.
9. The fee established for specific capital improvements should be reviewed at least every 2 years to determine whether an adjustment is required, and similarly the CIP and budget should be reviewed at least every 5 to 8 years.

10. Provisions must be included in the ordinance to permit refunds for projects that are not constructed because no impact will have manifested.
11. IF payments typically are required to be made as a condition of approval of the development, at the time that either the building or the occupancy permit is issued.

The rational nexus requirement was established in *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987). In that case, the United States Supreme Court held that permit conditions must be sufficiently related to the government's regulatory interests. The Court added the "proportionality" requirement in *Dolan v. City of Tigard*, 512 U.S. 374 (1994). In the *Dolan* case, the Court held that when governments impose permit conditions, there must be "rough proportionality" between the condition's requirements and the impacts of the development. Thus, the use of IFs must satisfy the nexus and proportionality rules as laid out by the Constitution.

#### *Other Considerations*

Four additional considerations have been listed in the literature as important for resorting to IFs:

- Political acceptability is vital in jurisdictions, as is the acceptability of the constitutionality of IFs, particularly in states that do not have enabling statutes.
- Strong real estate market conditions and growth are important for rapidly growing cities and regions. There have been quite a few instances in more recent economic times when IFs have been temporarily placed on hold or deferred to incentivize development.
- Institutional capacity in terms of clear-cut guidance on implementation and usage, proper legislation, and finally administrative and technical abilities to institute and manage IFs are important factors in deciding to move ahead with IFs.
- IFs can have built-in equity implications. The onus of establishing the rational nexus test lies on adopters to ensure fairness of the fees and rate structures. This test requires a demonstration of a need for the improvement as caused by the development, a cost basis for the rates apportioned to the development, and a benefit for those who pay with guidelines on how the money should be spent and placed in a fund that is separate from the local government or municipality's general fund (Mathur and Smith 2012).

#### **SPECIAL ASSESSMENT DISTRICTS**

Special assessment districts (SADs) are an institutional mechanism for financing local infrastructure investments by allowing an added fee on a defined district that most benefits from the improvements. The most typical SAD is unique in that it

refers to a unique district in which a local government can levy a fee (special assessments) against real estate parcels to pay for certain types of public projects. According to the U.S. Census Bureau, special assessments represent 0.31% of total state and local government revenues in the United States and 0.47% of local government revenues as of 2008–2009. Zhao and Larson (2012) present an excellent overview of SADs and their history in the United States.

## Implementation Considerations

### *Sources of Value Creation for SADs and Beneficiary Basis*

The rationale for SADs is proximity driven and based on the benefits derived largely from transportation investments and accessibility changes (Rolon 2008). Those closer to an improvement receive greater benefits than do those farther away or the larger community. The literature sometimes refers to these as special benefits. Thus, SADs attempt to isolate that value created to properties in areas that benefit from an improvement and channel that toward funding and financing the cost of a transportation project. The main benefit driver or source of value creation in these cases is the change in access in terms of reductions in travel time, travel costs, and distance made possible as a result of these investments. The main beneficiaries of this created value are the entities or affected community for whom the value is created.

Special assessment districts are common in the case of transit and transit-oriented development (Center for Transit-Oriented Development 2008). Zhao and Larson (2012) provide a succinct summary of public-transportation-related special assessments. They provide several examples of cities and transit districts using SADs to transit-improvement-related SADs. Like IFs, roadway improvements and construction are an authorized use of special assessments in the United States (Hagman and Misczynski 1978). Several authors have pointed out that SADs are now used to compensate for increasingly constrained state and local transportation improvements and maintenance budgets (Hough et al. 1997; Kogan and McCubbins 2008).

### *Establishment of SADs*

The steps involved in the initiation are laid down in state statutes, and there are some variations across states, but the following mostly sequential steps are typical of most SADs (Zhao and Larson 2012):

1. Initiation.
2. Feasibility studies.
3. Public notice requirements to affected community members.
4. Appraisal assessments (RCW §35-43-250 and Virginia Code §15.202407).

5. Initial project funding procurement.
6. Challenges and legal appeals.
7. Lien position.

### *SAD Geographic Boundaries or Areas of Applicability*

Because most SADs are conceptually driven by micro service area geography or benefit areas for projects for which they are developed, they are used in the context of service areas or specified boundaries. The service area itself and the rate determination are the two most difficult elements of SADs (Rolon 2008). These boundaries are determined by engineering or economic analysis. There are often determined after consideration of two geographic areas: a broader aggregate district where communities receive general benefits and a second one that is a more restricted or a smaller service area comprised of those receiving special benefit. This is an important technicality because once properties are assigned to a benefit area, they belong in that zone until expiration of the SAD (a duration specified by the statute of the state).

Boundary development is based on an assessment of the extent of special benefit that is delivered by the project. There are no guiding principles for boundary determination or rate setting (Mathur and Smith 2012; Zhao and Larson 2012). The notion of a generally open system combined with local benefit presents agencies wishing to pursue this route with a problem as to how the areas served/benefit areas/catchment areas can be defined and drawn for the purpose of levying the special assessment. This is a practical difficulty in implementation. Theoretically, the service area would establish a link between the project and the beneficiaries, a task that is in principle marred by the difficulty in establishing the beneficiaries for open systems such as roadways. As a practical matter, many agencies bypass this technicality and adopt distance-driven thumb rules for establishing service areas. In rare instances, SADs of a special kind are found at a macro areawide scale. An example of an areawide example is discussed in chapter three. These areawide examples are driven by general benefit considerations (as opposed to special benefit) and are generally used in a more programmatic basis. In such cases, a flat rate tax is often levied to fund transportation.

### *Assessment Rate/Fees*

A second problem arises with the determination of the rate or levy basis. In principle, much like boundary areas and user charges, levy rates or fees have a relation to the benefit on the property. However, the research still needs to advance how rates can be assessed in ways that can be attributed to the proposed improvement. There is another difficulty associated with future improvements because the benefit cannot

be anticipated in relation to the adoption of the SAD, which complicates rate setting. Some of these rules are discussed in the literature:

- A flat rate for all uses.
- A graduated levy based on perceived benefit distance, which may or may not vary by land use type. In this case, the rate can be a variable rate where the rate is stepped up by a distance factor indicating how far the property is from the improvement. This is often seen in the case of transit.
- A levy with a cost basis in which rates are set on the basis of cost recovery. These examples can include both types listed earlier and two other categories:
  - Rates based on cost apportionment of anticipated benefits received as a result of increases in land or property value.
  - Rates that are zone- or area-based, based on distance from the improvement. In this case, they could be graduated distance-based levies or flat.
- Frontage-based levies proportional to the frontage occupied by each landowner adjacent to the improvement or proportional to the area occupied by the parcel in the SAD. The rate may or may not vary by land use type. An example in this case is the Los Angeles Metropolitan Transit Authority rate calculation, for which the annual assessment rate is determined by dividing the bond repayment by the assessable square footage and factoring in the last 3 years of delinquency rates. The rate is then levied on the gross square footage of the assessable improvement or parcel area, whichever is greater. It is also fixed for all uses and independent of how close or far one is from the reference point (in the case of the Los Angeles Authority, a station; Rolon 2008). This is equally applicable for transit or highways.
- Equity criteria may be combined in rate formulas by making adjustments in the rate formula if equity is of concern. Another technicality linked to rate setting is the ad valorem versus non-ad valorem basis for rates. The definitions for VC suggest the ad valorem basis; however, the practice appears to be mixed in this regard.

The payments for infrastructure occur along two different lines: (a) pay as you go, which implies funds are paid out as they are collected; and (b) pay as you use, which implies SAD-backed bonds cover the up-front costs of the infrastructure (Mathur and Smith 2012).

### Legal Considerations

Special assessments are authorized in all 50 states either under explicit enabling legislation or under state constitutional provisions. Virtually all SADs require some type of landowner or voter approval of inclusion in the districts or as an appeal to dissolve the district to not fund the improve-

ment. In many states, legislatures have passed new enabling legislation that allows special districts to be used to finance a broader range of facilities than was allowable in the past. The most common use is for environmental and housing services, followed by the provision of other public infrastructure services, excluding transport. These districts often go by such names as improvement districts, road districts, metropolitan districts, and building authorities. In most cases, the districts serve the same general purpose as the traditional SAD, but they often are not limited to the use of assessments on property, such as front footage charges or acreage fees (AASHTO Center for Excellence in Project Finance 2013).

Special assessment districts appear in a variety of forms based on legal provisions in the United States. They are operationalized through the service areas that appear with different names in different states. They are also referred to as benefit assessment districts (California Benefit Assessment Act 1982), local improvement districts (Washington), business improvement districts, community improvement districts (Missouri), downtown improvement districts, TIDs (Virginia, Ohio), and special service areas (SSAs; Illinois), all of which operate under the same general defining principles. Some states, such as Minnesota, Michigan, and Nevada, call them SADs (League of Minnesota Cities 2011). Other forms of special districts allow for other types of levies, taxes, and fees to be imposed, including transportation benefit districts (TBDs) and TDDs. The typical SAD refers to a benefit where property fee type levies are the primary basis for charging, and no other types of taxes are used.

### *SADs and Rural Roadways*

A form of SAD called rural improvement district is used in Montana and North Dakota. For example, in Montana, state law allows for property owners to petition counties to initiate infrastructure improvements when at least 51% of property owners approve the measure. Similarly, Cass County in North Dakota requires 60% of landowners to support the assessment fee. In these cases, property owners are responsible for all costs of the improvement, although county governments undertake the actual construction (Hough et al. 1997; Zhao and Larson 2012).

### Applicability to Transportation

Special assessments have been used as a source of transportation funding by means of assessing property owners who are benefited by access changes brought about by the transportation project being constructed. The revenues are used to cover a portion of the project costs. As with IFs, statutes define the role of transportation as an eligible category for establishment of an assessment district and authorize the use of the fees on properties to fund transportation.



### *Transportation-Related SADs*

Special assessment districts are authorized in 50 states in different forms. SAD funding/financing mechanisms vary by district, and not all authorize transportation as valid service or public work category, and when they do, they often require an institutional mechanism for facilitating its use. This report discusses two of the most common types of SADs used in the United States that are applicable for transportation funding purposes. The first is known as the TID, adopted in Virginia and Ohio, using only property taxes dedicated specifically for transportation. The second one is the SSA (Illinois), which is a more typical type of SAD; transport infrastructure is among the many public works and services that an SSA can benefit. SADs also need to be supported by the majority of the property owners.

The Transportation District Act of 1964 was enacted to promote regional development of transportation systems. The Virginia TID is encapsulated in Virginia Acts of Assembly, Virginia Code. It applies equally to highways and transit. This act allows for the development of special local transportation districts, transportation tax districts, or TIDs:

- Chapters 13 and 15 of Title 33.1 of the Code of Virginia, Va. Code §33.1-409 et seq.
- Va. Code §33.1-430 et seq.
- Va. Code §58.1-3221.3.

These TIDs are responsible for construction, expansion, improvement, and operation of transportation improvements in the district. The Route 28 TID is one example of such a district.

The Ohio TID is included as part of the Ohio Revised Code, Title 55, Chapter 5540, Section 5540.01. The Ohio TID is also a generic transportation project funding district not necessarily restricted to highways, for which a project is noted to include a street, highway, parking facility, freight rail tracks and necessary related freight rail facilities, or other transportation project constructed or improved under this code.

An SSA is a common financing mechanism to establish and support a variety of services, physical improvements, and other activities within a specific geographic area of a municipality. The Illinois SSA is a type of non-transportation-specific SAD that allows for transportation as one of the several types of services or infrastructure that can be funded through this financing mechanism. The SSA is authorized in Illinois pursuant to Special Service Area Tax Law Article 27 35 ILCS 200/27-5 as amended (Illinois General Assembly 35 ILCS 200/27-5). SSA financing can improve or maintain designated areas within a community, and its boundary must consist of contiguous properties that benefit from expanded services and improvements. SSA financing also enables a municipality to provide public services to a portion of its jurisdiction without burdening the entire community with increased debt or operating taxes.

The Illinois SSA statute allows creation of SSAs that transcend municipal boundaries. Thus, the SSA enables a self-taxing district to be formed, primarily created to fund physical improvements such as infrastructure, commercial area management and promotions, and recreational and public safety facilities. Improvements may be funded through tax revenues generated through SSA and other funds, usually when a development proposal is in place by private developers for the area. Capital for improvements is obtained by debt issuance. The tax or additional revenue generated by the SSA normally takes the form of additional levies on individual properties, which are then used to amortize debt. The SSA taxes are collected by the county and remitted to the municipality (Illinois General Assembly).

### *Common Elements of SSAs and TIDs*

Almost all types of transportation SADs discussed, SSAs and TIDs, have some common elements built into the implementation process with respect to boundary determination. The Virginia statute specifies contiguity within single jurisdiction/locality and contiguity across localities/jurisdictions. This is a common element for almost all forms of special districts. Another common element is that both are property tax-based assessment districts, but the SSA can levy other charges or fees. In addition, the SSA fee is collected through the property tax system and is calculated on the basis of benefit but is not a part of the Illinois real property tax system; in other words, the tax is considered non-ad valorem.

### *Revenue Stability*

One of the justifications for using SADs has been that they offer a stable source of funding for bond financing. The literature suggests that they cannot be used to finance facilities that provide general, communitywide benefits. This specifically differentiates taxes and fees in the context of VC. Economists generally define tax as a way to generate revenue. On the other hand, a fee is strictly a type of a user charge, often used to defray the cost of providing the service or, in the case of special assessments, one that is proportionate to the special benefit generated by the improvement. This requirement makes the implementation of special assessments for specific purposes more complex and more legally difficult to institute than general-purpose taxes. However, there are instances when SADs have been used as a dedicated source of transport funding based on state-level initiatives suggested in the review.

### *Usage Potential for Transportation (Highway or Transit) Funding*

Because SADs are benefit based or access driven, they may be justified when a transport project alters access significantly and enhances the affected community positively through higher land values. Although access is critical, access is not the only driver for lasting economic value created for the

affected community. There is also a threshold or limit when marginal changes to access on networks will stop leading to benefits in terms of land values or other economic benefits. There is adequate evidence on this in terms of mature network land values (Dabinett 1998; Ingram 1998).

There are very few examples of SADs being used for large-scale projects because they are driven by local benefit and implemented by local governments. When that happens, the jurisdictions should have provisions in their codes for allowing interjurisdictional collaborations. In Ohio, adjacent municipalities can share costs of a street improvement when the improvement crosses municipal boundaries. The municipalities must first agree on the proportion each will contribute to the improvement project. From there, each municipality can decide whether the improvement will be paid for out of general funds or through special assessments. Then the municipalities must agree to designate one of them as the project administrator, responsible for construction of the improvement (Ohio Revised Code §727-41).

Virginia has specific provisions for multijurisdictional TIDs. Recently, the Dulles Rail Transit Improvement District in Virginia attempted to develop a cross-jurisdictional SAD covering Fairfax County and Loudoun County, near Washington, D.C., to finance the construction of an extension of Washington Metropolitan Area Transit Authority's (WMATA's) Orange Line. However, they were unable to gain the required public support in the larger district, and the boundaries were scaled back to Fairfax County alone (Center for Transit-Oriented Development 2008). This failure underscores the political difficulties in setting up SADs across multiple jurisdictions.

### Other Implementation Considerations

This mechanism may be most applicable in the following cases:

- Growth areas that are underserved in terms of transport infrastructure relative to growth in that the improvement addresses a need.
- Areas or advanced transport networks where a significant increment in accessibility exists (such as new river or bridge crossings), allowing separate systems to merge.
- Areas or advanced transport networks with significant bottlenecks (Rolon 2008).

Political acceptability is significantly affected by the design considerations of SADs and specific types of parcels included in the geographic area. In some situations, it has been noted that the exclusion of existing parcels/developments from service areas may enhance political acceptability (Mathur and Smith 2012).

In summary, the key features of SADs are:

- Special assessments are levied against property owners to finance certain public improvements and provide a steady stream of revenues.

- They apply only to properties within a designated area for their location-specific special benefits from the improvements. This emphasizes the beneficiary basis of SADs as a funding mechanism.
- The amount of the charge may be related to the value of the benefits the properties receive, which are estimated based on certain assessment methods.
- Special assessments are collected in property tax bills. Therefore, jurisdictions may use special assessments to finance infrastructure improvements even if they have reached their property tax limits. Thus, SADs' assessments are typically non-ad valorem in that they are directly tied to the improvement of property as a result of the improvement.
- SADs can issue bonds for financing infrastructure projects.
- SADs appear to lack conceptual basis with respect to beneficiary areas.

### SALES TAX DISTRICTS

Sales tax districts (STDs) are primarily a type of SADs, with the only difference being that they allow the use of only the sales tax (instead of the property tax). Much like SADs, they are levied in service areas that are benefit driven. SADs can sometimes also combine property fees and sales tax elements in one geographic area (Illinois SSA, for instance).

### Implementation Considerations

#### *Geographic Boundaries or Area of Applicability*

Much of the discussion on SADs is applicable to STDs. Unlike SADs, STDs are more frequently implemented on a macro regional scale benefit area, such as at the level of a municipality or areawide, and are not always limited to specific service areas. Sometimes, they may cover more than one municipality or county.

#### *Rates*

The maximum rates of STDs are stipulated by statutes. Unlike SADs, there is not a process for establishing rates for levy. The sales taxes are levied on all purchases within the area defined as the service area, unlike special assessments, for which fees are levied in some proportion to the benefit. Thus, the rates in this case may be considered as very low rate taxes.

#### **Applicability to Transportation**

Sales tax districts have been used as a source of transportation funding by means of levying a low-level sales tax on all transactions in an area benefited by the transportation project(s). The revenues are used to cover a portion of the project costs. As with IFs, statutes define the role of transportation as an eligible category for establishment

of an STD and authorize the levy of sales taxes to fund transportation.

### *Transportation-Related STDs*

In addition to the Illinois SSA, there are some examples of transportation-specific STDs, including Missouri and Kansas TDDs. Both of these TDDs allow property and sales tax as the basis of levies; however, all implementation exercises have been only in relation to sales tax.

In 1997, the Missouri General Assembly passed Senate Bill 303, amending the Transportation Development District Act to make it more flexible and usable by local communities. The Missouri TDD is an independent political subdivision and is defined as a transportation project development tool, governed by state statute, which is available for use by registered voters, local communities, and property owners throughout Missouri. A TDD is designed to facilitate specific public transportation improvements through the collection of taxes and the borrowing of funds. A TDD has geographical jurisdiction and is created by vote of qualified voters; the vote is then approved by the circuit court. The revenue of a TDD (most frequently sales tax) can be used only for public transportation and transportation-related improvements (Missouri DOT, Missouri General Assembly). The TDD can do all of the following and more:

- Fund, promote, plan, design, construct, improve, maintain, and operate one or more projects or assist in doing so; in addition, it is a political subdivision of the state.
- Work with projects that include bridges, streets, roads, highways, access roads, interchanges, intersections, signing, signalization, parking lots, bus stops, stations, garages, terminals, hangars, shelters, rest areas, docks, wharves, lake or river ports, airports, railroads, light rail, other mass transit, and any similar or related improvement of infrastructure.
- Form a board of directors who will possess and exercise all of the district's legislative and executive powers after qualified district voter approval.

- Contract with the Missouri Highways and Transportation Commission (MHTC) or the local transportation authority to receive revenue from the district to apply to project costs.

Similarly, Kansas uses its own version of the TDD.

### *Extent of Use*

Missouri authorized TDDs in 1990. The first TDD was established in Missouri in 1997 and as of December 31, 2009, 166 TDDs had been established (see Figure 7), making Missouri one of the more active states in applying this technique (State Auditor's Report 2011). Kansas also has several TDDs but not to the extent of Missouri.

### **Other Implementation Considerations**

Political acceptability of sales taxes is a vital implementation consideration. Many of the additional considerations discussed under SAD are also applicable to STD, including healthy economic and real estate conditions.

### **NEGOTIATED EXACTIONS AND CONTRIBUTIONS—DESCRIPTION**

Negotiated exactions (NE) and contributions are similar to IFs in that they are also charges or exactions to new developers for necessary growth-related services, but they differ in one significant way. Negotiated contributions are negotiated on a case-by-case basis and apply very locally to on-site improvements related to the new development. An exaction is a condition for development that is placed on a parcel, and it requires developer mitigation of adverse impacts of the development (existing or proposed). NEs can also take the form of private provision of land or construction of roads and in-kind contributions to local roads, parks, or other public goods as a condition of development approval, or can be requested in the form of in-lieu fees. IFs, on the other hand, are determined through a formal calculation of improvement

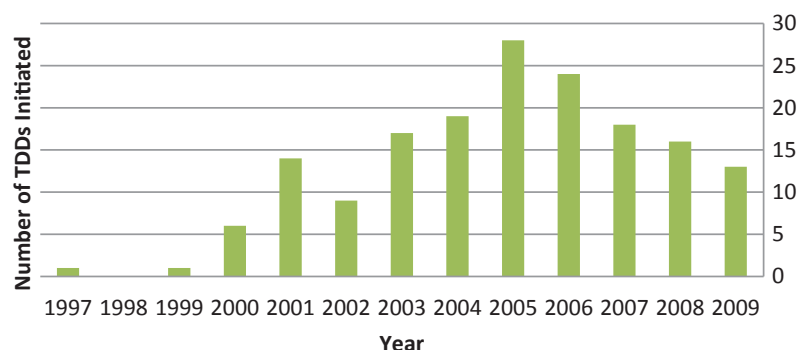


FIGURE 7 Number of TDDs in Missouri as of 2009. (Source: Recreated with data from *State Auditor's Report 2011*.)

costs and may involve larger area, off-site transportation improvements.

### Implementation Considerations

#### *Usage of Exactions*

The usage of NEs is rather similar to that of IFs; in some sense, NEs preceded IFs. Much like IFs, exactions are an attractive means of ensuring the provision of needed infrastructure in high-growth areas and where a jurisdiction's fiscal capacity is limited. The adoption of exactions as a method of infrastructure provision appears to be even more common and widespread than that of IFs (Iacono 2009).

#### *Geographic Scale*

Negotiated exactions are determined on an ad hoc, project-by-project basis through the development approval process. Thus, the scale of application is at one or more site(s) for any given project. The NE often takes the form of in-lieu fees for situations when the size of the development is rather small to individually dedicate land or facilities (Kolo and Dicker 1993). For larger developments, the local entities can enter into development agreements where a NE will involve the dedication of land and/or facilities by developers.

### Legal Considerations

As with IFs, the legality of NEs is grounded in the establishment of a rational essential nexus and proportionality rules between the required exaction and the services provided. Virginia proffers are an example of NEs. NEs need to be authorized legally and are almost always applicable for on-site improvements. They also require formal traffic impact studies (Lari et al. 2009).

### Applicability to Transportation

Highway and transit agencies and developers can negotiate a payment for capital improvements that are designed to provide access or service to the site that is being developed. They are equally applicable to new or existing developments. Municipalities themselves may also serve as administrators of such exactions.

### Other Implementation Considerations

Additional legal scrutiny of all land use negotiations is an important consideration for NEs. Recent Supreme Court rulings on land use negotiations, such as *Koontz v. St Johns River Water Management District* (Ewing 2013) may act as a deterrent in future.

### AIR RIGHTS—DESCRIPTION

Air rights are a VC financing mechanism in which a private agency partly compensates the public agency for the cost of an investment through cost-sharing agreements. The public agency can also share in the future revenues from the development. ARs involve the development of highway air space. The term “air space” is a legal term and refers to the right to use and control the open space above the property owned by another party, and ARs typically have been granted for the space above railways, highways, or other property. It is assumed that the parcel owner has the capacity to build within the limits imposed by zoning laws (Savvides 2004). Leasing ARs above, below, or adjacent to transit centers or highway facilities (when applicable) allows for development in prime locations without the demolition of existing structures or the displacement of current residents. In 2008, New York City alone documented 83 transportation infrastructure sites, comprising nearly 1,000 acres of roads, rail corridors, and rail yards that could provide areas for new surface development (Friedman 2012).

Air rights often occur through a transfer of development rights (TDR). In the United States, the first application of ARs was New York's Grand Central Station Terminal and Park Avenue development constructed over Central Railroad in 1913 (Campbell 2009). Today, we have examples of ARs developments over highway rights-of-way as well as transit stations and transit corridors.

More recently, in the transit arena, WMATA has been at the forefront of ARs development mechanisms. It has used ARs leases to help finance two of its transit stations. Similarly, Georgia's Metropolitan Transit Authority (MARTA) has successfully used ARs to generate revenues for transit projects. In the case of highways, many cities began to reconsider the sale of ARs over freeways to reconnect neighborhoods that had been split by their construction. Examples of such projects include:

- An esplanade built above East River Drive Highway in New York City intended to preserve a waterfront overlook at Carl Schulz Park.
- A city park constructed in Duluth, Minnesota, over Interstate 35, connecting the Lake Superior lakefront to downtown Duluth.
- A freeway park in Seattle, constructed over an interstate in downtown Seattle and comprised of both a large urban park and a 21-story office building.
- Union State Place on a land bridge across Interstate 670 in Columbus, Ohio. This bridge can support one-story buildings containing 27,000 square feet of retail space.

Public agencies in Boston have been among the most aggressive in pursuing ARs development over interstate highways. The Prudential Tower, a \$200 million mixed-use residential



redevelopment project, was the first major ARs development in Boston, built in 1957 using ARs over a Massachusetts Turnpike exit ramp (Larson and Zhao 2010).

Peters (1986) provides an excellent review of highway-related interstate air space projects, some of which include Washington DOT's ARs lease options over Interstate 5 to develop the Gateway Tower; use of air space under Interstate 5 at Spokane Street Interchange for a new maintenance facility; and the Massachusetts Turnpike Authority use of air space over and around the turnpike to develop Copley Place and other similar developments.

### **Implementation Considerations**

The lease or sale of ARs presents an opportunity for transit and highway agencies to generate much-needed revenue, but successful projects require time and extensive planning. Laying the groundwork for and building secure partnerships with key stakeholders is a must.

#### *Geographic Scale or Area of Applicability*

Air rights projects are very location-specific and possible only at the parcel level. ARs projects are highly susceptible to changes in the commercial real estate market.

#### *Sustainable ARs*

Air rights are most effective in communities with strong real estate markets. The sustainability of financing mechanisms, such as ARs for agencies and local governments, is often evaluated using considerations such as:

- The presence of a clear policy framework in place to guide JD activities.
- The presence of strong local government and transit institutional capacity to successfully plan, implement, and manage JD projects.
- The support or opposition of local stakeholders, including local residents who can make or break a project.
- The need to ensure that agreements are equally beneficial to all partners (Mathur and Smith 2012).

#### *Structure of AR Transactions*

Highway and transit agencies have dealt with the structure of the AR contracts in a number of ways. Four different methods of conveying ARs have been employed, one of which involves a leasehold and three of which involve granting the developer a fee interest in the air space [Goldschmidt 1964; American Planning Association (APA) 1964]. Because they are related very strongly to the performance of the real estate

market, this has led to the consideration of how ARs agreements may be developed or structured, including:

- Up-front, one-time payments versus conventional lease agreements.
- Long- and short-term leases: The lease provides access to air space as well as any land required for support or access to that air space for a defined period of time. ARs leases have been structured similarly to ground leases, including renewal options that usually last 99 years (Larson and Zhao 2010).
- Fee simple ownership rights: First, public entities may decide to sell both ground and ARs outright. This practice has been followed by the highway or railway agency obtaining a long-term or perpetual easement through or below the development (Prudential Tower in Boston, is an example of this approach). In such an instance, the public entity loses long-term control of the parcel but may reap a large enough financial gain to adequately compensate itself for this loss (Larson and Zhao 2010).
- Sale of ARs with grant of easement: Easements create a long term or perpetual term during which the landowner grants a nonpossessory interest to another entity to use part of a property for a specific purpose. Easements are often used to ensure that developers have access to the ground for construction (Larson and Zhao 2010).

### *Valuation Considerations*

Airspace utilization requires an explicit valuation of the air-space. For instance, the FHWA policy already stipulates that the DOT shall charge fair market value for use of land for any purpose not related to highways and that the income received from airspace leases has to be used for transportation purposes, as specified in 23 CFR 710.403 (e). Valuation and appraisal are critical parts of this implementation process. Valuation is noted as important in all VC ARs examples reviewed in this synthesis and in all other uses of air space not related to highways.

### **Legal Considerations**

Peters (1986) notes that FHWA issued a policy in 1986 to use airspace for the highway program. The current FHWA airspace guidelines are encapsulated in Title 23 Code of Federal Regulations (CFR; CFR 710.405-710.407; FHWA 2010). The FHWA guidelines cover airspace leases only for interstate ARs. ARs do need to be legally allowed to be used in, near, or adjacent to highway or transit corridors. The APA notes that legal and financial considerations influence the type of ARs conveyed (APA 1964).

### **Applicability to Transportation**

Use of airspace over, under, and adjacent to highway rights-of-way allowing for real estate development opportunities

is also VC. Because ARs are unused or excess development rights (such as building density or lot size) are gauged by the square foot and transferable, when permitted, from one buildable lot to another, they typically are activated through a TDR, which embodies the notion that these rights are a saleable and transferable commodity (Mills 1980). Thus, this mechanism relies on seizing the opportunities presented by air space when legally allowed to enable real estate development. The utilization of ARs has been a source of transportation project funding in the case of highways and transit in the dense cities of states such as Massachusetts and New York.

### Other Implementation Considerations

There are no major additional implementation considerations in this case.

### JOINT DEVELOPMENT—DESCRIPTION

Joint development is defined as “an effort by a public agency and a private developer to undertake a construction project.” JD is usually a voluntary joining of governmental entities with private for-profit organizations to undertake mutually beneficial development in connection with public infrastructure. It is generally a more encompassing and broader concept than traditional VC. A JD agreement generally contains formal legally binding language between a public entity and a private individual. Projects may be initiated through a codevelopment, which is an informal working arrangement in which the public agency and the private developer work together to complete their individual projects in a mutually beneficial way (FHWA 1996). These are general definitions that envelope public-private partnerships of all kinds. The JD concept is a public-private partnership agreement of the broadest kind. In the case of VC, it is a cooperative agreement between the public sector, private partners, and real estate developers to share the financial burden or cost of the transportation investment. The definition that is most pertinent to the context of VC is that provided by Sedway Kotin Mouchly Group (1996), which defines JD as “real estate transactions involving the development of private projects using publicly owned land or air rights.”

From the VC perspective, JD allows the capture of private benefits created by infrastructure improvements through specific JD arrangements to support the initial cost of the improvements. In this sense, successful JD projects may help alleviate funding shortages and improve market efficiency by better linking costs and benefits of transportation improvements. JD agreements typically accompany AR agreements, but other types of JD agreements are possible, including a lease of land or space to a developer; sale of land for specific types of development; joint construction of a transit or highway facility and private development; and others. Public and private partners can share costs, revenues, or financial risk, depending on the particular arrangement.

### Implementation Considerations

#### *Geographic Scale or Area of Applicability*

Joint development VC agreements are much like ARs and exactions. They tend to be used on a site-specific basis (project by project).

#### *Models of JD VC*

At least two kinds of VC-related JD modes have been presented in the literature, both of which are applicable to transit and highways (Zhao et al. 2012).

- Public ownership of land model: The public sector may sell or lease public-owned properties for funding where the transportation agency owns land adjacent to its facilities but does not need the property for immediate use, or where the parcel is not being used to its full potential. As pointed out, these contracts can be structured in different ways. The variations in this scenario in the United States include:
  - Transactions of publicly owned land.
  - Land banking as a revenue-sharing mechanism.
  - Commercial space leasing as a cost-sharing mechanism undertaken by an agency (common with transit agencies).
  - Transactions involving development rights in which a public agency owns land adjacent to its facilities and it sells, leases, or awards associated development rights to encourage development of a site and generate revenues. Many of the ARs projects belong in this category.
  - Development rights awards in which a private sector builds the facility (e.g., light rail) in return or exchange for developing the property around the site (e.g., station).
- Private ownership of land model: A public entity, or a developer working with a public entity, may exact land from private property owners who, in exchange, receive benefits in the form of property improvements.
  - Transactions involving privately owned property, which is not common in the United States.
  - Transactions involving development rights, such as density bonuses used in New York City geared at increasing the floor-to-area ratio.

#### *Extent of Use*

Joint development is more common with transit agencies. According to the Government Accountability Office (2010), 32 of the 55 transit agencies surveyed noted the use of JD. Although many of these JD projects were quite small, consisting of only a single parcel near a transit station, some were much larger, neighborhood-scale joint projects. WMATA, the agency receiving the largest amount of revenue from JD in 2008, generated \$8.8 million. Outside the United States,

JD projects are common in Asian cities primarily for transit. Some widely discussed examples of JD include Hong Kong's rail-property (R+P) model, the land consolidation model used in several Taiwanese cities, and Tokyo's land readjustment model. The success of these cases is attributable in part to their unique regional contexts, including high population densities, booming property markets, and favorable political, legal, or regulatory environments for JD (Zhao et al. 2012). However, such cases may not be entirely transferable to the United States.

### Legal Considerations

The use of JD in the United States goes back to the Pacific Railroad Act of 1862, which provided land grants to the Union Pacific and Central Pacific Railroads for the construction of the transcontinental railroad. Each railroad was given 400 feet rights-of-way plus 10 square miles for every mile of track built. The federal government expected the railroads to sell their acquired land to pay for the transcontinental railroad's construction. However, railroads later turned to government bonds to pay for the railroad's construction (Cox 2009).

As of 2010, regulatory barriers and public opposition prevented the widespread use of JD mechanisms in the United States, although 23 states had enacted legislation authorizing some types of public-private partnership. In addition, many states limit the number of JD projects or place constraints on the volume of development (U.S. DOT 2004). Despite these limitations, several public (mostly transit) entities have employed JD with varying levels of success. In 2004, New York City led the nation in the number of transit-related JD projects, primarily in the form of density bonuses provided to developers. The WMATA collected the most revenue or offloaded the most cost (Cervero et al. 2004) through JD. In addition to New York City and Washington, D.C., cities such as Portland, Oregon, and Philadelphia, Pennsylvania, use a variety of JD models (Zhao et al. 2012).

### Applicability to Transportation

Joint development refers to public-private partnerships in relation to real estate that is benefited from the transport investment or where there is a mutual dependency between the development and transport infrastructure. JD agreements can include ARs parcels or other parcel types and allow VC through real estate development and developer partnerships.

### Other Implementation Considerations

Additional legal scrutiny of all negotiations may be an important consideration in some JD agreements. Recent Supreme Court rulings on land use negotiations, such as *Koontz v. St Johns River Water Management District* (Ewing 2013), require a closer look at land use-related agreements. Administratively, JD agreements are complex to manage.

### LAND VALUE TAX—DESCRIPTION

The land value tax (LVT) is a variant of the property tax that imposes a higher tax rate on land than on improvements, or taxes only the land value. The most famous case for land value taxation is found in Henry George's 1879 book *Progress and Poverty*. More than 30 countries around the world have implemented land value taxation, so it is not a utopian proposal. In the United States, experience with land value taxation dates to 1913, when the Pennsylvania legislature permitted Pittsburgh and Scranton to tax land values at a higher rate than building values. A 1951 statute gave smaller Pennsylvania cities the same option to enact a two-rate property tax. Although most municipal governments in the state have not adopted two-rate taxation, a few have tried and then rescinded it. There are some communities that currently use this type of tax program. Now, LVT has been enacted in 17 jurisdictions in Pennsylvania (Speirs 2010). However, Pennsylvania's experience has had one setback since it was initiated. In 2001, Pittsburgh rescinded its two-rate system of property taxation after nearly nine decades, not because of the LVT mechanism itself, but because of deficiencies in assessment practices. The state of Hawaii also has experience with two-rate taxation, and in recent years, the Commonwealth of Virginia and state of Connecticut have authorized a few municipalities to choose a two-rate property tax, although none of the communities have yet adopted it. Connecticut adopted LVT for one municipality as recently as April 2013 after the bill was passed in December 2012.

In this mechanism, the burden of property taxation is taken away from labor and capital investments implicit in buildings to one that taxes only land. The shift of taxation away from buildings is a development incentive and incentivizes growth, while providing the municipality revenues to run the city from the tax revenues. For example, a drop of 5% in the building tax rate would require that revenue loss be made up by an increase in the tax rate on land values. The direct effect is to put a greater reliance on publicly created value (land) rather than privately created wealth (buildings, commerce, or wages). A higher tax on land has the acknowledged effect of removing the distortions on markets that traditional taxes create. It is more progressive than the current system, and studies have noted that it incentivizes vacant land into better use. Across the world, land value taxation has been adopted in 40 countries, with the earliest adopter being New Zealand, in 1849 (Dye and England 2010). Based on their extensive review, Dye and England comment that land value taxation is a mechanism that has worked at every level of government.

Land value taxation is also touted for its positive impact on smart growth because of its split-rate structure (Speirs 2010), although many aspects, such as density effects and compactness, are the subjects of ongoing investigation. The smart growth effects arise from the split rate structure, as noted. Speirs notes that when the tax rate is increased on the land part of the property and decreased on the building,



it leads to a negative capitalization effect on land, resulting in land being priced closer to its true market value. On the other hand, the availability of buildable infill lots at competitive prices can make that land more attractive to builders. The decreased tax on building improvements has a positive capitalization effect, similar to property tax abatements providing an incentive to develop densely and compactly.

One of the major advantages of land value taxation is based on the nature of the fixed supply of land and is noted as “when a tax does not affect the amount of the commodity produced or consumed, there is no additional cost, and such a tax is more efficient (less costly to the local economy) than other taxes that reduce production” (Dye and England 2010).

## Implementation Considerations

### *Administrative Aspects*

Introducing a LVT to replace a traditional property tax can be a straightforward procedure. No additional staff or expenses are required. Because most appraisal districts automatically divide the assessment into land and improvement values, only a software update is needed for billing. However, because it can affect significant changes for some property owners, a LVT normally is phased in over time, usually 6 to 10 years (Speirs 2010).

A major hurdle to the adoption of a LVT or split-rate property tax is political feasibility. As is typical with property taxes, the broad base and high visibility of property taxes can make them a focal point for conflict over public finance and budgetary practices at the local level. Any shift toward a land-based tax would also need to be phased in gradually to avoid large and abrupt increases in tax liability for certain types of property owners (Iacono et al. 2009).

### *Geographic Scale*

Land value taxation typically has been applied at the macro level on a regionwide or areawide scale, as is evident from the Pennsylvania counties.

### *Rate Setting and Valuation*

Land value taxation requires that appraisal districts value land and buildings separately and that rates be established by land use types.

### **Applicability to Transportation**

Land value taxation is motivated by the notion of all land paying for a benefit received or specifically paying for the access

to services and transport networks. Thus, historically it has been used to support a range of services. In the United States, in a few regions it has also been used to support transport.

## Other Implementation Considerations

There are no major additional implementation considerations.

## TAX INCREMENT FINANCE—DESCRIPTION

Tax increment financing is the most widely used local government program for financing economic development in the United States. TIF is authorized in almost all states and the District of Columbia and has been implemented in virtually every kind of community—central business districts, gritty urban industrial neighborhoods, small towns, suburbs, and even farmlands on the urban fringe. Typically, it is the first tool that local governments pull out of their economic development toolbox. All of the states except Arizona have TIF-enabling legislation. Most states require the finding of blight for TIF use, although some interpret the condition more liberally than others. Vermont has the most liberal legislation, allowing TIF to be used for development, job creation, or even simply to increase tax revenue (Mathur and Smith 2012). However, TIF is most typically an economic development tool and has not typically been used for financing transportation directly. In transportation, the most widespread use is for transit-oriented development, and its consideration in the context of highway projects is limited. Although Batt (2001) showed VC could have been used to finance a portion of New York State’s Interstate highway system, a 9-mile stretch of I-87 known as Northway, from its southern terminus to the point where it crosses the Mohawk River in Albany County.

The theory of TIF is that the revenue growth generated within a territorially defined district is earmarked, for a period of years, to pay for physical infrastructure and other expenditures designed to spur economic growth within that district. By generating new growth, those improvements and expenditures produce the incremental revenues that are used to pay for the program that sparked the growth in the first place. TIF is typically presented as self-financing, with its expenditures paid for by the increased revenues resulting from the growth it finances, without a tax increase.

## Implementation Considerations

### *Geographic Areas, Boundaries, or Area of Applicability*

Much like SADs, TIFs are associated with service areas. In the Texas example, a geographic zone is designated a transportation reinvestment zone (TRZ) and the generated increments are used to fund and finance transportation projects. However, the problems associated with rate structures are not an issue with TIFs because they are increment based

and do not involve the imposition of new taxes and thus tend to be more politically acceptable than are SADs.

### *Institutional Capacity*

Again, TIFs, such as SADs, require institutional capacity for ensuring compliance of TIF-like mechanisms and to garner support for the mechanism at the local levels (Mathur and Smith 2012).

### *Political Feasibility*

In terms of political feasibility, TIF districts have the advantage of shielding general taxpayers within a jurisdiction from broad-based tax increases and thus benefit from low political visibility. This perception that tax-increment financed projects pay their own way may mute local opposition and increase public acceptance (Iacono et al. 2009). It is important to point to the example of North Carolina's adoption of the Project Development Financing Act in 2003, which supports a TIF-like mechanism for issuing debt for streets, public transportation projects, and airport facility funding (North Carolina Legislature Article 6, Chapter 159 § 159–101; Rivenbank et al. 2007; Purvis 2008). This provision has not been used at all. Thus, this example shows that having an enabling framework is not sufficient. In North Carolina's case, feasibility is tied to a lack of fuller understanding of how the mechanism could work.

### **Legal Considerations**

According to the Council of Development Finance Associates, TIFs are the mostly adopted mechanism in the country and are legally allowed in almost every state in the country, with the exception of Arizona. They appear in a variety of forms. In Texas, they are called tax increment reinvestment zones (TIRZs) and in Georgia, tax allocation districts (TADs). TIFs in any form are typically used in the context of financing transit-oriented development and minor streetscapes. They have not been used in the context of financing capital costs of major transportation infrastructure. North Carolina passed the Project Development Financing Act, a TIF-like mechanism for issuing debt for streets, public transportation projects, and airport facility funding (North Carolina Legislature Article 6, Chapter 159 § 159–101). This made North Carolina the 49th state to allow TIFs, but one of the few allowing TIF for transportation capital spending. Recently, some states, including Texas, have developed TIF-like mechanisms specifically designed for funding and financing state highway projects. Texas's legislation puts forth an institutional concept called the TRZ to allow for TIF-like funding and financing for single and multiple jurisdictions with local governmental cooperation (Texas Transportation Code; Vadali et al. 2010a). Texas's law was first introduced in 2007. Vadali et al. (2010a) also explored more than 100 TIFs and found that typical TIFs do

not allocate expenditures for capital costs even in the case of transit, and most expenses were used for transit oriented development. However, TRZs do not receive favorable development benefits such as those that are common in TIF mechanisms by way of tax abatements or other subsidies or waivers. The TRZ is a variant of TIF in that it does not rely on a board for governance. The governance is within the hands of the local government that initiates the TRZ because the approach is grounded in voluntary partner agreements.

### **Applicability to Transportation**

Tax increment financing districts generate funding by means of assessing property owners who are benefited by access changes brought about by the transportation project being constructed. The revenues are used to cover a portion of the project costs. TIF is authorized in almost every state of the United States except Arizona (Council on Development Finance Agencies 2006). However, there are few instances of actual TIF or TIF-like experiments used to fund highway projects, and they are much more common in relation to transit-oriented development projects.

### **Other Implementation Considerations**

There are no major additional implementation considerations in this case.

### **TRANSPORTATION UTILITY FEES—DESCRIPTION**

The reasoning behind TUFs holds that the transportation system functions as a public utility comparable to municipal water and sewer systems. Utilities are funded by charging users based on how much they use the systems. Properties that cause more traffic by the nature of their use are responsible for a greater portion of the wear and tear on transportation infrastructure and might reasonably be expected to make larger contributions toward maintenance expenses. TUFs are most commonly applied to roads and used to fund preventive maintenance of existing facilities rather than capital projects (Ewing 1993; Iacono et al. 2009; Junge and Levinson 2012). A TUF is not a user fee in the classic sense. It is not voluntarily paid and does not fund a service that benefits specific individuals to the exclusion of those who do not pay fees. In this sense, it is more akin to a tax than a fee. The adoption of TUFs is simpler than a tax because, as a fee, it can be established without the requirement of a public referendum. It also goes by other names, such as street maintenance charges or street lighting fees.

The first TUF application was in Fort Collins, Colorado, in 1984, which tied the level of the fee to the amount of street frontage on each parcel. This fee system was abandoned in 1987 after a legal challenge by local residents, but TUFs are widely used in Oregon (League of Oregon Cities 2008) and Florida. The League of Oregon Cities indicates that 19 regions/cities were using TUFs as of 2008 (13 are shown in Figure 8).

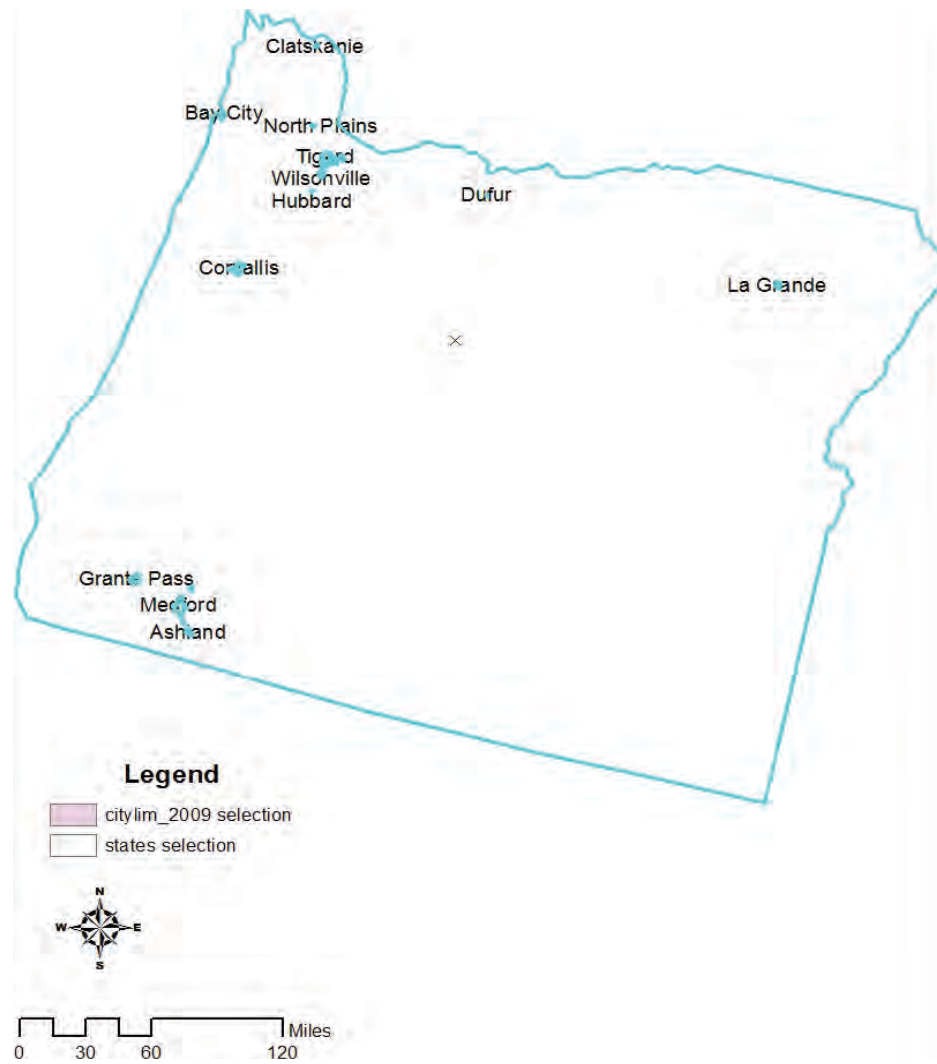


FIGURE 8 Oregon cities collecting TUFs as of 2008. (Source: Recreated from League of Oregon Cities 2008.)

The extent of adoption depends on the legality of the fees, which varies by state and the wording of the particular fee in question. The Fort Collins fee was challenged by residents and discontinued by the city. The fee in Pocatello, Idaho, met a similar fate in 1986, but litigation continued in both cases until reaching the state supreme courts. The first TUF in Oregon was not challenged, encouraging the governments to consider it as a viable transportation funding source. The concept was accepted in Texas, where Beaumont introduced a fee, and then Florida, where the Port Orange fee drew opposition and was overturned. In general, the 1990s were characterized by much interest in TUFs. In 1991, Palm Bay, Florida, instituted a TUF but had to drop the fee after the policy was ruled unconstitutional because the fee charged was not related closely enough to usage. A year later, the communities of Medford, Oregon, and Austin, Texas, took advantage of the successful TUF implementations in their states and implemented fees of their own. The TUF in Medford is notable because it recovered not only operations and

maintenance expenses but also capital expenditures, thereby expanding the scope of recoverable expenditures (Ewing 1993). Carlson et al. (2007) provide an excellent overview of TUF activity through 2006.

### Implementation Considerations

#### *Geographic Area or Area of Applicability*

Transportation utility fees typically are levied on an areawide basis.

#### *Fee Basis*

The fee basis for TUFs is much like that for IFs. The estimated number of trip ends attributable to each property type using the procedures found in the *Trip Generation* manual published by the Institute of Transportation Engineers (ITE

2003) is often used as the basis. Residential trip rates are given per unit and commercial rates per gross floor area and per employee. Jurisdictions may instead use flat or per-unit fees that vary only by property type, or fees based on land area, floor area, or frontage. Because all of these are estimates, rather than measurements of exact usage for individual properties as with water or sewer service, the connection between cost and service is less solid than for other utilities. For TUFs, the legality of the rates rests on the validity of the proxies used to approximate usage. The methods presented in *Trip Generation* have been noted to be more likely to withstand legal scrutiny than estimates based on lot size or other property size attributes. The ITE trip rates are meant to apply nationally, but some of the trip rates given may be based on very small sample sizes and may show little correlation to usage. If they are used as the basis for utility fees, the accuracy of the estimated rates may be improved by adjusting based on local traffic counts.

Subsequent TUFs have used a number of different bases for setting fee rates, including flat fees, fees that apply per unit of housing or per parking space, fees based on square footage or gross floor area, fees that vary with the trip generation rate for a given property type, and fees that are set at the discretion of local city councils. It remains unclear how well these different indicators correlate with transportation demand, with the exception of trip generation rates for different property types, which are published for planning purposes by the ITE's *Trip Generation Handbook*.

### Legal Considerations

Much like IFs, a TUF may require showing compliance on three aspects: (1) that it is associated with a particular benefit to the party being charged—one that is not shared by other members of the community; (2) that payment of the fee is voluntary; and (3) that the fees are earmarked only for expenditures that are reasonably related to transportation infrastructure costs.

### Applicability to Transportation

The applicability of TUF to transport lies in the idea that transportation is a service sector much like utilities, and use of transportation services requires a fee by beneficiaries.

### Other Implementation Considerations

There are no major additional implementation considerations.

## OTHER MECHANISMS—DESCRIPTION

In addition to the nine mechanisms reviewed, a few others, such as TCs, are discussed.

### Transportation Corporations

Transportation corporations are not funding mechanisms in themselves. TCs are governance mechanisms that have been used to enable and mobilize the use of other funding mechanisms toward the planning and project development of transportation projects. They have been primarily noted in the context of highway projects but in concept could be used for transit also. A TC is a group of private individuals and local governments who come together to form a nonprofit corporation for the planning and project development of transportation projects. These corporations primarily focus on implementing or expediting major transportation projects and are governed by a board of directors, under the oversight of a state transportation commission.

### Extent of Use—Examples

At least three states—Missouri, Florida, and Texas—have allowed for TCs. In Missouri, TCs were authorized under the 1990 Missouri Transportation Corporation Act, which allows localities to form nonprofit, quasigovernmental agencies called TCs to develop and oversee transportation projects. The most recent codes authorizing them are listed under §§ 238.300-238.367 Revised Code of Missouri. The goal of the Missouri TC is set as one that is “created to fund, promote, plan, design, construct, maintain or operate any transportation-related project in connection with the Missouri highways and transportation system” (Missouri DOT). A TC can be used only for projects that are owned by the state. The Revised Code of Missouri allows any local governmental entity or private party to file a petition with the MHTC, and TCs are approved based on public hearings (Missouri DOT Program Guide 2004). The program guide defines the Missouri TC as “specialized, temporary, private, not-for-profit corporations allowed under state law and that can be organized to plan, develop, and finance a particular transportation project” but cannot be compensated. The TC in Missouri is mostly used in connection with the development of STDs—the TDD can combine other VC mechanisms and direct user fees such as tolls. The process of TC establishment can also occur concurrently with the development of innovative funding mechanisms involving both VC and direct user fees. The purposes of the TC are to:

- Promote and develop public transportation facilities and systems and economic development in Missouri by new and alternative means.
- Perform many functions normally undertaken by the MHTC.
- Secure and obtain right-of-way.
- Assist in the planning and design of transportation systems and sell and convey excess rights-of-way at fair market value.
- Contract with federal agencies, states or their agencies, political subdivisions, MHTC, transportation authorities, corporations, partnerships, or individuals regarding fund-



- ing, promotion, planning, designing, constructing, improving, maintaining, operating, or assisting in a project.
- Limit and secure access to a project.

When considering the creation of a corporation, the commission is directed to hold a public hearing and notify the general public and all affected property owners and jurisdictions in the designated area. The governing body of each affected county, city, town, or village must approve the proposed project and the formation of the corporation by the commission. The commission must also find that the project is a necessary or desirable extension or improvement of the state transportation system and that the proposed corporation will have adequate funds to finance the proposed project. The commission may also require revisions to the plans and specifications and may authorize creation of one or more corporations to act within the same designated area, pursuant to specific stated public purposes (§238.330.1).

The corporation may issue bonds, notes, or other obligations to pay all or any part of the cost of a project. The obligations may be payable out of any of the property and revenues of the corporation. Such revenues may include payments derived from other entities pursuant to an intergovernmental cooperation agreement and fees, tolls, and charges by the corporation for use of the project (Missouri Revised Statutes §238.330.1). There are several TCs set up in Missouri in connection with highway projects.

### Implementation Considerations

There are no specific implementation considerations in the case of TCs.

### Legal Considerations

Texas TCs are authorized under Texas Transportation Code, Title 6, Chapter 431. The Texas Transportation Corporation Act of 1995 authorized the creation of nonprofit entities with broad powers to plan, develop, and maintain transportation facilities that are part of the federal or state highway system in areas with a population of 500,000 or more or one that is adjacent to one with such a population. Stated purposes of TCs in the state of Texas are:

- The promotion and development of public transportation facilities and systems by new and alternative means.
- The expansion and improvement of transportation facilities and systems.
- The creation of corporations to secure and obtain rights-of-way for urgently needed transportation systems and assist in the planning and design of those systems.
- The reduction of burdens and demands on the limited funds available to the commission and an increase in the effectiveness and efficiency of the commission.

- The promotion and development of transportation facilities and systems that are public, not private, in nature, although these facilities and systems may benefit private interests as well as the public (Texas Transportation Code, Title 6, Chapter 431).

The Texas TC powers are limited to “the promotion and development of public transportation facilities and systems” (Texas Transportation Code, Title 6, Chapter 431). There are some TCs set up in Texas.

Transportation corporations in Florida are authorized under the Florida Transportation Corporation Act, Sections 339.401-421, Florida Statutes (Florida Administrative Code and Register 1999). Among the specific activities of TCs authorized under Florida statutes are:

- Acquiring, holding, investing, and administering property and transferring title to the Florida DOT for project development.
- Performing preliminary and final alignment studies.
- Receiving contributions of land for right-of-way, and cash donations to be applied to the purchase of right-of-way or design and construction projects.
- Making official presentations to groups concerning the project and issuing press releases and promotional materials.

Transportation corporations in Florida cannot issue bonds and are not empowered to enter into construction contracts or undertake construction. They are enabled to otherwise borrow money or accept donations to help defray expenses or needs associated with the corporation of the transportation project (Williams 2006). There are no TCs established in Florida (Williams 2006).

### Other Implementation Considerations

There are no additional implementation considerations in the case of TCs.

### GENERAL EFFICIENCY, EQUITY, AND OTHER CONSIDERATIONS

According to public finance theory, funding methods or mechanisms should conform to the benefit principle, which states that the benefit of a service financed through fees or taxes goes directly to the taxpayer (Musgrave 1959). Lari et al. (2009) and Zhao et al. (2012) evaluate IFs, TIFs, SADs, LVTs, NEs, JDs, ARs, and TUFs on five criteria: (a) efficiency, (b) equity on the basis of cost benefit and ability to pay principles, (c) sustainability, (d) political and administrative feasibility, and (e) implementation requirements both general and in the context of Minnesota. Their evaluation is broad based, and much of it is transferable to other regions/states.



## Efficiency

Lari et al. (2009) and Zhao et al. (2012) evaluate efficiency aspects of mechanisms based on price signals. Peterson (2008) notes that underlying the use of land-based funding mechanisms to pay for infrastructure is the principle that the benefits of infrastructure projects are capitalized into land values. As long as the spatial distribution of project benefits can be internalized within a well-defined benefit zone, the mechanisms can be economically efficient. This same principle allows the mechanisms to be justified on the grounds of benefit equity. Cost efficiency is another measure of efficiency and is based on the extent to which costs incurred are recouped by the revenues generated (Dye and Sundberg 1998); this aspect has so far not been investigated with respect to transportation-related mechanisms. The current synthesis explores this dimension of mechanisms in chapters three and four.

## Equity

Rosenbloom (2009) notes that benefits received and ability to pay are the most traditional and familiar equity concepts. The benefits-received concept argues that equity increases when individuals pay in proportion to the benefits they receive from the service being financed, and this concept underlies the traditional user-fee approach to highway financing embodied in the gas tax. Ability to pay is based on the principle that those with greater income or wealth should pay more to support public services and is a basis for income and property taxes. Most mechanisms conform to the general benefit principle, where there is still a link between the payer and the benefit, but the link is indirect and the benefit is not necessarily in direct proportion to the payment. In some cases, such as SADs, increment-based approaches, and IFs, the notion of special benefit also applies (Dalvi 1998).

Altshuler and Gomez-Ibanez (1993) evaluate IFs based on market price approximations of rates set and ability to recover costs. The researchers note that IFs can be efficient if rates approximate market prices. Similarly, a National Surface Transport Policy and Revenue Commission report (2007) evaluates IFs on 12 distinct criteria categories, including three types of equity (geographic, vertical across income groups, and horizontal across vehicle user classes). Williams (2006) provides a detailed assessment of the pros and cons of TCs. Zhao et al. (2012) provide a detailed examination of JD. Mathur and Smith (2012) also discuss some of these mechanisms based on similar criteria. Lari et al. (2009) argue that IFs can be both efficient and equitable. The nexus tests are important for ensuring proportionality. Table 3 is a summary of the evaluations and has been adapted from Lari et al. (2009), who note that ability to pay equity of mechanisms varies in terms of actual incidence based on how rates are established, exemptions that are provided, and transportation modes covered.

## SUMMARY

Nine specific VC mechanism categories were reviewed: IFs, SADs, STDs, NEs, ARs, JDs, LVTs, TIFs, and TUFs. A 10th category, “other,” addresses TCs.

Different mechanisms lend themselves to different VC purposes. For example, IFs are aimed at cost recovery, whereas special assessments and increment finance are more relevant to project expansion benefits. The geographic scope of a study—within a local area, across local jurisdictional boundaries, and such—is also an important concern when choosing a VC mechanism. Other considerations for choosing a mechanism include efficiency for the purpose intended, legal framework, and equity (e.g., benefits received, ability to pay). Brief summaries of each mechanism are provided here.

### Mechanism 1—Impact Fees

Impact fees are a one-time charge levied on a development project to finance new infrastructure and services associated with new development. They can be effective across a range of geographic areas.

### Mechanism 2—Special Assessment Districts

Special assessments (e.g., property taxes) require local community members whose property benefits from the improvement to pay a small property fee to help offset the cost. Boundaries for the service or “benefit” area are usually small and rigorously defined, although in some instances macro area assessments are possible.

### Mechanism 3—Sales Tax Districts

Sales tax districts, a specific form of SADs, require beneficiaries of the project to pay a small sales tax intended to offset project costs. The nature of STDs makes them more common at the macro level than SADs.

### Mechanism 4—Negotiated Exactions

Similar to IFs, NEs are one-time levies negotiated on a case-by-case basis. They apply to discrete, local improvements deriving from the development.

### Mechanism 5—Air Rights

Air rights involve utilizing rights above, below, or adjacent to a highway improvement right-of-way for development that creates enhanced land value. These rights may be leased from the owning entity (e.g., from the highway agency owning the rights) by, for example, a private company and are limited at the parcel level.

TABLE 3  
EVALUATION OF VALUE CAPTURE MECHANISMS

Mechanism	Efficiency	Equity	Political Feasibility	Administrative Feasibility
IF	Can be efficient in principle. Uncertain if implemented rates satisfy efficient pricing rules (Altshuler and Gomez-Ibanez 1993).	Benefit equity. Slightly regressive. Equity via rates, modal equity and exemptions (TSDC legislation, for instance, Oregon).	High. Most states can legally implement. Three states have multimodal capabilities.	Low costs
NE	Efficient in terms of price signals and growth (Lari et al. 2009).	Benefit equity	High	Simple
SAD	Efficient in terms of price signals and growth.	Benefit equity. Can be regressive. Equity via rates, land use exemptions.	Low. Few states have enabling legislation. Requires political will and stakeholder support.	Can be difficult to implement. Requires coordination.
STD	Efficient in terms of price signals and growth.	Benefit equity	Medium. Few states have enabling legislation.	Easier to implement than SAD.
AR	Efficient in terms of price signals and growth.	Benefit equity Neutral to progressive in equity	Medium	Complex
JD	Efficient in terms of price signals and growth.	Benefit equity Neutral to progressive in equity	Medium	Complex and can be a lengthy process.
LVT	Efficient in terms of price signals and growth. Approximates the theoretical; efficient in value capture. Most studied in this context (Speirs 2010).	Benefit equity Can be regressive Exemptions via rates and land uses or other mechanisms.	Low. Very limited experience	Easy to administer because appraisal districts already appraise based on land and buildings (Speirs 2010).
TIF	Can be efficient.	Benefit equity Can be regressive; mitigate concerns.	Medium Dependent on political will. Mostly applied for transit-oriented development and not capital costs. Few examples of usage for capital costs for transportation.	Less difficult to implement than SAD.
TUF	Efficient in terms of price signals and growth.	Benefit equity (Ewing, 1993). Can be regressive.	Medium. Can be legally challenged if nexus tests are not applied.	Simple. Occurs through utility companies.
TC (Williams 2006)	Not applicable	Not applicable	Good as long as it is legally possible. Useful for garnering support and for project management.	Good. Can support debt liability (Williams 2006).

Compiled from Lari et al. (2009), Iacono et al. (2009), and Mathur and Smith (2012).

### **Mechanism 6—Joint Developments**

Joint development is a public–private partnership to develop private construction projects using public land or using ARs. In general, JD occurs on a site-specific basis and typically accompanies AR agreements.

### **Mechanism 7—Land Value Taxes**

A variant of the property tax (distinguished by a split rate on land and buildings), the LVT is specifically aimed at capturing the improvement benefit as realized by the land portion of property (separate from structural improvements). The LVT is typically applied at the regional or macro scale (e.g., county or city) level.

### **Mechanism 8—Tax Increment Financing**

The most widely used local finance option in the United States, TIFs use anticipated property value increases resulting from improvements to secure bonds or allow loans to fund the improvements. Small service areas typify the geographic application of TIFs.

### **Mechanism 9—Transportation Utility Fees**

Transportation utility fees based on the principle that the transportation system functions as a public utility. Thus, users pay based on how often they use the system. TUFs are most commonly used to fund preventive road maintenance on existing facilities.

### **Mechanism 10—Other (e.g., Transportation Corporations)**

Transportation corporations represent a nonprofit group composed of private individuals and local governments that plans and develops transportation projects. Governed by a board of directors and overseen by a state’s transportation commission, TCs expedite major transportation projects. The corporation can issue bonds, notes, or other obligations to pay for

project costs. They are a funding tool in that TCs often serve as project champions and obtain much-needed stakeholder support by doing so.

### **Applicability of Mechanisms to Transportation**

Assessment-based mechanisms (SADs), increment-based mechanisms, and land value taxation are conceptually driven by transportation accessibility-induced capitalization benefits to beneficiaries. IFs are driven by benefiting new development in areas associated with transportation improvements. TUFs are driven based on the public utility nature or service-sector aspect of transportation, such as airlines and utility companies that charge a fee for a service provided. STDs are driven based on grounds of general benefits to regions and areas served by transportation infrastructure and charge a low-level sales tax levied on all goods and services to pay for transport. ARs and JDs are driven by the opportunities afforded for real estate development through land use tools and public–private partnerships.

### **Modal Basis**

The state-of-the-practice review suggests that most of the mechanisms could be used for roads or transit. However, the following case examples need to be highlighted:

- The TUF as a mechanism is applicable only for the specific use of pavement maintenance and operating expenses. It is not a mechanism that can be used for funding and financing capital costs of improvements. The current review documented only one case in Oregon in which a TUF also covered capital costs.
- Many states have IFs just for local roads. Mullen (2012) notes that almost 14 states have roads as a set-aside category for IFs. At least 27 states were noted as having statutes specifically requiring the fees to be multimodal in nature and compliant with some form of a CIP. Oregon’s IFs, known as system development charges, are multimodal in focus and have a process that filters from goals down to rate structures.

## CAPTURING THE VALUE: STATE-OF-THE-PRACTICE CASE EXAMPLES

Chapter three presents case examples to demonstrate various aspects in the planning, design, and implementation dimensions of the various VC mechanisms, including the legal basis allowing for the adoption of each of the mechanisms within that context. To provide greater clarity on the context, background, and implementation of the example practices, this chapter delivers narrative descriptions of the project context complemented by information compiled from interviews and discussions, and collected and compiled from the review. These narratives are intended to offer descriptions of the players involved, how the process was initiated, the challenges faced, and the keys to implementation. Another aspect that is covered in the case examples is the use of one or more VC mechanisms as part of a strategy.

### SCREENING SURVEY MOTIVATION AND CRITERIA FOR SELECTION OF CASE EXAMPLES

Case examples illustrating the use of VC mechanisms are at the core of this synthesis. A screening survey was created as part of the process to identify potential candidates. The primary objective of the screening survey was to increase the chances of identifying prospects for the case examples, complementing the other efforts described in chapter two (information gained from the state-of-the-practice review). Owing to the cross-cutting nature of the topic, for state DOTs, questionnaires were sent to the respective members of the AASHTO SCOFA and also members of the SCOP. This synthesis aimed to include at least one example for each of 10 categories mentioned in the review. Telephone and e-mail interviews were conducted with professionals involved in the planning or implementation or otherwise directly aware of development or use of the mechanism within the context. In some instances, more than one professional was interviewed for each case.

Twenty-two (seven longer and several shorter examples) case examples of varying geographic scales illustrate how the tools discussed in chapter two have been used in various contexts and combinations to fund and finance highway infrastructure. These are state-of-the-practice examples, projects, and plans from across the country and illustrate the variety of ways in which local and regional governments, DOTs, and other highway agencies are using VC funding and financing mechanisms.

The following general criteria were used for selecting case examples from the screening survey and literature review:

- Key contacts could be identified and amenable for follow-up discussions.
- Sufficient data on the project were made available or could be compiled.
- The case example was applicable for highways.
- The case example was fairly recent in application or otherwise exemplary in some way.
- Boundaries of the project.
- Revenue and finance considerations.
- Equity considerations, if available.

### PREVIEW OF CASE EXAMPLES GROUPED BY GEOGRAPHIC SCALE

Table 4 shows the example mechanisms grouped by the geographic scale of application. Table 4 also shows that all programmatic applications are areawide in application and that in some cases, an areawide approach has been used to fund individual projects.

### Content of Case Examples and Sources of Data

The 22 case examples are compiled with data from three specific sources: (1) telephone and e-mail interviews with contacts provided by respondents; (2) a variety of materials provided by respondents, including project documentation, websites, and maps; and (3) supporting literature review of examples that were noted by respondents. The general types of questions presented at the interviews are discussed in Appendix C, and the responses and discussion provided the basis for the case study development. Two agencies did not respond to the survey but directly provided information on their case and program. The case examples illustrate the variety of factors that local governments, DOTs, other agencies, metropolitan planning organizations, or other project sponsors are likely to consider in adopting a mechanism to fund and finance highway infrastructure. These factors are practical aspects affecting implementation and the actual design itself and include items such as project size, community support/political will, the legal framework provided by state and local law, and more importantly, factors related to the process of

TABLE 4  
CASE EXAMPLES BY MECHANISM TYPE, SCALE OF APPLICATION, AND ROADWAY TYPE

Example/Facility	Mechanism	Scale/State, Local Highway
Massachusetts Turnpike—Boston's Copley Place	AR and JD	Site/Interstate 90
Virginia's I-495 and Fairfax Parkway Proffer Mechanisms.	NEs	Site/Interstate, local
WMATA—McPherson Square Station Area	JD	Site/Transit
Kansas City of Olathe Transportation Development District	STD, TDD	Site/Local
Eagle Road/Fairview Avenue Improvements	Other—STARR	Site/Local
Missouri, Transportation Development Districts	STD, TDD	Project/State
US 63 Expansion Project, Missouri	TCs, sales taxes	Project/State
Hwy 36 Expansion Project, Missouri—TDD	TCs, STD	Project/State
US-67 Expansion Project, Missouri	TCs, STD	Project/State
State Route 28, Virginia (Corridor)	SAD—TIDs	Corridor/State
I-25 Corridor, Denver	SAD—JSPIA Metropolitan District	Corridor/Interstate
Michael A. Fox Highway, Butler County, Ohio	Countywide special assessment—TIDs	Corridor/State
Northern Macadam TSDC, Portland, Oregon	IFs	Corridor/Local
Interstate 95/295 Corridor, Mercer County, New Jersey	IFs—TDD	Corridor/Interstate
El Paso (Comprehensive Mobility Plan [CMP] Improvements)	TIF-TRZ	Corridor/State
Elgin O'Hare Route 53/120 (Planning Study)	Special assessments—SSA	Corridor/State
City of Bozeman, Montana	IF	Areawide (programmatic)/Local
Portland, Corvallis	IFs—TSDC	Areawide (programmatic)/Local—city CIP
Washington's Transportation Benefit Districts	Special assessments—Benefit Districts	Areawide (programmatic)/Local
Oregon's Pavement Maintenance Facility Fee Program	TUF	Areawide (programmatic)/Local
Harrisburg, PA	LVT	Areawide (programmatic)/Local and state
Washington Road Fund Levy	Countywide assessments district	Areawide (programmatic)/Local
Bellingham Transportation District, Washington	Regionwide TBD	Areawide (programmatic)/Local and state

- Wisconsin, Washington—IFs across cities/counties and other methods these regions and allow.
- Montana IFs.
- California's Measure R and TransNET (half-cent sales tax).
- Georgia's TSPLOST (sales tax measure).
- Arkansas—Connecting Arkansas Program.
- Massachusetts I-Cubed Program.

capturing the value itself. The case examples are generally organized around the following format:

- Title.
- Facility name.
- VC mechanism.
- Background and description: provides context on the project area to explain why the tools used in the case study were appropriate and describes the planning process that created the mechanism.
- Legal authority.
- Local partnerships.
- Implementation considerations, including:
  - Levy basis: describes how the VC mechanisms work through levies and periodicity/frequency of levies.
  - Duration: describes the length of agreements.
  - Boundaries: aside from the area-based typology, this section serves to describe if finer boundaries are used in the creation of service areas and benefit districts within which the levies would apply.
  - Timing and collection of revenue streams: describes how and when the revenue was collected and the actual performance of the mechanism to the extent that information could be gathered and compiled.



- Financing aspects and risk considerations.
- Cost-efficiency or ability of mechanism to meet stated goals.
- Equity aspects in implementation.
- When possible, any lessons learned as reported by respondents and/or based on the review of pertinent project documentation.
- Project-related websites.

## **SITE- AND PROJECT-LEVEL MECHANISMS**

### **Boston's Copley Place, Massachusetts**

#### *Facility Name*

The facility discussed in this section is the Massachusetts Turnpike (I-90) in Boston.

#### *VC Mechanisms*

The VC mechanisms employed in this project are ARs and JD parcel-specific developments of 9.5 acres adjacent to the I-90 right-of-way. The joint successful use of two mechanisms is part of a strategy because the adoption and development of ARs could not have occurred in the absence of JD.

#### *Background*

Air rights refer to the right to use or control the air space under, over, or adjacent to an existing structure, such as highway, rail, or other property. Such rights can be afforded by a landowner to another party for purchase or use through a contractual agreement. JD, on the other hand, is a formal arrangement between the public sector and private entities such that the private entities share some costs of infrastructure improvement or contribute some benefits back to the public sector based on a mutual recognition of the benefits of such infrastructure improvements. Almost all 23 ARs parcel developments on the Massachusetts Turnpike (Mass Pike) are examples of ARs combined with JD because they bring together private parties such as developers to harness the value in air space development over highway rights-of-way. This example showcases how a public entity, Massachusetts Turnpike Authority (MTA), contracts parcels it owns with private developers by means of a TDR.

The Mass Pike was planned and constructed with an aim to revitalize Boston's economy and provide access to downtown. In 1952, the MTA was authorized by the Massachusetts Legislature as an independent entity charged with the construction and operation of a tolled highway from the border of New York east to the newly completed Route 128. By 1957, the new highway was completed and was soon extended to central Boston. The MTA was the first public transportation authority to use ARs with the development of

the Prudential Center in Boston and Star Market in Newton in 1963. Some others that preceded the Copley development and close to the I-90/I-93 interchange in the Back Bay area include the Hancock Garage, completed in 1976.

Copley Place is a completed (in 1986) development on the turnpike and provides a case example for the use of ARs and JD adjacent to highway rights-of-way. The project helped to bridge the South End and Back Bay, resulting in significant contributions to urban design and stimulating economic growth in Boston. The development agreement was between the Urban Investment and Development Corporation (UIDC) from Chicago and the MTA, who had ownership and control of the air space and rights over the property. The community review process went on over a period of 3 years through a Copley Place Citizens Review Committee, which included neighborhood associations, government agencies, and advocacy groups. The 9.5 acres are constructed over a railroad right-of-way as well as over the turnpike, in a prime area of downtown Boston. The project had to get through a rigorous community review process and had to be viable in terms of its construction technology and economic potential, something that no one to that point had been able to do. The Copley Place development includes two hotels, an office/retail area, and 900 parking spaces.

#### *Legal Authority*

Private development of ARs over the Boston Extension of the Mass Pike was first authorized by the Massachusetts Legislature in 1963. Boston's civic vision (Boston Redevelopment Authority 2000; Figure 9) guides the development of ARs in the corridor. The civic vision, while not a zoning code, provides the framework for the future citizen's advisory committees and the city of Boston to review ARs proposals. A total of 23 additional ARs parcels are included in this civic vision (including Parcels 8–10 but not including Copley Place). It is the corridor master plan. Copley Place preceded the civic vision, and it was noted it may have been out of scale with the context at the time. In 1997, the city of Boston and the MTA entered into a memorandum of understanding regarding review and approval of future ARs development.

#### *Local Partnerships*

The local partners and key players in the ARs developments for Copley Place and Parcels 8–10 are:

- Private developers (induced beneficiaries):
  - Copley Place: K. Dun Gifford with Urban Investment and One Development Co.
  - One Kenmore Place: Meredith Team.
- Public entity—Boston Redevelopment Authority.
- Public entity and parcel owner (initiator and beneficiary from ownership of rights). Massachusetts Turnpike Authority.

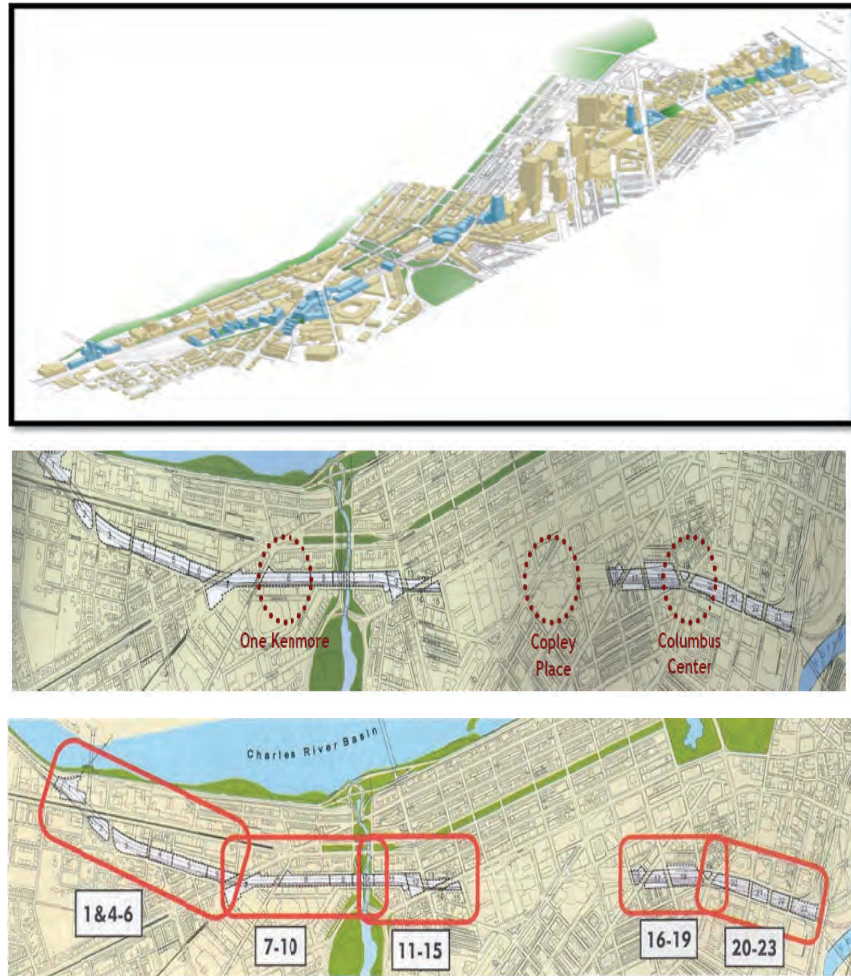


FIGURE 9 Boston Civic Vision (2000) and the 23 AR parcels. (Source: Boston Redevelopment Authority 2000, Civic Vision 2000, and MTA.)

### *Implementation Considerations*

The project initiator and beneficiary (as owner of ARs) is MTA, and the induced beneficiary is the developer. Implementation considerations covering cost–revenue agreements, duration, and other aspects are discussed here.

**Funding:** Federal grants in the amount of \$19 million were part of the project. The developer applied for an Urban Development Action Grant from the United States Housing and Urban Development Authority. The rent payments and schedule were subsidized by MTA to enhance the economic feasibility to the developer. UIDC wanted the lease divisible to enhance its ability to finance the project by separate leasehold mortgages, but MTA was unwilling to do this. The MTA wanted (if there were to be separate leases of portions of the project) cross-default clauses so that default under any one lease would be a default under the others. Any such provision would take away benefits the developer hoped for through separate leases. UIDC agreed to purchase treasury bonds for an amount equal to \$12 million (Rice Center 1986). The MTA (agency with ownership of inter-

change area and ARs) signed a memorandum of understanding with the UIDC (developer) to develop the site. The developer financed the reconstruction and relocation of infrastructure, including water, electrical, and telephone lines; rail right-of-way; and turnpike ramps, in return for development rights.

**Timing and Collection of Revenues:** The joint use of JD and AR mechanisms in this example provided for up-front costs, which were collected by the MTA. The Copley Place, with 3.4 million square feet of ARs development, includes 1.6 million square feet of high-end hotels (luxury and convention), Class A office space, high-end retail, and restaurants. Construction was phased to limit any impact to adjacent businesses and residents (Campbell 2004). Savvides (2004) notes the project's 21.73% internal rate of return and documents the Copley Place ARs development financial aspects as follows:

- Hard and soft costs: \$125.7 million.
- ARs premium: initially valued at \$9.5 million (this was the amount of public money required by the developer to make the project economically feasible).



FIGURE 10 Mass Pike AR parcels 8, 9, and 10 and Copley Place in 1984. (Source: The Future of Boston: [http://www.boston.com/advertisers/bigdig/air\\_pop.htm](http://www.boston.com/advertisers/bigdig/air_pop.htm).)

**Valuation of ARs:** The value of the rights was finally agreed upon and set at \$12 million based on separate valuation or appraisal of the development. The value agreed upon was slightly less than the basic land costs of other sites in the area, but land and reconstruction costs considered together were roughly equivalent to nearby site values.

**Duration and Timeline:** UIDC had a 99-year lease for the ARs over a portion of the Mass Pike used to construct the

mixed-use project. (Long-term lease is a JD mechanism.) Figure 10 shows the location of Parcels 8, 9, and 10 as examples (in relation to Mass Pike) and Copley Place in 1984. Figure 11 shows the project timeline for Copley Place and Parcels 8, 9, and 10.

**Equity Goals:** Campbell (2004) discusses a few social equity goals that the development of ARs furthered in reference to the Copley Place development.

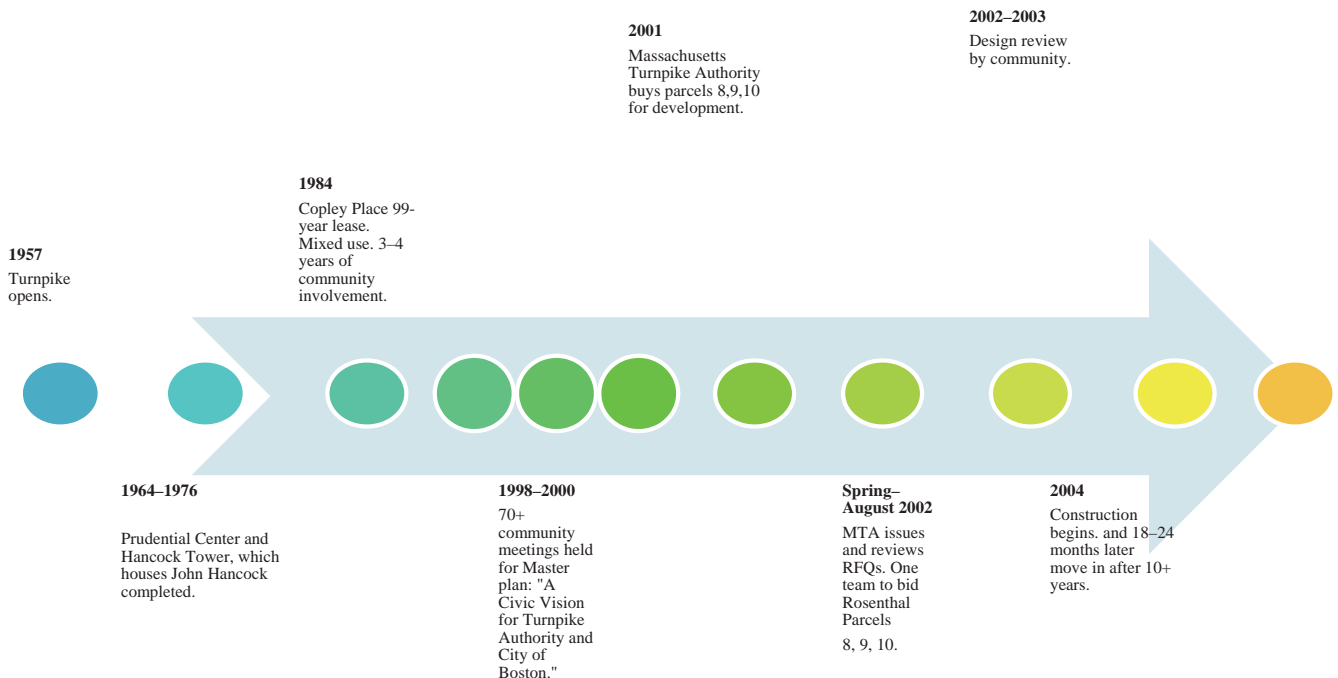


FIGURE 11 Mass Pike AR timeline and involved parties (Copley Place and Parcels 8, 9, and 10 on the Turnpike). (Source: Adapted from The Future of Boston: [http://www.boston.com/advertisers/bigdig/air\\_pop.htm](http://www.boston.com/advertisers/bigdig/air_pop.htm).)



- Maximization of the opportunities for residents and groups to benefit from employment opportunities made possible through the developments in Copley Place.
- Provision of affordable housing on site by leveraging Housing and Urban Development Authority funds.
- Creation of safe pedestrian links.

Campbell also notes that the project advances environmental goals related to the reduction of automobile trips and emissions and economic goals pertaining to enhanced commercial character and tax base. The JD aspect in this project avoids equity issues by not resorting to the tax mechanism.

**Stakeholder Involvement:** Copley Place required significant coordination and planning, as the timeline indicates (Figure 11). More than 70 community meetings were held for the master plan for the development of Parcels 8, 9, and 10. Copley Place involved 4 years of community involvement. Such ventures also require a guiding vision for the parcel or parcels when applied at the corridor level. The civic vision continues to be the guiding vision for the Mass Pike parcel developments.

**Potential Feasibility and Administrative Aspects:** These factors have been compiled from several studies, including those of Campbell (2004) and Savvides (2004), and from the Boston Redevelopment Authority. These translate as lessons that can be shared from the experience of Copley Place. These lessons indicate that success:

- Depends on the real estate demand, risk tolerant investors, and urban density. There have been several successful ventures and several that have not been as successful on the same corridor. Columbus Center, which started in 1998, is one of the ARs development parcels on the same corridor that has not been as successful, partly as the result of the associated crash of the real estate market in 2008.
- Requires pulling together landowners and financial backers to create a strong development team.
- Requires significant construction and stakeholder coordination. The highway and associated transit lines must remain fully active throughout construction.
- Requires a strong real estate market and desire to maximize density of development along with a potential for absorption of that extra density.

Several applications of ARs are being considered in the Virginia over highway and transit rights-of-way. Examples noted in the case of Virginia include WMATA stations over Interstate 66 in Arlington County.

#### **Washington Metropolitan Area Transportation Authority McPherson Square**

##### *Facility Name*

The facility discussed in this section is WMATA.

##### *VC Mechanisms*

Joint development (transit JD) and air space utilization of parcel-specific developments of McPherson Square Station, Bethesda, Maryland, and other excess land owned by WMATA are considered.

##### *Background*

This example is a transit-related JD example and is drawn from a Transit Cooperative Research Report 102 (Cervero et al. 2004) and Cord (1981). However, it is presented here because the WMATA JD experience is one example that is most closely related to VC, and WMATA often is noted as a national leader in this area. This experience is of value to all transit and highway modes. Generally, WMATA has had two major elements in its JD program, TDR and system interface, which the authority defines as follows:

- TDR is the disposition, by lease or sale, of excess owned or controlled real property interests, including ARs, at or near a station area. The earlier example of ARs on the Mass Pike right-of-way is similar in concept to the WMATA sale/lease.
- System interface is the direct, physical connection of pedestrian, vehicular, or visual access to WMATA facilities from adjoining private or public development. Connecting facilities could include station mezzanines or entrances, kiss and ride lanes, parking, or bus areas.

Many of WMATA's JDs occur through ARs/sale/lease of land/sale exchange and system interface combined. The example in this case is McPherson Square Station, an 11-story office building over a two-story retail space, which was completed in 1983.

In preparing for JD, WMATA typically conducts preliminary market studies to determine the feasibility of development at station sites. Visioning and community planning processes typically are handled by local jurisdictions. Provisions of master plans, urban design standards, access needs, infrastructure, or other local policies are sometimes negotiated with local jurisdictions in the early stages of JD, often before a private developer is selected. This approach helps make the JD deal more alluring to the private partner because preparations for the site are done ahead of time. In selecting private developers, WMATA has formal guidelines for evaluating projects.

##### *Legal Authority*

Washington Metropolitan Area Transit Authority generates additional revenue and promotes smart growth by leasing and selling property and development rights, sharing operating responsibilities, and charging fees for developments that can connect retail space to stations. WMATA's formal policies and guidelines steer its decisions. The top-performing

JD project, the Metro Center in Bethesda, Maryland, features 400,000 square feet of office space, a 380-room hotel, and 60,000 square feet of retail space and has spurred nearby office, retail, and residential development. The ARs lease generates \$1.6 million annually in rent, the highest for any single JD project in the country (Cervero et al. 2004). WMATA is able to charge connection fees or sell or lease land because WMATA has been involved with JD of parcels since the 1970s and adopts a model of land banking JD that allows it to involve the private sector in revenue-sharing agreements through its land.

### *Implementation Considerations*

The project initiator (as owner of land) is WMATA, whereas the induced beneficiary is the developer. Implementation considerations in this project included the following:

- Use of master plans: Ballston and Bethesda, two of the Washington, D.C. area's most successful station area projects, used master plans for coordinating long-term development around the station. The master plans coordinated public and private investments, linked station area planning with planning efforts for other areas, harnessed existing implementation tools for the station area, and committed public resources to the station area over time in coordination with private development.
- Development of supportive zoning near station areas.
- Understanding of all the opportunities for JD as present in projects to attract contributions from private developers and landowners (Cervero et al. 2004).

**Timing and Collection of Revenues:** The WMATA approach of JD and AR in this example provides for up-front costs and ongoing costs because of transit JD features related to system interface.

### **Virginia's Proffer System**

#### *Facility Name*

The facilities under consideration in this section are US-50/I-495 and Fairfax Parkway, Fairfax County.

#### *VC Mechanism*

The specific mechanism considered is the use of proffers NE: two office parks (a total of 4.2 million square feet of office) and residential areas (ITE Technical Council Committee 1988). Proffers are monetary payments from developers to localities and can be delineated into two categories: fees for improvement (or cash proffers) and conditional zoning (or noncash proffers). Cash proffers apply for counties with population growth of at least 10%, according to the 2000

Census. Conditional zoning is applicable only for projects such as turn lanes, reconstruction, and widening turn lanes (Grimes et al. 2006).

### *Background*

Virginia has a long history of using proffer zoning. It is prevalent in many counties in Virginia in various forms. The proffer system has been an element of land use regulation in Fairfax County, Virginia, for more than 25 years. In July 1975, proffers were introduced to the process for rezoning property within Fairfax County. The specific type of mechanism is typically determined in conjunction with Virginia DOT.

#### *Project US-50/I-495*

The US-50/I-495 project involved interchange reconstruction and widening of arterials and freeway. The site of the proposed project was approximately 360 acres located in Fairfax County at the intersection of I-495 (Capital Beltway) and US-50 (Arlington Boulevard). At that time, this site was the largest privately held undeveloped land parcel within the Beltway. In the 1970s, the land was still undeveloped, and access to the site was restricted, so the land was subsequently zoned for residential use. Developers offered to proffer the construction of a diamond interchange to connect the site to Arlington Boulevard in exchange for rezoning the land to commercial use. The roadway improvements proffered by the developers, acting in concert, included not only immediate site access but also major reconstruction of the I-495/US-50 interchange. The cost of this work was then estimated at about \$12 million, but the in-place cost when completed was closer to \$20 million (Spielberg 1987). The rezoning proposition was defeated as a result of community opposition owing to the size of the proposed commercial development among other concerns.

#### *Project—Fairfax Parkway*

Planned as a four-lane divided highway, except for a few sections near Herndon and Springfield, where it would be six lanes, the Fairfax Parkway was to extend for 35 miles from Route 7 Southward to Route 1, with a spur connecting to the express lanes of Interstate 95. The road was described as badly needed to connect residential and employment areas in Reston, Herndon, and Fair Lakes. From the developers' point of view, the parkway would make the Franklin Farm area easily accessible to the growing employment and shopping centers in the Dulles Corridor. The county government was seeking a right-of-way through the Franklin Farm area for the Fairfax Parkway. The parkway had been under consideration for many years, and the developers were reasonably certain that it would be built; thus, a proffer mechanism was a logical choice (Harrigan and Hoffman 2004). In November 1988, the Hazel-Peterson firm and Cavalier Land Development



Corporation paid for the construction of a stretch of the new parkway running 0.8 mile between Franklin Farm and Stringfellow Roads. Eleven months later, a 3-mile section of the Fairfax County Parkway opened. The project cost was \$23.6 million, and drivers could travel from West Ox Road near Herndon to Interstate 66.

### *Local Partnerships*

The local partners include:

- Developer
- Virginia DOT
- Fairfax County.

### *Legal Authority*

The legal authority was the Code of Virginia (Section 15.2. 2303 and other parts). Proffers are listed as regulatory land use tools that utilize zoning.

### *Implementation Considerations*

The initiator and beneficiary are the developers (Harrigan and Hoffman 2004; ITE Technical Council Committee 1988; Fairfax County 2009; American Planning Association 2012). The agencies benefit in terms of the proffer. Some implementation considerations include:

**Stakeholder Involvement:** Obtaining community support can be tedious.

**Timing and Collection of Revenues:** Exactions and developer contributions can take the form of up-front contributions or periodic payments over the duration of a project. In the case of the Fairfax Parkway, the developer contributions were received both up front to fund the cost of improvements and on an ongoing basis to monitor traffic (ITE Technical Council Committee 1988).

**Political and Administrative Feasibility:** Ensuring consistency or conformity to land use plans can be difficult at times. The first example shows the kind of problems that can happen when there is a lack of coordination or agreement on types of development. Since then, Fairfax County has many additional guidelines on proffers (Fairfax County 2009), including the use of comprehensive plans and a growth mechanism (American Planning Association 2012). The example also shows the inherent conflict between community and project development on one hand and developer goals on the other. Understanding the opportunities for NE as present in projects to attract contributions from private developers and landowners is vital. More recently, Alexandria, Virginia, negotiated a \$10 per square foot developer contribution for all development within a quarter-mile of a

new Metrorail station. Fairfax County also has many other examples of this mechanism applied elsewhere.

## **Eagle Road/Fairview Avenue CenterCal Project (Meridian City, Ada County), Idaho**

### *Facility Name*

The facility discussed in this section is Eagle Road/Fairview Avenue improvement.

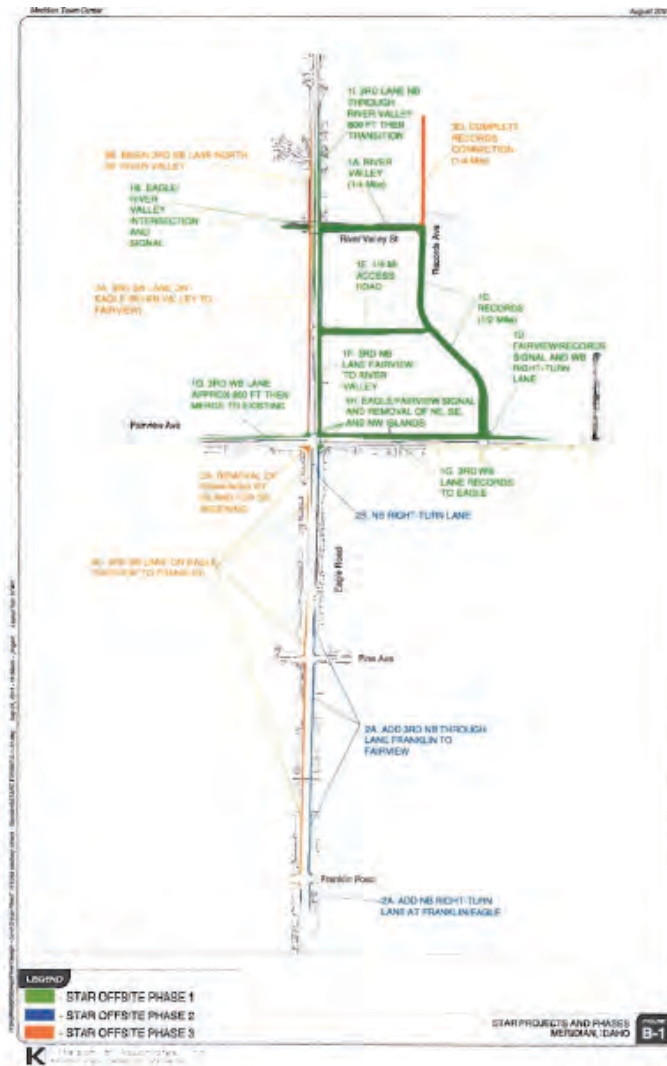
### *VC Mechanism*

The mechanism discussed in this case is a sales tax anticipation revenue rebate agreement (STARR) with developer.

### *Background*

The Eagle/Fairview project is located in the city of Meridian, Ada County (see Figure 12). The candidate project is a highway expansion project to seven lanes with accompanying access management improvements at several locations. The city of Meridian relies on Ada County Highway District (ACHD), Idaho Transportation Department (ITD), and the Community Planning Association of Southwest Idaho for street/highway planning. The city does not have a separate CIP for roads. The project is divided into three phases.

- Phase 1 concentrates mainly on the area between Fairview Avenue and River Valley Street, and the more detailed breakdown of Phase 1 includes:
  - Construct River Valley Street from Eagle Road to Records Avenue (Phase 1) and intersection improvements.
  - Construct Records Avenue from Fairview Avenue to the north property line.
  - Construct the new quarter-mile roadway between Eagle Road and Records Avenue.
  - Signalize and reconstruct the Eagle Road/River Valley Street intersection.
  - Widen and reconstruct the Fairview Avenue/Records Avenue intersection.
  - Widen and reconstruct the Eagle Road/Fairview Avenue intersection.
  - Remove the free-running, right-turn lanes and replace them with standard dedicated right-turn lanes on all four approaches of the Eagle Road/Fairview Avenue intersection when the intersection is widened to accommodate the third through lane on each approach.
  - Construct the third westbound through lane on Fairview Avenue between Records Avenue and Eagle Road.
  - Install a raised concrete median to restrict the existing driveways to right-in/right-out along this segment of Fairview Avenue.



STAR AGREEMENT - Meridian Town Center  
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Page 29 of 33

FIGURE 12 Eagle/Fairview Improvements and the Meridian Town Center Location. (Source: Sales Tax Anticipation Revenue Reimbursement Agreement, Meridian Town Center 2012, Idaho DOT.)

- Construct a 12-foot-wide dedicated right-turn lane on Fairview Avenue for the Eagle Road/Fairview Avenue intersection.
- Construct a 5-foot-wide bike lane on Fairview Avenue from approximately 400 feet east of Records Avenue to Eagle Road abutting the site.
- Construct a 12-foot-wide third westbound through lane west through the Eagle Road/Fairview Avenue intersection approximately 900 feet west of Eagle Road.
- Install a raised concrete median to restrict the existing driveway to right-in/right-out on Fairview Avenue between Eagle Road and Hickory Way.
- Phase 2 includes right-turn lanes for northbound traffic at Fairview Avenue and Franklin Road, and a through lane from Franklin Road to Fairview Avenue.
- Phase 3 will be a third lane southbound on Eagle Road.

Ada County is unique in that most local road construction is within ACHD's jurisdiction, rather than under the direct control of individual cities. The project is estimated to cost \$25,448,475. Phase 2 plans were near completion at the time of the interviews.

As part of this project, the developer intends to develop a single retail town center, known as Meridian Town Center, in the city of Meridian. The complex is located at the Eagle Road/Fairview Avenue intersection (shown in Figure 12) and is estimated to cost \$4 million. As part of a sales tax rebate agreement, the developer agreed to absorb the cost of Eagle Road/Fairview Avenue improvements from its own financing. The developer would eventually be repaid through sales

tax rebates from complex property sales. The rebate is based on the Idaho sales tax rate of 6%.

### *Legal Authority*

Idaho Code 64-3641 allows the developer 60% of the sales tax revenues collected from the development to be used for the reimbursement. Once the costs of the improvement from sales tax revenues have been made (not to exceed \$35 million, which is capped under Idaho Code), no additional reimbursements can be made (Sales Tax Anticipation Reimbursement Agreement 2012). This act is also the STARR Act. According to the agreement between the developer and ACHD and ITD, Phase 2 must begin when the occupancy permits exceed 680,000 square feet, and Phase 3 must begin when the permits exceed 950,000 square feet. The developer is entitled to receive sales tax reimbursements for all portions of the project cost, except costs for which the developer receives IF credits or reimbursements from ACHD.

### *Project Funding*

This project has no federal contributions. The project is a local project, and costs are part of ACHD and shared with the developer.

### *Local Partnerships*

The project's local partners include:

- The developer, Meridian CenterCal Properties, LLC (beneficiary and main collaborator and initiator),
- ACHD (collaborator),
- ITD (collaborator), and
- Community Planning Association of Southwest Idaho.

### *Implementation Considerations*

Some key implementation considerations include:

**Boundaries:** Single parcel (retail complex), the Meridian Town Center development. The proposed development is 1,017,911 square feet of mixed-use/lifestyle center including retail, commercial, office, and residential uses.

**Levy Basis and Duration:** Up-front payments are made by the developer toward the project with sales tax reimbursements based on revenues with duration determined by cost and amount of rebate accrued annually. It is noted that the duration is as long as it takes for the cost share to be paid off (capped at \$35 million). The agreement was signed in 2011.

**Risk Considerations:** The agreements include several default clauses on payments by the developer.

### *Applicable Mode(s)*

The applicable modes are highway-related improvements with project-specific agreements similar in framework to NEs.

### *Lessons Learned*

The following points were noted by interviewees as important lessons to be shared:

- The project was not on the plan to be funded by ITD. Thus, developer buy-in was critical for this project to be funded. The use of the approach allowed accelerated construction because the developer provided the initial funding for the road improvements.
- The developer can receive only the rebate subject to actual sales tax collected. Thus, market analysis of demand was critical.

### *Project Contacts*

The Idaho Transportation Department was the project contact.

### **Transportation Development District— City of Olathe, Kansas**

#### *Facility Name*

The facility name is Olathe Pointe and Gateway access improvements.

#### *VC Mechanism*

The mechanism is a STD, with a transportation-related sales tax.

### *Background*

Transportation development districts are available to any city or county in Kansas. The city uses several economic development tools for funding and financing tools, but TDDs are used specifically for transportation. There are currently 36 TDDs operating in the state of Kansas, and the city of Olathe is one of them. The transportation infrastructure improvements must be constructed to serve commercial development projects, with a goal of spurring development with use of a TDD. Figure 13 shows the examples discussed in this section.

### *Legal Authority*

Resolution 11-1066 provides for the development of TDDs in the city of Olathe, Kansas (City of Olathe 2012). However,



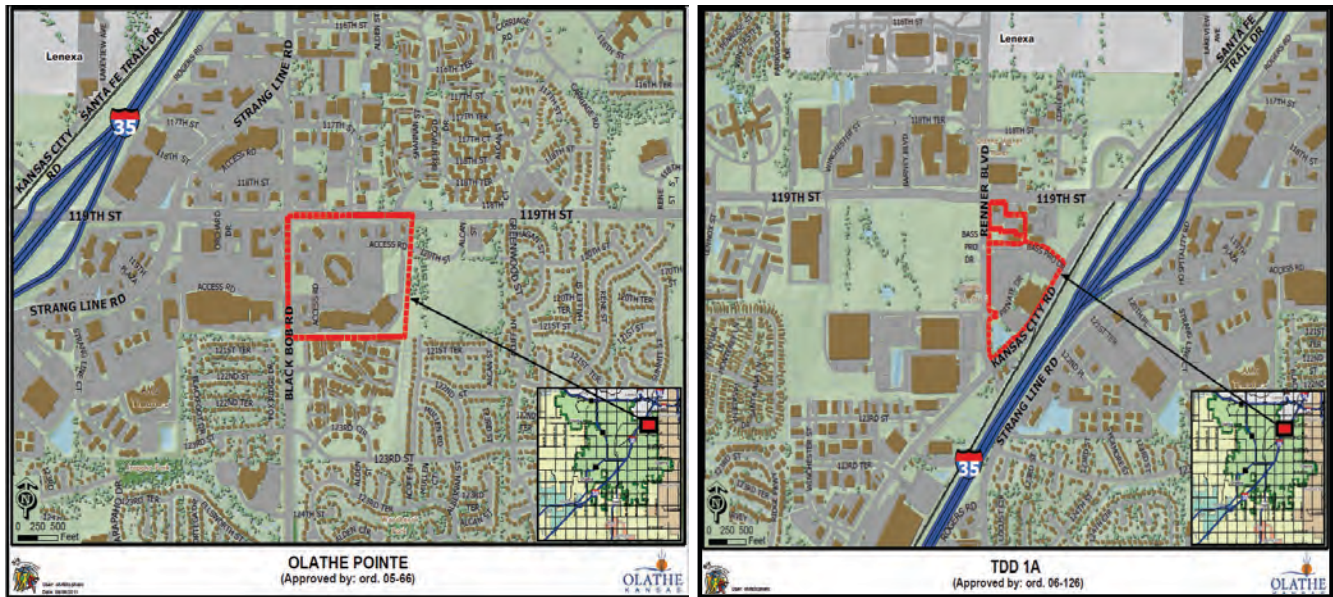


FIGURE 13 Olathe Pointe TDD—Access road improvements and Gateway 1A TDD-related improvements. (Source: City of Olathe, <http://www.olatheks.org/Finance/EconomicDevelopment/TDD/>.)

the purposes of such TDDs are to fund and finance transportation projects, including:

- Roads,
- Traffic signals,
- Parking lots and parking structures,
- Sidewalks,
- Utilities within or without the public right-of-way,
- Façade improvements, and
- Airport terminals or hangars.

#### Local Partnerships

The project local partners were:

- The City of Olathe (initiator), and
- The public because a petition and public hearing are required to establish a TDD (beneficiaries).

#### Implementation Considerations

**Boundaries:** The Olathe Pointe and TDD Gateway 1A boundaries are shown in Figure 13. The Gateway 1A is bounded by three streets: 119th Street, Kansas City Road, and Renner Road. The highlighting features of all the TDDs are they are small areas, cover one or more developments, and are bounded by the access roads surrounding those lots.

**Levy Basis and Duration:** Kansas TDDs in general and the city of Olathe TDD in particular use special assessments or new transportation sales tax within the district to finance

transportation projects. In this case, a transportation sales tax was used with the following parameters:

- In any increment of 0.10% or 0.25% not to exceed a maximum of 1% additional local sales tax within the district.
- A maximum duration of 22 years.

The Olathe Pointe TDD was set up in 2005 with 1% sales tax, whereas the Gateway 1A was set up in 2007. These are among the several set up by Kansas. The TDD reimbursement costs are \$14.94 million for this project, whereas total project costs are noted to be \$30 million.

**Timing, Collection of Revenues, and Financing Considerations:** The Olathe Pointe TDD inception-to-date revenues are \$2,001,928. The city of Olathe TDD and other TDDs in Kansas are required to:

- Maintain a separate fund for each district and project and assign a suitable title or name (i.e., Fifth Street Reconstruction TDD Fund).
- Withdraw the tax once the principle and interest are paid; any extra collections or surplus may be expended for purposes allowable for local sales tax receipts.
- Use the TDD sales revenues to back sales tax revenue bonds if needed or required by the project.

#### Applicable Mode(s)

This example showcases small-scale, highway-related improvements that serve commercial developments and access-related projects.

Websites for the Project

- <http://www.olatheks.org/Finance/EconomicDevelopment/TDD>.
- <http://www.olatheks.org/files/purchasing/OlathePointeTDD.pdf>.

Project Contact

The project contact is the city of Olathe, Kansas.

Missouri Sales Tax District—  
Highway 36 Expansion

Facility Name

The facility discussed in this section is the US-36/I-72 corridor in Missouri.

VC Mechanism

The specific mechanism discussed in this example is the use of multi-county STD, a TDD, for Missouri’s US-36/I-72 Corridor Transportation District.

Background and Special Features

US-36 in Missouri passes through or near St. Joseph, Cameron, Chillicothe, Brookfield, Macon, Monroe City, and Hannibal. From 1922 to 1926, it was “Route 8.” It is also Interstate 72. On August 3, 2005, residents of Macon, Marion, Monroe, Shelby, and Ralls counties approved Proposition 36B, which excluded Ralls County from the TDD and allowed for the construction of a four-lane US-36 to be constructed without Ralls County’s participation. This construction would serve as an extension of Interstate 72 west from Hannibal to Cameron and would make US-36 four lanes across Missouri.

With the passage of Proposition 36B, the US-36/I-72 Corridor Transportation District was created to help fund construction to convert the remaining 38 miles (61 km) of a two-lane

highway between Macon, Missouri, and Monroe City, Missouri, by September 30, 2010. East of the Monroe City exit, US-36 is a four-lane highway to US-61, where I-72 takes over the alignment. The project is noted to be the Missouri DOT’s longest TDD project at 52 miles (83.2 km) in the northeastern part of Missouri; it spans five counties. The project is designed in three phases and is part of a larger project to upgrade Route 36 to four lanes between Macon and Hannibal. The value creation opportunities came from the need to upgrade a vital link. The three phases are:

- Monroe City–Hannibal
- Shelbyna–Monroe City
- Shelbyna–Macon.

The project is part of the 10-year transportation improvement long-range plan but is not in the 5-year transportation improvement plan. Because Missouri DOT indicated a funding shortfall, the regions were told there was no money essentially until 2025–2030. Thus, the community decided to mobilize its own resources. Table 5 presents the project timeline, and the project location is shown in Figure 14.

Legal Authority

The TDD Act, Sections 238.200 to 238.280, allows for the formation of TDDs. The revenues of a TDD, the majority of which are sales taxes, can be used only for transportation-related projects (Missouri DOT 2004; Revised Statutes Missouri 2013).

The actual project costs for this expansion project started out at \$100 million and then increased to \$227 million for expanding 52 miles (83.2 km). However, costs came down to \$89 million as the result of (1) value engineering studies that were conducted by Missouri DOT before construction, (2) letting of contracts, and (3) construction bid prices lower than engineering estimates because of slack demand.

Project Funding

The funding package includes a \$7 million federal earmark and a TDD sales tax. The TDD’s share was agreed upon

TABLE 5  
PROJECT TIMELINE—HIGHWAY 36, MISSOURI

Date	Project Activity
September 2005	Preliminary design plans for Macon to Shelbyna section presented to public
October 2005	Preliminary design plans for Shelbyna to Monroe City section presented to public
Fall 2005	Land acquisition begins for Monroe City to Hannibal section
Spring 2006	Land acquisition begins for Macon to Shelbyna section
Summer 2006	Land acquisition begins for Shelbyna to Monroe City section
Summer 2007	Construction begins on Monroe City to Hannibal section
Fall 2007	Construction begins on Shelbyna to Monroe City section
Winter 2007	Construction begins on Macon to Shelbyna section
July 2010	All four lanes open to traffic



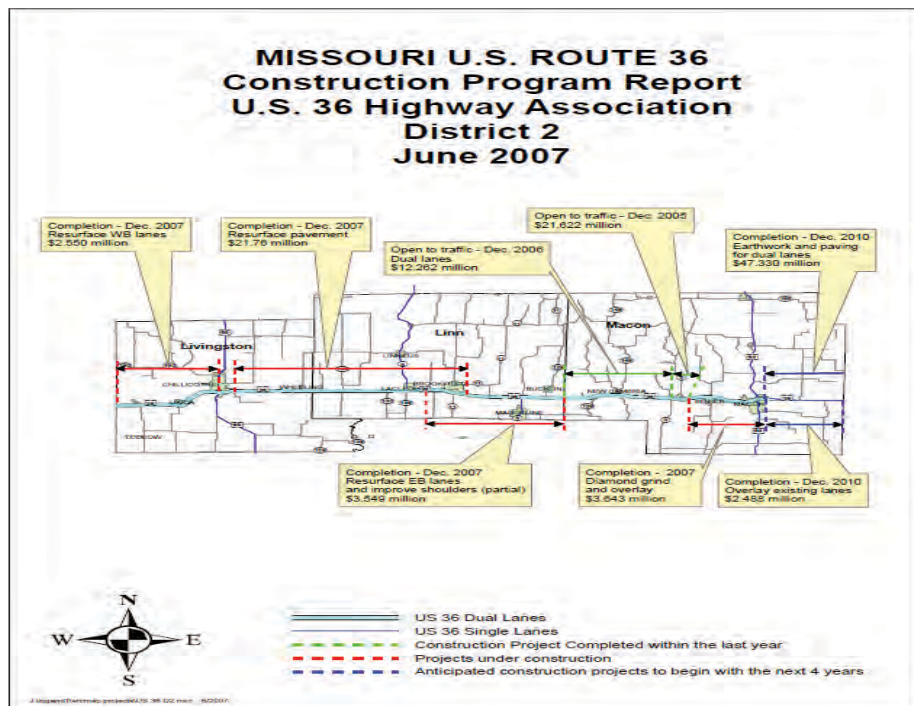
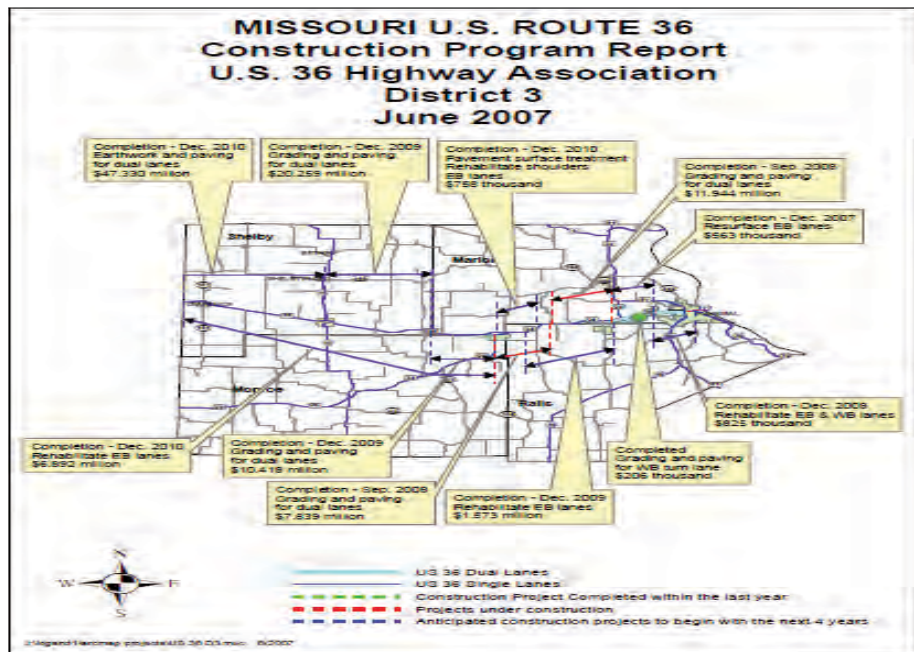


FIGURE 14 U.S. Hwy 36 Monroe, Shelby, Marion, and Ralls County Segment (D3, top) and Macon, Linn, and Livingston Segment (D2, bottom). (Source: Maps provided by Missouri DOT District Offices.)

as half of the construction cost, but it ended up equaling \$34,299,339.63. This did not include any costs related to design, engineering, acquisition of right-of-way, utility relocation, or administration cost or the maintenance cost of the roadway after construction.

### *Local Partnerships*

The TC was set in 2003, and partnerships were made among Missouri DOT, MHTC, and the counties (initiators) and community (beneficiaries). The Missouri Transportation Finance Corporation (MTFC) financed the TDD loan of \$34.3 million for 15 years.

### *Implementation Considerations*

Some key implementation considerations include:

**Boundaries and TDD Influence Area:** The area of influence was based on five adjacent counties: Macon, Marion, Monroe, Shelby, and Ralls. However, Ralls County opted out of the TDD sales tax. On August 3, 2005, residents of Macon, Marion, Monroe, Shelby, and Ralls Counties approved Proposition 36B, which excludes Ralls County from the TDD and allows for the construction of a four-lane US-36 to be constructed without Ralls County's participation. Thus, the other four counties were therefore included in the TDD area. In addition, the city of Clarence wanted on/off ramps at its overpass on Missouri Hwy 151 at US Hwy 36 (in Clarence), which were not part of the original design. Because this was essentially a change order of a design, the city of Clarence's portion was used to fund and finance on/off ramps at US-Highway 151. A separate funding agreement over the base agreement was made with the city of Clarence, Shelby County Commissioner, and Missouri DOT to add ramps on U.S. Hwy 36.

**Levy Basis and Process for Capturing the Value:** A half-cent additional sales tax was approved by voters. Voters in all four counties approved the sales tax. The required majority vote of 51% was not attained in Ralls County. However, to get it on the ballot, an intergovernmental agreement was signed, and the agreement met the Missouri statutes guiding the TDD. The revenues from the sales taxes are deposited in a separate account from which the TDD pays the obligations, makes loan payments, and makes investments to meet future obligations. The VC sales tax revenues portion was limited to 50% of construction costs only. The TDD was not responsible for project costs associated with design and engineering, right-of-way, utility relocation, and administrative costs.

**Duration of the TDD:** The duration of the TDD is 15 years starting from 2005, after which the extra tax goes away. The last payment is set for December 2020.

**Timing and Collection of Revenues:** The revenue streams started to come in from 2005, one year before construction. The

total projected revenue for the year 2013 was \$2+ million, not including an investment income of approximately \$130,000. Projected costs were \$41,330 (mostly legal). The beginning balance was on the order of \$8.6 million for the year beginning 2013. The revenue is collected by the Missouri Department of Revenue and paid out to the TDD on a monthly basis.

**Cost Efficiency:** This case example provides an opportunity not only to assess the timing of revenues in relation to construction, but also the extent to which the TDD has been able to meet the projected 38% share in the project cost. As of this point, an amount of \$12+ million (of the \$34.3 million TDD cost basis, or approximately 38%) has been paid off from sales tax revenues. This project has until 2020 to pay off the balance of approximately \$21 million of the TDD share.

**Financing Based on Revenue Streams:** The Missouri Department of Revenue transfers funds to a bank account. Annual loan payments from the account are made to the MTFC according to an amortization schedule provided by MTFC by the end of the calendar year. The role of a feasibility assessment/study was noted to determine the adequacy of sales tax revenue streams and to aid the financial analysis.

**Risk Considerations in Agreements:** The agreement with MTFC was such that there was a loan repayment break for the first 3 years into the TDD and that Missouri DOT would pay off any unpaid loan balances in the event of default. According to the interviewees, there is no indication that is likely to happen. The TDD was set up in 2005 with the first collection on January 1, 2006. However, the first loan payment was not required to be paid off until December 31, 2009.

### *Lessons Learned*

The agency representatives interviewed pointed to some of following lessons learned:

- The mechanism allowed for accelerated delivery of a project that was on the long-range plan but with no funds available until 2035.
- The cost reductions made because of value engineering made the project easier to sell to the public for community support.
- The mechanism is not costless. There are transaction costs associated with a TDD, and institutional capacity is required to manage the TDD. Transaction costs were kept down by keeping the area of influence limited to immediately adjacent counties in totality. The costs associated with the TDD were noted to be limited at 1% (mostly legal costs) and were low owing to general political will to get this project going from all quarters because it was widely accepted as a needed vital freeway for these regions.
- The mechanism requires institutional capacity for managing and overseeing the process and revenues, which was handled by the TC.

- The opting-out clause from TDD areas is noted to retain the acceptability, but it is also noted to lead to free-rider problems in other regions.
- The development of stakeholder support is challenging and requires vision and time. Political acceptability is important for voter approval, as is clear from the lengthy community involvement phase.

#### *Project Website*

The project website is [http://www.modot.org/northeast/projects/route36\\_projectinformation.htm](http://www.modot.org/northeast/projects/route36_projectinformation.htm).

#### *Contact*

The contact for this project is the Missouri DOT.

#### **Missouri Transportation Corporation—US-63 Expansion**

##### *Facility Name*

The facility discussed in this section is the US-63 Corridor Expansion Project, Missouri.

##### *VC Mechanism*

The mechanisms discussed in this example include TC (Highway 63 Transportation Corporation) and citywide sales tax.

#### *Background and Sources for Value Creation*

This project's mission is indicated in the following paragraph.

To fund, promote, plan, design, construct, maintain and operate, or assist therein, the . . . construction of two additional lanes on Highway 63 . . . from Route KK in Adair County to the intersection of Highway 63 bypass of Kirksville . . . to issue revenue bonds and refunding revenue bonds . . . to pursue additional funding through the State Infrastructure Bank . . . to secure and obtain rights-of-way . . . [in] a Cooperative Agreement with the Commission, the County of Adair and the city of Kirksville (Highway 63 Transportation Corporation).

In 1998, when Missouri DOT deferred the four-lane expansion plans for US-63 from Macon to Kirksville until at least 2020, Kirksville citizens decided to take advantage of that act to move the project forward. A Highway 63 Taskforce was formed by the Kirksville Area Chamber of Commerce, and with the cooperation of Missouri DOT, MHTC, the citizens of Adair and Macon Counties, and other interested parties and organizations, the Highway 63 Transportation Corporation (H63TC) was incorporated in 1999.

Several members travelled to Jefferson City to meet with Missouri DOT and legislators to manage the strategic steps

to have the highway built. These people included board members of US-63 (some of whom were interviewed for this report) and KOCH Performance Roads Incorporated. The presidents of A.T. Still University and Truman State University were among the founding ex officio members of the corporation who communicated the message of *Highway 63 4 Life: Safety, Economic Development, Recruitment of Students to Universities, and Life!*

The US-63 project was part of a 15-year plan for the city of Kirksville. Figure 15 shows the project map. Figure 16 shows the project timeline based on project agreements shared by Missouri DOT (Missouri DOT Project Agreements Highway 63).

#### *Legal Authority*

In 1990, the Missouri Transportation Corporation Act was created to allow quasigovernmental agencies called TCs to seek alternate funding for and oversee highway improvement projects. Sections 238.300 and 238.360 of the revised statutes of Missouri authorize the formation of nonprofit corporations for the purpose of promoting and developing public transportation facilities and systems and alternate means.

The corporation was set up to include jurisdictions that would be interested in and affected by the expansion of this project. The core groups were the Kirksville Area Chamber of Commerce (four members); city of Kirksville (three members); Adair County (two members); counties north and south of Adair County (one from each); and the cities of Macon, Atlanta, and LaPlata (one from each).

#### *Project Costs and Funding*

Projects costs were noted to be \$37.4 million (Highway 63 Cooperation Agreement Provided by Missouri DOT). The funding included the half-cent sales tax revenues of city of Kirksville. KOCH Performance Road worked with Missouri DOT in sharing road-building mechanisms and provided a 15-year maintenance guarantee on the section of US-63 between Macon and Kirksville, Missouri. MHTC provided the balance funding. These revenues provided 30% of the project cost with the remaining provided by MHTC.

#### *Local Partnerships*

The project local partners were:

- Kirksville residents and city of Kirksville (beneficiaries and key collaborators)
- Highway 63 Corporation (nonprofit TC)
- MHTC
- Missouri DOT (partner)
- KOCH Performance Roads Inc. (design–build–maintain agreement for 15 years).



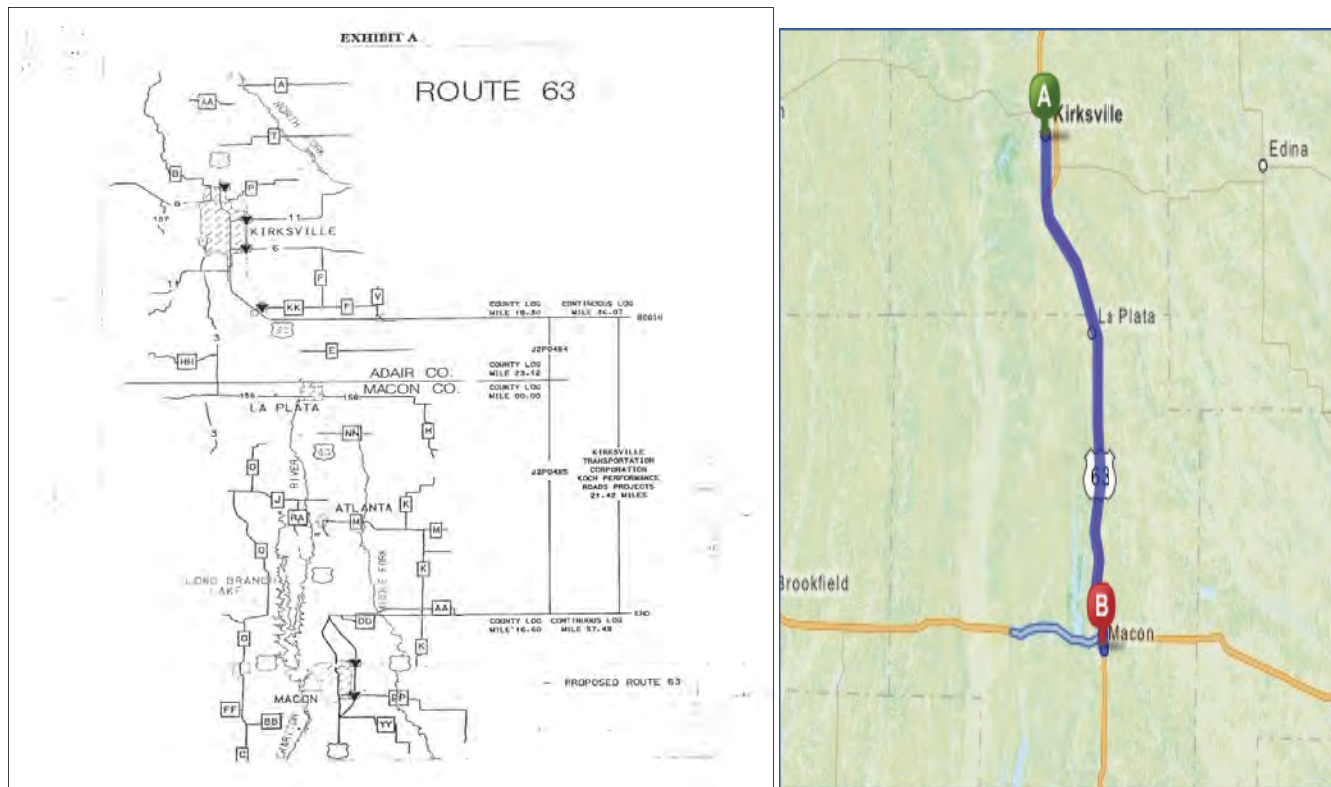


FIGURE 15 U.S. Hwy 63 project and location map (Kirkville, Missouri). (Source: Maps provided by Missouri DOT District Offices.)

### Implementation Considerations

Some key implementation considerations include:

**Levy Basis and Service Area:** The sales tax measure was a specific tax approved by the state in 2000 for the funding of economic development projects approved by the voters, including the TC. The citizens of Kirkville approved a half-cent sales tax (citywide) in April 2003 by an overwhelmingly supporting vote by 78.9%. The tax was to be used to build a road to the south of the city limits.

**Duration:** The duration of the sales tax was set at 10 years, ending in 2013. The construction started in 2003. It was completed in 2005.

**Equity Considerations:** No equity aspects were specifically noted because the process was approved by voters.

**Timing and Collection of Revenues:** The corporation had a feasibility study based on forecast analysis of sales tax revenues conducted and provided guidance to the city as needed. The sales tax revenues were collected by the city of Kirkville and paid through the Highway 63 Transportation Corporation. Because of the corporation, there is a mechanism in the agreements between the corporation and the city for the accounting of the revenues. Approximately \$11.5 million was projected from sales tax revenues. Collections started before construction.

**Financing Based on Revenue Streams and Risk Considerations:** The sales tax revenues were used to back debt issued.

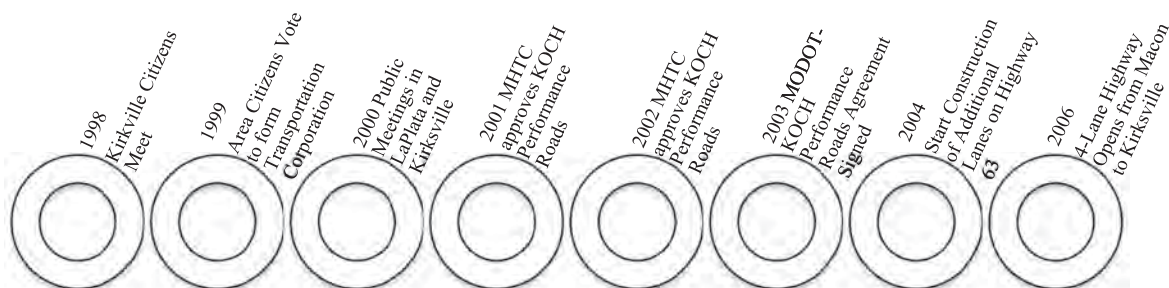


FIGURE 16 U.S. Hwy 63 project timeline (Kirkville, Missouri). (Source: Developed from Highway 63 Project Agreement, Highway 63 Corporation Documentation, Missouri DOT—Truman State University Archives.)

If the sales tax funds generated were not sufficient, it was expected that the city's federal aid urban dollars would be used to make up the shortfall. The sales tax receipts have been sufficient each year. The role of a feasibility assessment/study conducted early in the process helped determine the adequacy of sales tax revenue streams and aid the financial analysis.

**Cost-Efficiency:** Thirty percent of the project cost was proposed to be covered by the TDD sales tax. This project paid its share of the project cost of \$11.5 million from economic development sales tax revenues to meet debt obligations.

### *Lessons Learned*

Interviewees reported the following points as key lessons learned:

- The project presented an opportunity to share in a unified, collective effort contributing to the building of the community.
- The stakeholders were proactive and could send a message that reached across diverse groups. The process took more than 4 years.
- The communication efforts through focus groups were facilitated by the corporation members, and an educational team of citizens of Kirksville were identified to articulate the benefits of a four-lane "Highway 4 LIFE." This was vital because voter approval was required for the sales tax to be approved.
- The delivery project was accelerated as a result of the adoption of accelerated delivery methods and funding. The public-private partnership (PPP) elements helped maintain the roadways and deliver the safety benefits faster than would have been possible with a traditional approach.
- The TC is not a funding tool in itself but an engine to support the overseeing of the project, project funding, and promotion.

### *Project Website*

- The project-related documents archive is at Truman University Library.
- <http://library.truman.edu/manuscripts/H3-Hiway%2063.asp>.
- <http://www.modot.org/plansandprojects/documents/D2HwyConstSched.pdf>.
- <http://www.corporationwiki.com/Kansas/Wichita/koch-performance-roads-inc/30070674.aspx>.

### *Contacts*

Missouri DOT is the project contact.

## **Missouri Transportation Corporation— US-67 Corridor Expansion, Missouri**

### *Facility Name*

The facility discussed in this section is the US-67 corridor expansion in Missouri.

### *VC Mechanism*

The mechanism adopted in this project context is a TC (Hwy 67 Transportation Corporation) and city sales tax.

### *Background and Sources for Value Creation*

Highway 67 is part of the state highway system and is owned by MHTC. The commission, city of Poplar Bluff, and the corporation desire to provide for the acquisition of right-of-way, design, and construction of two additional lanes to the existing Hwy 67 lanes located between Poplar Bluff and Fredericktown, beginning approximately 1 mile south of Highway JJ and extending north to 1 mile south of the Route E overpass. This would make Hwy 67 a four-lane project from Poplar Bluff (Butler County, Missouri), through Wayne County, and to Fredericktown (Madison County). The four-lane improvements were constructed over and through hilly terrain and over the St. Francis River and several other smaller creeks. The project length is 50 miles (80 km). Figure 17 shows the project limits and location relative to the St. Francis River as well as project cost sharing. The project started in 2005 and was completed in 2011.

### *Project Cost*

The total project cost is noted as \$180 million. The city and corporation were responsible for 50% of the project construction and construction inspection cost.

### *Legal Authority*

In 1990, the Missouri Transportation Corporation Act was created to allow quasigovernmental agencies called TCs to seek alternate funding for and oversee highway improvement projects. Sections 238.300 and 238.360 of the revised statutes of Missouri authorize the formation of nonprofit corporations for the purpose of promoting and developing public transportation facilities and systems and alternate means. The not-for-profit 5013C Hwy 67 Corporation was required by the state of Missouri through Missouri DOT to serve as the official liaison with Missouri DOT. In addition, the Hwy 67 Corps provided the campaign leadership to provide meetings and gain support of the community of the city of Poplar Bluff to pass the half-cent tax.



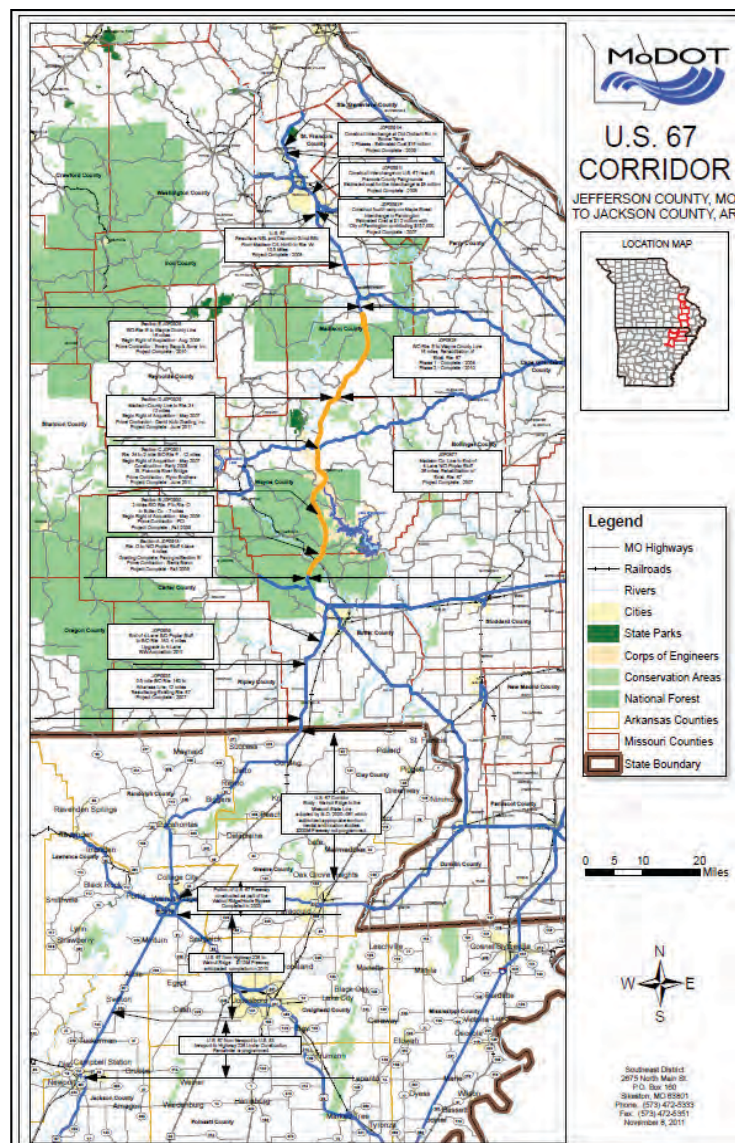
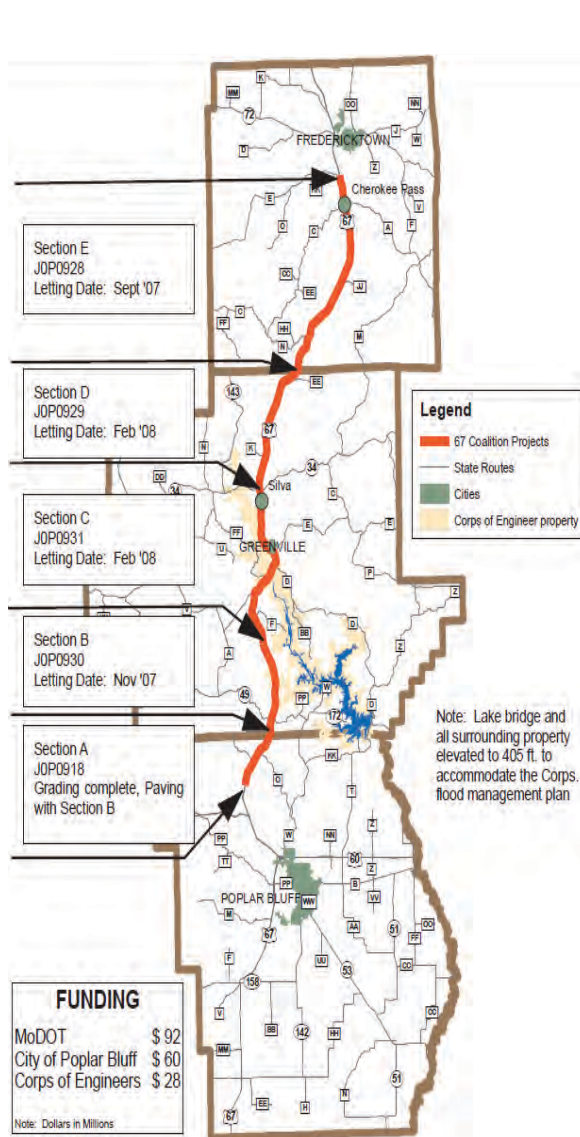


FIGURE 17 U.S. Hwy 67 project location, limits. (Source: Maps shared by Missouri DOT District Offices.)

### Project Funding

The funding included the half-cent, citywide, voter-approved sales tax revenues of the city of Poplar Bluff. The interviewees noted that there was already an existing TDD in the city, and the TDD chose not to participate in this project but had set aside \$30 million for other related projects in the region. Thus, the half-cent sales tax was additional to the existing \$0.01 sales tax in the region (Hwy 67 Project Documentation and Interviews). The project funding breakdown is as follows:

- The Missouri DOT (\$92 million of total project cost).
- The U.S. Army Corps of Engineers (USACE) funded the cost of \$28 million to build a new four-lane bridge over the St. Francis River plus approximately 6 miles (3 miles on each side of the bridge). The \$28 million was a part of the \$180 million total cost.

- The landowners provided through sales taxes \$60 million or 50% of the project cost.
- The Delta Regional Authority provided \$5 million grant funding applied to corporation obligations (Hwy 67 Project Agreement).

### Local Partnerships

The project local partners are:

- City of Poplar Bluff residents (beneficiaries; initiator and collaborator),
- Hwy 67 Corporation (nonprofit TC),
- MHTC,
- Missouri DOT (partner), and
- USACE (beneficiary and partner).

### *Implementation Considerations*

Some key implementation considerations include:

**Duration:** The duration of the sales tax is set at 30 years, ending in 2035. The construction started in 2005.

**Levy Basis and Service Area:** The half-cent, citywide, sales tax measure was a specific tax approved by the voters of the city of Poplar Bluff, including the TC. There was an existing TDD in the area that chose to not participate.

**Equity Considerations:** No specific equity issues were noted by the interviewees, even within the context of 50% of the project cost borne by landowners of Poplar Bluff.

**Timing and Collection of Revenues:** The collections started in the same year as construction. Because of the corporation, there is a mechanism in the agreements between the corporation and the city for the accounting of the revenues. The sales tax receipts have been sufficient each year so far, and it was indicated by respondents that the sales tax will be able to pay off the \$60 million share over the duration for which the tax is active.

**Risk Considerations:** The share of local contributions was linked to state revenue performance with an understanding that local contributions would come down if state revenues exceeded \$500 million, according to the agreement documents shared by interviewees.

### *Lessons Learned*

The following points were noted by interviewees as key lessons:

- Communication with citizens and business and property owners was recognized as very important in building trust from all concerned.
- The TC is not a funding tool in itself but an engine to support the overseeing of the project, its funding, and its promotion. The not-for-profit 5013C Hwy 67 Corporation was required by the state of Missouri through Missouri DOT to serve as the official liaison with Missouri DOT. The Hwy 67 Corporation provided the campaign leadership to provide meetings and gain support of the community of the city of Poplar Bluff to obtain voter approval to pass the half-cent tax.
- The process was noted to be a time-consuming process but one that got them the desired result. The process has been quite involved, as the cooperation agreements and archived documentation showcase.

### *Project Website or Project-Related Information*

- [http://www.modot.org/southeast/news\\_and\\_information/special\\_events/mid-americaexpress.htm](http://www.modot.org/southeast/news_and_information/special_events/mid-americaexpress.htm).

- <http://www.morail.org/southeast/Route67ImprovementsSouthofPoplarBluff.htm>.
- <http://www.semissourian.com/story/1757353.html>.
- <http://dar.rustcom.net/story/1780860.html>.
- <http://dar.rustcom.net/story/1771606.html>.
- [http://www.morail.org/southeast/documents/FINAL\\_APIL2.pdf](http://www.morail.org/southeast/documents/FINAL_APIL2.pdf).

### *Contacts*

Missouri DOT is the contact for the project.

## **CORRIDOR-LEVEL MECHANISMS**

### **Transportation Improvement Districts— State Route 28, Virginia**

#### *Facility Name*

The facility that is discussed in this section is State Route 28 (SR-28), Virginia (corridor).

#### *VC Mechanism*

The mechanism discussed in this section is the SAD, which is used to fund improvements in the corridor. The special assessment mechanism was used as a part of a corridor funding and bond strategy, where Phases 2 onward were part of a PPP agreement.

#### *Background and Source for Value Creation*

As discussed in chapter two, TIDs are a type of SAD used in Virginia to fund transport projects. This section discusses specific examples of TID use in Virginia. This example showcases a high-growth area characterized by funding shortfalls in capital programs used to finance a state transportation facility (State Route 28, Virginia).

Located in Northern Virginia just east of Washington, D.C., SR-28 forms a major north–south corridor in Loudoun and Fairfax Counties, running 15 miles between I-66 on the south and Route 7 on the north; both are major east–west corridors. SR-28 is a primary state highway traversing the counties of Fairfax, Loudoun, Prince William, and Fauquier in Virginia. In the late 1980s, SR-28 was a two-lane country road. Growth pressures in the region demanded that SR-28 be upgraded to increase its capacity to handle the resulting traffic volumes. Thus, the primary source for value creation was the upgrade for a critical part of the network under pressure from growth. However, there was no formal justification in terms of an economic impact analysis, community support for the upgrade, and willingness to allow the property tax surcharge.



### *Highway Improvements Funded Through SR-28 TID*

Special assessments were used for funding two phases of SR-28 improvements.

- Phase 1 Improvements (1991–1998): 14-mile (23-km) expansion of SR-28 (from two to six lanes) and three interchanges (at Routes 50, 7, and Dulles Toll Road). In 1988, the Commonwealth Transportation Board issued \$138 million for Phase 1 and agreed to a 75/25 split of shared costs between the district (75%) and the Virginia DOT (25%).
- Phase 2 Improvements (2002–2007): This part of the agreement was signed as a public–private partnership (P3) between several partners and carried out as part of Virginia’s P3 Act (source: <http://www.28freeway.com> and personal discussions). A \$200 million investment was undertaken for the conversion of six at-grade interchanges with signalized intersections to high-capacity, grade-separated interchanges in this agreement. This was subsequently amended in 2006 to include four more interchanges (for a total of 10 interchanges). Virginia DOT contributed more than \$70 million, with ultimate plans calling for an expansion of SR-28 to eight lanes. The original six interchanges include:
  - Air & Space Museum Parkway Interchange—*Completed summer 2004.*
  - Route 625 Interchange—*Completed.*
  - Route 625 Interchange (Waxpool/Church Roads), Flyover Bridge and Waxpool Road Widening—*Completed fall 2005.*
  - Church Road Widening and Washington & Old Dominion (W&OD) Trail Bridge—*Completed fall 2006.*
  - Route 606 Interchange (Old Ox Road)—*Completed spring 2005.*
  - Route 662 Interchange (Westfields Boulevard)—*Completed fall 2005.*
  - Route 668 Interchange (McLearen Road)—*Completed spring 2006.*
- Phase 3 (2007–2010): Four additional interchanges at a cost of \$136 million:
  - Willard Road Interchange—*Completed summer 2009.*
  - Route 608 Interchange (Frying Pan Road)—*Completed spring 2010.*
  - Innovation Avenue—Phase 1 (partial interchange; Center for Innovative Technology)—*Completed fall 2007.*
  - Route 1793 Interchange (Nokes Boulevard/Dulles Town Center)—*Completed summer 2009.*
- A final phase includes the expansion of SR-28 to eight lanes under the project scope.

### *Local Partnerships*

The major local partners in this venture were the local landowners (beneficiaries) because the process was driven by

local petition. The other main partners, including the Phase 2 P3 parties, include:

- Virginia DOT (initiator based on support of the district act and local governments and landowner petition).
- Developer: Clark Construction Group.
- Developer: Shirley Contracting Group.
- Designer: Dewberry and Davis, LLC.
- Route 28 Corridor Improvements, LLC (Route 28 Project Website and personal discussions).

### *Legal Authority*

In 1986, under the leadership of Governor Gerald L. Baliles, Virginia was confronted with transportation challenges, and the governor initiated a comprehensive program to address current and future transportation needs in the Commonwealth. As an integral component of this program, the Virginia General Assembly approved the special tax district with an alternate means of financing critical transportation improvements.

Following Virginia Law, such a district was formed only upon the joint petition of owners of at least 51% of the land area in each county located within the boundaries of the adopted district, and zoned or used for commercial or industrial purposes. Loudoun County and Fairfax County entered into a contract with the district on September 1, 1988. The Virginia TID is encapsulated in the Virginia Acts of Assembly Sections, Virginia Code. This act allows for the development of special local transportation districts, transportation tax districts, or TIDs.

The district is governed by a commission of nine members composed of four of the elected members of the Board of Supervisors of Fairfax County, four of the elected members of the Board of Supervisors of Loudoun County, and the chairman of the transportation board or his or her designee. The chairman of the district is elected by and from among its members. There are other local TIDs in Virginia, and the SR-28 TID is just one example.

On October 17, 1987, a group of owners of land along SR-28 in Fairfax County and Loudoun County filed with the boards of supervisors of the counties a joint petition for the creation of the State Route 28 Highway Transportation Improvement District (SR28-HTID) pursuant to the Multicounty Transportation Improvement Districts Act (Virginia Code Section 15.2-4600 et seq.). In the petition, the petitioning landowners proposed that (1) certain transportation improvements be constructed within the district, (2) the district should enter into a contract with Virginia DOT pursuant to which Virginia DOT would provide the design, planning, and construction and any other undertaking deemed necessary for the construction and annual provision of such transportation improvements in the district, and (3) the boards of supervisors of the counties should impose a special improvements tax within the district on commercial and industrial property and collect the revenues therefrom, which the district would use solely for the district’s portion

of the annual payments required under the contract with Virginia DOT and related costs as authorized under the district act for services performed in connection with the implementation of such transportation improvements. After public hearings, the boards of supervisors adopted resolutions establishing the district and also adopted concurrent resolutions setting forth the material understandings of the counties and the petitioning landowners with respect to the district, including a 75/25 ratio of the costs to be shared by the district and Virginia DOT with respect to the transportation improvements.

In 1995, the Virginia General Assembly also passed the Public Private Transportation Act, which allowed Phase 2 to be carried out as P3 design–build–develop (Chapter 22, Code of Virginia 1995; Virginia DOT 1995).

### *Implementation Considerations*

Many implementation considerations listed in this section are interconnected. The important considerations in this case example include:

**Boundaries:** In 1987, Virginia authorized the creation of the first special tax districts to finance transportation invest-

ments in this SR-28 project, taking advantage of the law passed by the governor. Loudoun County, in partnership with Fairfax County, formed the Route 28 Highway Transportation Improvement District on December 21, 1987, the first TID in the Commonwealth. Figure 18 shows the location of SR-28 and the geographic boundary associated with the TID used to fund and finance SR-28 improvements. The district boundaries encompass approximately 14,800 acres of land; the district is approximately 14 miles in length and is located generally along SR-28 in the counties. Eight miles of the project are located in Fairfax, and approximately 6.2 miles are in Loudoun County. Both counties are located in the northeastern corner of Virginia and are part of the Washington, D.C., metropolitan area, which includes jurisdictions in Maryland, the District of Columbia, and Northern Virginia (Figures 19 and 20).

The key criterion in the boundary development is the requirement for contiguity within local jurisdictions. The code itself allows for the creation of local TIDs in a single city or county or in two or more “general benefit areas” that are contiguous cities or counties. However, the process for defining the actual service area in terms of properties to be included/excluded for the SR28-HTID could not be established beyond direct proximity. Figure 19 shows only the Loudoun County portion.

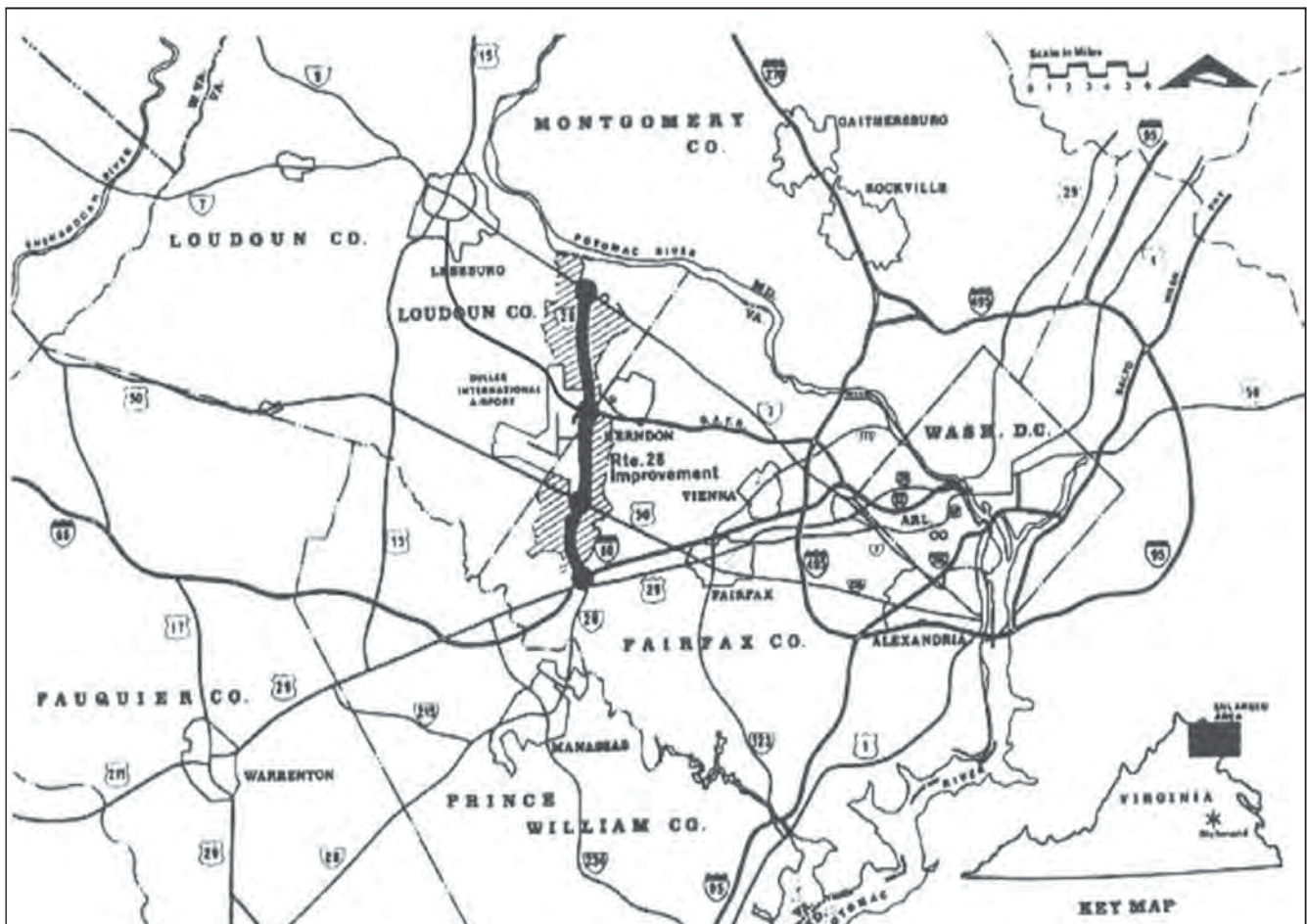


FIGURE 18 Virginia SR-28 TID boundary (Fairfax and Loudoun counties). (Source: Virginia DOT.)

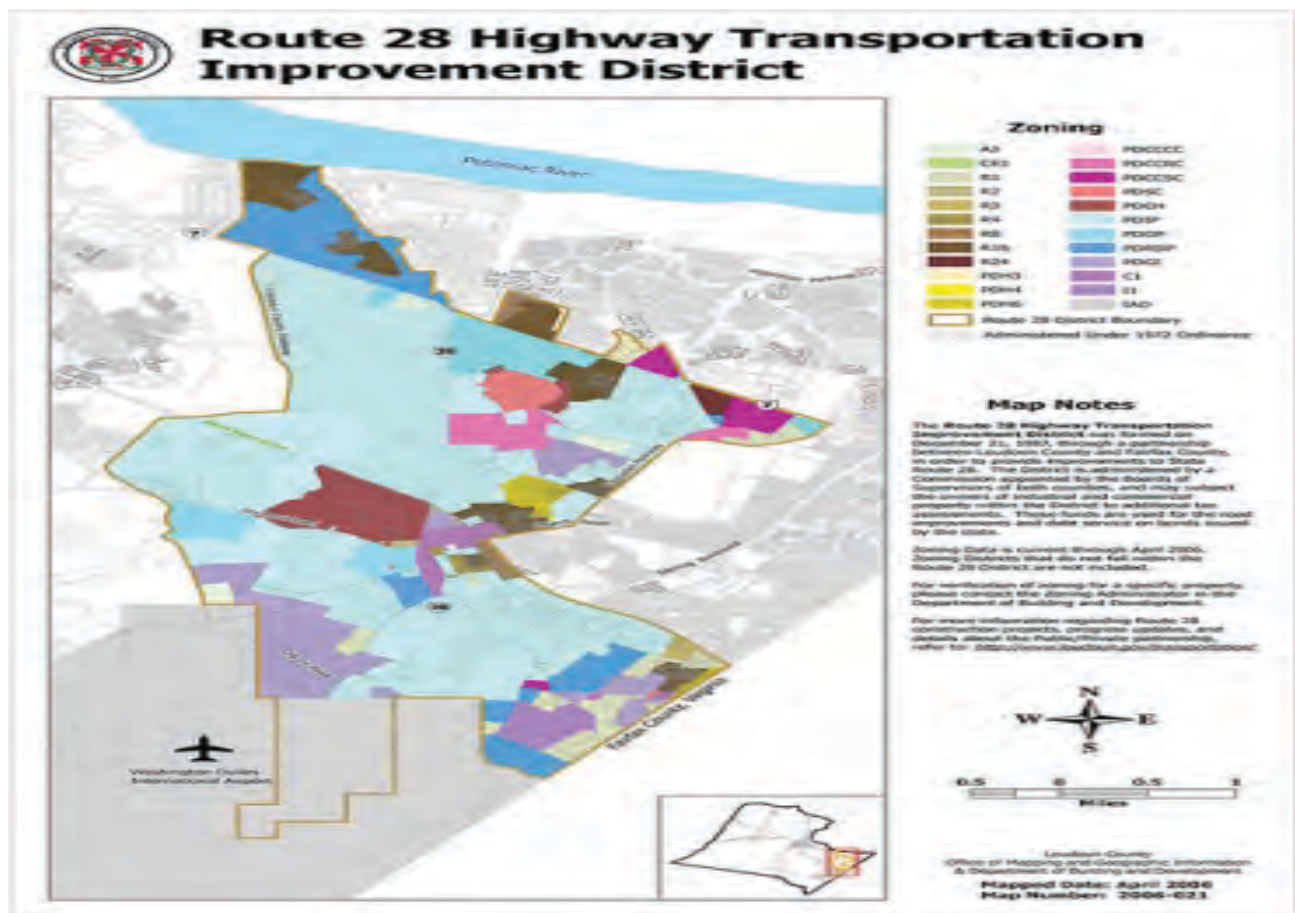


FIGURE 19 Virginia SR-28 TID Loudoun County boundary. (Source: Loudoun County Geographic Information System Office.)



FIGURE 20 Location of Fairfax and Loudoun counties and SR-28. (Source: Virginia DOT.)



**Levy Basis and Duration:** Both Loudoun and Fairfax County agreed to pay all tax revenues to the Commonwealth Transportation Board. The contract specified that (1) the County Administrator shall include in the budget all amounts to be paid by the county under the district contract for the fiscal year (75/25 split of shared costs between TID and Virginia DOT); (2) the county shall provide by February of each year the total assessed fair market value of the district as of January 1 of that year; and (3) the district in turn shall notify the county of the required payment and request a rate sufficient to collect that amount, to a maximum of \$0.20 per \$100 of assessed value.

Property values are used as the basis for assessments; however, the revenues generated are *not* considered ad valorem taxes or property taxes. Instead, they are considered as non-ad valorem assessments based on benefits or improvement to the property from district expenditures because benefits are presumed to be proportional to property values, and land values are used as a substitute or proxy for direct measurement of benefits generated. The levies satisfy the following criteria:

- TID levies are recurring on an annual basis. These funds, in addition to funds received through the state primary road fund allocation formula, are to be used for the road improvements and debt service on bonds issued by the state.
- TID levies apply to all current and future development.
- The periodicity is annual. The fiscal year 2013 assessment is \$0.18 per \$100 valuation. The levy has been ongoing for 25 years as of 2013.
- The levy was aimed only at commercial and industrial property in the service area, which subsequently covered 10,204 acres.

The tax district defined a distinct scope of work when it formed in the 1980s. It was noted during the interviews that once that scope is completed, the tax district will dissolve.

**Timing and Collection of Revenues:** The collected tax revenues for the SR28-HTID were deposited to a project completion fund (PCF). Revenues were collected from 1995, a few years after Phase 1 construction began.

**Financing Considerations:** The chronological breakdown of the financing is provided here:

- 1988: Debt issued by the state to fund road improvements to SR-28 was authorized during the 1988 Virginia General Assembly and became effective July 1, 1988. The Commonwealth of Virginia issued \$138.5 million in revenue bonds for the SR-28 project in September 1988. These tax revenues were used for road improvements and debt service on bonds along with funds received through the state primary road fund allocation formula.
- 2002: In 2002, the transportation board, the authority, and the commission amended the original 1988 district contract, adopting a plan of financing and refinancing

the district project and creating a schedule of financing by the transportation board and the authority for Phase 2's six grade-separated interchanges for SR-28. The plan called for funding these interchanges through the issuance of bonds by the authority in an amount sufficient to provide funding for approximately \$90 million of the costs of the district project (the initial authority bonds), and the issuance of bonds by the transportation board to produce an additional \$36 million of the costs of the district project, with debt service on all bonds to be payable from the special improvements tax levied in the district.

- 2003: At the request of the transportation board, the authority issued the series 2003 bonds to provide \$30 million for costs of the district project.
- 2004: The authority issued its series 2004 bonds to finance an additional \$60 million of costs of the district project. The proceeds of the initial authority bonds and the investment income thereon were sufficient to fund the construction costs of Phase 2's six interchanges on SR-28, and such interchanges were completed in 2007.
- 2006: The contract was amended to consider an interest-free loan, which was subsequently replaced by an allocation of state funds.

TID bonds continue to hold AAA ratings.

**Risk Considerations and Performance of the SR28-HTID:** Initially, tax revenue collections at the maximum amount were not sufficient to pay the debt obligation in full as a result of land values not holding up (Table 6). Consequently, the difference was made up from the Northern Virginia State Highway Allocation. This process is expected to continue until such time as district revenues are sufficient to fund

TABLE 6  
SPECIAL ASSESSMENT TAX  
REVENUE HISTORY SR28-HTID  
(FAIRFAX AND LOUDOUN  
COUNTIES)

Fiscal Year	Total (\$)
1995	5.877
1996	4.274
1997	3.839
1998	4.638
1999	5.905
2000	7.524
2001	9.907
2002	11.244
2003	12.847
2004	11.434
2005	12.834
2006	14.980
2007	19.117
2008	21.886
2009	23.694
2010	21.015
2011	17.705
2012	18.412
Total since 1996	227.13

debt service costs in full. In 1992, real estate rebounded and allowed debt refinancing at lower interest rates. The revenue performance since 2001 has been above what is needed to pay debt service. This allowed the SR28-HTID to go ahead with additional design and construction using the project completion fund as 100% self-financed. For Phase 2, the TID supported \$470 million of improvements. In fiscal year 2007, the SR-28 TID was projected to generate \$8,200,000 in current and delinquent tax revenue, and it surpassed that estimate.

### *Lessons Learned*

Virginia law allows for single county and multicounty TIDs. The SR28-HTID example highlights some of the considerations, including infrastructure financing and phasing, that communities have to take into account to successfully implement TIDs, as well as some of the challenges of financing infrastructure investments within the TIDs. Here are some of the key lessons as pointed out by interviewees. This example also highlights that financial performance of the project corridor TID revenues is closely reflected in county bond ratings, which are AAA in this case, or investment grade (Route 28 TID Prospectus, Fairfax County 2012). This project was not in the region's long-range transportation improvement plan.

- The SR28-HTID involved a diverse group of stakeholders, including the local landowners and private-sector participants (Clark and Shelly Construction companies) over the project phases. A voluntary joint petition from the landowners was required to support the special assessment for funding transportation improvements to allow growth in the corridor and area.
- The project allowed acceleration of planned highway improvements adopted by the state, which relied primarily on slower pay-as-you-go financing from the Northern Virginia region's share of the state primary road fund allocation. With the PPP under Phase 2, significant corridor improvements funded with a 75/25 split allowed design and construction to proceed much sooner than if the project were publicly funded. The major improvements were provided years before they would have been realized through traditional financing. The SR28-HTID supported \$470 million of improvements.
- The TID board could use debt as a way to finance the projects secured by the tax revenue funding made possible by TID revenues. The TID approach is noted to make a substantial difference in a corridor where, for example, a local match is needed to leverage federal grant funds for construction of a new rapid transit line, or where grade-separated interchanges are needed along a highway corridor to improve traffic flow, as this example specifically showcases.
- Another reported advantage of this TID approach is that it provides a steady stream of funding from year one, which may even avoid the need for bonding as a financing mechanism. It does not affect general funds for the jurisdictions because it is based on an additional charge.

- A similar rail-related TID has been established to finance rail in the parts of the same corridor (Dulles Rail TID) and is being discussed elsewhere. The Phase 1 Dulles Rail TID was established in 2004, and Phase 2 was established in 2012 at \$0.22/\$100 valuation (<http://www.fairfaxcounty.gov>).

The points listed here are not barriers per se but factors reported by interviewees as those that other agencies will need to consider in their use of this mechanism.

- The tax revenues provide a steady flow of funds, yet debt finance is linked to real estate cycles even with surcharges. When a large percentage is covered by the district, as in this case (75%), there needs to be clear vision of shortfall agreements for debt service. Revenue shortfalls relative to the amount needed to service the debt required an arrangement from another entity to service that shortfall. In this case, the Commonwealth's Northern Virginia State Highway Allocation provided the backup guarantee and bridged that gap initially when the tax district had some issues with land values not holding (1988, 1989) and revenue was insufficient to pay debt service. The rebound of real estate values in 1992 allowed the refinancing of the debt to take advantage of lower interest rates. Surpluses to the PCF accrued since 2001, allowing full debt service repayments and the tax district to move forward with additional design and construction using the PCF (100% tax district financed). There are transaction costs associated with the setup, maintenance, and management of a TID.

### *Applicable Mode(s)*

- The applicable mode in this example is highway, but examples abound in transit.
- The same TID mechanism is used for funding transit and rail elsewhere in the same counties (Dulles Rail).

### *Website for Project*

The website for the project is <http://www.28freeway.com/projectoverview.html>.

### *Project Contact*

The contact for the project is Virginia DOT.

### **Joint Southeast Public Improvement Association— I-25 Corridor, Colorado**

#### *Facility Name*

The facility discussed in this section is the I-25 corridor, in Denver, Colorado.

### VC Mechanism

The mechanism discussed in this example is a SAD of a much larger scale, called the “metropolitan district,” that is used in conjunction with a voluntary organization such as a TC.

### Background

One of the earliest examples of TID was the 1983 creation of Denver’s Joint Southeast Public Improvement Association (JSPIA), a voluntary cooperative organization, such as a TC, among commercial property owners located in a 5-mile suburban corridor along I-25. Over time, funds recovered by the JSPIA TID were used by the Colorado DOT to cover two-thirds of the cost of improvements to five interchanges and one overpass located in the district (Murphy 2010; Strathman and Simmons 2010). According to Colorado statutes, landowners can form quasipublic entities known as metropolitan districts. During the late 1970s and early 1980s, unprecedented growth caused the south I-25 corridor to gridlock, including the interchanges along the I-25 corridor and the major thoroughfares, such as Belleview Avenue, Orchard Road, and Arapahoe Road. Traffic backed up onto connecting thoroughfares, placing pressure on adjacent residential neighborhoods. In short, the entire southeast corridor was in jeopardy of gridlock (Special District Association of Colorado 2007). As a result, in 1983, the JSPIA brought together four Title 32 metropolitan districts along the south I-25 corridor to comprehensively address long-term transportation planning and funding improvements. As businesses continued to emerge along the southeast corridor, the number of Title 32 districts involved also grew, from four to 18 by 2003. By 2004, the process had become cumbersome, and the growth led to the development of one common district called the Southeast Public Improvement Metropolitan District (SPIMD). This approach combined the metropolitan districts with zoning. Through the public–private effort, JSPIA committed to approximately \$40 million to support and upgrade transportation improvements on the I-25 corridor and a number of arterial roadways in the Denver region.

The area covering JSPIA was mostly office land use and a prime growth area for the Denver region and is referred to as the second central business district for Denver (Figure 21).

### Local Partnerships

The local partners were

- Developer,
- State,
- FHWA, and
- Landowners (beneficiaries).

JSPIA was initiated by private owners/developers with a long-term plan for the corridor to raise revenue to fund and finance the corridor improvements. Since its inception in

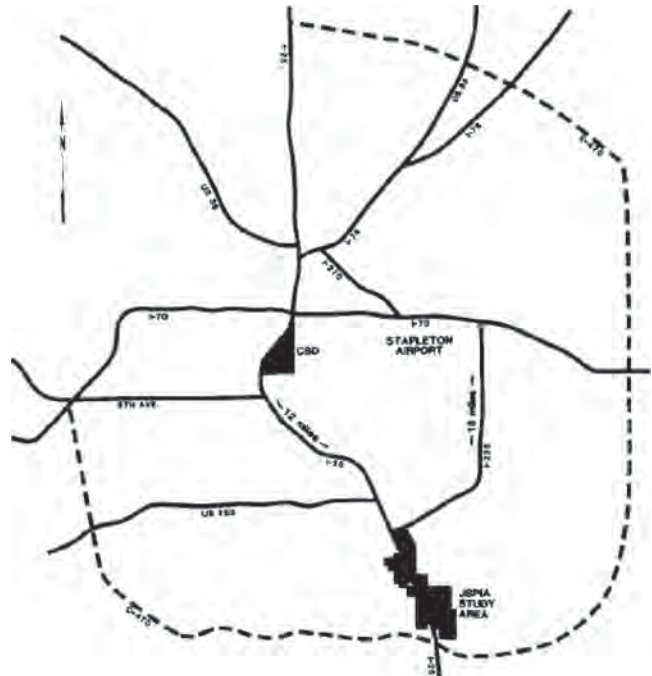


FIGURE 21 Location of JSPIA, Denver, Colorado, relative to the central business district. (Source: Reprinted from Ullevig 2000.)

2004, SPIMD joined with the Southeast Business Partnership and representatives from each of the corridor governments in formation of the Southeast Urban Corridor Transportation Steering Committee. In alignment with this group, SPIMD helped to fund numerous projects to ease and better the completion of the Transportation Expansion Project, specifically funding \$7.5 million to ensure the construction of additional pedestrian overpasses at three new light rail stations. Now SPIMD is partnering with Denver’s Regional Transportation District for transit planning in the region.

### Implementation Considerations

Many implementation considerations listed in this section are interconnected. The important considerations in this case example include:

Boundaries and Improvement Type: Areawide. Arapahoe County, Colorado.

- Four metropolitan districts in 1983; 18 districts in 2003 due to growth.
- Yosemite Street Overpass at a cost of \$4.5 million, but other improvements were also made in the corridor, including park-and-ride areas to serve light rail.

Duration: Continued for 20 years.

Levy Basis: The district is a type of SAD, in which property owners are taxed to pay off bonds for transportation

improvements that benefit their property. In Colorado, these districts act as quasigovernmental entities. The goal was to construct a \$4.5 million overpass based on proportional share of district members' total assessed valuation (Meisner 1984).

**Timing of Revenues:** The revenue streams accrued alongside improvements on the corridor.

**Performance of Revenue Streams:** Over the course of 20 years (1983–2003), JSPIA provided more than \$30 million to fund a variety of transportation improvements along the I-25 southeast corridor, including the construction of overpasses, the construction of essential interchanges, and the widening of roads frequented by commuters on their way to work in the busy business district. In addition, JSPIA helped to provide expansive landscaping and highway beautification programs.

**Administrative Feasibility:** The JSPIA TID became cumbersome as a result of addition of districts over time, leading to difficulties in communication and management.

### **Transportation System Development Charges—Northern Macadam, Portland, Oregon**

#### *Facility Name*

The facilities discussed in this section are part of the city of Portland's Northern Macadam TSDC.

#### *VC Mechanism*

The mechanism discussed in this section is an IF within a service area called "overlay" in the context of Oregon's TSDC. The project is from the 10-year CIP.

#### *Background*

The city of Portland first adopted a Citywide System Development Charge for Transportation by Ordinance 171301, effective July 18, 1997. The purpose of the charge was to support a prioritized list of multimodal capital investments from the 10-year lists of capital improvements. The project included in this report is a corridor project, the Northern Macadam Project. It includes six projects whose total cost (low confidence level) is estimated at \$194.5 million, of which \$32.9 million is eligible for North Macadam TSDC overlay funding. The city of Portland also uses another citywide TSDC. The Macadam TSDC overlay project focused on developing a project list and TSDC rates for an overlay district that will charge special TSDC rates to development in North Macadam to be spent on high-priority transportation improvements in the North Macadam area. The TSDC overlay rates are in addition to the citywide TSDC rates. The projects include:

- SW Harbor Drive and River Parkway intersection improvements

- South Portal, Phase 1
- Moody/Bond Street Improvement: Gibbs to Sheridan (east leg of couplet)
- South Light Rail
- SW Kelly Way/Hood Avenue ramp improvement (South Portland circulation)
- North Portal: SW Corbett and Sheridan Street improvements.

#### *Legal Authority*

System development charges for transportation, sewers, or other infrastructure are authorized by ORS 223.297–223.314 (<http://www.portlandoregon.gov/transportation/46210>). Portland's TSDC was the first multimodal TSDC, allocating project costs among motorized vehicles, transit, and non-motorized (bicycle and pedestrian) trips (City of Portland 2009). Oregon's System Development Act requires that SDCs be based on an adopted CIP.

#### *Local Partnerships*

The key developers include:

- Developers (beneficiaries) and
- City of Portland (initiator).

#### *Implementation Considerations*

Many implementation considerations listed in this section are interconnected. The city of Portland conducts feasibility assessments/studies of rates and revenues. The important considerations in this case example include:

**Levy Basis and Eligible Projects:** For the city of Portland, the TSDC fee-generated revenues are vital to funding projects. These fees are one-time assessments on developers of new development based on the number of vehicle trips the developments are forecast to generate. The fee basis is the new development building permit issued to the developer and is based on trips only to and from the development. The rates are based on required infrastructure capital costs to accommodate the additional trips the development creates. Generally, about one-quarter of a project's cost may be paid for by TSDC revenues. The remainder of the project cost is paid with other revenues, in part because a portion of the needed investments addresses existing transportation needs, and transportation infrastructure is not one of them. A development that is part of the North Macadam overlay has to pay both the citywide TSDC and the North Macadam TSDC. The rate-setting process is such that it reflects the multimodal nature of trips generated from a site. The evaluation procedure for projects to be funded based on SDCs in Portland is based on a two-tier scale. The first is a minimum qualification criteria list set followed by a more exhaustive set based



TABLE 7  
CITY OF PORTLAND EVALUATION CRITERIA

Evaluation Criteria	Evaluation Subcriteria
<b>Criteria Set A: Projects are required to meet Criteria 1–3 to be considered for TSDC</b>	
1. Support bicycle, pedestrian, and/or transit modes (i.e., add capacity, improve access, improve connections, remove bottlenecks, fill in missing links)	a. Accommodates increased density b. Supports mixed-use development c. Supports 2040 Growth Concept land-use components d. Improves connections and access from neighborhoods to employment and industrial areas e. Fills a gap f. Improves safety
2. Improve movement of freight and goods	a. Reduces conflicts between freight and nonfreight uses b. Provides access to intermodal terminals and related distribution facilities c. Fills a gap d. Improves safety e. Supports emergency services
3. Reduce congestion, improve access, and/or Circulation	a. Benefits to community/economic development b. Among business districts c. To and within activity centers d. Fills a gap e. Improves safety f. Supports emergency services
<b>Criteria Set B: If one of Criteria 1–3 are met, the additional criteria 4 and 5 are used in evaluation</b>	
4. Community and business priority	a. Priority expressed by neighborhood and business interests b. Addresses equitable geographic distribution of projects
5. Strong potential leverage	a. Amount and likelihood of potential funding from other sources

Source: Update on TSDC, <http://www.portlandoregon.gov/transportation/article/313028>.

on Table 7. The legislation is clear on how TSDC charges can be used for all modes, as is implicit in the rate calculations. The city also periodically revises its rate structure.

Permits for a new development or redevelopment project must generate more than 15% of new transportation trips to the site and meet certain other criteria to be assessed a TSDC. The TSDC total is then determined by multiplying the number of projected additional trips by a rate set for the proposed land use.

The North Macadam example charges for the 2013–2014 rates (for new developments) are listed here and have built splits for motorized transport (75%), transit (12%), and non-motorized transport (13%), developed using the process shown in Figure 22:

- Single-family residential: TSDC charge per unit of \$2,529.
- Multifamily residential: \$1,793.
- Commercial hotel/motel: \$2,251.
- Commercial service station: \$14,067.
- Commercial bank: \$26.
- Commercial restaurant drive-thru: \$46.83.
- Commercial retail: \$5.09–\$57.39.
- Commercial institution: \$2.84–\$475.
- Truck terminals: \$24,300.

**Timing and Collection of Revenues:** The revenues are one-time assessments. They are collected on an ongoing basis when permits are issued in the construction area.

**Revenue Performance:** In 2007, the citywide TSDC program had collected an estimated \$44.7 million to help pay for 70% of the projects on the 1997–2007 TSDC project list. With extensive public input, the city identified a list of growth-oriented, multimodal transportation improvement projects to guide the spending of TSDC revenues over the 10-year duration.

This particular TSDC application was developed in 2009. According to the city, this TSDC has been successful in contributing \$10 million toward street networks and light rail (Portland Milwaukee Light Rail). The actual revenues of this overlay for the year 2010–2011 are not known.

**Equity, Sustainability, or Livability Incentives/Credits:** The TSDC program adopted by the city provides built-in incentives to encourage transit-oriented development, affordable housing, and small-scale development through TSDC discounts and exemptions. These tend to reduce revenues from system development charges (City of Portland 2007). Multimodal consideration and basis allow an equitable distribution of project funds. The credits are noted to be a positive incentive for developers.



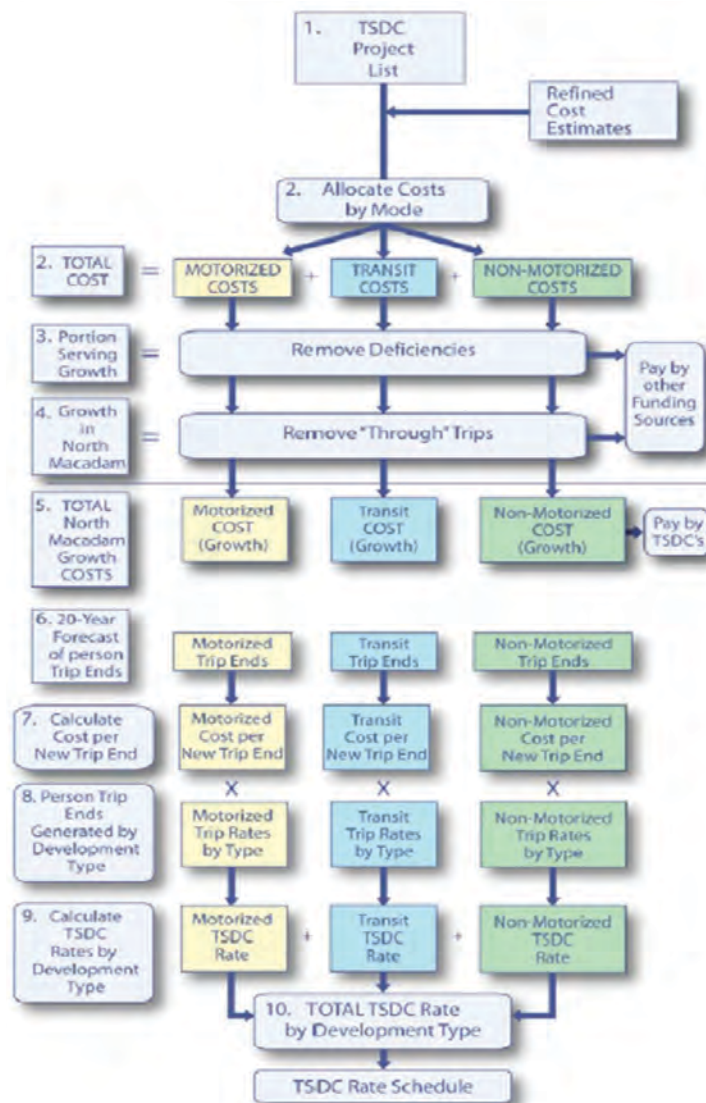


FIGURE 22 North Macadam TSDC rate-setting protocol. (Source: City of Portland, <http://www.portlandoregon.gov/transportation/article/338700>.)

**TSDC Reductions:** TSDCs cannot double dip (i.e., they need to take into account the payment by new development of other fees, taxes, and such that the government uses to pay for the capital cost of the same public facilities). These other revenues are accounted for by subtracting them from the cost of capital improvement projects that are attributable to SDCs. The adjustment includes only the taxes, fees, and such that are earmarked for or proratable to the same capital improvements that are the basis for the SDC.

Portland uses general transportation revenue, grants, and funding from other local, state, and federal sources to pay for portions of its transportation improvement projects. Portland's TSDCs take into account future use of general transportation revenue, grants, and other funding by subtracting city-budgeted commitments for those revenues from the cost of projects in the TSDC Capital Improvement Program. In addition to the adjustment described previously, a developer

who contributes land, improvements, or other assets receives a credit for qualified public improvements that reduces the amount of SDC due.

**Uses of TSDC Revenue:** SDC revenue can be used for the capital cost of public facilities. SDCs cannot be used for operating or maintenance expenses. The costs of capital facilities that can be paid for by TSDCs are specified in Portland's City Code 17.15.100.

**SDCs and Impacts of Development:** When determining SDCs, governments generally take the following four factors into account:

- **Demand (impacts)**—Demands placed on public facilities vary among different types of development. The city of Portland TSDC is based on the number of trips generated on the transportation system by each type of

development. Portland's TSDC is based on trip generation rates reported nationally by the ITE and mode of travel data from the Portland area. Portland's City Code 17.15.070 allows developers to submit data and analysis to demonstrate that the impacts of their proposed development are less than the impacts used in this rate study. For the city to accept alternative (reduced) impacts, those impacts must be permanent and enforceable (i.e., through land use restrictions, deed restrictions, lease terms, etc.).

- **Benefit criteria**—Benefit criteria include personal use and use by others in the family or business enterprise (direct benefit), and use by persons or organizations who provide goods or services to the fee-paying property (indirect benefit). Portland's TSDC is based on the number of trips generated on the transportation system by each type of development, which includes some direct benefit trips and some indirect benefit trips. By basing the TSDC on the number of trips, the TSDC is related to the impacts generated and benefits received by the development.
- **Levels of service**—The city of Portland determines its needs for transportation facilities by reviewing a variety of factors, including the volume of traffic and levels of congestion on major roads.
- **Size of development**—SDCs are typically charged on the basis of the size of the development (i.e., number of dwelling units or number of square feet of development). Portland's TSDC rate schedule lists the TSDC amount per unit of development (i.e., dwelling unit or square foot). The size of each proposed development is multiplied by the TSDC rate per unit.

**Revenue Projections, Duration, and Boundaries Zones (or Overlays):** In 2008, stakeholder input led staff to recommend a TSDC overlay rate projected to collect \$18 million over 20 years. System development charges use an overlay area (or area of impact) to levy charges. Although the actual criteria used for the development of the overlay are not known, the overlay area appears to be based on new developments and redevelopments within a reasonable distance of the proposed projects (Figure 23).

**TSDC Benefits:** TSDC funds are used to leverage federal, state, and other available funds to get maximum value from the investment—sometimes attracting as much as 85% of a project's cost from other sources. As a result, the total value of projects completed so far is nearly \$119 million.

**Stakeholder Involvement:** The city has an active community participation framework, which includes all stakeholders, such as business leaders and local community members. It also has a very transparent process in rate development with respect to equity across modes and across income classes. Garnering public support can be a barrier. Portland had an extensive public input process required to move forward with the process.

**Administrative Feasibility:** Initial levels of investment in management and transactions costs associated with administration of TSDCs are high.

#### *Applicable Modes (Multiple), Rates, and Evaluation Criteria*

The city of Portland TSDCs are designed to support the principal modes of travel in a multimodal system. For the purpose of organizing and analyzing data that support the TSDCs, the city identified three categories to encompass different modes of travel:

- **Motorized:** automobile, truck, and motorcycle travel but not bus or railcar travel.
- **Transit:** rail and bus travel.
- **Nonmotorized:** pedestrian and bicycle travel.

The mode-based evaluation criteria used by the city are designed to meet "rough proportionality" rules and are applied for all growth-related capacity additions and improvements, including Intelligent Transportation System additions; they are shown in Table 7.

#### *Applicability to Other Regions*

This example requires enabling legislation. In this case, the enabling act was the TSDC Act, and the city of Portland issued an ordinance to adopt a citywide SDC.

#### *Applicability to Other Project Types*

A recent study conducted for the Oregon DOT explores the potential of SDCs in the context of funding Oregon DOT's interchange and access management through the practice of preparing an Interchange Area Management Plan; such a plan is required for all new interchanges and developed collaboratively with the local government (Strathman and Simmons 2010). Strathman and Simmons note that SDCs had been adopted in North Ontario, under a resolution passed by the city council in July 2006 (*Resolution #2006-129, A Resolution Establishing Fees and Charges for System Development Fees for the City of Ontario*). The resolution laid out a schedule for transportation SDCs based on the ITE land use code per unit of development.

#### *Website for Project*

Update of TSDC—2007 at <http://www.portlandoregon.gov/transportation/article/338700>.

North Macadam SDC at <http://www.portlandoregon.gov/transportation/article/386066>.



FIGURE 23 North Macadam overlay or area of TSDC charges. (Source: City of Portland, <http://www.portlandoregon.gov/transportation/article/386066>.)

### Texas Transportation Reinvestment Zones— El Paso Improvements, Texas

#### Facility Name

The facilities discussed in this section are the El Paso Comprehensive Mobility Plan corridor improvements.

#### VC Mechanism

The mechanism adopted in this example is the TRZ, which is related to tax increment finance but differs in important ways. The mechanism is adopted as part of a loan financing strategy and a way to leverage other federal and state funding sources.

#### Background

The Texas DOT El Paso District actively started exploring the applicability of innovative financing mechanisms to complement traditional transportation funding sources and meet pressing infrastructure funding needs of projects in the comprehensive mobility plan (CMP) for the region. In December 2008, the city of El Paso established a TRZ to set up a revenue stream adequate to support an obligation for the projects identified in the 2008 CMP. In 2010, the city of El Paso revisited the original study. The special features of this example are:

- The use of an increment-based mechanism for funding transportation projects by a local government process made possible by the state.



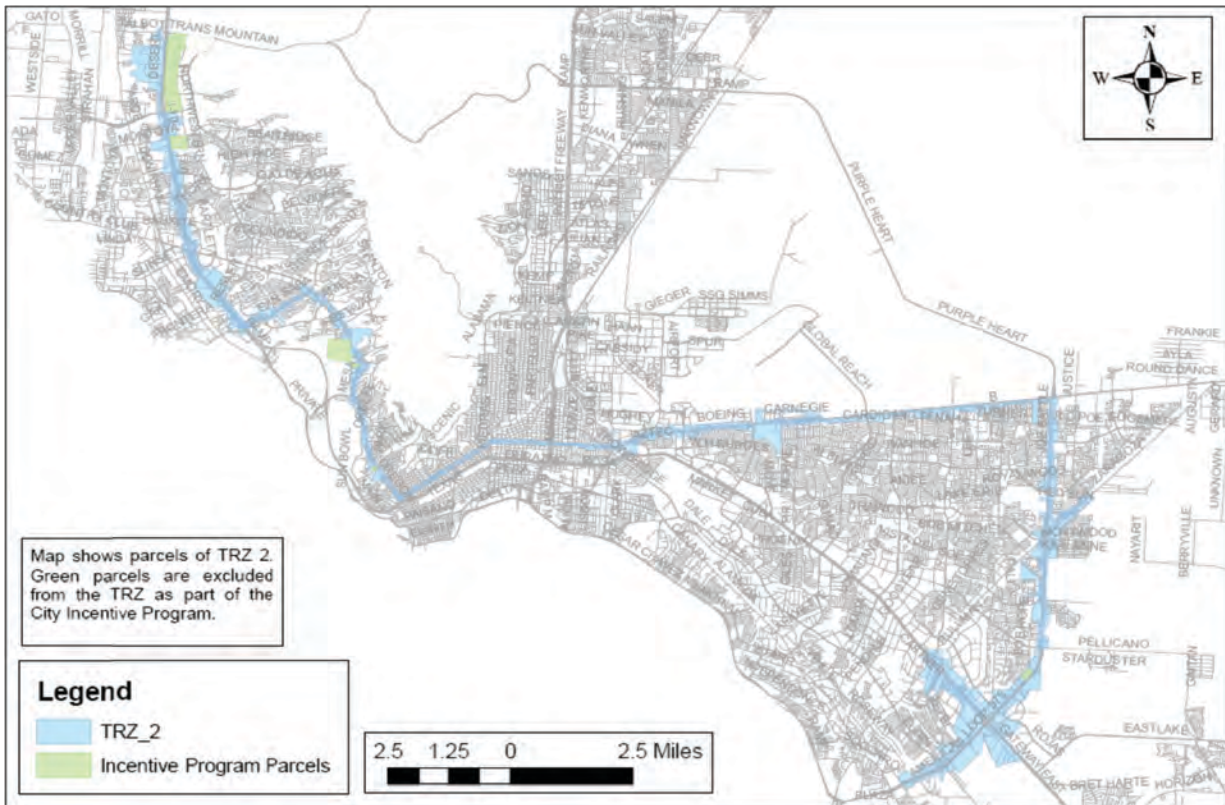


FIGURE 24 Map of proposed TRZ corridors (TRZ 2), El Paso, Texas. (Source: Vadali et al. 2010b.)

- The use of tax increments that are negotiated with the local entity.
- The use of corridor-based projects that are part of the metropolitan planning organization comprehensive long-range mobility plan for the region.
- The use of a state infrastructure bank (SIB) loan.
- The combination of several types of funding sources.

The value-creating proposed improvements include interchange improvements, new connections between existing roadways, new roadways, safety and pedestrian access improvements, and aesthetic and transit improvements in the corridors shown in Figures 24 and 25.

The TRZ 2 primarily focuses on two projects:

- Loop 375 at FM 659 (Zaragoza).
- Loop 375 at I-10/Americas Interchange.

The TRZ 3 focuses on just Loop 375 Northeast.

### Project Funding

Total project cost for one project, the I-10/Americas Interchange, is noted as \$146 million. The funding provided by the TRZ 2 was part of a local match that includes federal and

state dollars, as well as American Recovery and Reinvestment Act (ARRA) funds. The project funds were:

- ARRA, \$96 million.
- SIB loan, \$30 million at 4.95% interest rate. The TRZ 2 funds are being used to repay the SIB loan.
- Coordinated border infrastructure funds, \$15 million.
- Texas DOT, \$5 million (Camino Real Regional Mobility Authority 2010).

### Legal Authority

Texas HB 563 provides for the institutional framework present in the TRZ. Two TRZs (TRZ 2 and 3) were adopted by local ordinance 017332, El Paso, Texas, in 2010 through a public hearing. The El Paso TRZs are tax increment TRZs in that only property-tax-related increments are used. The legal provisions also allow for the establishment of the same TRZ as STDs in specific cases. There have been no applications of sales tax within TRZs. According to the law, TRZs require all or a portion of the local entity portion of increments to be set aside for the purpose of transportation. TRZs do not impose new taxes. They also do not involve other taxing districts, such as schools and hospitals. The mechanism is applicable only to roadways that are on the state highway system.

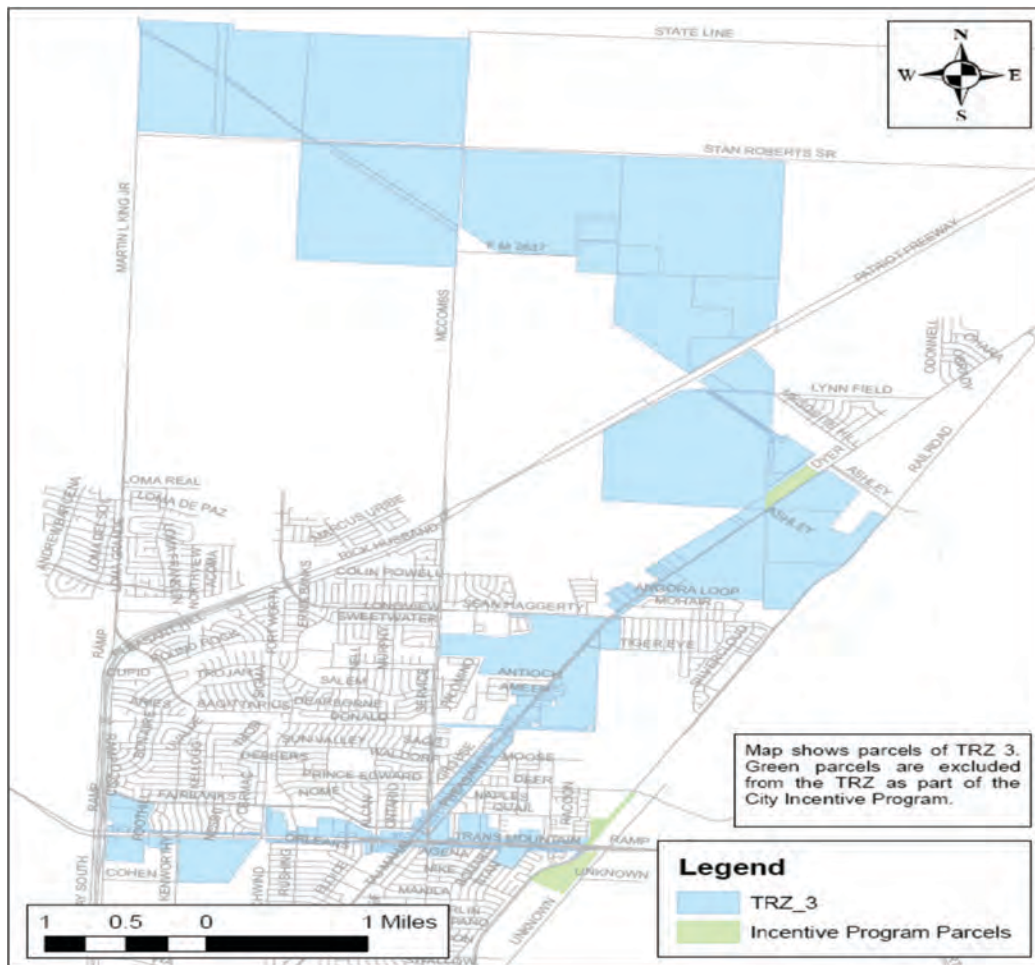


FIGURE 25 Map of proposed TRZ corridors (TRZ 3), El Paso, Texas. (Source: Vadali et al. 2010b.)

### Local Partnerships

The local partners include:

- City of El Paso, Texas (initiator).
- Camino Real Regional Mobility Authority (CRRMA).
- El Paso Metropolitan Planning Organization (through the CMP evaluation and assessment).
- Texas DOT—El Paso District.
- Local property owners (beneficiaries and share in increment).

### Implementation Considerations

Many implementation considerations listed in this section are interconnected. Many of these factors are determined through feasibility studies conducted early in the process, as noted by the agency. The important considerations in this case example include:

**Boundaries and Equity Considerations:** The law lays down contiguity requirements for boundaries and explicitly

notes that contiguity needs to be maintained for zones. When individual units/entities exist within the boundaries that may break the boundaries owing to exempt status or other privilege, they are included in the boundary but excluded from payments. Another requirement that this TRZ and all other TRZs have is to maintain within their boundaries a record of all active preexisting financial commitments through other economic development tools, such as tax increment finance or tax abatement districts. When a boundary includes any of these existing other economic development tools, the TRZs are required to exclude them from all financial commitments so as not to double dip. Although this reduces the revenue potential, it is an equity-preserving feature.

Equity is also preserved through the use of surpluses of revenues (after financial obligations for CMP projects are met) for transit, through the provisions of consideration of unproductive land in the corridors, through the requirement to meet safety needs, and through the requirement to facilitate development within the zones.

In the case of the El Paso project, the TRZ 2 boundary consists of five separate corridors but contiguous boundaries.



The boundaries are developed based on proximity and revenue/cost consistent distances as well as provisions within the code that make it difficult to remove property once adopted. The TRZ 3 comprises three separate contiguous boundaries. The two TRZs together include approximately 10,000 acres of land.

**Levy Basis and Duration:** The mechanism is such that the levy basis for capture of value occurs through the existing tax rates of the jurisdiction that initiates the TRZ, which could be the municipality, the county, or both jointly. The process does not issue new taxes or new fees but works through the existing property tax rates. The estimated tax increment is developed, and municipalities voluntarily agree on a sharing of a percentage of increment (maximum of 100%) for a set duration to meet project obligations.

The duration in this case is set at 30 years, starting in 2010 and using a 100% increment sharing agreement between the city of El Paso and the regional mobility authority. The base year set for tax increment purposes was the 2010 appraised taxable base. There is no additional levy. The levy basis is considered to be the base year assessed taxable value on an ad valorem basis.

**Timing and Collection of Revenues:** The revenues were collected from year 2011 onward prior to construction.

**Risk Considerations:** Default clause arrangements were built in dealing with revenue shortfalls with the local entity (city) such that the city would balance any shortfalls in increment-based portions of the loan repayment. The cost of Loop 375 at FM 659 (Zaragoza) is noted as \$32 million. The funding package includes \$12 million of State Category 2 (Metropolitan and Urban Corridors Funding) funds and \$20 million from TRZ 2 revenues. The TRZ will not generate funds for infrastructure right away, much like every increment mechanism. The increments trickle in over the lifetime of the district. Because construction costs are incurred earlier in the process relative to increments, the partnering local government/entities had to find ways to pay for the up-front costs of any initial improvements. In this case, the regional mobility authority had access to other funds, including an SIB loan.

**Revenue Performance:** The impact of TRZ 2 and 3 was \$641,132 for the fiscal year 2012 budget based on a property valuation base of \$97.4 million, with actual revenues exceeding the forecasts. TRZ 2 alone was \$575,426.

**Stakeholder Involvement:** The city's support through increment sharing and other agreements made the process of using the TRZ possible. The method of voluntary contributions implicit in the concept can be developed in a revenue-consistent manner or in proportion to cost. Some of these may be addressed as part of feasibility studies.

## *Lessons Learned*

Some of the important lessons reported by interviewees include:

- The TRZs include substantial acreage with undeveloped land in comparison to traditional TIF. Because land development is speculative, the CRRMA chose not to issue debt but instead took a loan. The city's good financial ratings allowed the CRRMA to obtain a low interest rate for the loan and Build America Bond subsidies.
- The presence of existing financial precommitments through other tax-increment agreements and abatement programs is a positive factor in the TRZ development; too many precommitments will reduce the ability of TRZ to generate increments. These financial commitments must all be considered at the time of establishment.
- The TRZ is a good source for local matching funds. It is still dependent on the economic climate and can be valuable as a complementary source of funds. It is important that alternative methods be investigated for maintenance and operations.

## *Applicable Mode(s)*

The applicable modes include

- Highway projects, such as in this example,
- Transit projects through use of surplus funds,
- Safety, and
- Transit.

## *Website for the Project*

The website for the project is <http://www.crrma.org>.

## *Project Contact*

The project contact is Texas DOT.

## **Mercer County Impact Fee, New Jersey**

### *Facility Name*

The facility discussed in this section is the I-95/295 corridor, Mercer County, New Jersey.

### *VC District*

The mechanism discussed in this section is the TDD.

### *Background*

In late 1988, faced with significant development pressure in a relatively undeveloped area, Mercer County initiated a study

aimed at determining the appropriate intensity of development and effectuating the necessary infrastructure improvements. This process involved a cooperative effort between the county, municipalities, and landowners. This led to an infrastructure impact analysis study conducted for the Mercer County I-95/295 Corridor, which formed the basis for the TDD application, and the TDD was approved by DOT Commissioner Thomas Downs on April 2, 1990.

The overall goal of the TDD was to manage growth and coordinate and finance transportation infrastructure improvements in a regional growth area. The transportation goals were to:

- Maintain acceptable traffic flows:
  - Encourage transportation-efficient land use.
  - Recommend appropriate zoning and other regulatory changes.
  - Identify needed roadway improvements.
  - Encourage travel demand management.
  - Develop access management plan for district.
- Protect quality of life for existing residents:
  - Reduce through traffic in existing residential areas that border the district.
  - Develop an integrated system of roadway improvements orienting district traffic away from existing residential areas that border the district.
- Make alternatives to single-occupancy autos more attractive:
  - Explore mass transit alternative.
  - Provide opportunity for bicycle and pedestrian activity.
- Encourage participation in the transportation management agency.

Public-sector costs for several highway improvements are distributed among the state, Mercer County, and Ewing, Hopewell, and Lawrence Townships. The appropriate costs are based on existing and anticipated roadway jurisdictions. Public-sector costs for those improvements that are to be funded through the TDD Trust Fund were noted to be as follows:

- New Jersey DOT = \$11,583,368,
- Mercer County = \$6,191,818,
- Ewing Township = \$1,993,773,
- Hopewell Township = \$700,527, and
- Lawrence Township = \$153,669.

### *Local Partnerships*

The local partners include:

- Townships (Ewing, Hopewell, Lawrence) and Mercer County (initiators).
- New Jersey DOT (initiator through the JPP).
- Development community (beneficiaries).

### *Legal Authority*

The Transportation Development District Act of 1989 P.L.1989, c.100 (C.27:1C-1 et seq.) provides for the assessment of fees for off-tract transportation improvements. It allows counties, in cooperation with the New Jersey DOT and the private sector, to establish TDDs in high-growth areas. These districts form the backdrop for a PPP to fund and implement transportation improvements necessitated by growth. The act was approved in 1990 and required a JPP to be in place in its amendment. The law requires that a fee formula be established that assesses developers for their fair share of transportation improvements and that developers are able to know or calculate their fee based upon the plan. The JPP met 12 times throughout the process, commencing on May 8, 1990, and concluding on November 1991. Under this law, counties in cooperation with New Jersey DOT may establish TDDs to assess development fees for transportation improvements.

### *TDD Ordinances*

The Mercer County Board of Chosen Freeholders adopted local ordinances 92-17, 94-19, and 97-1. The ordinances require the establishment of a trust fund, and any fees not committed to a project within 10 years are to be reimbursed to the developer.

### *Implementation Considerations*

Some of the key implementation considerations include:

**Boundaries:** The service area was approved in 1990. This is shown in Figures 26 and 27. The TDD is generally bounded by Pennington–Washington Crossing Road (Route 546) to the north, Federal City Road to the east, and Upper Ferry Road to the south, and the western edge includes lots west of Scotch Road.

**Duration:** The horizon year for the planned improvements was 2010, with a 20-year planning horizon from a base year of 1990.

**Joint Planning Process/Local Partners:** The JPP required by the legislation ensures that the opportunity for participation in the planning process is afforded all levels of government and the private sector. There were several members of the JPP, including New Jersey DOT; New Jersey Transit Authority; Mercer County Planning; Mercer County Engineering; the townships of Ewing, Hopewell, and Lawrence; and private sector partners.

**Levy Basis and Equity:** The TDD law establishes a framework for the assessment and collection of IFs for district improvements. The TDD law states that development fees must be based on a cost-sharing formula and reasonably

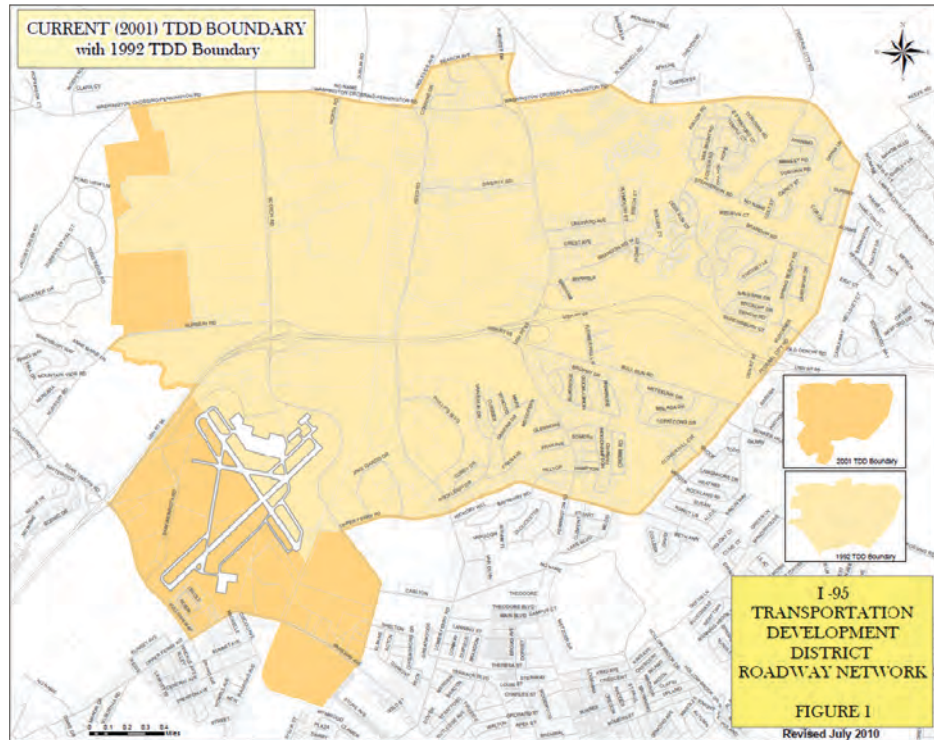


FIGURE 26 Mercer County, New Jersey Transportation Development Districts. (Source: Mercer County Planning Department, personal communication.)

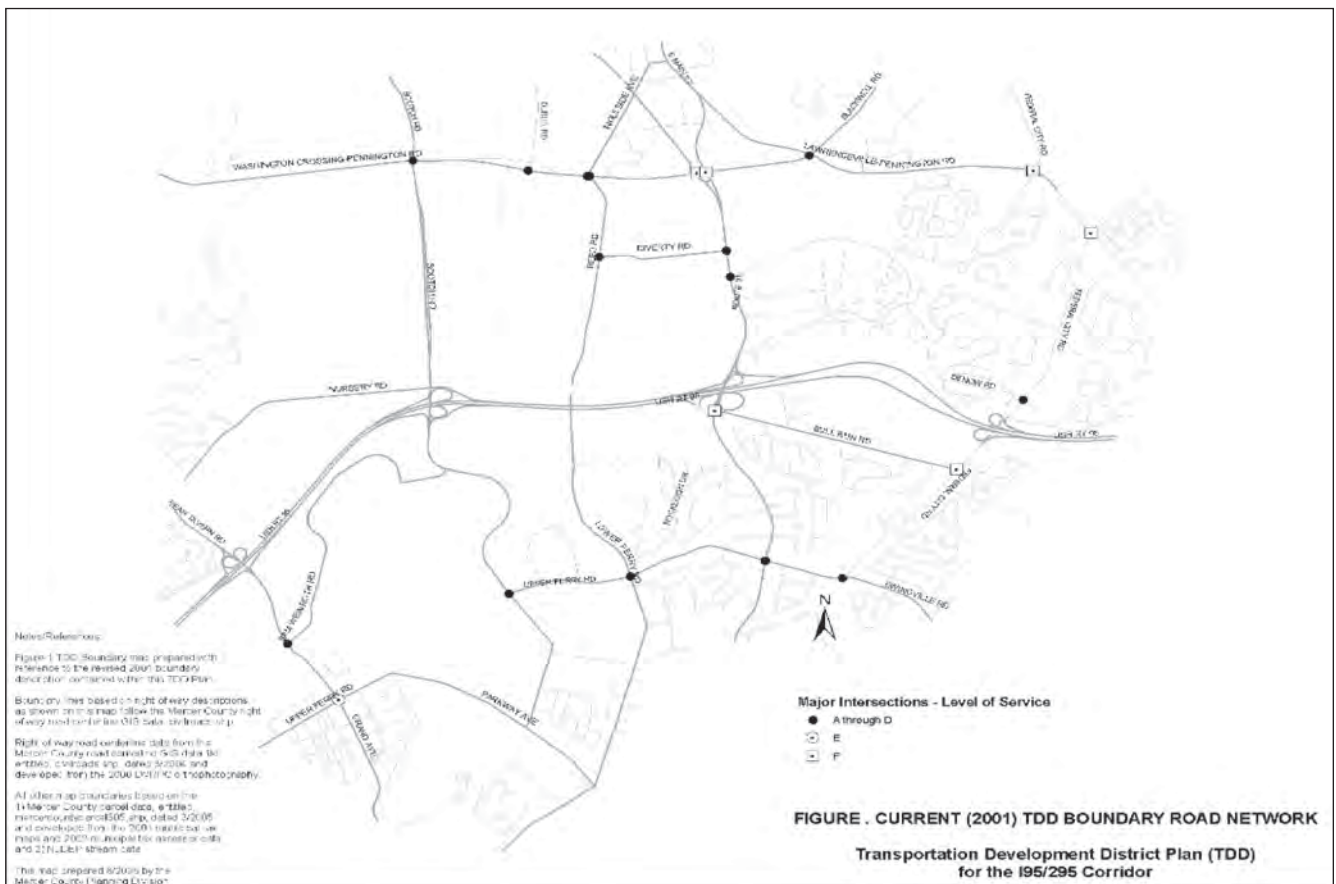


FIGURE 27 Mercer County, New Jersey Transportation Development Districts Road Network. (Source: Maps shared by Mercer County Planning Department.)



related to the added traffic growth and other criteria attributable to a particular development. Therefore, savings that accrue to one developer as a result of these exclusions cannot be distributed to the district. These costs, then, must shift to government. The JPP exercises oversight on the fee structure.

Exclusions were made for low- and moderate-income housing units; developments with preliminary approval pre-dating the development assessment liability date; savings associated with successful trip reduction mechanisms; and specified beneficial or neutral impact land uses. The first two exclusions are required by law, whereas the last two are permitted by law. Costs for these exclusions were calculated as if they were to be paid by the developer, but the cost was added to the government share, rather than the developer share.

This method was expected to simplify plan maintenance and ensure that developers are not paying more than their fair share. The levy basis is a per-trip fee that is set for the entire subdivision at the time the development receives approval from the municipal approval authority. Fees are deposited in the TDD fund, which is overseen by the county treasurer. Trip reduction credits are applicable for trips during the peak hour when guidelines for flex hour/staggered work hour schedules are specifically developed.

**Revenue Performance:** The Mercer County share of public improvement costs was the highest local share at approximately \$6 million, and it has been paid in full.

### *Lessons Learned*

Some of the key lessons as derived from project documentation and based on interviewees.

- The development of this plan was a collaborative effort through formation of the required JPP.
- The equity provisions are built into the law and in implementation through credits.
- The TDD must have a plan of development and be consistent with other land use and development plans, as is true in this case.
- The TDD process is long with legal hurdles. TDDs are high in transactions costs.
- The allocation of planning costs needs to be clear because the TDD does not allow planning costs to be included.

### *Website*

The project website is <http://nj.gov/counties/mercer/departments/planning/transport.html>.

### *Project Contact*

The project contact is the Mercer County Planning Department.

## **DISTRICT OR AREAWIDE MECHANISMS (PROGRAMMATIC APPROACHES)**

### **Michael A. Fox Highway—Ohio, Butler County Transportation Improvement District**

#### *Facility Name*

The facility discussed in this section is the road improvement on State Route 129 (Michael A. Fox Highway), Ohio.

#### *VC Mechanism*

The mechanism discussed in this section is the district or areawide SAD.

This example showcases a unique venture just for innovative financing for road improvements and a first in many categories in the country. The Butler TID started out with a single project but used an areawide concept for funding and financing of the project. This soon paved the way for the consideration of other transportation needs in the county. Although this Ohio TID and other TIDs in Ohio are primarily project-driven, the approach taken is areawide and programmatic and thus included in this section. In addition, the sales tax revenues were used to back SIB loans.

#### *Background*

The Butler County project was initiated in 1971 and corresponds to the Butler Regional Highway. Limited state and federal funding led to Ohio's search for alternatives for building and improving roads. The Butler Regional Highway Project was also one of the first FHWA Test and Evaluation (TR 045) projects. As a result of the Butler TID's performance, the state law was changed in 1995 to allow all counties in Ohio to establish their own TIDs. The Butler County TID (BCTID) is also a national model. It is the first organization in the United States to receive funds from Ohio's SIB, a practice that was then adopted in other projects in the county. This TID is the largest TID in the region. The same concept has been used in at least nine other projects besides SR-129.

SR-129, or Michael A. Fox Highway (Figure 28), is a four-lane, limited-access, divided highway connecting the city of Hamilton to I-75 through Fairfield and Liberty Townships. This 10.7-mile project begins at the former SR-129/SR-4 intersection in Hamilton and runs east between Princeton and Hamilton-Mason Road. Interchanges are located where the highway meets I-75 and at Bypass 4, SR-747, and Cincinnati-Dayton Road.

Construction of this highway began in May 1998. With only 19 months of construction, the highway opened December 13, 1999, 8 months ahead of schedule. Route 4 to Hampshire Drive in Hamilton and Cincinnati-Dayton Road to I-75 opened in





FIGURE 28 State Route 129, Butler County, Ohio.  
(Source: Butler County TID, <http://www.bctid.org>.)

October 1999. Table 8 shows the project timeline. The TID is defined as an entity seeking “to bring local units of government together as one to share powers, create revenues to fund and build transportation projects and associated facilities” (Butler County TID). It coordinates federal, state, and local resources in planning, building, financing, and operating transportation

budgets. A TID is a special district—a unit of government organized for a geographic area to find innovative and alternative funding for improving the existing transportation system. Some of the features include:

- The area of a TID can include the entire county or a portion of the county.
- A TID is a vehicle for intergovernmental and public–private collaboration.
- A TID is a local structure coordinating federal, state, and local resources in planning, financing, constructing, and operating transportation projects.
- A TID can be created only by the county commissioner.

#### *Local Partnerships*

The local partners are:

- Local developers (with \$7 million in contributions).
- BCTID consisting of partnership with local landowners (with \$17 million in contributions). No state or federal money was involved.
- County commissioners who authorized the TID (county—initiator).
- Landowners (beneficiaries).

TABLE 8  
STATE ROUTE 129, BUTLER COUNTY TID TIMELINE

Year	Event
1959	Petition for interchange.
1968	Ohio bond issue approved. Butler and Hamilton Counties appealed for access to interstate highway.
1970–1972	Project announced by Governor Rhodes for \$28.6 million in the hope that it would open up areas. Michael A. Fox Highway journalized. Cost \$34.7 million.
1979–1981	Butler and Warren Counties contributed funds when state funding was threatened. Contract awarded to complete the environmental impact statement (EIS). 25% local funding, 75% federal funding.
1988	Decision made to terminate the project at I-75. Revisions were made to EIS regarding traffic. City of Hamilton and Butler County agreed to continue study using 100% local funds.
1993	The Ohio General Assembly established the Transportation Improvement District Program under House Bill 154 and Ohio Revised Code Section 5540.02. Public hearing, and in October the TID was established.
1994–1995	Final EIS with a relocation alternative. Record of decision made in 1995. The Michael A. Fox Highway is the first innovative financing project in the nation approved by the FHWA.
1996	TID receives first SIB loan in the nation for \$10 million. The Ohio DOT and the TID sign the lease agreement for the Michael A. Fox Highway. Under this lease agreement, Ohio DOT agreed to pay for the construction costs of the highway, and the TID agreed to maintain the highway for 20 years and complete much-needed improvements to local roads. The improvements included the construction of the Union Centre Interchange, the widening of State Route 747, and the extension and widening of Muhlhauser Road.
1997	TID receives second (\$10 million) and third (\$15 million) SIB loans. Sale of \$158.5 million in Butler County TID highway improvement bonds to pay for construction. TID becomes the first entity to repay SIB loans.
1998	Kokosing Construction awarded the contract along with two other companies, including Resource International. May 1998: TID Board of Trustees passed a resolution authorizing the study of tolls to pay for the TID’s obligations outlined in the lease agreement with Ohio DOT.
June 1999	Tolls removed. Ohio DOT agrees to maintain the highway and relinquishes TID of its obligations.
December 1999	TID opens Michael A. Fox Highway.

Source: <http://www.bctid.org>.

### *Legal Authority*

In response to increasing demands for such alternatives, the Transportation Improvement District Program was authorized by the Ohio General Assembly in June 1993 from legislation sponsored by former State Representative Mike Fox. Butler County's TID was formed by the Butler County Commissioners in January of the following year. Originally established as a demonstration project to test the TID concept, the BCTID is Ohio's first TID.

### *Implementation Considerations*

The implementation considerations include:

**Boundaries:** Countywide TID. It applies to all properties in the county.

**Duration:** It is still active and has supported several improvements beyond Michael A. Fox Highway. It was promised for 20 years.

**Levy Basis:** TID special assessments may be levied only once annually per lot or parcel at an amount not to exceed 10% of the assessable value of the lot or parcel assessed pursuant to a statutory method for determining fair market value. The board must determine the fair market value of the assessed property in the calendar year that the area is designated a TID. The fair market value is multiplied by the average rate of appreciation of the lot or parcel since that calendar year. The assessable value of the lot or parcel is the current fair market value of the lot or parcel minus the amount reflecting the average rate of appreciation.

One research report (Williams 2006) points out that the special assessment process in legislation is less effective than that available to local governments. As a result, TIDs have not been widely used, and instead, a variety of other methods have been used to structure financial packages for projects. In addition, TIDs have enabled the use of innovative construction methods that have resulted in cost savings. Examples include the ability to purchase excess property around locally funded interchanges that can be sold to offset project costs, advance acquisition or right-of-way, and lease agreements with Ohio DOT that served as a credit stream for bond payments.

### *Lessons Learned*

The lessons reported in the project documentation include:

- The TID is envisioned as a consensus-building exercise and process because it brings many stakeholders together. The TID ensures that there is consensus among all interested parties and that those who benefit also contribute their fair share.

- The project uses bond authority of a TID. Ohio TIDs are tax exempt and can issue tax-exempt highway improvement bonds to finance projects.
- The TIDs can leverage funds from other sources (federal, state, and local). According to several annual and financial reports of this TID, the TID notes that it has seen reductions in federal and state of Ohio dollars. In addition, the state also continued with restrictions on certain types of projects under the Ohio Transportation Review Advisory Council program. Thus, the TID took a progressive view on economic development in the region.
- The TID has been noted to have helped in three ways:
  - The TID is local and is therefore noted to be more responsive to community concerns and allows for consensus building. It has allowed the county to invest in transportation to lay the foundation for economic growth. With the oversight of several state and federal agencies, including the FHWA and Ohio DOT, the TID serves Butler County, two cities, and three townships.
  - The TID accelerates the development of road construction through concurrent design and engineering and expedited construction schedules.
  - The accelerated schedule for Michael A. Fox Highway eliminated 4 to 5 years from traditional schedules. The BCTID notes that it is saving \$8 to \$10 million on the cost of the highway, a \$158 million project.
- This project was the first Ohio TID in several ways. It was the first FHWA Test and Evaluation (TE 045 project), the first project for which the roadway was leased to Ohio DOT, and the first SIB loan project.
- The implementation of the infrastructure improvements required to support a TID such as the areawide BCTID for investments required a long-term vision and coordination among multiple public agencies.

### *Applicable Mode(s)*

This TID was set up for a highway project.

### *Website for Project*

The BCTID site is the website for the project: <http://www.bctid.org>.

### *Contact*

The project contact is Ohio DOT.

### **Ohio TID—Other**

#### *Facility Name*

The facilities discussed in this section are Ohio road improvements.

### VC Mechanism

The mechanism discussed in this section uses the areawide SAD.

### Other TIDs in Ohio (Districtwide or Areawide)

According to the Ohio Program Resource Guide (Ohio DOT 2013), TIDs were created to promote intergovernmental and public-private cooperation by coordinating resources in transportation projects. For the 2012–2013 biennium, the TID program provides or earmarks \$3.5 million each fiscal year to finance TIDs. In addition to providing funding, Ohio House Bill 114 now establishes a new process for TIDs in comparison to the old process established in the 1993 original code. As of fiscal year 2013, Ohio registered 16 TIDs, as shown in Table 9 and Figure 29. This section serves to highlight that TIDs have evolved since their original inception in 1995 for Butler County. Now, the TIDs are considered an institutional mechanism and a nonprofit agency that provides seed money through earmarks for highway projects.

### Legal Authority

Under the revised Ohio code (Chapter 5540), proposed projects will be considered based on their ability to address at least one of the following needs: economic development, safety, preservation, or capacity. The total amount of funding provided for each project is limited to 10% of total project costs or \$250,000 per fiscal year, whichever is greater. TIDs may cosponsor a project and individually apply for as much as \$250,000, as long as the combined amount does not exceed 10% of the project's total cost (Ohio DOT 2013). Ohio TIDs can also issue revenue bonds following the code to serve as the financing engine for local transportation improvement projects, primarily highway. A summary of TID projects and their funding through TIDs is provided here (Ohio DOT 2011; see Table 9). According to the Program Resource Guide, in fis-

cal year 2014, \$3.5 million is available to TIDs on a competitive basis. To be eligible for funding, a TID has to register annually with Ohio DOT. The earmark provides the seed money. Funding must be used for a specific project (or projects). Funding may be used for preliminary engineering, detailed design, right-of-way acquisition, construction, or other eligible project costs under certain circumstances. TID funds cannot be used for administrative costs (Ohio DOT 2013).

### Implementation Considerations

The implementation considerations include:

**Boundaries for Ohio TIDs:** All Ohio TIDs are meso scale or countywide, with the exception of Rossford, which is a municipal TID. County commissioners authorize all TIDs.

**Duration:** In principle, a TID would have a duration/expiration if it were provided for in the resolution from the TID as put forth by the county commissioner. For fiscal year 2014–2015, according to Ohio DOT, TIDs will be required to register with the Ohio DOT each year to be eligible for funding (that said, they could still exist at the county level and not register with Ohio DOT or receive funding). TIDs must now have a minimum program of projects, as follows:

- \$10 million+ within the past 8 years.
- \$15 million+ within any time frame (thus, if a TID completed a large project before 2005, it is still eligible).
- For new TIDs that are registering for the first time, a program of \$10 million+ going forward.

**Levy Basis:** Assessments based on the county portions of a tax.

### Applicable Mode(s)

Funding must be used for a specific project (or projects). Funding may be used for preliminary engineering, detailed

TABLE 9  
OHIO TRANSPORTATION IMPROVEMENT DISTRICTS AND HIGHWAY PROJECT FUNDING

Butler County (in millions)	Montgomery County	Warren County
Bypass 4—Millikin \$1.3	I-70—Ohio 202 \$10.2	I-75—Ohio 73 interchange \$4.4
Symmes Road \$8.1	I-70—Ohio 201 \$1.5	I-71—Mason-Montgomery \$25.5
Union Centre Interchange \$24.9	Kingsridge—Lyons Ridge \$6.3	Total \$29.9 million
Ohio 129 \$164.9	Austin Interchange \$43.9	
Ohio 747—Tylersville \$2.1	Byers Road \$12.2	
Ohio 747—Port Union \$3.9	Motoman Road \$2.2	
Muhlhauser Road \$9.3	Austin Landing \$16.3	
Lakota West Drive \$.3	Austin enhancement \$2	
West Chester Road \$2.9	Austin Landing Phase II \$14.1	
Bypass 4—Princeton \$2.3	Miami Township Trail \$.7	
Ohio 747—Princeton \$1.1	Medlar Road Trail \$1.2	
Ohio 747—Ohio 129 \$5.6	Multimodal freight \$19.8	
Liberty Way Interchange \$50.4	Dog Leg Road \$8	
Bypass 4 widening \$26.4	Mound Connector \$18.7	
Total \$303.4 million	Total \$155.2 million	



FIGURE 29 Ohio TIDs fiscal year 2012–2013. (Source: [http://www.dot.state.oh.us/Divisions/JobsAndCommerce/tid/Documents/2011\\_Nov\\_Registered\\_TID\\_Map.pdf](http://www.dot.state.oh.us/Divisions/JobsAndCommerce/tid/Documents/2011_Nov_Registered_TID_Map.pdf).)

design, right-of-way acquisition, construction, or other eligible project costs under certain circumstances. TID funds cannot be used for administrative costs.

#### *Website for Project*

The Ohio DOT Program Resource Guide (2013) is available at (<http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Documents/ODOT%20Program%20Resource%20Guide.pdf>).

#### *Contact*

The project contact is Ohio DOT.

#### **Bellingham–Transportation Benefit Districts, Washington**

#### *Facility Name*

The facilities discussed in this section are Bellingham, Washington, road and multimodal improvements.

#### *VC Mechanism*

The mechanism discussed in this section is the STD based on benefit districts. Other levies, such as vehicle registration fees, can be combined with this district to form a funding strategy.

#### *Background*

Transportation benefit districts are quasimunicipal corporations with independent authority, including the authority to impose certain taxes and fees—either through a vote of the people or city council action—for transportation purposes. These areawide TBDs are used to fund and finance the city's 6-year transportation improvement program projects. The Bellingham City Council formed Transportation Benefit District No. 1 on July 10, 2010. Bellingham Mayor Dan Pike originally proposed that the city council create the district to help provide dedicated funding for priority transportation needs within Bellingham. Washington has several TBDs, just as Ohio and Kansas have several TDDs. The TBDs are also used in conjunction with vehicle registration fees in the case of Washington.



### *Local Partnerships*

The local partners are

- City of Bellingham (initiator) and
- Buyers.

### *Legal Authority*

The formation of transportation benefit districts by cities is governed by RCW 35.21.225 and RCW 36.73, Bellingham Ordinance Number 2010-07-240.

### *Implementation Considerations*

**Boundaries (areawide):** The boundaries of the benefit district coincide with city boundaries and specification of the transportation improvements to be funded by the district. The district is governed by the members of the city council acting as district board of directors.

**Levy Basis and Duration:** The rate and periodicity of the fee is as follows:

- A \$0.002 cent sales tax.
- The district was effective July 2010, with an annual fee.

### *Applicable Mode(s)*

The Bellingham TBD is used for multimodal projects, such as (a) arterial pavement resurfacing projects in the city, (b) bikeway and sidewalks, and (c) transit enhancement projects as per RCW 36.73.015.

### *Websites*

Websites relevant to the project are:

- <http://www.mrsc.org/subjects/governance/spd/tbd.aspx#Bellingham>,
- <http://www.cob.org/government/tbd/index.aspx>, and
- [http://www.cob.org/web/legilog.nsf/0/87A22C2DC4F665A288257773007A20F7/\\$file/201007040.pdf](http://www.cob.org/web/legilog.nsf/0/87A22C2DC4F665A288257773007A20F7/$file/201007040.pdf).

### *Contact*

The project contact is Washington DOT.

### **Oregon's Transportation/Pavement Maintenance Facility Fee Program—Corvallis**

#### *Facility Name*

The facilities discussed in this section are located in the city of Corvallis, Oregon.

### *VC Mechanism*

The mechanism discussed in the section is the use of TUFs for funding pavement maintenance only.

### *Background*

In 1993, Corvallis was in a good position to provide adequate street funding, including pavement maintenance, at an average rating of 85 of 100. The city had the following funding sources:

- SDCs to provide extra capacity.
- Development requirements to provide adequate street and sidewalk infrastructure.
- State gas tax share that kept up with inflation.
- Property tax levy devoted to the street fund that was growing with assessed values.

However, since 1993, the purchasing power of state highway fund revenues has decreased owing to inflation. Measure 50 (1997) reduced property tax revenue, forcing the city to prioritize services.

Eventually, the city stopped using any general fund revenue for streets and furthermore transferred the property tax levy revenues to the general fund. At the same time, revenues declined, the burden on the street fund increased. In response to the declining street fund revenues, the city formed a task force to look at current transportation funding resources and assess the funding need. The task force came up with two funding options: a vehicle registration fee and a transportation maintenance fee (TMF). The city agreed to settle on the maintenance fee. The city worked to inform the public about the state of city streets and the need for additional investments (League of Oregon Cities 2008). The TUF, called a transportation maintenance fee, was passed in 2005. The funds are used for street reconstruction and overlays.

### *Legal Authority*

In most states, localities may levy taxes only if specifically authorized by state law, but they have blanket authority to charge user fees. Therefore, a TUF is typically collected as part of a unified municipal utility bill, rather than as an add-on to the local property tax bill. These cities have moved with the presumption that TUFs are fees for the provision of public infrastructure services similar to water and electricity. TUFs are adopted by local city ordinance.

### *Local Partnerships*

The local partners include:

- City of Corvallis (initiator) and
- Landowners (beneficiaries).

### *Implementation Considerations*

The implementation considerations include:

**Boundaries:** TUFs are areawide and involve the entire city.

**Levy Basis:** Residential users are charged a flat fee, whereas commercial users are charged based on trip generation rates in Corvallis. However, Oregon has several such applications (see League of Oregon Cities 2008), and the rate types vary from region to region. In some, they are similar to those of Corvallis, in others they are flat, and in yet others they are based on trip generation. In Corvallis, the fee was structured so that 75% of the revenue comes from residential users. The charge is collected on a monthly basis, much like a utility bill.

**Duration:** 2005—Sunset was programmed for 2011 originally. However, the city voted to continue it past 2011.

**Use of Revenues:** Revenue is invested only in the streets under city jurisdiction. With this mechanism, revenues cannot be used to construct new infrastructure to expand the transportation system or enhancements not directly related to improving or maintaining the condition of existing city streets. The revenue potential of this mechanism is modest (evaluated annually). Originally, the use of the revenue generated from the fee was strictly regulated, with about one-third going to pavement preservation activities (overlays) on arterial and collector streets and the other two-thirds being used to reconstruct portions of existing boulevards. From 2012, the revenue was set aside for pavement preservation activities on all streets (local, arterial, and collector). Street reconstruction will be supported by other revenue sources.

**Equity Considerations:** The rate basis is the way equity issues can arise and also be addressed in TUF implementation because the rates are estimated from generation or sometimes set at flat rates. Everyone is a beneficiary and pays for the service.

**Revenue Performance:** The TMF generates more than \$400,000 per year, and the revenue is dedicated to specific pavement maintenance projects. In the year 2006–2007, the revenue was \$408,000.

### *Lessons Learned (City of Corvallis, Portland)*

The lessons, as compiled from project documents, include:

- The funds from the TMF contribute to almost 50% of Corvallis' locally raised street fund revenue, which has helped the city bridge part of the street funding gap.
- The decision to adopt was made on an overall fiscal assessment of all revenue sources used by the city. This process started in 2003 for Corvallis City with recommendations made by panel in 2004.

- Obtaining stakeholder support is a lengthy process. The city conducted more than 20 presentations to business and community groups, such as Kiwanis and rotary clubs, to make their case (League of Oregon Cities 2008).
- The clear methodology, clear purpose, and clear rate structure may help with increasing stakeholder support and addressing equity concerns. In Corvallis, for example, only 75% of the revenue came from residential users. In Oregon City, for instance, residential customers are charged for maintaining local streets, whereas nonresidential customers are charged for maintaining arterials. Maintenance of collector streets is equally shared. In addition, the fee is based on the average number of trips by land use, based on trip generation rates established by ITE.

A similar Clackamas County experience demonstrated that the larger aspects of implementing the proposed TUF were the associated policy choices and public education required to implement the program (Springer and Ghilarducci 2004).

### *Applicability to Other Regions*

- At least 12 cities in Oregon use this mechanism: Ashland, Canby, Bay City, Corvallis, Eagle Point, Grants Pass, Hubbard, La Grande, Lake Oswego, Medford, Milwaukie, North Plains, Philomath, Phoenix, Talent, Tigard, Tualatin, West Linn, and Wilsonville. A few others are considering it.
- Clackamas County, Oregon, has been discussed in detail by Springer and Ghilarducci (2004). It is noted that local streets in unincorporated areas of Clackamas County are typical targets for deferred maintenance in favor of investments in higher functional classes. Several local facilities have degraded to such a poor level as to be impassable by motor vehicle traffic. The county worked with five local cities to develop a TMF for their jurisdictions. The participating cities included Oregon City, Milwaukie, Gladstone, Happy Valley, and Estacada. The county maintenance forces supply road maintenance services to these cities on a contract basis. Other cities within the county opted to not participate or had a city-based TMF program already in place. Clackamas County TUF policy targeted activities and services with a clear and direct benefit to roadway users and set aside eight core elements to represent the road maintenance program. Springer and Ghilarducci discuss a detailed three-stage process for developing rates.
- At least six cities in Montana also adopted this mechanism (Bozeman, Billings, Helena, Hamilton, Lewiston, Butte–Silver Bow). In Montana, the TUF is called a street maintenance fee. A few cities in Florida (including Port Orange) also use this mechanism).

## Websites

Relevant websites include:

- <http://www.apwa-wa.org/forums/OregonCities2007TUFReport.pdf>,
- <http://www.mdt.mt.gov/research/toolkit/m1/ftools/fd/tuf.shtml>,
- <http://www.corvallisoregon.gov> (Corvallis), and
- [http://www.mdt.mt.gov/research/toolkit/m1/casestudies/bozeman\\_cip\\_mt.shtml](http://www.mdt.mt.gov/research/toolkit/m1/casestudies/bozeman_cip_mt.shtml) (Bozeman).

## Harrisburg Land Value Tax, Philadelphia

### Facility Name

The facilities discussed in this example are transportation improvements in the city of Harrisburg, Pennsylvania.

### VC Mechanism

The mechanism discussed in this section is land value taxation or split-rate property taxation on land and buildings.

### Background

Pennsylvania is the one example where an LVT through a split-rate property tax has been implemented in the United States. Cities such as Harrisburg and Pittsburgh are often cited in the literature as examples of these applications (Center for Economic Studies 2012; Junge and Levinson 2012a). Some other states, such as Connecticut, are considering this type of taxation. A pilot program authorizing LVT in Connecticut was recently passed into law (House Bill 6706, Connecticut General Assembly 2013). According to Speirs (2010), 17 cities in Pennsylvania employ this mechanism, with Harrisburg being among the first to institute it. This tool splits the standard property tax into its two components of land values and building values. The tax rate is increased on the land part of the property and decreased on the building.

The city of Harrisburg, the capital of Pennsylvania, began gradually phasing in split-rate land value taxation in 1975. Since the introduction of a split-rate LVT, the mill rate on land has been gradually raised, while the mill rate on improvements has gradually decreased. The changes in the mill rates on land and improvements were revenue neutral; that is, they were intended to keep total property tax revenues the same while redistributing the tax burden. Initially, in 1975, the ratio of tax on land to tax on improvement was set at 1.4:1. In the 1980s, the city made split-rate LVT central to its economic development and land use mechanism and raised the land-to-improvement ratio to 3:1. The ratio was raised again in 1999 to 4:1 and again in 2002 to 6:1, where it remains today (City of Harrisburg 2005).

## Legal Authority

This policy has been credited to Harrisburg's former mayor, Stephen R. Reed. The actual implementation was adopted through local ordinance.

### Local Partnerships

The local partners include:

- City of Harrisburg (initiator) and
- Landowners (beneficiaries).

### Implementation Considerations

Some of the implementation considerations include:

Boundaries: Citywide.

Duration: The city ultimately wants to eliminate the tax on the buildings/improvements and turn the taxation into a pure LVT.

Levy Basis and Periodicity: The value of a property is split into (1) land, and (2) building and improvements. This is what makes it a split rate, with the land-to-improvement tax ratio being 6:1. It is levied annually (sometimes monthly) on those who own the title of the land. It has been continuously in place since 1975.

Equity Considerations: The LVT is considered a revenue neutral shift in tax base that does not lead to an increase in tax base. It can have positive or negative social equity implications. Its application in Harrisburg has been shown to have beneficial social and vertical equity effects.

Revenue and Performance Aspects: The tax revenues go to city development in infrastructures, public facilities such as schools and hospitals, and such. Thus, transport infrastructure receives a part of revenues. This research was not able to identify how or what revenues are allocated across competing city needs. The city has made \$4.8 million worth of investments since 1982 through this mechanism.

### Applicable Modes

The revenues should be applicable to all modes. According to Mr. Reed (Common Ground OR-WA 2003), with the two-tier tax rate policy, Harrisburg aims for city revitalization by incentivizing urban renewal and curbing urban sprawl, specifically by doing the following:

- Inducing the highest and the best use of the land.
- Rewarding the better use of the land.

- Discouraging land being left vacant or unused.
- Encouraging vertical and high-rise development.
- Discouraging spread and preserving natural areas and open-space areas, such as parks and historic sites.

### *Lessons Learned*

Some of the key lessons compiled from project documentation include:

- The potential role LVT played in promoting Harrisburg's growth: More than 20 years ago, Harrisburg was ranked as the most distressed city in the United States. From 1950 to 1977, Harrisburg lost nearly half its population. According to federal criteria, it was the second most distressed city in America. After the introduction of two-tier property taxation, along with other revitalization policies, Harrisburg made an impressive comeback. In the ensuing decade, the number of vacant sites fell by nearly 90%, and the number of businesses more than doubled (Common Ground OR-WA 2003).
- The potential positive role of LVT-induced tax base growth: Although the policy does not aim to decrease crime rates and such, the increasing tax revenues do in a way support the development of the public and social sectors of the city, improve the overall living standard of the city, and benefit the residents. It is reported that the city and its economic development as a whole have benefited from the LVT (Common Ground OR-WA 2003).
- The low implementation costs: Implementation costs would be similar to an area TDD. When the city of Harrisburg switched to an LVT, the main expense came from reprogramming the software. The system needed to be programmed to allow the two rates to be separated and the calculations for each property tax bill redone to reflect the separation. The appearance of the bills and an explanation of the change to a two-tiered tax system attached to the bills were the only changes affecting the taxpayer. This system was implemented by city ordinance and approved by the city council (Speirs 2010).

### *Applicability to Other Regions*

Land value taxes have been adopted in 17 cities in Pennsylvania. Current rates for the different cities are shared by the Center for Economic Studies (Speirs 2010). Connecticut has recently (May 2013) authorized LVTs.

### *Website*

A relevant website is <http://www.urbantoolsconsult.org>.

## **Washington State's Road Fund Levy**

### *Facility Name*

The facilities discussed in this section are Washington State county roads.

### *VC Mechanism*

The mechanism discussed in this case is the countywide special assessment.

### *Background*

Washington's RCW 36.82.050 allows a special road fund levy for the purpose of "raising revenue for establishing, laying out, constructing, altering, repairing, improving, and maintaining county roads, bridges, and wharves necessary for vehicle ferriage and for other proper county purposes." This is applied in every county in Washington. This tax sounds similar to an LVT but is not strictly an LVT.

### *Legal Authority*

The mechanism is provided for by RCW 36.82.050.

### *Implementation Considerations*

The implementation considerations include:

Boundaries: Countywide.

Levy Basis: At the time of making the levy for general purposes, the RCW allows counties to make a uniform annual additional tax levy throughout the county, or any road district thereof, per the following guidelines:

- Levy as great as \$2.25 per \$1,000 assessed value.
- Limited by 1% annual growth (plus new construction).
- May be increased with voter approval.
- May exceed \$2.25 (within 1% limit) if total county levy and road levy does not exceed \$4.05.
- May be diverted to county general use and spent only on unincorporated area uses.
- May be shifted to county general use with tax levy spread over unincorporated and incorporated areas.

Duration: Annual.

Collection of Revenues: All funds accruing from the levy are to be credited to and deposited in the county road fund, except that revenue diverted under RCW 36.33.220 is to be placed in a separate and identifiable account within the county current expense fund and revenue diverted under



Chapter 39.89 RCW be expended as provided under Chapter 39.89 RCW.

Revenue Performance: See Figure 30 for visual representation of revenue performance since 2002.

#### *Applicable Modes*

County roads.

#### *Website*

The relevant website is <http://apps.leg.wa.gov/rcw/default.aspx?cite=36.82.040>.

#### *Contact*

The project contact is Washington State DOT.

### **Montana's Impact Fee Program**

#### *Facility Name*

The facilities discussed in this section are located in the city of Bozeman and are part of the Greater Bozeman Area Transportation Plan.

#### *VC Mechanism*

The mechanism discussed in this section is transportation IFs.

#### *Background*

This funding source is becoming an increasingly common method for financing transportation infrastructure needs in Montana and in other states. The city of Bozeman is located in Gallatin County in southwestern Montana. Yellowstone National Park and the Big Sky resort area are nearby. The city of Bozeman continues to grow in geographic size by annexing new land to accommodate population and business growth. In 2008, Bozeman was approximately 19.25 square miles in size. Bozeman's substantial growth since 1990 has put significant demands on the city to provide necessary infrastructure and services for new development. The public funding mechanisms available to Bozeman during this time were insufficient to meet this need. The city explored new ways to fund new infrastructure and services. There are a number of factors that prompted Bozeman to consider and ultimately adopt IFs, including:

- Lack of funding to pay for improvements needed to accommodate new growth.
- Growing resistance to increased development exactions.
- Perceived need to be proactive in maintaining the current service levels.
- Bozeman's history and tolerance of "user pays," a principle that places the cost of new infrastructure resulting from new development on the developer, not the entire community (Montana DOT).

The city of Bozeman and Gallatin County, in conjunction with the Montana DOT, completed a major revision to the Greater Bozeman Area Multimodal Transportation Plan in 2007, which outlines a 2030 vision for transportation improvements in the region. The major street network improvement

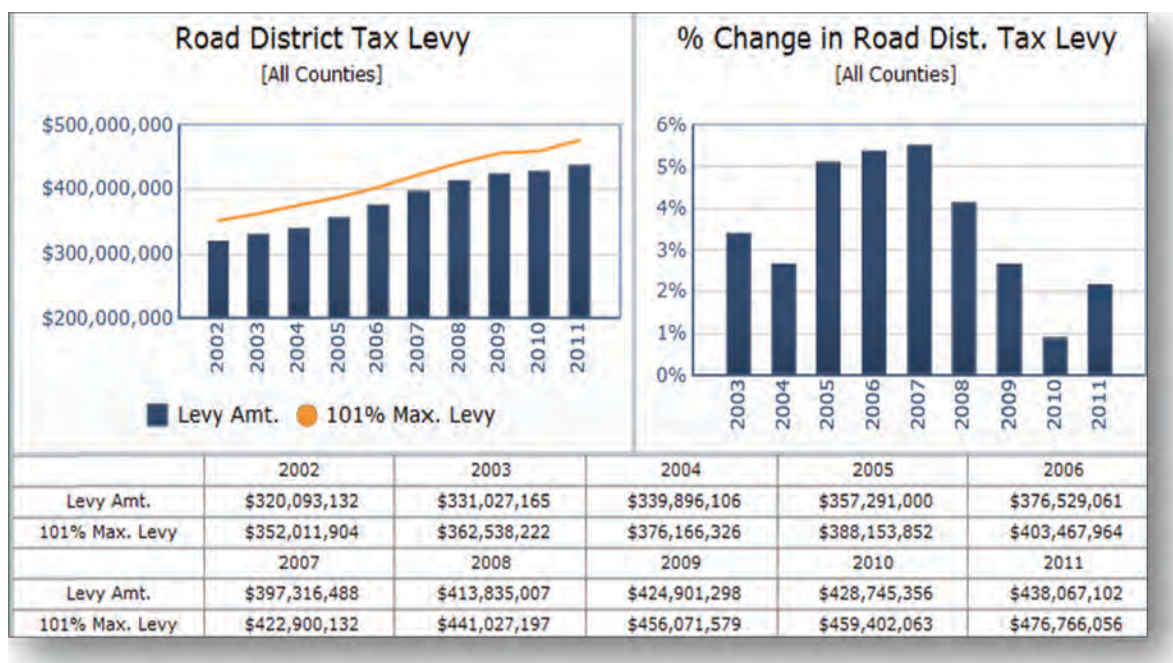


FIGURE 30 Washington's road fund levy rate and revenue trends. (Source: Washington State Department of Revenue.)

projects recommended in the long-range transportation plan are considered for inclusion in the CIP. Bozeman lists its 5-year funding priorities for capital projects in the CIP, which is updated annually. IFs are part of a broad-based funding mechanism used by the city. Funding for projects listed in the CIP can come from a variety of sources, but projects funded by transportation IFs must be included in the CIP. Besides IFs, governmental transfers (state urban funds), and assessments from special improvement districts, general fund revenues, development exactions, and TIFs are all available for Bozeman. For instance, Bozeman has a downtown TIF, the funds from which are used to fund and finance street projects and parking. Over the next 10 years (2013–2022), the funding from IFs will go to support \$19.7 million of capital improvements on road segments and \$5.3 million in intersection improvements.

### Legal Authority

Montana Code Annotated, Title 7, Chapter 6, Part 16 enables local governments to establish IFs to help pay for public infrastructure services. A governmental entity that intends to propose an IF ordinance or resolution must establish an IF advisory committee. Bozeman initially enacted the IF program based on the city's general police power granted by the Montana State

Constitution. The legal basis for IFs became explicit when the 2005 Legislature passed Senate Bill 185, which granted general authority to adopt IFs and established certain standards for documentation and procedures in adopting an IF.

### Local Partnerships

The local partners include:

- City of Bozeman (initiator) and
- Developers (beneficiaries).

### Implementation Considerations

Some implementation considerations include:

**Boundaries:** Citywide (Gallatin County—City of Bozeman), as shown in Figure 31. The entire city forms a single integrated network that serves all parcels in the city limits, and the entire city is considered the service area pursuant to Montana Code Annotated 7-6-1602(1)(f).

**Levy Basis:** Bozeman assigns 80% of the calculated cost of service to new development. The other 20% of the cost of

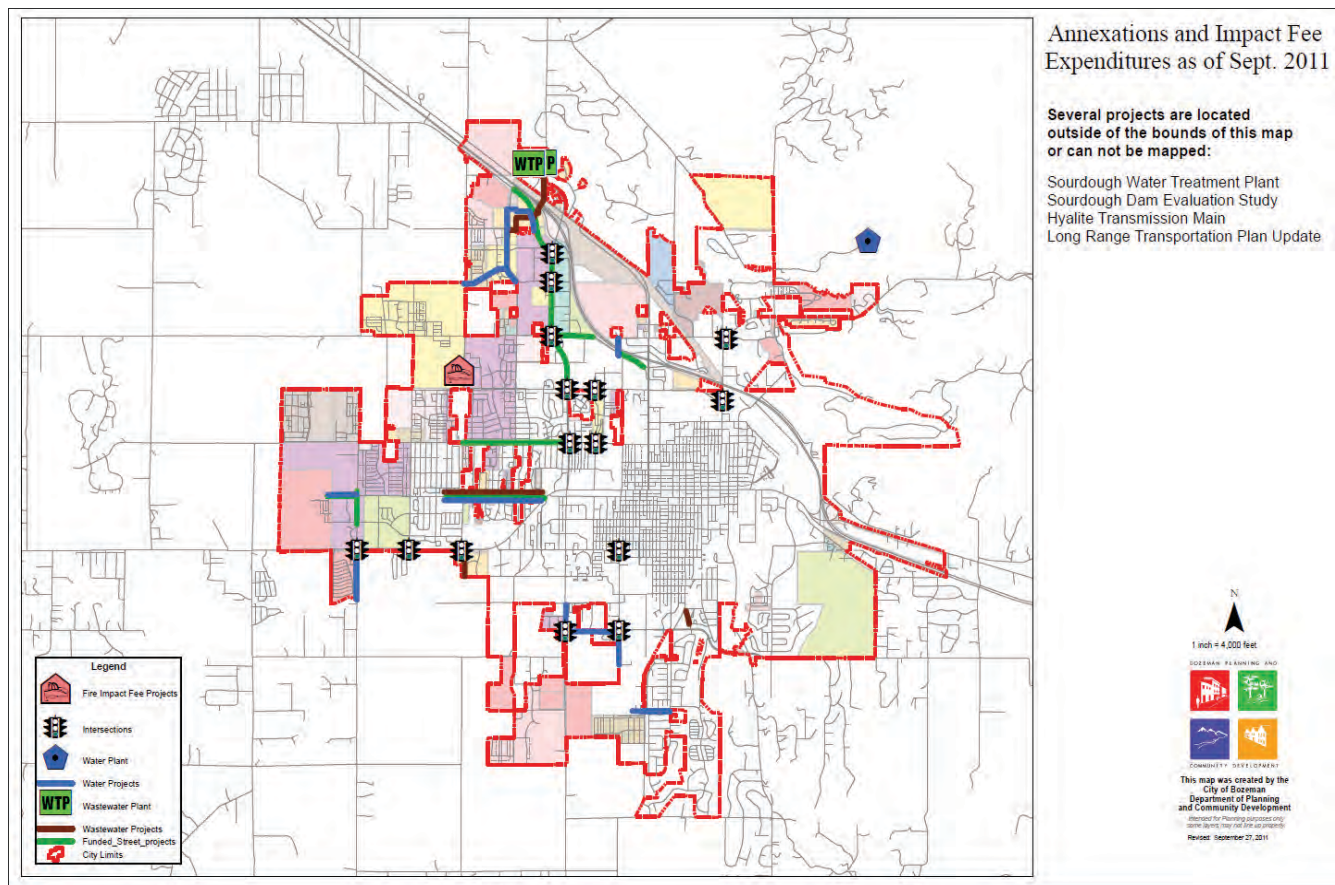


FIGURE 31 City of Bozeman's impact fee service area. (Source: Washington State Department of Revenue. <http://www.bozeman.net/Smarty/files/c7/c7362884-6467-4fdc-a12f-ac591e3e46ce.pdf>.)

service must be met through other funding means. Fees are typically assessed by local governments according to a formula in Montana. In Bozeman's case, the rates are established by a special study conducted in 2008. This study revises earlier guidelines established in 1996. The rate is adjusted annually (City of Bozeman Traffic Impact Fee Study 2008; Streets Development Impact Fee Study 2012).

The transportation IFs are imposed on all new development at the time of building permit approval. The street IF is based on ITE trip generation rates, trip adjustment factors, and net capacity cost per average trip length. For residential uses, transportation IFs are calculated based on the number and kind of dwelling unit, such as single-household detached or manufactured home. For commercial, industrial, and institutional uses, transportation IFs are calculated on a per 1,000-square-foot basis. Trip characteristics are inputs to the demand component of the transportation IF and include the following: number of daily trips generated, length of those trips, and proportion of travel that is new travel. The trip characteristic variables were obtained from a previous trip characteristics study conducted in Bozeman and from the ITE *Trip Generation* reference report. Other variables used in calculating the IF include cost per lane-mile, equivalent gas tax credit, facility life, interest rate, fuel efficiency, effective days per year, capacity per lane-mile, interstate adjustment factor, and tax credit.

The 2012 development IF study conducted for Bozeman lays out three criteria based on need, benefit, and proportionality as the rational nexus test. This study lays out a systematic framework for IFs based on (1) an incremental expansion cost method; (2) a plan-based fee for future improvements, which allocates costs for a specified set of improvements to a specified amount of development (all identified in a long-range plan, essentially a cost-per-demand approach); and (3) a system of credits, including revenue credits for those developments as a result of double payment situations, which could occur in a scenario such as Bozeman resorting to multiple revenue sources and a site credit for a developer reimbursement for land dedication or construction of system improvements. The estimated IF cost for road segments in the CIP is approximately \$1.64 million per lane-mile (Street Impact Fee Study 2012).

Duration: Levied annually over from 2013–2022.

Revenue and Performance: A 2012 study shows that street IFs should yield approximately \$29 million over the next 20 years (2013–2022), which will go to support \$19.5 million in capital improvements and another \$5.3 million in intersection improvements.

#### *Applicable Modes*

Funds can be used for a wide variety of capital investments, including bicycle or pedestrian facilities that are built in conjunction with and included in a capacity-adding transportation system facility. The Montana code also restricts use of funds

from transportation IFs for operation, maintenance, repair, alteration, or replacement of transportation facilities or equipment (such as buses). Bozeman has a four-step process to ensure that these uses and restrictions are respected, as noted here:

- Preparation of long-range transportation plan.
- Classification of project types.
- Development and update of a CIP.
- Implementation and cost verification of project.

Bozeman applies IFs to major streets along with government transfers and taxes.

#### *Lessons Learned*

Some lessons compiled from the IF documentation include:

- The program requires consistent and clear identification of the process and methods that the area to require private developers to pay for public services or infrastructure needs triggered by new development.
- The role of community education is critical. Bozeman has an IF advisory committee, as specified in the Montana Code, the main goal of which is to review and monitor the process of calculating, assessing, and spending the fees.
- The approach adopted by Bozeman is to evaluate the use of IFs as part of a larger fiscal study in conjunction with all other revenue sources it uses, and these mechanisms are built into the rate structure (TischlerBise Inc. 2012).
- The rate-setting process requires much up-front work and follow-up.
- There is significant regional coordination to ensure that developer actions in communities do not create strategic conflicts.
- The revenues are a moderately stable source but are still dependent on the economic climate.
- The IF approach does have high initial transaction costs in terms of conducting feasibility studies, planning, and assessments for consistency with CIPs and following up with developers and managing revenues later, but offers a moderate to sizeable source of steady revenues.

#### *Websites*

Relevant websites include:

- <http://mdt.mt.gov/research/toolkit/m1/ftools/dei/if.shtml>,
- <http://www.bozeman.net/Departments-%281%29/Planning/Home.aspx#.UbX9UeRjWt8>, and
- <http://www.bozeman.net/Smarty/files/1b/1b59f5a2-9469-4922-b4f6-0430f4230979.pdf>.

#### *Contact*

The project contact is Montana DOT.



## OTHER AREAWIDE OR REGIONAL EXAMPLES (PROJECT AND PROGRAMMATIC APPROACHES)

### Chicago Metropolitan Agency for Planning's 'GO TO 2040' Initiative

#### Facility Name

The facility discussed in this section is the Elgin O'Hare West Bypass Project—Central Thruway/Route 120, Illinois.

#### VC Mechanism

The mechanism discussed in this section is the special assessment.

#### Background and Implementation Considerations

"GO TO 2040" is the Chicago area's comprehensive regional plan to help its seven counties and 284 communities. One of the top priority projects under the GO TO 2040 plan is the Elgin O'Hare West Bypass (EOWB) Project, a \$3.57 billion (2010 dollars) project. VC opportunities are being investigated for the project, which is planned to include new construction (and reconstruction of existing facilities) of 16 miles of highway, 17 interchanges, 12 miles of fixed-route transit, and other improvements to adjacent roadways. The GO TO 2040 plan notes that toll revenues are expected to cover a large portion of the project cost. A critical aspect of this project is its bonding capacity. The final EOWB report will include a further examination of the impacts of imple-

menting VC mechanisms in the Elgin O'Hare project area. The initial hypothesis is that, when instituted carefully, VC mechanisms will be an efficient and effective way to fill the financing gap for this project. Of course, implementing VC mechanisms will require significant buy-in from local elected officials and the public. If VC shows promise, the next phase of project development will require significant outreach to the communities. For some mechanisms, state legislative action may be required. Figure 32 shows the EOWB area.

Value capture planning analysis was undertaken for some parts of the EOWB project, in particular the Central Lake Thruway/Illinois Route 120 Bypass part of EOWB. The Route 120 Corridor Planning Council recently published a unified vision for the Central Lake Thruway. The vision proposes a new 8-mile long, four-lane boulevard that traverses undeveloped areas south of the current IL-120 (see Figure 33). High-level funding options have been evaluated for the project, including federal, state, county, and municipal contributions, as well as user fees. Currently, the project is estimated to cost approximately \$461 million, nearly 90% of which is attributable to the proposed bypass. Rough federal, state, and local funding contributions have been estimated, and an analysis of the funding potential of user fees (tolls) has been completed. A VC analysis was completed in 2011 to quantify an order of magnitude level of local funding that could be generated using VC mechanisms and provide another funding option for the bypass. In particular, only two mechanisms were considered: (a) special service area (a type of SAD allowed by law in Illinois but currently limited to single jurisdictions), and (b) tax-increment finance-like mechanisms primarily focused on commercial uses for

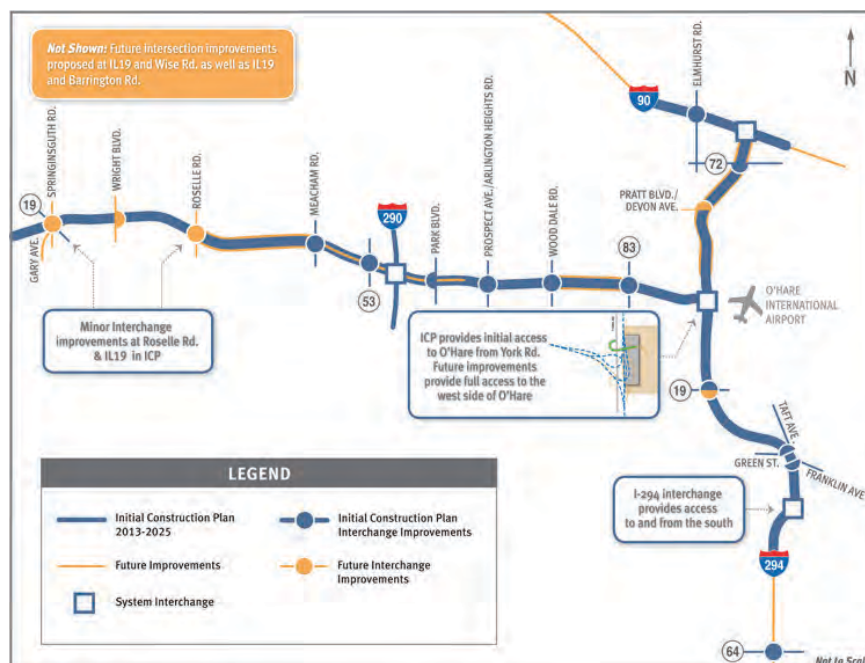


FIGURE 32 Elgin O'Hare West Bypass Project area. (Source: <http://www.elginohare-westbypass.org/SitePages/Home.aspx>.)



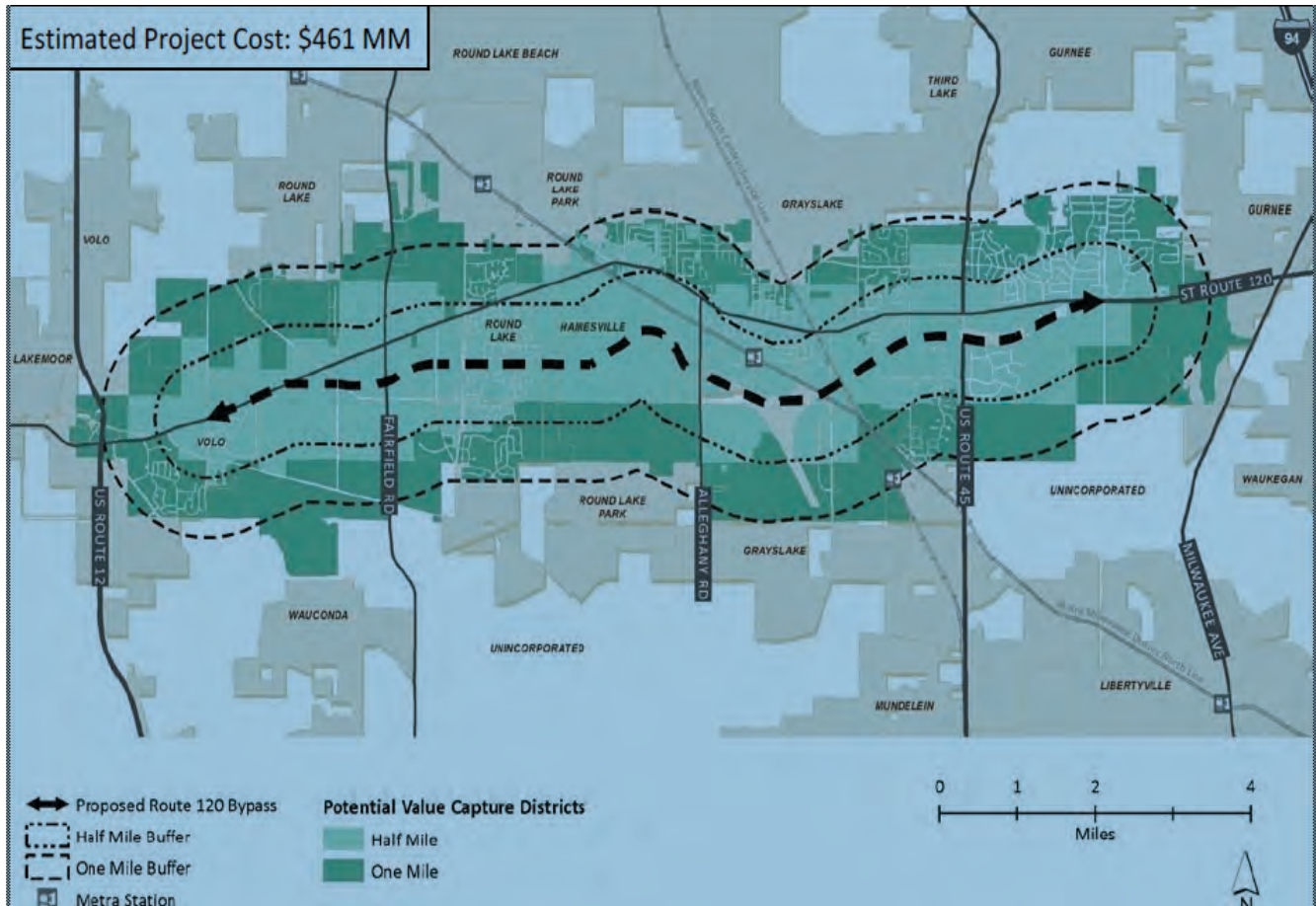


FIGURE 33 Central Thruway/Route 120 value capture service area boundaries for SSA and TIF type mechanisms. (Source: <http://www.cmap.illinois.gov/>)

SSA portions using flat and graduated tax rates. The service areas used in this study are shown in Figure 33.

The study concluded that for VC to work in this project setting, the following conditions must be met:

- The project will require stakeholder coordination.
- Rates must be calibrated to show proportionality to benefits if the SSA mechanism is to be used.
- A governance structure needs to be defined because the boundaries traverse several municipal jurisdictions.
- Legislative amendments or new legislation will likely be needed to facilitate the application of TIFs and SSAs for regional transportation projects.
- If the bonding capacity relies on future development and a credit enhancement is provided by a credit-worthy entity, it is likely that the entity will require broad consensus on future growth policies by communities, including the appropriate level of zoning and density to facilitate the anticipated level of new development.

The preliminary study concludes that VC tools are vital and needed but can provide only a part of the revenues to fund the project.

#### Website

The relevant website is <http://www.cmap.illinois.gov/2040/main>.

#### Arlington County Commercial Transportation Tax, Virginia

##### Facility Name

The facilities discussed in this section are the Arlington County, Virginia, transportation improvements.

##### VC Mechanism

The mechanism discussed in this section is special assessment.

##### Background

Arlington County has adopted a countywide program to generate revenues for transportation investments. The commercial

transportation tax of a maximum of \$0.125 per \$100 assessed value on commercial and industrial properties will be used to fund regional transit programs, a complete street investment program, and a share of a future streetcar system. This tax was authorized in Virginia by the Virginia General Assembly in 2007 and is applicable not only to Arlington County but also for all counties and cities that are part of Northern Virginia Transportation Authority and the Hampton Roads Metropolitan Planning Area (Code of Virginia 2007). The provision laid out by the Virginia General Assembly allows localities within these two transportation authorities to impose the tax on commercial and industrial property and use the revenues exclusively for transportation purposes that benefit the locality. Not all localities have approved this proposition. For instance, Fairfax County and Fairfax City have adopted this proposition and charge \$0.11 and \$0.55, respectively, per \$100 valuation of commercial property.

#### *Website*

The relevant website is <http://www.arlingtonva.us>.

### **TRANSNET, California (San Diego)**

#### *Facility Name*

The facilities discussed in this section are multimodal transportation improvements in San Diego, California.

#### *VC Mechanism*

The mechanism discussed in this section is the local option sales tax—Transportation.

#### *Background*

TRANSNET is the half-cent sales tax for local transportation projects that was first approved by voters in 1988 and then extended in 2004 for another 40 years. Administered by San Diego Association of Governments, the program has been instrumental in expanding the region's transportation system, reducing traffic congestion, and bringing critical transportation programs to life. During the 60-year life of the program, more than \$17 billion will be generated and distributed among highway, transit, and local road projects in approximately equal thirds.

That initial 20-year TRANSNET program generated approximately \$3.3 billion between 1988 and 2008. San Diego Association of Governments distributed the money in equal thirds among transit, highway, and local road projects. In addition, \$1 million was earmarked annually for bicycle paths and facilities. The program also funded seven innovative walkable community demonstration projects in Encinitas, San Marcos,

Oceanside, El Cajon, and the communities of North Park, Golden Hill, and Claremont in the city of San Diego.

In November 2004, more than 67% of voters countywide approved the extension of TRANSNET to 2048. The 40-year extension will generate more than \$14 billion for transportation improvements, with the funds allocated using a similar formula (dedicated to transit, highway projects, local roads, and other new programs). The extension funds major highway expansion projects along Interstates 5, 8, 15, and 805, as well as State Routes 52, 54, 56, 67, 76, 78, 94, 125, and 905 and numerous local road projects. In addition, it supports a robust public transportation system, including new bus rapid transit services and carpool/express lanes along many of the major transportation corridors.

#### *Website*

The relevant website is <http://www.keepsandiegomoving.com/transnet-about.aspx>.

### **Washington Transportation Impact Fees (City of Olympia)**

#### *Facility Name*

The facilities discussed in this section are Washington state roads.

#### *VC Mechanism*

The mechanism discussed in this section is IF.

#### *Background*

The city of Olympia and other cities in Washington have charged transportation IFs (Washington RCW 39.92.040) to developers of new construction since 1995 in accordance with Washington's Growth Management Act of 1990. The fees are used to offset the costs of the transportation system improvements that new growth necessitates. The Public Works Department determines the schedule and use of the fees. The Community Planning and Development Department collects the fees from developers, typically as part of the building permit process. According to Washington's Growth Management Act, the IFs are used to meet the main goal of the act, which is to address the negative impacts of uncoordinated growth through comprehensive and inclusive land use planning. Under the act, counties and cities of a certain size and growth rate are required to implement plans and regulations to address the potential negative impacts of growth within the community. In Washington, IFs are authorized for jurisdictions making plans under the Growth Management Act (RCW 82.02.050-110), as part

of “voluntary agreements” under RCW 82.02.020, and as mitigation for impacts under the State Environmental Policy Act (Ch. 43.21C RCW). GMA IFs are authorized only for public streets and roads; publicly owned parks, open spaces, and recreation facilities; school facilities; and fire protection facilities in jurisdictions that are not part of a fire district. Setting fee schedules for IFs is a complex process typically involving rate studies; generally, IFs do not recover the full cost of a new facility because these fees must be directly and proportionately related to impacts associated with new development (Municipal Research and Services Center).

#### Website

The relevant website is <http://olympiawa.gov/city-government/budget-financial-reports/~media/Files/AdminServices/CapitalFacilitiesPlan/2009-2014/Transportation%20with%20Impact%20Fees%20A.pdf>.

#### Arkansas—Connecting Arkansas Program

##### Facility Name

The facilities discussed in this section are Arkansas state roads.

##### VC Mechanism

The mechanism discussed in this section is the sales tax with turnbacks.

##### Background

Connecting Arkansas Program (CAP) is an ambitious program used to fund several highway projects in Arkansas over the next 10 years, starting in 2013. The plan included a constitutional amendment with a dedicated half-cent sales tax (programmatic approach) to support a \$1.8 billion program and the highway projects listed here and shown in Figure 34.

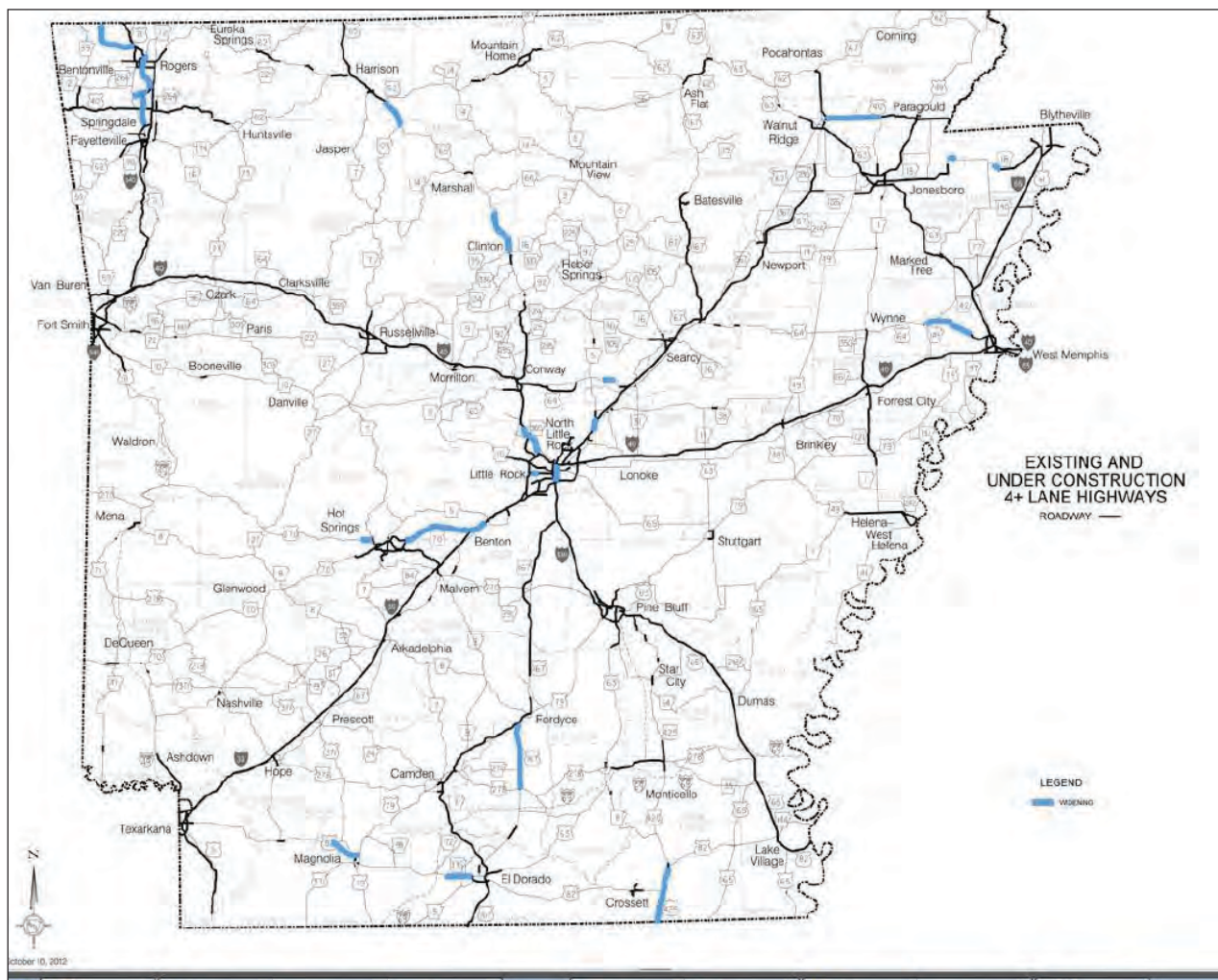


FIGURE 34 CAP planned highway projects in Arkansas. (Source: [http://www.arkansashighways.com/2012\\_hcstax/HalfCent\\_Statewide\\_10\\_12\\_2012.pdf](http://www.arkansashighways.com/2012_hcstax/HalfCent_Statewide_10_12_2012.pdf).)



The sales tax will be abolished by the constitution when debt service is paid off (no later than 2023). The mechanism is also supposed to provide turnback revenues to counties and cities.

- Completion of widening of I-40 to six lanes between Little Rock and Conway.
- Completion of widening of U.S. Hwy 67 to six lanes from Jacksonville to Cabot.
- Improvements to I-30 connecting Little Rock and North Little Rock, including widening of the I-30 Arkansas River Bridge.
- Continuation of widening of I-630 in Little Rock from Baptist Hospital to University Avenue.
- Completion of widening of U.S. Hwy 64 to four lanes between Conway and Beebe.
- Continuation of widening of I-30 to six lanes between Benton and U.S. Hwy 70.
- Widening of U.S. Hwy 70 to four lanes between I-30 and Hot Springs.
- Continuation of widening of U.S. Hwy 270 to four lanes from Hot Springs westward.
- Completion of widening of U.S. Hwy 412 to four lanes between Paragould and Walnut Ridge.
- Completion of widening of Arkansas State Highway 18 to four lanes between Jonesboro and Blytheville (to I-55) in east Arkansas.
- Continuation of widening of U.S. Hwy 64 to four lanes between Marion and Wynne.
- Widening of I-540 to six lanes between Fayetteville and Bentonville.
- Completion of the initial two lanes of the future four-lane Bella Vista bypass.
- Beginning of four-lane construction of the U.S. Hwy 412 Springdale bypass from I-540 to the Northwest Arkansas Regional Airport connector.
- Continuation of widening of U.S. Hwy 65 to four lanes between Harrison and Clinton.
- Completion of widening of U.S. Hwy 167 to four lanes between I-530 and El Dorado.
- Completion of widening of U.S. Hwy 425 to four lanes from Hamburg to the Louisiana line.
- Beginning of the widening of U.S. Hwy 82 to four lanes from El Dorado to Magnolia to Texarkana.

Arkansas's 75 counties are projected to gain from this by means of turnback revenues.

A somewhat similar mechanism is Georgia's adoption of the Transportation Special Purpose Local Option Sales Tax (TSPLOST). Authorized by the 2010 Transportation Investment Act, the 2012 TSPLOST referendum was held on July 31 but has continued to meet opposition in many counties. In July

2012, three of Georgia's 12 economic development regions approved the TSPLOST, a one-cent sales tax earmarked to fund a list of transportation improvements specific to each region. TSPLOST passed in the Central Savannah River, River Valley, and Heart of Georgia regions. As of January 1, 2013, sales tax in the 46 Georgia counties located in these regions increased by 1% (<http://www.taxrates.com/blog/2012/12/10/georgia-tsplost-sales-tax-rate-changes-january-2013/>).

### *Website*

The relevant website is [http://www.arkansashighways.com/2012\\_hcstax/issue\\_1.aspx](http://www.arkansashighways.com/2012_hcstax/issue_1.aspx).

### **SUMMARY**

Information from the literature review was combined with anecdotal evidence derived from interviews and discussions with agency personnel who applied the mechanisms summarized in chapter two. No universal VC approach exists, of course. Each location/application is unique, and agency personnel proved adept at tailoring mechanisms to their individual needs. In many cases, more than one source was adopted (e.g., in Washington State, Montana, Virginia, Oregon, and Texas).

To assess how different states apply the mechanisms, members of SCOFA and the SCOP, both of AASHTO, were surveyed. Twenty-two case examples (organized by geographic scale and mechanism used) are presented, profiling applications at the corridor, project, local, and regional levels. These case examples document various elements of the mechanisms as reported by agencies or as documented in the literature in terms of:

- Political acceptability.
- Transaction cost-efficiency (includes implementation-related transaction costs to agencies).
- Practical (e.g., design and implementation) considerations (including revenues).
- Local partnerships involved.
- Equity with regard to burden across different income groups and equity of revenues and costs.

The case examples in this chapter have provided many examples of how VC mechanisms have been used to fund highways. Each case example has focused on a particular application and the practices and viewpoints of a particular agency and the local context in which the mechanism was adopted. The next chapter steps back from the set of cases to take a broader look at common themes that emerge from the literature review and the case examples.



## SUMMARY OF FINDINGS AND COMMON THEMES

### FINDINGS FROM THE STUDY

This synthesis examines local government options for land VC to fund public investment projects. The literature review and case examples covered 10 mechanisms from which several key findings and common themes may be summarized. The examples indicate that there is not a universal approach to VC funding and financing. Although several of these locations undertook similar practices, the particulars of those approaches were tailored to fit each location. In many cases, more than one source was adopted (examples of those include Washington State, Montana, Virginia, Oregon, and Texas). The mechanisms reviewed in this document and for which case examples are documented were evaluated using the following criteria: (1) political acceptability; (2) transaction cost-efficiency (includes implementation-related transaction costs to agencies); (3) practical considerations such as design and implementation considerations; (4) cost-efficiency from the point of revenue adequacy; (5) local partnerships involved; and (6) equity with regard to burden across different income groups and equity of revenues and costs attributed to different vehicle classes. Each of the findings is discussed in this chapter.

#### Acceptability and Transactions Costs

Table 10 shows a qualitative relative assessment of mechanisms in terms of political acceptability, implementation costs, and institutional capacity. Implementation and transaction costs provided by reporting agencies are used to compare mechanisms on a three-point scale: high, medium, or low. Often-reported transaction costs include those pertaining to administration, revenues, accountability, and a small portion of legal costs. These aspects are important in the context of understanding overall costs and benefits of each mechanism.

### GENERAL IMPLEMENTATION FINDINGS

Tables 11 and 12 discuss the main design and implementation features of the adopted mechanisms based on case examples.

#### Types of Mechanisms, Area of Applicability, Beneficiaries and Service Areas

##### *Types of Mechanisms Adopted and Area of Applicability*

The cases examined showcase a variety of mechanisms adopted. In some cases, more than one VC mechanism was

also used. This was seen in the Oregon, Washington, and Virginia case examples. In general, Montana, Washington, Virginia, and Oregon are among the states that allow multiple mechanisms to be considered. The mechanisms adopted as seen in the examples seem to be context sensitive and driven by the local need and economic condition at the time, the general readiness, the existing guidance available, and finally, if applicable, the type of development (for IFs, exactions, and STARRs). Only IFs, LVTs, and sales taxes were reported to be used in the context of programmatic approaches to fund transportation projects screened from plans were considered for funding. In one case example, the property tax (through the road fund levy in Washington State) was used in a programmatic way to fund local roads and transport projects.

#### *Programmatic Versus Project Funding*

Programmatic approaches tend to adopt taxes as the form of levies (Table 11), in comparison with project level funding, for which levies typically assume the form of fees. In most cases, taxes go into the government's general fund, where the revenue can be used for whatever the government thinks is best, as guided by elected officials. In the case of project funding, governments may impose "fees" to cover the governments' specific costs of providing particular services, and those fees normally can be used only to cover the costs of the services provided in that area. In increment finance approaches, where typically no new levies are issued, the portion of increments set aside from participating local jurisdictions may also be used to cover the costs of the services provided in that area. In general, in the case of programmatic funding, the notion of the general benefit area defines the geography of levy coverage. In the case of project funding, both the general benefit and special benefit area become applicable for the consideration of fees. However, the case examples previewed in this study showcase a few examples in which a programmatic approach is also used in the context of funding for a single project (such as in the Missouri and Butler County examples).

#### *Beneficiaries*

Both landowners and developer communities are seen to be the beneficiaries of the transportation improvements and have a significant role in VC mechanisms as the agents for whom value is created. Thus, buy-in from these groups is vital for most mechanisms. In some case examples, such as IFs, the developer beneficiaries are directly identifiable at the

TABLE 10  
EVALUATION OF MECHANISMS BASED ON REVIEW AND CASE EXAMPLE(S)

Mechanism	Institutional Capacity and Transactions Costs	Acceptability
IF	High initial planning costs and in periodic rate studies as required by law	Most widely adopted mechanism across the country. Acceptability and stakeholder support are based on transparency of process and larger goals of a region.
NE	Low	Works on a case-by-case basis; it is generally more acceptable/applicable in most areas. Traffic and access from developments can be a cause for concern, and it is a gap-filling approach on existing networks.
LVT	High initial costs and in periodic rate studies	Only adopted in Pennsylvania. One other city to adopt in Connecticut as of 2013. Requires a paradigm shift in thinking for most regions; thus, use has been limited to few regions in the country. However, it is also a mechanism that is being examined in some other regions and countries.
TIF	Moderate	Can be applicable anywhere as long as there is a clear link between project and benefits. Acceptability is based on transparency, strong real estate markets, and longer-term vision. TIFs have been most widely adopted for financing transit-oriented development and related streetscapes but less often used in funding capital costs of projects.
SAD	Moderate to high	Can be applicable anywhere as long as there is a clear link between project and benefits. Acceptability to stakeholders is based on transparency, strong real estate markets, and longer-term vision.
STD	Moderate	Can be applicable anywhere as long as there is a clear link between project and benefits. Acceptability to stakeholders is based on transparency, longer-term vision, and demand for transportation services.
TUF	High initial costs and in periodic rate studies	Limited applications so far but is applicable only for pavement maintenance. Acceptability is based on transparency of process and larger goals of a region, as is seen in Portland example.
ARs	High	Works with JD. Stakeholder involvement and acceptability can be a long process.
JD	High	Works with ARs and also in conjunction with real estate development. Acceptability can be a long process.
Other—TCs	Low—Funding tool to promote and coordinate use of one or more mechanisms	Applicable with many funding mechanisms as a support framework. Acceptability is linked to transparency. All examples examined had all documents/agreements archived.
Other—STARR	Low	Because it is applicable on a case-by-case basis, it is generally more acceptable.

time of permit issue. In other examples, identifying beneficiaries may be tied in with the delineation of a service area.

#### *Boundaries and Service Areas (Benefit Zones or Service Areas)*

A broader “general benefit” area defines the regions or areas that are served by the facility and assumed to refer to the direct beneficiaries. In almost all cases seen in this study, the general benefit area has been defined by host counties or cities. Within the broader general benefit area, the geographic service area that is characterized by direct physical proximity has often formed the basis for further delineating beneficiaries of transport investments.

The review suggests that VC mechanisms can be justified as being economically efficient as long as the spatial distribution of project benefits can be internalized within a well-defined

benefit area. The case examples provided the opportunity to see how the benefit zones were applied in the context of different regions and mechanisms. Thus, the examples were categorized by geographic scale. This showed that sometimes the same VC mechanism was adopted at a smaller geographic service area for project-level funding and on an areawide basis for programmatic applications. This was the case with sales tax, system development charges, and property-tax-related districts. First, the boundaries of a particular mechanism were found to vary with type of approach—programmatic versus project. Second, when an approach more closely tied to a corridor or project-oriented SAD, TIF, or IF was used, the service area was defined as a much smaller area serviced by the project and was limited to its immediate vicinity. In most cases, a visual assessment and reviewed documents indicated that service areas were drawn and developed based on distance-based thumb rules even in the case of open systems. These distances typically were a maximum of 1 to 2 miles on either side of the project centerline in the case of all highway improvement

TABLE 11  
BENEFICIARY BASIS, DESIGN FEATURES, AND APPLICABLE LEVEL OF GOVERNMENT—PROJECT OR CORRIDOR MECHANISMS

Value Capture Mechanism	Beneficiary Basis			Coordination			Timing Initiation		Levy Basis		Levy Frequency	Cost Coverage by Mode					Level of Government/ Legal		Area/Boundary		
	Landowners	Developers	Public	Taxing Authority	Negotiation	Partnership	Before Improvement	After Improvement	New Development	Existing Development	One time	Annual	Highway Improvement Capital	Operations & Maintenance	Other (Such as Transit-Oriented Development, Transit Bikeways)	State	Local	Entire Area/ Jurisdiction	Limited Area/Service Area/Name	At the Site	
1. IFs • TSDC North Macadam • Mercer TDD New Jersey		X  X X		X  X X			X  X X		X  X X		X  X X		X  X X		X  X X	X  X X		X  — —	X  X/TDD X/TDD		
2. SAD General • Virginia—TID • Denver—Metropolitan District (JSPIA) • Illinois SSA Elgin O'Hare (Planned) • Olathe, Kansas TDD • Butler County TID	X X X  X X X			X X X  X X X			X  X  X X X		X X X  X X X	X X X		X X X  X X X	X X X  X X X		Context Corridor improvement Corridor improvement  Corridor improvement & transit Development related	X X X  X X X	X X X  X X X	X  —  — X—TID	X X/TID X/Metropolitan District  X/SSA X TDD		
3. STD—General • US Hwy 36 TDD • Olathe, Kansas TDD			X X X	X X X			X X X					X X X	X X X		X — Development related	X X X	X X X	X  — —	X X/TDD X/TDD		
4. Negotiated Exactions • Virginia I-495		X  X			X  X X	X  X X	X  X X		X  X X		X  X X		X  X X				X  X			X  X	
5. Typical TIF • TIF-TRZ	X X			X X	— X X	— X X	X X X		X X X	X X		X X	X X		X X (via surpluses)	X X	X X		X/TIF X/TRZ		
6. ARs • Boston's ARs		X X			X X X	X X X	X X X		X X X		X  X (lease)		X X		X  —		X X		X  —	X  X	
7. JD • Boston's ARs, JD • WMATA JD		X  X X			X  X X	X X X	X X X		X X X		X  X—cost X—revenue		X  X —	—  X	X  X (transit & other) X (transit & other)		X X X		X  — —	X  X X	
8. Other Transport Corporations (Hwy 67, Hwy 63) • Other (STARR)		—  X	X		—  X X	X  X X	X  X X		—  X				X  Local street improvement			X  —	—  X	X  —		—  X	

<sup>1</sup>Implies not applicable.

TABLE 12

BENEFICIARY BASIS, DESIGN FEATURES, AND APPLICABLE LEVEL OF GOVERNMENT—PROGRAMMATIC APPROACHES

VC Mechanism	Beneficiary Basis			Coordination			Timing Initiation		Levy Basis		Levy Frequency		Cost Coverage by Mode			Level of Government/ Legal		Area/Boundary		
	Landowners	Developers	Public	Taxing Authority	Negotiation	Partnership	Before Improvement	After Improvement	New Development	Existing Development	One time	Annual	Highway Improvement Capital	Operations and Maintenance	Other (such as Transit-Oriented Development, Transit, Bikeways)	State	Local	Entire Area/Jurisdiction	Limited Area/Service Area	At the Site
1. IFs General • Bozeman, Montana • Mercer TDD, New Jersey		X X X		X X X			X X X	— X X	X X X		X X X		X X X		X X X	X X X		X X	— — X (TDD)	
2. STD • Bellingham, TBD, Washington • Ohio TIDs	— — X	X X		X X X			X X X	— X	X X	X X		X X X	X X X		X X		X X X	X X X		
3. SAD • Washington Road Fund Levy	X X			X			X X	— X	X X	X X		X X	X X		X X	X X	X X—County	— X		
4. LVT • Harrisburg, Pennsylvania			X X	X X			X X		X X	X X			X X		X X	X X		X X		
5. TUF • Pavement Maintenance Fee Corvallis, Oregon	X X	X X	X X	Utility company collects Utility company collects	X X									X X		X X		X X		



projects examined. As noted in chapter two, the E470 corridor, for instance, used a prespecified threshold of 1.5 miles from the Tollway as a way to levy highway expansion fees. In special cases, such as Texas, where a TIF-like TRZ was adopted, the service areas had to account for other factors, such as impacts to general fund revenues of a municipality because the procedure involved local government cost-sharing agreements through increment sharing. This is not the case for STDs, SADs, or other mechanisms because they levy additional fees and create new revenues.

Other jurisdictional and contiguity provisions pertaining to boundaries as noted from the case examples refer to:

- The multijurisdictional aspect: The Virginia TID, Illinois SSA, and Texas TRZ allow for multiple contiguous jurisdictions to develop service areas. The Virginia TID and Illinois SSA allow for multiple adjacent jurisdictions to develop assessment areas for a project that traverses multiple jurisdictions and also has a cost basis for the service area in those jurisdictions. For instance, both Fairfax County and Loudoun County were part of the service area for the SR-28 TID.
- Contiguity aspects in boundaries: Contiguity within an individual jurisdiction's service area is an important element of service area development. In principle, service areas based on assessments can have exemptions that may be perceived as breaking contiguity, but they still are included in the service area, if only to maintain contiguity. The Texas TRZ code is explicit in its reference to this type of contiguity. The Illinois and Virginia TIDs and Butler areawide TID are seen to satisfy this criterion visually. This implies that a service area cannot be broken in any way because of parcels that have exemptions, including institutional and properties for which no payment of taxes is required.

## Revenue Capture Considerations

### *Timing and Availability of Revenues from Adoption of Mechanisms*

Tables 11 and 12 show that funding from many mechanisms is available before the improvement is in place and before the value can be fully realized. In the case of the SR-28 project, the revenues accrued during Phase 1 but before completion. This allows the possibility of financing methods that may be backed by those revenues for up-front investments, as the case examples have shown. This synthesis has provided several examples, such as SR-28, Texas TRZ, JSPIA, Missouri TDD, and Butler County TID, in which this approach has been used.

### *When and How Often Are Payments Made?*

Almost all VC mechanisms that are project or corridor driven are set up early in the process and before the construction of the project. This implies that many VC mechanisms allow

funds to roll in before the project construction. Developer charges such as IFs, NEs, ARs, and JD are one-time fees or agreements on new development; however, assessment districts, TIF, LVTs, STDs, and programmatic approaches are all annual charges or fees on the same properties. IFs, although levied on a one-time basis, are collected every year on new developments as they apply for permits. ARs, JDs, and NEs are by their very nature one-time transactions. ARs and JD financial terms can include sale and lease-back arrangements, such as the 99-year lease seen in the case of Boston's ARs example or other cost- or revenue-sharing agreements that can go over a longer duration. TIF, STD, and SAD payments occur annually once established until the TIF, STD, or SAD expires. Financial terms, such as debt service or loan repayments, are primary criteria for the effective duration, although they typically may be set for 20 to 30 years. TUFs are also annual payments. Developer contributions, such as the STARR example, are also one-time agreements with annual developer rebates from sales taxes.

### *Levy Basis or Who Pays?*

IFs, ARs, JDs, NEs, and STARRs are the only mechanisms that are based on new development and are levied on developers. All other mechanisms are based on both existing and new development with the area defined for the situation. Finally, sales taxes are levied on the general public based on general sales. The sales tax levies are also sometimes capped to a maximum, but in most of the examples, the taxes ranged from a half-cent sales tax to a maximum of a one-cent additional sales tax in support of transportation improvements.

### *Levy Structures*

Although the review suggested many types of rate structures, the actual SAD case example's rate structures were practically led, and simplicity in rate setting through flat rates was a critical part of the acceptability. The rate was set at \$0.20 (and capped at that) for all uses within the TID for the SR-28 corridor project.

Rate structures for TSDC IFs and other IF examples follow standard procedures using trip generation estimates based on the ITE handbook. Although these rates are based on estimates of likely future trips, the rates are subject to debate at times. However, TSDC rate setting is a systematic and transparent process that allows for credits, the use of other revenue mechanisms, and the multimodal nature of trips and investments. In the case of the TIF-like example, there were no rates, only cost-sharing agreements for increment sharing with local entities.

### *Revenue Collection and Coordination*

The revenues are collected by either a municipality/city or a county and deposited in a special fund for allocation to

transportation projects by the entity overseeing the project funding and financing. In some case examples, as when a sales-tax-related TDD was used, a more formal revenue collection and reporting process was noted with the involvement of the Department of Revenue. TUFs are collected by the municipality's public works department.

With respect to the coordination of VC mechanisms, the taxing authorities have a significant role. These taxing authorities are different in each case. In the case of TUFs, the taxing authority is the municipal public works authority or utility services. In the case of all property tax-based mechanisms such as SADs or increment-based approaches, the taxing authority is the local government (municipality or county), but the mechanism is operationalized through the appraisal districts so landowners know they are or are not part of a service area. In all other cases, the taxing authority is the local government, such as a municipality or county.

### *Duration*

In most cases in which a sales tax, property tax, or increment approach was used, whether in the context of a project, corridor, or more areawide programmatic approach, the duration was long term (20 to 30 years) and defined to expire when the project loan or debt was serviced, after which the tax would be repealed.

### *General Financing and Risk Considerations*

The revenues from VC have been used in the case examples as a project finance method. VC returns are dependent on real estate and land, and the risks are associated with cyclical variations in real estate markets. In cases of mechanisms used at the project or corridor level, a different kind of fiscal responsibility was noted by interviewees in which default clauses and provisions were placed in contracts to address economic risk and contingencies. The associated risk with revenue projections places emphasis on the need for analyzing and evaluating the value potential itself. This has been noted in many case examples, and some have noted the need for undertaking preliminary feasibility assessments. Three projects had contract clauses that dealt with default arrangements to meet debt or loan requirements. During the recessionary time period of 2009, the revenues from the SR28-HTID did fall, just as they did in the early years. However, the Northern Virginia State Highway Allocation covered the payments. In the case of the Missouri Route 36 project, the repayment clauses from sales tax revenues were relaxed for the first 3 years from 2007.

### **Cost Efficiency—Ability of Revenues to Meet Stated Project Needs**

Although in principle all mechanisms are efficient from the perspective of generating price signals that increase the efficiency of urban land markets and help rationalize the urban

development patterns, there was little case evidence of cost-efficiency in the literature. The case examples explored here provided an opportunity to investigate the ability of mechanisms to meet project needs in terms of timing and the ability to recoup cost and to understand the ability of these mechanisms to meet their stated share in project costs. This is primarily meaningful for project and corridor funding in contrast to programmatic approaches.

Developer exactions and IFs approach VC from the cost side. They are one-time, up-front charges designed to recover the infrastructure costs associated with growth. NEs in this synthesis refer to the requirement that developers either install at their own cost the internal infrastructure required to meet development standards or pay for infrastructure elements provided by public authorities or donate in-kind. IFs aim to cover the costs of the *external* infrastructure caused by new development. For these approaches to be used for cost recovery, they are required to satisfy rational nexus tests, be limited to a proportionate share of infrastructure costs, be used exclusively for the capital investment purpose cited to justify the fee, and finally, follow the state-provided guidance.

Several of the projects examined were under way at the time of this investigation, but three projects allowed the opportunity to get greater insights. The SR-28 project allowed the opportunity to track the timing and collection of revenues in relation to project-related needs, as did the Texas TRZ and the TDD US-63 project in Missouri. No example was fully complete, so an adequate picture cannot be drawn yet, but the evidence suggests that the SADs, TIFs, IFs, TSDCs, LVTs, and TUFs are meeting their obligations. A brief summary of the revenue contributions of some of the examples looked at is presented in Table 13. Most of the examples suggest that the mechanisms meet the needs based on timing and gross dollars available. However, most approaches, including those related to sales taxes with their reliance on real estate markets, do require risk arrangements in the event of inadequate revenues to meet debt or loan obligations in any year. Table 13 suggests that VC mechanisms have supported a significant share of capital cost needs with a rare maximum of 75% of project costs. The three categories with highest construction cost support coming in from VC tools include STDs, TID special assessments, and TIF-like TRZ options.

### **Value of a Guiding Framework**

The case examples and review show that a higher-level framework played an important role in setting the trajectory of agency choices of mechanisms. In most cases, the observed higher-level framework was also a legal one. Another observed guiding framework provided is a CIP, or a long-term plan, that identifies transportation projects for a region. This review points to a study by Rappa (2002), who showed that IF guidance in at least 14 states was developed in ways that the mechanism could only be used in connection with a CIP. In the IF type examples examined in the current study, Oregon TSDC

TABLE 13  
REVENUE TO NEED COMPARISONS OF VC MECHANISMS

Example	Revenue	Duration	Share in Costs
TUF, Bozeman, Montana	Proposed \$29 million	2013–2022	80% of cost of service due to new development or \$25 million
AR/JD, Copley Place, Massachusetts	\$12 million ARs premium	99-year lease	Cost share and revenue share
Route 36/I-72, Missouri	\$12+ million paid (38% of project costs)	2005–2020	\$34.3 million (50% of project costs)
Highway 63, Missouri	\$11.5 million paid	2003–2013	30% of project costs from sales tax or \$38.2 million
Highway 67, Missouri	Adequate so far	2005–2035	50% of project costs only (\$60 million)
CenterCal, STARR	Tax rebates capped at \$35 million	2011 onward	Cost share: \$25.4 million
TDD, Olathe Pointe, Kansas	\$2 million so far	2005–2027 (22 years)	\$14.94 million
State Route 28, Virginia	\$227.13 million since 1996, initial few years inadequate	Ongoing for 25 years as of 2013	75% of project costs
JSPIA, Colorado	\$30+ million	1983 (20 years)	—
TSD, North Macadam	2008 projection \$18 million	20 years	—
TRZ, Texas	\$641,132	2010 onward (30 years)	Cost share up to \$30 million or a goal to reach 21% of the interchange project cost
Mercer County IF TDD, I-95/295 Corridor	Paid	1990–2010 (20 years)	Approximately \$6 million share (13% of improvements through District)
TID, Butler, Ohio	Paid	1993 (20 years)	\$17 million share
TUF, Corvallis, Oregon	Generates approximately \$400,000 annually	2005 onward	—

and Montana-Bozeman IFs were both examples of adopting funding options in the context of the 10-year CIP.

In the context of other mechanisms, the Ohio TID, Texas TRZ, Oregon TSDC, and Mercer County TDD were all adopted to fund a specific project or group of projects from long-term improvement plans. Virginia Route 28, for example, and Boston's ARs were adopted in the context of a long-term strategic vision for the region or corridor.

### Equity of Mechanisms

Equity on the basis of standard benefit principles is seen in the case of SADs, TIFs, exactions (cash), STARRs, JDs, and ARs. Equity on the basis of costs imposed on the society is seen in the case of LVTs, TUFs, and IFs. Equity on the basis of ability to pay is implicit in SAD rates, but it was not in the case of the SR-28 example (flat rate). With respect to equity of an adopted mechanism, equity provisions of the case examples were examined. Equity in adoption was addressed as part of the rate structure, exclusions of certain types of land uses, or by means of external provisions, such as affordable housing and transit (LVTs, ARs, TIFs). Modal equity and vertical equity were both addressed through rate structures in IFs adopted in Oregon. Finally, the Texas TIF example also addressed through policy and legal guidance the use of surplus revenues set aside toward transit. Equity in terms of participation was noted in all project and corridor case exam-

ples. Mechanisms vary conceptually in terms of type of theoretical equity and how they are perceived. However, in actual implementation, rate structures and considerations such as multimodality credits (TSDCs, for example) and affordable housing (ARs or JDs) allow opportunities for addressing vertical equity and modal equity provisions. This study finds that perceived equity, theoretical equity, and equity in implementation are all different. Equity in implementation is often noted in the literature and cases as either a stated goal or required by a framework to address any perceived vertical, geographic, or modal equity considerations.

### COMMON THEMES

The synthesis has carried out a review of several mechanisms and documents practices that were matched to the specific legal and geographic framework. A wide range of VC mechanisms was observed in funding highway projects. Many of the practices described in this report benefited from creative implementation of available mechanisms. Some of the mechanisms adopted were undertaken within the framework provided by comprehensive plans, whereas others were adopted either in the context of a corridor vision, and yet others were adopted on a piecemeal basis. Yet, several recurring themes relating to the implementation of an adopted mechanism emerged and are important for a wider audience seeking to implement such mechanisms in their regions. These themes include (1) the recognition of a need for higher levels of stakeholder

involvement and outreach, (2) the realization that VC has an integral role to play in a fiscally constrained environment as part of a larger toolbox of funding mechanisms, (3) the ability of mechanisms to deliver project delivery benefits in a number of ways, (4) the recognition of challenges and barriers in support of mechanisms, and (5) the role of feasibility studies and modeling in addressing many aspects of adopting any mechanism. This synthesis does not prescribe a method or an approach because this is contextually driven and dependent on a variety of factors.

### **Stakeholder Involvement**

Almost all of the project and corridor case examples note that stakeholder involvement is a major step. It can be a very time-consuming and protracted process, as in the case of ARs, or one that is simpler but still involves stakeholder coordination, as in TIF mechanisms. The programmatic approaches involve either public hearings or voter approval (as in the case of a sales tax). Missouri has enlisted the support of TCs to help with the stakeholder support process, in which the nonprofit corporations serve as project champions. In almost all cases, the stakeholder involvement process has taken 1 to 5 years. In yet other cases, having a legal framework in place has not been adequate.

### *Lags in Adoption of Mechanism*

A common point noted across examples is that the development of an enabling framework is not adequate to promote adoption of a mechanism. Much like a new technology, there is a time lag in diffusion or adoption of a mechanism. In other words, there is a gap between the legal provision and actual use, during which stakeholder involvement plays an important role. This is seen in the case of the Missouri TDDs, Ohio TIDs, Virginia TID, and Texas TRZ. In all these cases, the time lag was 1 to 9 years. It is important to point to the example of North Carolina's adoption of the Project Development Financing Act. This provision has not been used at all. In North Carolina's case, this lack of use is tied to a lack of fuller understanding of how the TIF mechanism could work.

### *Local Partnerships*

Local governments and communities at the municipal level are the central players involved in the implementation of these VC mechanisms. Many state efforts support these efforts by providing these mechanisms with an enabling framework. Departments of transportation are noted to initiate a process, but local governments are often responsible for the planning and design of all of these VC mechanisms. The nature of the overlapping interests and jurisdictions underscores the need for cooperation and collaboration among state DOTs, counties, municipalities, and other local authorities. Many of the examples presented in this synthesis show that the involvement process can be quite lengthy, spreading over a few years.

Some examples showcase the use of TCs as a funding aid to garner stakeholder support and to aid in the process of funding and financing a project or set of projects. This was seen in all of the Missouri case examples. Others have extensive community involvement protocols, such as the Boston ARs examples, and to a smaller extent, the SR-28 project. Phase 2 of that project moved along as a full PPP; thus, clarity with respect to funding was critical for support.

A third category of examples included those in which stakeholder involvement, cooperation, and collaboration were achieved early in the process through a vision captured by a long-range transportation plan or a CIP. Examples from Oregon, New Jersey, Texas, and Ohio were discussed. In the Texas example, public hearings were part of the stakeholder involvement process and were used for establishing the ordinance.

Many of the practices were noted to have early collaboration with partnering agencies and other stakeholders with messages related to the opportunities made possible by the roadways, as in the US-63 example in Missouri. These case examples also underscore the need for pragmatic approaches; in many cases, success was enabled by the ability of the professionals involved to form a realistic assessment of the institutional, political, or financial framework at play and to adapt an approach that fit within that framework.

Local partnerships showed a subset of the following agencies and stakeholders involved in the collaborative process, depending on the special circumstances of the location/project context:

- Community, landowners (SADs, TIFs, STDs, LVTs, TUFs).
- Departments of transportation (all).
- Corporations, if applicable (Missouri examples).
- A private company involved in a PPP contract for project delivery, if applicable (Virginia example).
- USACE (Missouri examples).
- Developer community (NEs, JDs, ARs, STARRs).
- County commissioners (for countywide mechanisms).
- Municipalities/jurisdictions (all).
- Local metropolitan planning organizations (Texas and Oregon examples).

Although all mechanisms can meet with local opposition, some examined here met with more local opposition than others. Among those were TUFs and LVTs.

### **Value Capture as Part of Funding Toolbox**

A common theme from the literature review and case examples is the acknowledgment that these mechanisms can be considered as part of a larger funding toolkit to ensure that the most critical projects are delivered.



## Benefits

The case examples, together with follow-on surveys of the literature and interviews with agency personnel, demonstrate at least three broad classes of tangible benefit from the adoption of mechanisms.

### *Benefits—Accelerated Delivery*

Despite the often lengthy stakeholder involvement process, the most cited benefit was accelerated project delivery and investments made possible for projects on long-range plans.

### *Benefits—Local Match*

A second benefit reported in three project-level case examples was the ability of revenues to be used as a local match to pool with other funding sources. This benefit was noted in the case of the SR-28 TID, Texas TRZ, and Ohio TID (Butler County). VC can rarely ever be used on its own to fund projects, but it can be part of the mix of financing mechanisms used to advance a project or contribute to ongoing operations.

### *Benefits—Revenue and Financing*

A third benefit in many cases was the stream of revenues that allowed either debt or loan finance or other mechanisms that provided the much-needed seed money to get the project off the ground. The revenue yield in all assessment-based approaches was linked to the strength of the real estate cycle. In all the project and corridor-level approaches examined in this study, a common point was perceived riskiness of the revenue sources for the purposes of debt financing.

## Challenges

The methods are not without problems. The challenges and barriers to implementation of practices that support VC are related to the support of an approach. A substantial portion of the transportation professionals interviewed for this report mentioned this aspect.

### *Challenges Related to Coordination Among Multiple Jurisdictions*

Chief among the factors required for successful implementation of VC strategies is the need for coordination among many diverse public sector entities across different jurisdictional boundaries and with different authorities (and interests). Inter-jurisdictional and partnering entities present challenges.

In general, the following two situations are associated with particular coordination challenges:

- When TIF, such as tools or special assessment are involved, agencies that generally do not have taxing

authority have to coordinate with local taxing authorities to help establish the district and dedicate a portion of the tax increment toward the project or set aside the revenues from assessments.

- Because zoning helps optimize the value available for capture, agencies often have to work with local zoning authorities to modify zoning regulations. This typically arises in the case of NEs or JD.

Some agencies have successfully coordinated with local governments when using VC strategies, but others have faced challenges. Partnering agencies may lack precedent for active collaborations. Some form of higher level of support has been important in urging agencies to cooperate. This higher level of support can be a common vision that binds the regions together; this is seen in the SR-28 project.

### *Challenges Related to Support of an Approach*

The success of many of the practices included in this report is predicated on buy-in or acceptance of the practice from multiple players, especially the general public and high-level officials in the area. It is therefore important that these practices garner public support. Often, opposition from the general public is not seen on the policy level but rather in response to specific projects. This occasionally can occur because of the public's lack of understanding regarding the benefits of a transportation project or because many members of the public do not pay close attention to municipal planning processes until a project is proposed in their back yard, and then the "not in my back yard" response is to be expected. Almost all of the mechanisms need public support, either through a public hearing for an ordinance or through voter approval. Thus, communities can opt out of the funding mechanism. This was very clear in the Missouri case example, in which Ralls County did not want to be a partner in the project funding. Most of the mechanisms focus on some form of community outreach. In the cases of Boston's ARs, the process was very involved. In Missouri's case, TCs helped with the messaging. The TTD in New Jersey required a JPP to ensure buy-in at every stage. In a few cases, the implementing agency found that a community champion could be invaluable in building support among neighbors. In other cases, the use of TCs has been charged with the task of garnering support, as was seen in the Missouri case.

### *Challenges Related to Balancing of Funding Sources*

This synthesis documents that local entities have a variety of options available for funding. However, balancing those resources is a complex process.

## **Role of Feasibility Studies in Addressing Implementation Considerations**

Several implementation aspects and finally design of VC mechanisms are interconnected. For instance, the general

and benefit service areas, rates, and duration for which a mechanism will be in place are all strongly linked to the funding or revenue potential and eventually financing. To that end, several case examples pointed to the role of feasibility studies in addressing the implementation considerations. City of Portland examples pointed to the use of routinely conducting rate studies in support of broader equity goals.

### *Use of Mechanisms as Part of a Broader Strategy*

The review and case examples show that mechanisms can be used individually or jointly as part of a strategy. The most typical jointly used mechanisms observed are the use of ARs in conjunction with JD. In principle, there may be limits on how many such mechanisms may be jointly considered, and the overall expected economic benefits and return on investments also may place limits on the mechanisms. The practices considered here suggest that at most two mechanisms are seen in accompaniment. Mechanisms such as SAD, TIF-TRZ, TID may also be used as part of a broader funding and financing strategy, in which the ongoing revenues may be used to defray loan or debt service requirements, as seen in the Virginia SR-28, Texas, and Butler County examples. Finally, individual mechanisms such as IFs and sales taxes are also seen as part of a broader strategy to fund parts of transportation improvement plans. Viewed individually, each case example shows how project finance methods and local conditions can affect the decision for a project to come to fruition. However, on a collective scale there are some common characteristics of agencies that have been successfully applying VC mechanisms with other methods as part of a broader strategy, including:

- An integrated approach to projects in transportation plans and use of specific VC mechanisms. This is observed in the IF and STD case examples. This may be partly the result of the requirements imposed by the IF legal framework, as noted in chapter one. Prioritization and screening are noted to be approached by means of feasibility studies.
- An integrated approach to blending VC revenues from user fees and other sources to aid project delivery. Agencies such as those from Washington, Montana, and Oregon showcase examples of several funding tools in use at the same time. Agencies, such as these on the upper end of the spectrum, pointed to the reliance on fiscal impact feasibility studies to balance revenue sources. On the other hand, the Missouri and Texas examples demonstrate the integrated use of multiple sources of funding in conjunction with one VC mechanism.

### *Use of Economic and Land Development Impacts and Other Models in Feasibility Studies*

Many studies pointed to the need to rely on economic feasibility studies to determine a variety of implementation aspects,

such as rates, service areas, and revenue potential, and to inform key stakeholders early in the process. As evident from several case examples, use of high-quality land cadastral data is of vital importance in assessing and determining feasibility. Most early case examples did not emphasize the value of any economic assessment to garner support besides evaluating the feasibility of the mechanism itself. More recent ones, such as the Texas example, do emphasize the value of economic assessments in all stages of the case study, starting with gathering support.

### *VC Mechanisms and Fiscal Responsibility*

If assessment districts, developer charges, STDs, and other options can provide part of the solution to urban infrastructure funding, they can also create new types of problems and risks if implemented and designed poorly. According to a World Bank study (Peterson 2009), these mechanisms are termed capital budgeting options for the short- or medium-term but not necessarily the longer term. The same study also points out that these mechanisms have significant practical advantages as part of the mix of capital budgeting for infrastructure as supplemental funding sources. Some national models/toolkits developed by FHWA explicitly consider alternative local revenue sources, such as those from VC methods (FHWA 2012). Toolkits such as the FHWA toolkit allow consideration of PPP projects in which VC mechanisms (such as the E470 Tollway, which used highway expansion fees, as noted in chapter two) form a mix of the funding formula.

Many of the mechanisms discussed in this synthesis have a PPP aspect in the sense that they are essentially noncommercial PPPs. In two examples, they have accompanied traditional design-build-maintain PPPs, as seen in the case of the SR28-HTID and Missouri example.

Risks from Use of Multiple Value Capture Mechanisms or Excessive Reliance on a Single Source: Two observations are worth noting in the case of regions with a programmatic approach to mechanisms and a guiding framework:

- Three case examples (Wisconsin, Washington State, and Montana) reported having guidance in place for more than one mechanism set. For instance, the Washington State RCW and Municipal Research Services Center provide for multiple revenue options. The Montana DOT also maintains a toolkit in which the agency reports multiple mechanisms and shares case examples conducted by other regions and cities across the country with their municipalities and counties. In the case of Wisconsin and Montana, interviewees noted that they track their revenues and have local entities report their revenue sources, allowing local governments to assess the balance of their revenue sources.
- Montana's Bozeman case example showed that a more formal fiscal analysis was part of the analytical framework in the adoption of IFs as part of the city's overall capital budgeting plan to reduce risk from a single source.

Risk from Revenue Shortfalls in the Use of a Single Source: The need to meet debt service and loan commitments place a higher level of fiscal responsibility on the valuation of revenues and approaches to deal with risk. This has been noted in the discussion on General Financing and Risk Considerations.

### Ongoing Area of Study and Analysis

The screening survey and literature review also provided an opportunity to showcase regions and cities in the country that are increasingly beginning to consider VC mechanisms. The trend is also echoed in some of the international research explored in this study. Some examples of recently completed work include the study by the Center for Transportation Studies (Lari et al. 2009) and the Maryland DOT's (2012) National Governor's Association study. Some agencies also indicated that they were exploring VC mechanisms in greater detail.

### SUMMARY

Information from the literature review was combined with anecdotal evidence derived from interviews and discussions with agency personnel who applied the mechanisms summarized in chapter two. No universal VC approach exists, of course. Each location/application is unique, and agency personnel proved adept at tailoring mechanisms to their individual needs. In many cases (e.g., in Washington State, Montana, Virginia, Oregon, and Texas), more than one source was adopted. The geographic distribution of case examples helps to illustrate some of the issues that transportation finance professionals and planners face with regard to funding transportation projects and the different approaches and solutions used to address these challenges.

To assess how different states apply the mechanisms, members of the SCOFA and SCOP, both of the AASHTO, were surveyed. Twenty-two case examples (organized by geographic scale and mechanism used) are presented, profiling applications at the corridor, project, local, and regional levels that showcase how different agencies have adopted the mechanisms and the features of the final adopted mechanism in the specific project context.

Generally speaking, communities across the United States face similar challenges when attempting VC. Although some mechanisms were implemented as part of comprehensive plans, others were adopted as the need arose. When examining

the implementation of VC mechanisms by the interviewees, common findings became evident:

- The need for a clear legal framework supporting the VC mechanism chosen.
- The need for a high level of collaboration and cooperation among stakeholders.
- The need for creative thinking regarding which mechanisms might be useful for a given project.
- The need for a vision to use these mechanisms to complement a larger set of funding mechanisms.

Based on the case examples discussed in chapter three, the benefits identified include the following:

- **Accelerated Delivery.** VC mechanisms facilitate project delivery by making investments available earlier in the development process, thereby capturing the opportunity for infrastructure improvements that might not otherwise have been possible. Two case examples involving state highways demonstrate the impact of VC on delivery speed for projects that were originally unfunded and on long-range (10-year) plans.
- **Local Funding Matches.** In three of the case examples, revenues from a capitalization benefit allowed local fund-matching opportunities to finance a portion of project costs and to be pooled with other funding sources. In two cases, the use of mechanisms also accompanied PPPs.
- **Getting a Project off the Ground.** In some cases, VC mechanisms can identify scarce initial funding by providing needed revenue streams that allow loan or bond financing. In at least three case examples, revenue streams (assessments and TIF) came in before the improvements, and risks of revenue streams were dealt with through default clauses or backstop arrangements.

Several other common themes beyond benefits were identified. They include the following:

- **Stakeholder Involvement Process.** The process can be lengthy, the number of stakeholders can be large, and consensus must occur over these groups.
- **VC as Part of Larger Toolbox.** There is general agreement that the mechanisms potentially can be considered as part of a larger funding toolbox.
- **Feasibility Studies.** Economic and other feasibility studies have a role in addressing several implementation aspects, including rates, service areas, duration, and timing; as part of broader strategy; or to ensure greater fiscal responsibility in revenue projections for financing purposes.

## CONCLUSIONS

### STUDY OBJECTIVES AND CASE EXAMPLES

This synthesis examined the state-of-the-practice methods for capturing a portion of the economic value generated by public investment in transportation infrastructure to fund transportation improvements to inform the planning practice. This study is developed from a literature review of 10 categories of mechanisms and specific case examples of how some agencies have employed the mechanisms to explain the nuances of actual implementation.

Many communities have undertaken value capture (VC) mechanisms to fund and finance transportation projects in their regions. This synthesis documents current practices that diverse communities have undertaken in a range of settings and contexts with the goal of providing transportation infrastructure (primarily highways), along with the challenges faced by the communities that implemented these practices. These case examples are not best practices. They also do not constitute a comprehensive database of case examples. They are merely a compilation of case examples as identified by the screening survey, the respondents, and through reviews that serve a primary purpose of increasing the knowledge base with respect to a number of aspects identified in the scope of the work, including (1) the matching of mechanism to project; (2) the design and implementation of the adopted mechanism with specific reference to issues in the capture of value and revenue considerations; (3) the stakeholders in the process and their involvement; and (4) key challenges in the case context.

The case examples demonstrate the universal challenges facing transportation professionals who are trying to use VC techniques and some common themes in the ways that communities have sought to address the challenges and the benefits received. From the high-population areas of Mercer County, New Jersey, Washington State, and Boston, Massachusetts, to less dense areas, such as Corvallis, Oregon, and Bozeman, Montana, meaningful efforts at VC for funding and financing projects rely on a guiding framework and often are enhanced by collaboration and cooperation with other relevant agencies or stakeholders, along with an overall approach that uses creative adaptation to formulate mechanisms that work for specific situations. The case examples cover project- and program-based settings, and several examples refer to projects from transportation improvement plans, capital improvements programs, or long-range plans.

### VALUE CAPTURE AS A NET GENERATOR OF NEW FUNDS

This study and many others in the domain suggest that some mechanisms that are discussed in this study, such as increment finance, do not really create a new source of funding. They only partition an existing source of wealth and transfer it to other parties. Methods that levy a fee [impact fees (IFs), special assessments] can lead to net new sources or generation of revenues. Similarly, air rights (ARs) and joint development (JD) when used in the context of project funding, as discussed in the case examples, may be considered a net new revenue source.

### CHOOSING A VALUE CAPTURE MECHANISM AS PART OF A FUNDING MIX

This study does not suggest any specific mechanism, but it does suggest through a variety of case examples that VC mechanisms can serve as a complement and be part of a larger funding package for a project. The VC mechanisms can reflect the capture of value created from one large beneficiary group of transport investments—the real estate community comprising landowners and developers. Similarly, other beneficiaries of transport investments, such as direct users of a facility, may provide different revenue streams, such as user fees. Thus, a useful economic assessment of projects would benefit greatly from a fuller identification of all the beneficiary classes in early stages of a project planning process. The case examples showcase different mechanisms and the specific circumstances that led to those choices in that local context, whenever possible. In most cases, the presence of a guiding framework appears to be a significant driver. However, even with a guiding framework stakeholder support may perhaps be the most significant factor in actual adoption and implementation of a preferred design, as reflected in rates, voluntary agreements, and exclusion/inclusion of land uses. The choice of a mechanism is also influenced in large part from an assessment of relative reliance on that source in the context when program guidance provides many choices locally.

The selection of any approach is recognized by respondents as accompanied by the need to address the equity and financial risk associated with the adoption and actual implementation of the funding method selected. Finally, many choices are possible for funding capital costs of transportation, including up-front and ongoing project costs. Only



one method, transportation utility fees (TUFs), appears to have been discussed in the context of funding operations and maintenance.

## CHALLENGES TO WIDER IMPLEMENTATION

A few studies, such as the Government Accountability Office 2010 one, have noted the challenges in wider application of VC mechanisms. Most of these challenges stem from obtaining stakeholder support and coordination across agencies, as discussed in chapter three, even with an enabling framework. However, in the context of project-based funding, there are other technical and information challenges that come in the form of knowledge gaps. Some of these knowledge gaps include:

- A lack of knowledge of the private land development effects from capacity-enhancing transportation projects. These impacts include how land development may have evolved in corridors and regions served by projects. This facet of transportation projects is an important factor in allowing a better assessment of the revenues from the VC mechanisms. There is a large amount of literature on property value effects of transportation investments; however, land development effects encompass much more than pure property value effects.
- A richer understanding of costs, benefits, risks and uncertainties of projects that have employed such funding methods. The sample included in this synthesis has pointed to several costs, such as transactions costs and administrative costs, that come from implementation and benefits from having the project in place. The sample also provides insights into risk considerations stemming from uncertainties associated with economic risks or other project contingencies, all from a qualitative perspective. An analysis of the costs and benefits of VC mechanisms is of value for selecting between alternative mechanisms when they are available. It is also of value for evaluating a given or chosen mechanism in parallel with other more typical non-VC funding sources and other innovative finance sources that may be used to fund transportation projects. Toolkits such as the Public Private Partnership Toolkit (FHWA 2012), noted in chapter four, allow VC to be considered alongside other non-VC funding sources to permit an evaluation approach for PPP projects adopted anywhere in the country.
- A better assessment of legal frameworks allowing states and regions to allow financing based on funding streams based on methods discussed in case examples. Almost all case examples included in this synthesis noted that financing backed by funding streams generated by VC mechanisms was allowed.
- A comprehensive understanding and characterization of factors that can lead to successful VC for different project types, locations, and at different times in the

business cycle. Although some of the case examples examined in this study may be considered “successful,” for others it may be too soon to tell if the efforts are successful. The literature review also points to examples that have not been very successful. This study suggests that it may equally important to study examples that have not been so successful.

- The formal delineation of land beneficiaries and spatially appropriate service areas for different types of projects. The case examples reveal how practical guidelines have been used to delineate proximity-based service areas for almost all mechanisms that rely on these geographic boundaries, including IFs, special assessments, sales tax districts (STDs), and tax-increment-like mechanisms. There is little understanding of the actual beneficiaries of projects and linkages with proximity based boundaries. As noted in the literature, roadway systems are open systems complicating the linkage assessment. Throughout the literature on land value effects of transportation, a relatively unexplored issue is the spatial distribution of effects and the formal linkages between beneficiaries and land outcomes.
- There is a knowledge gap on challenges, issues, and effects of a wider adoption of land-based taxes. This study identified only two states that have considered land-based taxes.

## FUTURE RESEARCH SUGGESTIONS

Several of the knowledge gaps discussed point to future research needs. An important consideration, as suggested from this synthesis and past research, is that VC tools offer the advantages of accelerated delivery, local matching of monies, and mobility improvements. Despite that most mechanisms are part of toolkits related to local government economic development, highway agencies need to be able to suggest or consider feasible options for transportation planning in a fiscally constrained environment. It is evident that the use of such tools comes with several challenges, including but not limited to transaction costs, stakeholder involvement costs, and administration costs.

- Research is needed to examine ways by which transportation agencies can (1) match VC mechanisms with the investment decision needs, and (2) have at their disposal toolkits or other decision-support mechanisms that can evaluate costs, benefits of specific individual transportation projects, and established goals. A valuable extension of this line of investigation could be to explore the feasibility of considering groups of projects.
- Research is needed to understand how to better improve the analysis of VC mechanisms as part of a funding package in the context of traditional design build and public private partnership delivery processes. At the same time, research is needed to facilitate a feasibility assessment of the likely costs, benefits, and risks of

adopting a specific VC mechanism and to understand the roles and value of supporting economic and other models and methods at various stages of adoption.

- A need exists to understand how best to identify real estate beneficiaries for different types of high-capacity projects and the value of using different tools, methods, and models to further the process. The current report and its evidence suggest that service-area-based IFs, STDs, special assessment districts (SADs), and tax increment financing (TIF) are the VC types that have been used predominantly for corridor and project financing and require the identification of beneficiaries.
- Little to no research has been conducted on the cost/benefit or economic impact on projects and corridors that have used such mechanisms. This study shows that there are valid examples that can provide a richer context for a full before and after study.
- Much has been invested in the development of national databases of transportation capacity projects, such as those developed under the Strategic Highway Research Program (SHRP 2). This line of research led to the development of economic impacts of capacity projects drawn from across the country and a database of those projects. This database of projects, the “Transportation Project Impact Case Studies,” is housed at the Transportation for Communities website (<http://www.transportationforcommunities.com/>) or <http://tpics.us/> and consists of more than 100 case examples from different types of capacity projects geographically distributed across the United States. Databases such as these provide a valuable resource for assessing the general economic impacts and also may be of value in studying the broader land development impacts in support of VC mechanisms. Thus, research to leverage existing databases such as those just noted in support of VC would be of value.
- Policy studies evaluating and documenting the issues in a more widespread adoption of land-based taxes, such

as a land value tax (LVT), would also be of value in determining the value of new sources of funding.

- Finally, this study suggests that there is a need to investigate better and more useful ways of community engagement for the use of VC mechanisms that do not rely on a legal framework. Stakeholder involvement has been noted as a key element in almost all studies once a method has been decided upon.

## SUMMARY

This chapter concludes this study by noting the following key points.

- Fee-based VC mechanisms can lead to net new revenue sources. Increment finance approaches do not lead to new sources of revenues. All mechanisms are of value in a funding toolbox.
- The most important factor that was identified through the literature review and case examples was the guiding framework. This was followed by the stakeholder support. Ultimately, these factors become vital for agencies to consider when choosing among mechanisms.

Future research is needed to better optimize how VC mechanisms are used. If state DOTs better understand how local entities use VC mechanisms, they can achieve the most bang for their buck in an era when development and maintenance dollars are becoming ever more constrained. A better understanding of the cost/benefit and economic impact of mechanisms most often used for corridor and project financing—namely, IFs, STDs, SADs, and TIFs—is also needed. This chapter has identified several knowledge gaps that exist in furthering VC mechanisms. These knowledge gaps have been summarized into six research needs. A formal research statement is provided in the abstract (Appendix D).

## ACRONYMS

ACHD	Ada County Highway Department
AR	Air right
CIP	Capital improvement plan
CMP	Comprehensive mobility plan
DOT	Department of transportation
EOWB	Elgin O'Hare West Bypass
GMA	Growth Management Act
IF	Impact fee
JD	Joint development
JPP	Joint planning process
JSPIA	Joint Southeast Public Improvement Association
LVT	Land value tax
MHTC	Missouri Highways and Transportation Commission
MTA	Massachusetts Turnpike Authority
MTFC	Missouri Transportation Finance Corporation
NE	Negotiated exaction
PCF	Project completion fund
PPP	Public-private partnership
RCW	Revised Code of Washington
SAD	Special assessment district
SCOP	Standing Committee on Planning
SCOFA	Standing Committee on Finance and Administration
SIB	State infrastructure bank
SPIMD	Southeast Public Improvement Metropolitan District
SR28-HTID	State Route 28 Highway Transportation Improvement District
SSA	Special service area
STARR	Sales tax anticipation revenue rebate agreement
STD	Sales tax district
TBD	Transportation benefit district
TC	Transportation corporation
TDD	Transportation development district
TDR	Transfer of development rights
TID	Transportation improvement district
TIF	Tax increment financing
TRZ	Transportation reinvestment zone
TSDC	Transportation system development charge
TSPLOST	Transportation Special Purpose Local Option Sales Tax
TUF	Transportation utility fee
UIDC	Urban Investment and Development Corporation
USACE	U.S. Army Corps of Engineers
VC	Value capture
WMATA	Washington Metropolitan Area Transportation Authority

## REFERENCES

- AASHTO Center for Excellence in Project Finance, "Special Assessment Districts," 2013 [Online]. Available: [http://www.transportation-finance.org/funding\\_financing/funding/local\\_funding/value\\_capture/special\\_assessment\\_districts.aspx](http://www.transportation-finance.org/funding_financing/funding/local_funding/value_capture/special_assessment_districts.aspx) [accessed Mar. 2013].
- AECOM, *Analysis of Alternative Financing Mechanisms and Institutional Options*, Final Report—Volume III: Section 1—Commission Briefing Paper 5A-11, "Evaluation of Impact Fees and Value Capture Techniques," Technical Issues Papers, National Surface Transportation and Revenue Commission, 2007.
- Alterman, R., *Private Provision of Public Services: Evaluation of Real Estate Exactions, Linkage, and Alternative Land Policy*, New York University Press, New York, N.Y., 1988.
- Altshuler, A. and J. Gomez-Ibanez, *Regulation for Revenue: The Political Economy of Land Use Exactions*, Lincoln Institute of Land Policy, Cambridge, Mass., 1993.
- American Planning Association (APA), "Policy Guide for Impact Fees," APA, Chicago, Ill., 1997 [Online]. Available: <https://www.planning.org/policy/guides/adopted/impactfees.htm> [accessed Feb. 2013].
- American Planning Association (APA), Virginia Chapter, *Managing Growth and Development in Virginia: A Review of the Tools Available to Localities*, 2012.
- Andelson, R.V., *Land-Value Taxation Around the World*, Blackwell, Malden, Mass., 2000.
- Batt, W., "Value Capture as a Policy Tool in Transportation Economics: An Exploration in Public Finance in the Tradition of Henry George," *The American Journal of Economics and Sociology*, Vol. 60, No. 1, 2001.
- Boston Redevelopment Authority, "A Civic Vision for Turnpike Air Rights in Boston," 2000 [Online]. Available: <http://www.bostonredevelopmentauthority.org/pdf/PlanningPublications/Turnpike%20Air%20Rights%20Civic%20Vision.pdf> [accessed Mar. 2013].
- Bowes, D.R. and K. Ihlanfeldt, *Economic Impact Analysis of Transit Investments: Guidebook for Practitioners*, TRB Report 35, Transportation Research Board, National Research Council, Washington, D.C., 2001.
- Butler County TID, Various documents [Online]. Available: [www.bctid.org](http://www.bctid.org) [accessed May 2013].
- California Benefit Assessment Act, 1982 [Online]. Available: <http://codes.lp.findlaw.com/cacode/GOV/1/5/d2/1/6.4> [accessed Mar. 2013].
- Camino Real Regional Mobility, Project Documents 2010 [Online]. Available: <http://www.crrma.org>, [accessed Mar. 2013].
- Campbell, B., *Creating Sustainable Air Rights Development Over Highway Corridors—Lessons from Massachusetts Turnpike in Boston*, Dissertation, Massachusetts Institute of Technology, Cambridge, 2004.
- Carlson, D., B. Duckwitz, K. Kurowski, and L. Smith, *Transportation Utility Fees: Opportunities for the City of Milwaukee*, Robert M. Follette School of Public Affairs, University of Wisconsin, Madison, 2007.
- Center for Transit Oriented Development, *Capturing the value of transit*, 2008 [Online]. Available: <http://www.reconnectingamerica.org/resource-center/books-and-reports/2008/> [accessed April 2013].
- Cervero, R., et al., *TCRP Report 102: Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*, Transportation Research Board of the National Academies, Washington, D.C., 2004, 551 pp.
- City of Harrisburg, "City of Harrisburg Two-Tier Tax History," Public Document, 2005 [Online]. Available: <http://www.urbantoolsconsult.org/upload/City%20of%20Harrisburg%202%20tier%20tax%20rate.pdf> [accessed Apr. 2013].
- City of Olathe, "Council Policy Statement," 2012, Public Document [Online]. Available: <http://www.olatheks.org/files/CityDocuments/ccp/F-6.pdf> [accessed Apr. 2013].
- City of Portland, Oregon, 2009 [Online]. Available: <http://www.portlandoregon.gov/transportation/338700> [accessed January 2013].
- City of Portland, "Rate Study," Public Document, 2007 [Online]. Available: <http://www.portlandoregon.gov/transportation/article/340812> [accessed Apr. 2013].
- City of St. Louis, *Transportation Corporations Program Summary*, 2008 [Online]. Available: [http://www.stlrcga.org/Documents/Incentives/MO\\_Transportation%20Corporations%20Detail.pdf](http://www.stlrcga.org/Documents/Incentives/MO_Transportation%20Corporations%20Detail.pdf) [accessed Jan. 2013].
- Code of Virginia, Virginia General Assembly, Chapter 22, "Public Private Transportation Act of 1995," 1995 [Online]. Available: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC560000000220000000000000> [accessed May 2013].
- Code of Virginia, Virginia General Assembly, 2007 [Online]. Available: <http://lis.virginia.gov/cgi-bin/legp604.exe?000+cod+58.1-3221.3> [accessed Sep. 2013].
- Common Ground OR-WA, Common Ground USA ([CommonGroundorwa.org](http://CommonGroundorwa.org)), "Land Value Taxation—The Harrisburg Experience," 2012 [Online]. Available: <http://CommonGroundorwa.org/index.php/component/k2/item/373-land-value-taxation-%E2%80%93-the-harrisburg-experience> [accessed Apr. 2013].
- Connecticut General Assembly, 2013 [Online]. Available: [http://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&bill\\_num=HB-6706](http://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&bill_num=HB-6706) [accessed Sep. 2013].
- Copley Place Project Information, Urban Investment and Development Company, Chicago, Ill., 1980.
- Cord, H., "Washington Transit Program Includes Joint Development," *Right of Way*, June 1981.
- Council on Development Finance Agencies, "National Roundup: Tax Increment Financing," 2006 [Online]. Available: <http://www.cdfa.net/cdfa/cdfaweb.nsf/ordredirect>.



- html?open&id=tifnationalroundup.html [accessed Apr. 2013].
- Cox, T., "Collectible Stocks and Bonds from North America," 2009 [Online]. Available: <http://www.coxrail.com/land-grants.htm> [accessed Apr. 2013].
- Dabinett, G., "Realizing Regeneration Benefits from Urban Infrastructure Investment: Lessons from Sheffield in the 1990s," *Town Planning Review*, Vol. 69, 1998, pp. 171–189.
- Dalvi, M., "Value Capture as a Method of Financing Rail Projects: Theory and Practice," In *Readings in Indian Railway Finance*, K.B. Verma, Ed., Academic Foundation Publishing, New Delhi, India, 1998.
- Dolan v. City of Tigard*, 114 S. Ct. 2309, 1994 [Online]. Available: [http://en.wikipedia.org/wiki/Dolan\\_v.\\_City\\_of\\_Tigard](http://en.wikipedia.org/wiki/Dolan_v._City_of_Tigard) [accessed Sep. 2013].
- Duncan Associates, "Impact Fee Resources" [Online]. Available: <http://www.impactfees.com/> [accessed Apr. 2013].
- Dye, R. and R.W. England, *Assessing the Theory and Practice of Land Value Taxation*, Lincoln Institute of Land Policy, Cambridge, Mass., 2010.
- Dye, R.F. and J.O. Sundberg, "A Model of Tax Increment Financing Adoption Incentives," *Growth and Change*, Vol. 29, 1998, pp. 90–110.
- Ewing, R., "Transportation Utility Fees," *Government Finance Review*, 10, 1994, 13–17.
- Ewing, R., "Transportation Utility Fees," *ITE Journal*, 1993.
- Ewing, S., "Supreme Court Decision will Impact Land-Development Projects Nationwide," 1999 [Online]. Available: <http://www.jdsupra.com/legalnews/supreme-court-decision-will-impact-land-57947/> [accessed July 2013].
- Fairfax County, "The Proffer System in Fairfax County, Public Document," 2009 [Online]. Available: [http://www.fairfaxcounty.gov/dpz/resources/proffer\\_system\\_paper-revised.pdf](http://www.fairfaxcounty.gov/dpz/resources/proffer_system_paper-revised.pdf) [accessed May 2013].
- Federal Highway Administration (FHWA), *Joint Development Study*, FHWA, Washington, D.C., 1996 [Online]. Available: [http://www.fhwa.dot.gov/real\\_estate/practitioners/uniform\\_act/acquisition/jntdev.cfm](http://www.fhwa.dot.gov/real_estate/practitioners/uniform_act/acquisition/jntdev.cfm) [accessed Apr. 2013].
- Federal Highway Administration (FHWA), *Airspace Guidelines to 23 CFR 710.405-710.407*, FHWA, Washington, D.C. 2010 [Online]. Available: [http://www.fhwa.dot.gov/real\\_estate/practitioners/right-of-way/corridor\\_management/airspace\\_guidelines.cfm](http://www.fhwa.dot.gov/real_estate/practitioners/right-of-way/corridor_management/airspace_guidelines.cfm) [accessed Aug. 2013].
- Federal Highway Administration (FHWA), "Public Private Partnership Toolkit," FHWA, Washington, D.C., 2012 [Online]. Available: <http://www.fhwa.dot.gov/ipd/p3/toolkit/> [accessed Apr. 2013].
- Fensham, P. and B. Gleeson, "Capturing Value for Urban Management: A New Agenda for Betterment," *Urban Policy and Research*, Vol. 21, No. 1, 2003, pp. 93–112.
- Florida Administrative Code and Register, "Florida Transportation Corporation Act," Sections 339.401-421, Florida Statutes, 1999 [Online]. Available: <http://flrules.eregulations.us/code/rule/14-35.0011?selectdate=6/16/2013> [accessed May 2013].
- Friedman, P., "Investment Up in the Air: Air Rights and Transit," 2012 [Online]. Available: [http://web1.ctaa.org/webmodules/webarticles/articlefiles/RAIL\\_30\\_AirRights.pdf](http://web1.ctaa.org/webmodules/webarticles/articlefiles/RAIL_30_AirRights.pdf) [accessed Feb. 2013].
- Government Accountability Office (GAO), *Public Transportation: Federal Role in Value Capture Strategies for Transit Is Limited, but Additional Guidance Could Help Clarify Policies Report 10-781*, GAO, Washington, D.C., 2010 [Online]. Available: <http://www.gao.gov/new.items/d10781.pdf> [accessed May 2013].
- Grimes, M., K. Mattingly, and J. Miller, *Alternative Transportation Funding Sources Available to Virginia Localities*, FHWA/VTRC 06-R17, Virginia Transportation Research Council, Charlottesville, 2006.
- Hagman, D. and D. Mischynski, *Windfalls for Wipeouts*, American Society of Planning Officials, Chicago, Ill., 1978.
- Harrigan, L. and A. Hoffman, *Happy to Grow: Development and Planning in Fairfax County, Virginia*, Joint Center for Housing Studies, W04-2, Harvard University, Cambridge, Mass., 2004.
- Hough, J., A. Smadi and J. Bitzan, "Innovative Financing Methods for Local Roads in Midwest and Mountain-Plains States," Upper Great Plains Transportation Institute, North Dakota State University, Fargo, N.D., 1997 [Online]. Available <http://www.mountain-plains.org/pubs/pdf/MPC97-74.pdf> [accessed Mar. 2013].
- Huxley, J., *Value Capture Finance. Making Urban Development Pay Its Way*, Urban Land Institute, Washington, D.C., 2009.
- Iacono, M., D. Levinson, Z. Zhao, and A. Lari, *Value Capture for Transportation Finance: Report to the Minnesota Legislature*, 09-18S, University of Minnesota Center for Transportation Studies, Minneapolis, 2009.
- Ingram, G., "Patterns of Metropolitan Development: What Have We Learned?" *Urban Studies*, Vol. 35, 1998, pp. 1019–1035.
- Institute of Transportation Engineers, *Trip Generation User's Guide*, Washington, D.C., 2003.
- ITE Technical Council Committee, "Private Financing of Transportation Improvements," *ITE Journal*, Vol. 43, 1988.
- Junge, J. and D. Levinson, "Financing Transportation with Land Value Taxes," *The Journal of Transport and Land Use*, Vol. 5, No. 1, 2012a, pp. 49–53.
- Junge, J. and D. Levinson, "Prospects for Transportation Utility Fees," *Journal of Transport and Land Use*, Vol. 5, No. 1, 2012b, pp. 33–47.
- Kemp, A., V. Mollard, and I. Wallis, *Value Capture Mechanisms to Fund Transport Infrastructure*, NZ Transport Agency Research Report 511, United Kingdom, 2013.
- Kogan, V. and M. McCubbins, *The Problem of Being Special: Special Assessment Districts and the Financing of Infrastructure in California*, Keston Institute for Public Finance and Infrastructure Policy, Los Angeles, Calif., 2008.
- Kolo, J. and T. Dicker, "Practical Issues in Adopting Impact Fees," *State and Local Government Review*, Vol. 25, No. 3, 1993, pp. 197–206.
- Lari, A., et al., *Value Capture for Transportation Finance*, Center for Transportation Studies, University of Minnesota, Minneapolis, 2009.

- Larson, K. and Z. Zhao, "Air Rights Development as a Value Capture Strategy," Transportation Research Board Annual Meeting Compendium of Papers, Paper No. 10-3358, Transportation Research Board of the National Academies, Washington, D.C., 2010.
- League of Minnesota Cities, Special Assessment Guide, 2011 [Online]. Available: [www.lmc.org/media/document/1/sagtext.pdf](http://www.lmc.org/media/document/1/sagtext.pdf) [accessed April 2013].
- League of Oregon Cities, "TUF Solutions for Local Street Funding: A Survey of Transportation Utility Fees," 2008 [Online]. Available: <http://www.apwa-wa.org/forums/OregonCities2007TUFReport.pdf> [accessed Mar. 2013].
- Levinson, D. and E. Istrate, "Access for Value: Financing Transportation Through Land Value Capture," Brookings Institution, Washington, D.C., 2011 [Online]. Available: <http://www.brookings.edu/research/papers/2011/04/28-transportation-funding-levinson-istrate> [accessed Dec. 2012].
- Levinson, D.M., "The Limits to Growth Management," *Environment and Planning B: Planning and Design*, Vol. 24, 1997, pp. 689–707.
- Libby, L.W. and C. Carrion, "Development Impact Fees," Ohio State University Extension Factsheet CDFS-1558-04, Columbus, 2004 [Online]. Available: <http://ohioline.osu.edu/cd-fact/1558.html> [accessed Mar. 2013].
- Maryland Department of Transportation, "Value Capture: A Transportation Revenue Option for Maryland," Study Prepared for Maryland Blue Ribbon Commission on Transportation Funding.
- Mathur, S. and A. Smith, *A Decision Support Framework for Using Value Capture to Fund Public Transit: Lessons from Project Specific Analysis*, Minnesota Transportation Institute 11-14, San Jose State University, 2012.
- Measure 50. 1997 [Online]. Available <http://www.oregon.gov/dor/STATS/docs/303-405-98/pg6-11.pdf> [accessed April 2013].
- Meisner, L., "Financing Urban Transportation Improvements," Report 2—*Use of Private Funds for Financing Highway Improvements*, Federal Highway Administration, U.S.DOT, Washington, D.C., 1984.
- Mills, D.E., "Transferable Development Rights Markets," *Journal of Urban Economics*, Vol. 7, 1980, p. 63.
- Missouri Department of Transportation, "A Guide to Financing Successful Partnerships with Missouri Department of Transportation," Missouri DOT, Jefferson City [Online]. Available: [www.modot.org/services/community/documents/programguide.pdf](http://www.modot.org/services/community/documents/programguide.pdf) [accessed Jan. 2013].
- Missouri Department of Transportation, "A Guide to Financing Successful Partnerships with Missouri," Department of Transportation, 2004 [Online]. Available: [www.modot.org/services/community/documents/programguide.pdf](http://www.modot.org/services/community/documents/programguide.pdf) [accessed Jan. 2013].
- Missouri Highways and Transportation Commission, "City of Poplar Bluff, Missouri and Highway 67 Corporation Cooperative Agreement," Public Document, Jefferson City, 2005.
- Missouri Highways and Transportation Commission, "U.S. Highway 36–Interstate 72 Corridor TDD and U.S. Highway 36–Interstate 72 Corridor Transportation Corporation Cooperative Agreement," Public Document, Jefferson City, 2005.
- Missouri Revised Statutes, Chapter 238, Transportation Districts and Transportation Corporations, Special Section 238.300 [Online]. Available: <http://www.moga.mo.gov/statutes/C200-299/2380000300.HTM> [accessed April 2013].
- Missouri State Business and Community Service [Online]. Available: <http://ded.mo.gov/> [accessed Jan. 2013].
- Mullen, C., Duncan Associates, "State Impact Fee Enabling Acts," 2012 [Online]. Available: [http://www.impactfees.com/publications%20pdf/state\\_enabling\\_acts.pdf2012](http://www.impactfees.com/publications%20pdf/state_enabling_acts.pdf2012) [accessed Feb. 2013].
- Municipal Research and Services Center, "Washington: Local Improvement Districts and Road Improvement Districts" [Online]. Available: <http://www.mrsc.org/subjects/transpo/assessdistricts.aspx> [accessed Mar. 2013].
- Murphy, N., *Methods for Financing Transportation Infrastructure*, Oregon Department of Transportation, Salem, 2010.
- Musgrave, R., *The Theory of Public Finance, A Study in Public Economy*, McGraw Hill, New York, N.Y., 1959, pp. 71–89.
- National Association of Home Builders (NAHB), *Impact Fee Handbook*, NAHB, Washington, D.C., 2008 [Online]. Available: <http://www.nahb.org/infrastructurefinance> [accessed Mar. 2013].
- National Surface Transportation Policy and Revenue Commission, *Transportation for Tomorrow*, Report of the National Surface Transportation Policy and Revenue Study Commission, 2007 [Online]. Available: [http://transportationfortomorrow.com/final\\_report/index.htm](http://transportationfortomorrow.com/final_report/index.htm) [accessed Nov. 2012].
- Nelson, A. and M. Moody, "Paying for Prosperity—Impact Fees and Job Growth," Discussion Paper, Brookings Institution, 2003 [Online]. Available: [http://www.brookings.edu/reports/2003/06metropolitanpolicy\\_nelson.aspx](http://www.brookings.edu/reports/2003/06metropolitanpolicy_nelson.aspx).
- National Governor's Association, Center for Best Practices, 2012 [Online]. Available: [http://www.mdot.maryland.gov/Office\\_of\\_Planning\\_and\\_Capital\\_Programming/Blue\\_Ribbon/Documents/Meeting\\_Agenda\\_032111/NGA\\_Value\\_Capture\\_Summary\\_for\\_BRC\\_032111.pdf](http://www.mdot.maryland.gov/Office_of_Planning_and_Capital_Programming/Blue_Ribbon/Documents/Meeting_Agenda_032111/NGA_Value_Capture_Summary_for_BRC_032111.pdf) [accessed Mar. 2013].
- Nollan v. California Coastal Commission*, 483 U.S. 825, 1987.
- Ohio Department of Transportation. "Ohio Transportation Improvement Districts," Public Document, 2011 [Online]. Available: [http://www.dot.state.oh.us/Divisions/JobsAndCommerce/tid/Documents/2011\\_Nov\\_Registered\\_TID\\_Map.pdf](http://www.dot.state.oh.us/Divisions/JobsAndCommerce/tid/Documents/2011_Nov_Registered_TID_Map.pdf) [accessed May 2013].
- Ohio Department of Transportation. "Ohio Program Resource Guide," Ohio Department of Transportation, Columbus, 2013 [Online]. Available: [www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Documents/ODOT%20ProgramResource%20Guide.pdf](http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Documents/ODOT%20ProgramResource%20Guide.pdf) [accessed May 2013].

- Peters, R., "Building Castles in the Air—An Air Rights 'Under and Overview,'" International Right of Way Association, Right of Way, Gardena, Calif., June 1986.
- Peterson, G., "Unlocking Land Values to Finance Urban Infrastructure," *Trend and Policy Options*, World Bank and International Bank for Reconstruction and Development Policy Paper, 2008.
- Pershing, J.P., *TCRP Legal Research Digest 28: Uses of Fees or Alternatives to Fund Transit*, Transportation Research Board of the National Academies, Washington, D.C., 2008, 37 pp.
- Purvis, D., "Tax Increment Financing in North Carolina: Great Expectations, Limited Use," Paper Submitted in Completion of the Master of Public Administration, University of North Carolina, Public Document, 2008 [Online]. Available: <http://www.mpa.unc.edu/files/ShawnPurvis.pdf> [accessed Mar. 2013].
- Rall, J., A. Wheet, N. Farver, and J. Reed, *Transportation Governance and Finance: A 50-State Review of State Legislatures and Departments of Transportation*, National Conference on State Legislatures, Washington, D.C., 2011.
- Rappa, J.G., *Comparison of State Development Impact Fee Statutes*, OLR Research Report, 2002 [Online]. Available: <http://www.cga.ct.gov/2002/olrdata/pd/rpt/2002-R-0842.htm> [accessed May 2013].
- Rice Center, *Alternative Financing for Urban Transportation*, Federal Highway Administration, DOT-1-86-30, U.S. Department of Transportation, Washington, D.C., 1986.
- Rivenbank, W., S. Denning, and K. Millonzi, "2007 Legislation Expands Scope of Project Development Financing in North Carolina," *Local Finance Bulletin*, Vol. 36, Nov. 2007.
- Rolon, A., "Evaluation of Value Capture Mechanisms from Linkage Capture to Special Assessment Districts," *Transportation Research Record: Journal of the Transportation Research Board*, No. 2079, Transportation Research Board of the National Academies, Washington, D.C., 2008, pp. 127–135.
- Rosenbloom, S., "The Equity Implications of Financing the Nation's Surface Transportation System," *TR News* 261, 2009, pp. 3–9.
- Route 28 Project Website, various documents [Online]. Available: <http://www.28freeway.com/projectoverview.html> [accessed May 2013].
- Route 28 TID Prospectus, Fairfax County, 2012, Public Document [Online]. Available: [http://www.i-dealprospectus.com/PDF/1\\_55007.pdf](http://www.i-dealprospectus.com/PDF/1_55007.pdf).
- Rybeck, R., "Using Value Capture to Finance Infrastructure and Encourage Compact Development," *Public Works and Management Policy*, Vol. 8, No. 4, 2004, pp. 249–260.
- Sales Tax Anticipation Revenue Reimbursement Agreement, Meridian Town Center, Idaho DOT, 2012.
- Savvides, A., "Regenerating Urban Space: Putting Highway Air Space to Work," *Journal of Urban Design*, 2004, pp. 47–71.
- Sedway Kotin Mouchly Group, *Joint Development Entrepreneurial Study*, Report, San Francisco Bay Area Rapid Transit District, 1996.
- Smith, J. and T. Gihring, "Financing Transit Systems Through Value Capture: An Annotated Bibliography," *American Journal of Economics and Sociology*, Vol. 65, No. 3, 2006, p. 751.
- Smolka, M., *Implementing Value Capture in Latin America: Policies and Tools for Urban Development*, Policy Focus Report, Lincoln Institute of Land Policy, Cambridge, Mass., 2013.
- Special District Association of Colorado (SDACO), *Special Assessment District Newsletter*, Dec. 2007 [Online]. Available: [www.sdaco.org](http://www.sdaco.org) [accessed May 2013].
- Speirs, M., "Land Value Taxation: An Underutilized Complement to Smart Growth Policies," Dissertation, 2010.
- Spielberg, F., "How Citizens Associations View Developer Offers of Innovative Transportation Solutions," 1987 [Online]. Available: <http://www.ite.org/Membersonly/techconference/1987/CCA87G53.pdf> [accessed May 2013].
- Springer, C. and J. Ghilarducci, "Transportation Utility Experience," *Transportation Research Record, Journal of the Transportation Research Board*, No. 1895, Transportation Research Board of the National Academies, Washington, D.C., 2004, pp. 15–24.
- "State Auditor's Report," Report No 2011-116, 2011 [Online]. Available: <http://www.auditor.mo.gov/press/2011-116.pdf> [accessed Jan. 2013].
- State Smart Transportation Initiative (SSTI), "A Survey of State and Local Transportation Revenue Sources," SSTI, Madison, Wisc., 2012 [Online]. Available: [http://www.ssti.us/wp/wp-content/uploads/2012/09/State\\_&\\_Local\\_Transportation\\_Revenue\\_Sources.pdf](http://www.ssti.us/wp/wp-content/uploads/2012/09/State_&_Local_Transportation_Revenue_Sources.pdf) [accessed May 2013].
- Strathman, J.G. and E. Simmons, "Financing Mechanisms for Capital Improvements: Interchanges," SPR 687 OTREC-RR-10-07, Oregon Department of Transportation, Salem, 2010.
- Texas Transportation Code, Title 6, Chapter 431 [Online]. Available: <http://www.statutes.legis.state.tx.us/Docs/TN/htm/TN.431.htm> [accessed May 2013].
- TischlerBise Inc., "City of Bozeman Transportation Impact Fee Study Final Report 2012" [Online]. Available: <http://www.bozeman.net/Smarty/files/1b/1b59f5a2-9469-4922-b4f6-0430f4230979.pdf> [accessed May 2013].
- Ullevig, A., "JSPIA B.U.S. Corridor Study," 2000 [Online]. Available: [www.ite.org/Membersonly/annualmeeting/1985/AHA85A60.pdf](http://www.ite.org/Membersonly/annualmeeting/1985/AHA85A60.pdf) [accessed Apr. 2013].
- United Nations Conference on Human Settlements, "The Vancouver Action Plan: Recommendations for National Action Approved at Habitat," Vancouver, Canada, 1976.
- United States Department of Transportation, *Report to the Congress on Public Private Partnerships*, December 2004 [Online]. Available: <https://www.fhwa.dot.gov/reports/pppdec2004/pppdec2004.pdf> [accessed April 2013].

- Vadali, S., et al., *Planning Tools to Assess the Real Estate Leveraging Potential for Roadways and Transit: Technical Report*, FHWA/TX-11/0-6538-1, Texas Transportation Institute, Texas A&M University, College Station, 2010a.
- Vadali, S., et al., *Transportation Reinvestment Zone Handbook*, FHWA/TX-11/0-6538-2, Texas Transportation Institute, Texas A&M University, College Station, 2010b.
- Williams, K., *Alternative Funding Mechanisms for Improving Transportation Facilities*, Center for Urban Transportation Research (CUTR), Report Prepared for North Carolina Department of Transportation, CUTR, University of South Florida, Tampa, 2006.
- Zhao, J. and K. Larson, "Special Assessments as a Value Capture Strategy for Public Transit Finance," *Public Works Management and Policy*, Vol. 16, No. 4, 2012, pp. 320–340.
- Zhao, Z., K. Das, and K. Larson, "Joint Development as a Value Capture Mechanism," *The Journal of Transport and Land Use*, Vol. 5, No. 1, 2012, pp. 5–17.
- Zhao, Z., M. Iacono, A. Lari, and D. Levinson, "Value Capture for Transportation Finance," *Procedia—Social and Behavioral Sciences*, Vol. 48, 2012, pp. 435–448.



## APPENDIX A

### Survey Questionnaire

#### GLOSSARY OF VALUE CAPTURE MECHANISMS

What is Value Capture? Value capture is an innovative financing tool that allows recovery of part of the value created to real estate and commerce. It can be implemented in many ways to fund transportation. We are seeking examples of value capture applications in any of the following 10 categories.

1. *Impact Fees*: Monetary charges or fees associated with costs incurred with extension of public services for private developments and will include:
  - System charges.
  - Traditional developer impact fees.
2. *Land Value Tax* or Split Rate Property Tax: A tax on unimproved portion of land only.
3. *Negotiated Developer Exactions*: Fees, charges or any requirement placed on developers for in-kind contributions of facilities.
4. *Air Rights*: Refers to the sale of development rights for land adjacent to or above a transportation facility.
5. *Joint Development*: A public-private partnership where a private-sector partner either provides the transportation facility or makes a financial contribution to offset the public cost.
6. *Special Assessment Districts* (SADs): Special districts created to finance a public improvement. These will include benefit districts of the broadest variety such as:
  - Transportation Benefit Districts (TBD).
  - Transportation Improvement Districts (TID) and all other improvement districts as long as the mechanisms have been or are being used for funding transport projects.
7. *Tax Increment Finance* (TIF): Use taxes levied on incremental increase in property values resulting from an improvement. The taxes are used to fund improvements usually through repayments of bonds. These will include all categories such as:
  - Allocation Districts (TAD).
  - Transportation related Reinvestment Zones (TRZs).
  - Revitalization Districts (as long as the mechanisms have been or are being used for funding transport projects).
8. *Sales Tax Districts*: Small increments in sales taxes levied in special districts. This will include categories such as Transportation Development Districts (TDD).
9. *Transportation Utility Fees* (TUF): Fees assessed on properties based on amount of trips generated and will include:
  - Mobility fees.
  - Road user fees.
10. Other mechanisms will include all other related to land, real estate, or sales tax options including:
  - Local option sales tax used for funding transportation.
  - Other mechanisms that are not covered in the nine broad included categories.

#### Respondent Information

Please enter the date (MM/DD/YYYY):

*Please enter your contact information. \**

Name: \_\_\_\_\_

Agency/Organization: \_\_\_\_\_

City & State: \_\_\_\_\_

Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

### Synthesis Questionnaire

- 1) Please provide as much information as you can on any of the following value capture mechanisms that have been used in your state or region. This question represents the core content of this survey. Depending on the web browser you are using, you may need to use the scroll bar at the bottom to view all columns.

	Mode		State Legislation, Statute or Ordinance Allowing for the Use of the Mechanism (Please provide a brief description, title or web link)	Examples in Your State/Region (List cities and project types)	Contacts for TRB Follow-up (Please provide names, e-mails, and phone numbers, if available)	Additional Comments (including any specific benefits, if applicable)
	Highway	Transit	Multimodal			
Impact Fee	( )	( )	( )			
Land Value Tax (LVT) or Split Rate Property Tax	( )	( )	( )			
Negotiated Developer Exactions	( )	( )	( )			
Tax Increment Financing (TIF)	( )	( )	( )			
Air Rights	( )	( )	( )			
Joint Development	( )	( )	( )			
Transportation Utility Fee	( )	( )	( )			
Special Assessment Districts (SAD)	( )	( )	( )			
Sales Tax Districts or Sales Tax Revenue Bonds	( )	( )	( )			
Other Mechanisms (use the comment box)	( )	( )	( )			

- 2) Please use the space below to provide any important web links to case examples, case example documents, and further discussion on specific benefits to region or state.

**THANK YOU FOR YOUR TIME!**

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<http://tti.tamu.edu>

## APPENDIX B

### Screening Survey Participants/Respondents

TABLE B1  
SCREENING SURVEY PARTICIPANT/RESPONDENTS

Agency	AASHTO Region and Standing Committee
Washington State Department of Transportation	4, Standing Committee on Finance and Administration
Alabama Department of Transportation	2, Standing Committee on Planning
Maryland Department of Transportation, The Secretary's Office	1, Standing Committee on Finance and Administration
Idaho Transportation Department	4, Standing Committee on Finance and Administration
Montana Department of Transportation	4, Standing Committee on Finance and Administration
Wisconsin Department of Transportation	3, Standing Committee on Finance and Administration
Oklahoma Department of Transportation	4, Standing Committee on Finance and Administration
Iowa Department of Transportation	3, Standing Committee on Finance and Administration
Missouri Department of Transportation	3, Standing Committee on Finance and Administration
South Dakota Department of Transportation	4, Standing Committee on Planning; Standing Committee on Finance and Administration
Arkansas State Highway and Transportation Department	2, Standing Committee on Finance and Administration
Georgia Department of Transportation	2, Standing Committee on Planning
Texas Department of Transportation	4, Standing Committee on Finance and Administration
Michigan Department of Transportation	3, Standing Committee on Finance and Administration
Hawaii DOT, Highways Division	4, Standing Committee on Finance and Administration
Colorado Department of Transportation	4, Standing Committee on Finance and Administration
North Dakota Department of Transportation	4, Standing Committee on Finance and Administration
New Hampshire Department of Transportation	1, Standing Committee on Finance and Administration
Virginia Department of Transportation	2, Standing Committee on Finance and Administration

Contacts from agencies such as Ohio Department of Transportation provided information directly through e-mail.

Agencies in New Jersey such as the New Jersey Planning and Zoning Commission also provided information directly by means of phone and e-mail.

## APPENDIX C

### Interview Guide

[NOTE TO PANEL MEMBERS: This interview guide is based on the case example information called for in the Scope of Work. It is a generic guide, since the details of each representative/interviewee will depend on (1) the focus of the particular case example, (2) the role and responsibilities of each interviewee regarding the case example, and (3) the documented information that already exists and can be used in the case example.]

#### INITIAL INTERVIEWS

The initial interviews—several of which are being conducted and some of which have been conducted already—seek to find out from the primary agency contact what is addressed in the agency’s candidate business/decision process, the role of engineering economic analyses within this process, and the type, detail, and maturity of the economic method used. The interviews identify documents that are available to describe the process and the specific economic analyses used. The agency contact may be asked to help gather and provide additional information. These interviews are the basis of recommendations to the panel regarding likely case examples, and to the interviewed agency as to which specific applications of their engineering economic analyses are most beneficial to include in this synthesis report. The information gathered in these initial interviews enables me to begin case example development.

#### FOLLOW-UP INTERVIEWS

Follow-up interviews with each agency will look to fill in gaps, flush out useful details, clarify points, and correct any misconceptions on our side. If warranted, the context of the case example will be strengthened—that is, how does the funding mechanism fit into the agency’s overall decision framework for highway investments? At this stage of the synthesis study, before obtaining survey results, I will be conducting these follow-up interviews after coming up with a preliminary case example draft based on the information identified in the initial interviews. Once survey results are obtained, the information gathering and interview process will likely be compressed to move more quickly, since the drafts of the initial set of cases will have established roadmaps and guidelines enabling work to proceed more quickly.

To some degree I am “over programming” the number of candidate case examples, realizing that (1) some case examples may, on fuller development, turn out not to bear fruit in meeting the study’s objectives and therefore need to be dropped, and (2) attempts to schedule future interviews with some agencies may not be successful within the time frame needed for Draft 1 completion in June.

The follow-up interviews will address the following items, drawing on items required in the Scope of Work:

- **Characteristics of the case example**, with an eye toward providing a diverse set of examples in the report, and comments on unique, innovative, or comprehensive aspects.
- **Types of investments/project and modal orientation for which funding was raised** (e.g., expansions/upgrades, managed lanes, toll lanes, other new capacity projects, operational improvements, and modal orientation such as capital expenses and operations expenses or as a combined mechanism with transit and/or other modes).
- **Specific resources that might support the case example** (e.g., maps, images, supporting analysis if used, specific legal background that allows use of a method).
- **Design and implementation considerations** (e.g., process defining how the funding method was designed such as how boundaries were developed for beneficiary areas for applying the method, how the revenues were raised and how the revenues were managed and recycled back to the project, equity considerations, and the initiation process, and the role of feasibility studies in considering any or all of these factors).
- **Revenue raising considerations** (e.g., what type of levy was used, frequency and duration of levy/fee/charge, how the revenues were projected and other specific considerations in revenue generation as well as financing aspects such as issuance of bonds, specific considerations in revenue projections, and the role of feasibility studies in considering any or all of these factors).
- **Local partners and key players** (who were all the agencies or entities involved in the process of making that a usable funding source/mechanism and the key layers in getting the project going).
- **Supporting data for the revenue analysis.**
- **Who exercises oversight, and who receives the results?**



## APPENDIX D

### Research Problem Statement

#### RESEARCH PROBLEM STATEMENT

This synthesis indicates that value capture mechanisms offer advantages of accelerated delivery, local matching of monies, and sometimes seed money for critical mobility improvements. Given that most value capture innovative funding and finance mechanisms are part of local government economic development related toolkits, highway agencies and local organizations need to be able to consider feasible options for planning in a fiscally constrained environment. This study demonstrates that the operationalization of such methods comes with several challenges, including but not limited to transaction costs, stakeholder involvement costs, and administration costs. There are other operationalization challenges that are implicit in the use of specific mechanisms which rely on the use of special service areas and processes for establishing fees or levies. Some of these issues are contingent on a fair assessment of future economic returns and beneficiaries from undertaking the improvements.

Research is needed to show if value capture can be integrated better into decision support tools to allow (a) a relative assessment of the costs, benefits and relative risks of the mechanism in comparison to other types of funding sources in a toolbox. National level tools such as those developed by the FHWA (PPP Toolkit) allow some of this type of analysis in the context of PPP projects but only consider value capture mechanisms sparingly. There is also no such toolkit for general project finance for projects that are not PPP type projects but still have multiple revenue sources. The research study could help to develop and enhance the value capture considerations as agencies begin to consider this in their funding portfolio. The research should pay attention to the financial assessment or a comparison of risks, returns and costs of undertaking value capture mechanisms allowing comparison across other revenue sources and across other potential value capture revenue sources. It is increasingly being recognized that economic impacts and information from economic models including land development effects may play an important role in furthering the discussion of value capture and other funding methods. Land development effects, including private (land) development beneficiaries, land related effects of highway capacity projects have received somewhat dissimilar attention in the literature. Property value effects are well studied in the literature but general private land development effects

and beneficiaries are rarely documented for different types of capacity projects. Advances in types of data both open and public domain now allow better identification and assessment of such effects. On one hand, national level databases such as those developed under Strategic Highway Research Program (SHRP 2) C03 “Interactions between Transportation Capacity, Economic Systems and Land Use Merged with Integrating Economic Considerations Project Development,” have provided a valuable national level resource to study and assess economic impacts of projects completed nationwide, but they generally have not focused on land development aspects. How can databases like this have in further discussions on land development that are so vital to value capture?

#### RESEARCH OBJECTIVES

The first question many decision makers may ask in the context of fiscal constraints is how can additional funding by means of value capture be considered and if value capture tools have to be deployed what would be entailed and how much can be expected as a way to recoup costs? What are the risks and returns from adopting a specific mechanism, and how could they be compared across funding sources when pooling from different revenue sources? The proposed research will aim to address these issues by means of the three related objectives.

- Develop a framework and a toolkit for decision makers to use for studying the integration of value capture tools as part of a toolkit. To that extent, this research would evaluate existing toolkits such as the FHWA PPP Toolkit and assess the potential for enhanced consideration of value capture mechanisms for PPP and non-PPP projects delivery.
- Consider as part of the framework the role of economic and other feasibility models in calculating the risk and returns from implementing value capture and integrate that as part of a decision support toolkit.
- A third but related objective is to develop a set of case examples to showcase land development effects of capacity projects from sample national level databases and to show how the analysis may be part of an overall feasibility assessment of value capture mechanisms.

Abbreviations used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI-NA	Airports Council International-North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation