The Report Committee for Shaun E. Tooley
Certifies that this is the approved version of the following report:

Innovative Transportation Finance: Value Capture Techniques Applied in the State of Texas

APPROVED BY
SUPERVISING COMMITTEE:

Supervisor:

Ming Zhang

Robert Paterson

Innovative Transportation Finance: Value Capture Techniques Applied in the State of Texas

by

Shaun E. Tooley, B.S.

Report

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Community and Regional Planning

The University of Texas at Austin

August 2010

Dedication

This master's report is dedicated to my grandmother, Ruth Tooley, who supported and encouraged my interests in urban planning and development since I was young.

Acknowledgements

The research team wishes to thank the following agencies and individuals for their support and contributions to the project. Any errors remain the research team's responsibilities.

Municipalities:

- City of Amarillo
- City of Austin
- City of Dallas
- City of Houston
- City of San Antonio

Metropolitan Planning Organizations

- Capital Area Metropolitan Planning Organization;

Transit Agencies

- Via Metro
- DART
- Houston Metro

State

- Texas Department of Transportation
- Texas, State Comptroller's Office
- Maine Department of Economic and Community Development, Jeanne St. Pierre
- Maryland Department of Transportation, Office of Policy and Government Affairs

Individuals

- Henry S. Markus, website: TOD Advocate
- Chuck Berry, TxDOT El Paso District Engineer
- Jonathan Lane, Senior Management Analyst, City of San Antonio, Center City Development Office, Tax Increment Finance Program
- Barbara Zektick, State Legislative Analyst, Maryland Department of Transportation, Office of Policy and Government Affairs
- Rajat Rajbhandari, Texas A&M University
- Aldrete-Sanchez Rafael, Texas Transportation Institute
- Jeff Arndt, Texas Department of Transportation
- Kelley Shaw, Planning Director, City of Amarillo
- Stephen Andy Scheidt, Public Information Coordinator, Via Metropolitan Transit
- Linda Cherrington, Texas Transportation Institute
- Tom Logan, Texas Department of Transportation
- David Hawes, Principal, HawesHillCalderon LLP
- Tim Douglas, Deputy Director, City of Houston, Finance Department, Economic Development and TIRZ program
- Patricia Bailey, State of Texas Comptroller's Office

Date Submitted: 8/13/2010

Abstract

Innovative Transportation Finance: Value Capture Techniques Applied in the State of Texas

Shaun E. Tooley, MSCRP

The University of Texas at Austin, 2010

Supervisor: Ming Zhang

Transportation finance has been historically dominated by assessing taxes to transportation users and taxes on the general public. Innovative financing mechanisms such as tax increment financing, special assessment districts, and others represent value capture techniques that tax property owners to pay for transportation costs. Value capture techniques provide supplemental funds to support capital construction costs but are not substitutes for existing dedicated and traditional tax revenue methods. The major findings of Texas practice indicate that tax increment financing for transit does not significantly contribute towards the transit infrastructure. Instead tax increment funds finance the improvement of public infrastructure surrounding transit stations and stops and can be labeled transit-supportive investments.

Table of Contents

List of Tables

List of Figures

CHAPTER 1 INTRODUCTION

1.0 Overview

This report presents a study of tax increment financing (TIF) as a value capture technique for financing transit supportive infrastructure and development focusing on the practice in Texas. The report aims to make a valuable contribution towards understanding the context and potential for tax increment finance for application as an innovative financing tool for transit.

The need for transit finance stems from the growing instability of existing funding sources. In general, the United States is facing a transportation funding crisis as the purchasing power of traditional sources erodes and becomes unstable during times of recession. Demand for transit service has been increasing in recent years as well as competition for capital federal funds for system expansion. Agencies must look to both local sources of dedicated funding and explore new alternative options in the transforming federal fiscal environment. Innovative financing mechanisms such as tax increment finance and other value capture techniques present potential funding opportunities to transit agencies. The findings in the report point towards the use of tax increment financing for supporting transit-oriented development and transit-supportive infrastructure investments in and around stations rather than direct infrastructure support for transit agencies.

In 1983 the Federal Highway Trust Fund was amended to dedicate $0.0286 per gallon to mass transit since the rationale holds that the public benefits by subsidizing transit to reduce road congestion. The motor fuel tax is the primary revenue source for the Highway Trust Fund and the majority of federal funds for transit with the remainder of transit funds derived from the General Fund. Many factors threaten the purchasing power of the traditional motor fuel tax. The last time the federal gas tax was increased occurred in 1993, since then the purchasing power of the motor fuel tax has eroded 33 percent (NSTIFC 2009). Martin Wachs reports that the purchasing power of today's average fuel tax is less than 1956, when the interstate highway act was passed (2003). Additional complications such as increasing fuel efficiency, increasing vehicle miles traveled, introduction of hybrid and electric vehicles, and lack of indexing taxation to inflation dilute the motor fuel tax. In addition the role of the federal government in supporting transit agencies have been undergoing devolution as federal funds become increasingly scarce and more competitive and transit agencies must look to local sources of dedicated funding.

The nation's rail transit infrastructure has grown to 22 commuter rail, 15 heavy rail, and 28 light rail systems and more transit agencies are constructing streetcar, light rail, and bus rapid transit alignments adding pressure to fiscal competition (RITA, 2009). The challenge of financing the maintenance and expansion of the nation's transportation network appears daunting to the American taxpayer. Transit like all other modes of transportation require subsidy to be affordable and allow for economic expansion.

Despite being a stable funding source and one where the user pays, fares constitute a small proportion of funds.

From the 1970s onward sales taxes have replaced federal operational support and have become common funding sources for the majority of transit finance. Sales taxes constitute on average more than three-quarters of transit revenue for metropolitan transit agencies in the state of Texas (TxDOT, 2007). Although sales taxes generate higher revenue per capita than an increase in the motor fuel tax, the reliability of sales taxes greatly diminishes during times of recession. Sales taxes are beneficial since they generate revenue from the entire jurisdictional tax base, however, if one jurisdiction does not participate in the transit district and competes for retail with participating jurisdictions than trouble ensues. Furthermore, sales taxes can work in opposition to addressing regional and metropolitan transportation needs or only address popular capital projects to the public leaving significant but less popular projects in dire situations. Lastly, there is a limit to the number of retail establishments and consumption that can be sustained by the financial health of a given metropolitan area and local governments may opt to select big-box retail uses that generate larger amounts of sales tax revenues than transit-supportive development.

In recent years states have been aiding in the growing financial gap, but only 15 states invest more in transit agencies than funds from the federal government and a majority of states such as Texas provide limited or zero funding for metropolitan transit agencies (Cherrington, 2008). Taxes on the general public are the most stable sources of

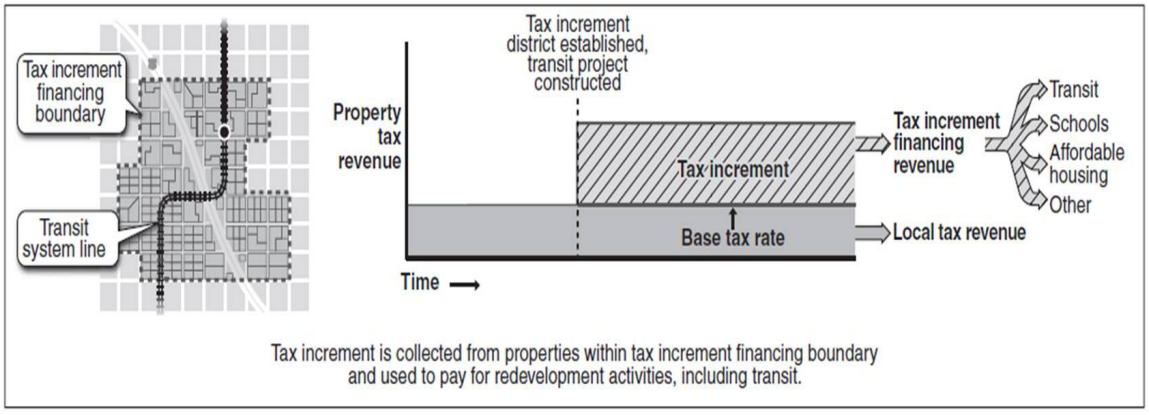
funding such as the property tax, but are highly regulated by states and unpopular among voters. Increasing transit fares erode the affordability of transit and challenge the budgets of the transit dependent. Funding sources that target landowners who benefit from publicly created value from new transportation infrastructure provides an increasing alternative to address gaps in transit finance.

Tax increment finance or TIF has been considered an innovative financing technique. The application of tax increment financing in the United States has been in practice since first authorized in the state of California in the early 1950s as a method for matching local funds in combination with federal funds. Tax increment finance works by participating governments and special districts freezing the existing property tax rates for a period of time. Tax revenues generated by the increase in assessed value over the frozen assessment base are placed into a tax increment fund for public improvements. For tax increment revenues to be successful depends on many factors including a, the timing and added value of new development; b, appreciation of existing land and improvements; c, the loss of value from any existing improvements demolished to make way for new development; and d, future tax rates and the percentage of participation of each taxing jurisdiction. Tax increment financing districts are typically established in areas considered blighted or economically depressed or under-performing. Tax increment financing became popular in the 1980s and 1990s as federal and state funds for economic development declined. The period in which a TIF district is removed from contributing to

the municipal budget is an incubation period where the district redevelops and attracts new development and grow the district assessed value or tax base and economy.

The common goal of tax increment districts is to stimulate development by reducing the risk and costs of development in undeveloped or underdeveloped areas. Tax increment funds can also be viewed as subsidies derived from future users, which is the motivation behind the beneficiary principle where the user pays directly for their proportion of use. For this method of subsidization to work TIF funds must be spent strategically to encourage new development. The reliance on future growth potential makes tax increment revenue speculative. If governments are not dedicated and able to make TIF districts successful, governments may not be able to repay the debt issued. The method is not guaranteed to work independently and requires careful attention, administration, and in some cases, additional financing tools to spur development.

Figure 1.0 How Tax Increment Finance Works



Source: GAO, 2010

Value capture is a category of transportation finance which focuses on recapturing publicly created value from the landowner or entity benefiting from the construction of public infrastructure. Value capture techniques include the land value tax, joint development, impact fees, special assessment districts, and tax increment financing. Each method recaptures value from infrastructure differently: the land value tax decreased the property tax on buildings and increases it on land with the effect being redevelopment in the urban core and higher densities; joint development is a public-private partnership between a transit or government agency and developer to share in the cost of constructing stations and development around the transit stations; impact fees are fees assessed on new development for application for transit capital projects; and special assessment districts occur when landowners in the vicinity of a transit station add an additional assessment to their property taxes to pay for the new infrastructure.

Transit authorities invest millions of dollars into capital infrastructure projects without sharing in the benefits. Value capture strategies attempt to apply a benefit principle to public infrastructure investment to recapture a portion of the publicly created value from landowners. Many value capture techniques have been applied in the United States to support transit capital infrastructure investment, but few are competitive with other financing streams at the Federal, state, or local level. The most common methods to be discussed in this paper are transit-oriented development and tax increment financing; neither concept is new. Few states authorize the use of tax increment financing for transportation to capture higher land value from increased accessibility or focus on

economic development potential around transit stops or stations to utilize the increased accessibility to incentivize development.

Figure 1.1 Value Capture Overview in Transportation Finance

Funding Mechanism	Beneficiaries		Measurement of Benefit	Finance Instrument	Cost Type	
					Upfront	Ongoing
General Revenue	General public		General tax base growth	General fund allocation; property tax; transportation sales tax	●	●
Value Capture	Restricted non-user beneficiaries	Landowners	Land value growth	Land Value Taxes	●	●
			Property tax growth	Tax Increment Financing	●	
			Assessed special benefits	Special Assessment	●	
			Transportation utility	Transportation Utility Fees		●
		Developers	Off-site development opportunities	Development Impact Fees	●	
			Off-site access benefits	Negotiated Exactions	●	●
			Development privileges	Joint Development	●	●
			On-site development opportunities	Air Rights	●	●
User Fees	Users of transportation facilities	Vehicle operators	Gas consumption	Gas taxes	●	●
			Mileage	Mileage-based charges	●	●
			Vehicle units/types	Vehicle sales tax; license tab fee; wheelage charges	●	●
			General access rights	Tolling		●
			Demand-controlled access rights	Congestion pricing		●
			Rights to incur environmental impacts	Transportation environmental taxes/fees		●
		Passengers	Ridership	Fare or permits		●

Source: CTS, 2009

Many value capture techniques have been applied in the United States to support transit capital infrastructure investment, but few are competitive with other financing streams at the Federal, state, or local level. Several major transit systems such as Washington Metropolitan Area Transit Authority (Washington, D.C. area) or Bay Area Rapid Transit (San Francisco area) have been successful with implementing transit-joint development (TJD) whereas some Asian systems like Hong Kong entirely finance the transit system through TJD.

The Texas Department of Transportation has been exploring value capture options available to provide alternative sources of financing for transportation projects. Three existing and proposed laws focus on value capture in the State of Texas: Tax Increment Reinvestment Zones (TIRZ) using tax increment financing authorized for use by municipalities and counties under Tax Code Chapter 311; Senate Bill 898 amending Chapter 222 which allows municipalities to enter into agreements with the Texas Department of Transportation (TxDOT) to finance freight or passenger rail systems; and Senate Bill 1266 also amending Chapter 222 permitting municipalities and counties to enter into agreement with TxDOT to establish Transportation Reinvestment Zones (TRZ). In light of fiscal pressures at each level of government, interest is growing for alternative and innovative financing mechanisms and the use of value capture and more specifically tax increment financing is one method currently practiced in the State of Texas.

The application of tax increment financing for transportation is relatively new and is most commonly applied to transit-oriented housing and supportive infrastructure. Eight states in addition to Texas have utilized tax increment funds for either direct use for transit infrastructure or indirectly supporting transit through transit-oriented development and infrastructure. The attention given towards making transit systems successful has shifted from park-and-ride towards developing land around transit systems to be supportive of transit or transit-oriented development (TOD). The popularity of TOD has been widespread in recent decades as billions of dollars are spent in developing land around transit stations. The potential for capturing the increased tax increments or levying a special assessment fee or other mechanisms appears promising.

The utilization of tax increment finance funds for transit-oriented development is beneficial to the TIF district since new development increases the assessed land values and grows the tax increment fund. Common application of TIF funds for transit-oriented development and transit supportive infrastructure include stations, landscaping, sidewalks, streetscaping and wayfinding, utilities and drainage, and street construction and connectivity. In limited documented cases such as Portland, Oregon tax increment funds contributed towards rail infrastructure, vehicles, and equipment. Tax increment funds for stations have also been limited, such as Chicago, Maryland, and Georgia. The most promising examples for applying tax increment funds for transit investment and encouraging development occur when additional value capture strategies such as joint development take place, as in the case of the Washington Metropolitan Area Transit

Authority. The transit related tax increment financing districts in the state of Texas will be covered in-depth in this report.

1.1 Key Concepts and Ideas

a. TIF or Tax increment financing has been covered briefly in the preceding paragraphs. It is one type of value capture technique that applies to landowners.
b. TIRZ or Tax Increment Reinvestment Zones is the name given to tax increment financing districts in the State of Texas with legal authority by Chapter 311 of the Tax Code.
c. TJD or Transit-Joint Development is a value capture strategy where a transit agency owns land around stations and either leases or sells to developers to jointly develop and or jointly operate the development. This allows the transit agency to have a stable revenue stream in addition to ensuring high quality and high density development to support transit ridership.
d. TOD or Transit-Oriented Development is a concept where development occurring around transit stations and stops is designed in such a manner to support transit ridership. Transit-oriented development or TOD is commonly high density development with vertical mixed uses occurring in the same building or horizontal mixed use where different land uses locate in close proximity. Development densities are highest within one-quarter mile of stations and stops,

but the Federal Transit Administration accepts a definition of TOD area that expands to one-half mile radius from the transit station or stop.

e. TRZ or Transportation Reinvestment Zone is the tax increment financing designation given to highway and roadway TIF districts according to Senate Bill 1266.

f. Value Capture encompasses a variety of financing techniques such as tax increment financing based on the principle that the person or entity benefiting from publicly created value returns a portion of the benefit or assessment of the publicly created value being created. Additional value capture mechanisms will be explored in Chapter Three Transportation Funding Options.

1.2 Organization of the Report

In order to organize the concepts and ideas briefly described in the introduction, this report is organized in the following manner:

Chapter 2: The history and theory transportation finance in addition to a discussion of transportation policy will be covered in Chapter Two.

Chapter 3: Chapter Three discusses the legal statutes in the State of Texas supporting tax increment financing, compares Texas TIF legislation to other states, and highlights the challenges for TIF supporting transit.

Chapter 4: This chapter examines the various options for funding transit. The chapter will cover transportation funding sources with a more in-depth focus on value capture financing techniques.

Chapter 5: This chapter explores the topic value capture more in-depth, value capture policies in other states and transit-based value-capture practice in the State of Texas.

Chapter 6: The subject of economic development is paramount to transit and tax increment financing. The purpose of TIFs is to serve as a catalyst mechanism between undeveloped and underdeveloped status of area in the present and healthy and thriving redeveloped areas in the future. This chapter will explore the link between development and transit.

Chapter 7: The final chapter is the Conclusion and will reflect on the information from the previous chapters and draw conclusions.

CHAPTER 2 TRANSPORTATION FINANCE

2.0 Introduction

The historical experience of financing transportation infrastructure in the United States provides context for examining the role of value capture techniques currently in use in Texas and potential usage for transit and transit district level investment in the future. The examination of the history of transportation infrastructure finance will cover broad areas such as public finance theory, financing mechanisms, and trends in the role of federal, state and local governments in transportation finance.

2.1 Contextual Theory

The theory of public finance of transportation infrastructure stems from the work of Henry George and Adam Smith. Henry George stipulated that the increases in the value of land are a product of community investments. Modern theorists have labeled this relationship a social compact formed between land owners that results in a municipal financial structure based on joint consumption and enjoyment of public goods. For landowners to organize in compact urban settlements the process of negotiation and consensus, typically orchestrated by elective officials, must occur to provide for collective infrastructure needs such as water and sewer, electricity, roads, etc. The

quality, quantity, and level of technology characteristics of the public works infrastructure will be determined by the level of tax burden the voting public is willing to bear. At present the quality of life enjoyed from public infrastructure is very high relative to other developed nations, undeveloped nations, and historical conditions in the United States. The degree to which voters are willing and able to be taxed for the expansion and maintenance of transportation infrastructure is an exploration left for another thesis, but the associated topic of transportation finance will be explored greater depth in the following paragraphs.

2.2 History of Infrastructure Finance

Although the history of public works and transportation infrastructure in the United States begins with colonization, the major historical marker for transportation finance is the construction of massive public works in the late 1800s. Municipalities became debtors and issued general obligation bonds backed by municipal full faith and credit. The common method of municipal revenue was property taxes, which continues to be a major financial mechanism for local government today but to a lesser extent. Local governments sought new methods of financing public works projects when states imposed debt limits for the guaranteed general obligation bonds. The solution for municipalities was to seek nonguaranteed sources, or funds not backed by municipal full faith and credit, such as special assessment bonds and revenue bonds. If general

obligation bonds utilize property taxes for paying off the debt service, then special assessment districts levy a fee or "special assessment" charge in addition to property tax to reflect the increased property value gained from the infrastructure investment, and revenue bonds utilize the "revenues" generated from operation of a facility or service. As public finance researchers point out, property owners defaulted on paying the special assessment fees during the Great Depression and states imposed revenue debt restrictions and limits.

Local governments were faced with exploring new financing options such as a public authority or special districts to "provide a vehicle for using nonguaranteed debt and to finance activites out of fees and charges or special benefit districts" (Pagano and Perry, 2008). The Port Authority of New York was the first public authority beginning in 1921 and New York established many authorities thereafter with infamous Robert Moses as the supervising commissioner. Special districts and public authorities did not have debt limits. According to transportation finance researcher Martin Wachs, in the 1920s California expended 40 percent of state revenue on road building, maintenance, and paying the interest on the bonds issued for roads (2003). He elaborated further that the historical use of toll roads was a difficult method (construction and operation of toll booths) for collecting user fees and that local and state governments found charging fuel taxes as a simpler method than administering tolls. He points out that fuel taxes were popular because the public saw the direct benefits of transportation investment were worth the costs. In an example, Dr. Wachs explains that in 1957 the Californian fuel tax

was $0.06 and that current fuel taxes would have to rise by $0.11 in order to regain the buying power experienced in 1957. The result of diminished buying power by fuel taxes helps to clarify the rise of alternative financing mechanisms and sources for transportation infrastructure, but until the 1960s most local governments operated within a narrow tax policy framework (Goldman and Wachs, 2003). The United States is experiencing a growing shortfall in transportation funding. The last time the federal gas tax was increased occurred in 1993, since then the purchasing power of the motor fuel tax has eroded 33 percent (NSTIFC 2009). The stability of the motor fuel tax is diminishing and a transportation funding crisis is causing a national discussion to take place exploring alternatives. Many have proposed a vehicle miles traveled tax (a.k.a. mileage fee) where automobile drivers pay per mile driven. Others advocate for more toll roads, managed lanes, and congestion pricing where drivers pay either for use of a roadway, pay per time of day and traffic congestion, or pay to enter a high traffic area in general. Increasing the motor fuels tax is akin to political suicide for politicians since it would give voters a reason to replace incumbent politicians with new ones over this hot tempered issue.

2.3 Historical Public Transportation Development

The landscape of public transportation finance is complicated by multiple layers of government, revenue sources, and level of government support for different transit agency service areas. The historical development of transit service provides insight into present-day complexities. Urban regions and economic expansion are constrained by

transport networks and technology; transport networks serve as flow channels for goods and services and provide access between places or origin for people, goods, and services to points of destination. The concentration of land use activities and dense urban populations congests the urban transport network. Public transportation services in the form of omnibuses or long stagecoaches were initiated to provide faster and more comfortable service for patrons. The horse-drawn omnibuses would be superseded by horse-drawn railcars or horse tram prior to the introduction of the streetcar. The utilization of smooth rail guideways improved the use of horsepower (the propelling power source), passenger capacity, and comfort; the first horse-drawn "street railway" initiated service in New York in 1832 or six years after the first railroad was invented in 1825 by George Stephenson in England (Vuchic, 1981). Vuchic credits the horse tram as a significant element to post-Civil War boom in housing expansion away from the highly concentrated American city centers.

Steam engine propelled carriages emerged between 1821 and 1840 but did not become technologically advanced until the 1870s. Frank Sprangue and assistants designed a power generation and distribution system to advance streetcar technology to replace horse-drawn streetcars and provide service at a lower cost. By 1912 electric traction propelled streetcars had expanded to 30,438 service miles from an original 2,050 miles for "street railways" of any technology type in 1880 (Vuchic, 1981). The technological improvement from streetcars and expanded service continued to allow American cities to expand and prosper in the late 1800s and early 1900s. Large metropolitan cities such as Boston, New York, Philadelphia, and Chicago erected rapid rail systems about the same time but grade separated the guideway either below the surface in subways or elevated. The highest concentration of rapid rail construction

occurred between the 1880s and 1920s and would slow down until new systems were constructed in the 1950s such as Cleveland and federally-supported systems such as Washington, D. C. and San Francisco in the 1970s.

The traditional 4-axle streetcar was replaced by the PCC car or President's Conference Committee to compete with the comfort, performance, and modern image of the bus and automobile, however, the rise of the automobile and bus would replace or eradicate streetcar service even as new technology became available such as the 6- and 8-axle DÜWAG railcar in Germany in the 1950s. Light rail transit made a comeback in the United States in the 1980s and 1990s beginning with San Diego and Portland as frontrunners.

Buses replaced streetcars as the public transit "workhorses" or constitute the majority of transit service due to flexible routes, technology, and costs. Bus-rapid transit has become a popular method for heavily traveled bus routes or as a lower cost alternative to light rail and rapid rail transit technologies.

The chronology of inventions in public transportation is detailed in Table 2.0 on the following page. The information is derived from Dr. Vulkan Vuchic, Professor of Transportation Engineering at the University of Pennsylvania. His texts books on transit are well-known and comprehensive for use in the classroom and professional workplace.

Each invention in transit technology allows transit agencies to respond accordingly. In recent years, the introduction of light rail transit, bus-rapid transit, and the modern streetcar have each caused a stir and metropolitan regions are experiencing transit revivals. Metropolitan regions as autocentric as Oklahoma City or San Antonio, which formerly exhibited streetcars in the early twentieth century, are exploring the possibility of reintroducing streetcars according to modern technological standards and design.

Table 2.0 Chronology of Inventions in Public Transportation

Year	Location	Event
ca. 1600	London	"Hackney coaches"—taxicab services
1612	Paris	"*Fiacre*"—taxicab service
1662	Paris	First urban public coaches—common carriers, horse-drawn carriage
ca. 1765	England	Invention of steam engine (Watt)
1825	Stockton-Darlington, England	First railway opened (Stephenson)
1826	Nantes, France	First horse-drawn omnibuses
1832	New York	First horse-drawn streetcar line
1838	Boston	First commuter fares on a railway line
1838	London	First suburban railway service
1863	London	First underground rapid transit line
1868	New York	First elevated rapid transit
1873	San Francisco	Invention of cable car (Hallidie)
1876	Germany	Invention of internal combustion engine (Otto)
1879	Berlin	First application of electric motor for traction (Siemens)
1881	Berlin	First electric streetcar (Siemens)
1882	Hallensee, Germany	Demonstration of the first trolleybus (Siemens)
1883	Germany	First lightweight ICE (Daimler)
1886	Mannheim, Germany	First ICE-powered automobile built (Benz)
1886	Montgomery, Alabama	Invention of underrunning spring-loaded trolley pole for streetcars (Van Depoele)
1888	Richmond, Virginia	First successful major electric streetcar line (Sprague)
1890	London	First rapid transit with electric traction
1892	Germany	Invention of compression-ignition engine (Diesel)
1893	Ohio and Oregon	First interurban lines
1897	United States	Invention of multiple-unit train control (Sprague)
1897	Boston	First streetcar tunnel
1899	Great Britain	First motorbuses
1901	Wuppertal, Germany	First successful monorail
1901	Fontainebleau, France	First trolleybus line in operation (Lombard-Gerin)
1902	Bielatal, Germany	Practical overhead power pickup for trolleybus (Schiemann)
1904	New York	First four-track rapid transit subway line for local and express services
1914	United States	Introduction of jitneys
ca. 1920	United States	Use of pneumatic tires for buses
ca. 1927	Nottinghamshire, England	Introduction of diesel motors for bus propulsion
1936	Brooklyn, New York City	First PCC car in service
1955	Düsseldorf	First modern articulated streetcar, contributing to the development of LRT mode (DÜWAG)
1955	Cleveland	First extensive park-and-ride system (with rapid transit)
1956	Paris	First rubber-tired metro
1957	Hamburg	First rapid transit with one-person train crews
Late 1950s	West Germany	First modern articulated buses and trolleybuses
1962	New York	First fully automated rapid transit line (42nd Street shuttle)
1960s	Europe	Widespread use of self-service fare collection
1966	Hamburg	First Transit Federation (*Verkehrsverbund*) with integrated fares and services
1968	Victoria Line, London	First automated fare collection with graduated fare

Table 2.0 Continued

Year	Location	Event
Late 1960s	Western Europe, U.S.	Introduction of transit (LRT, bus) malls
1969	Shirley Highway, Washington	First exclusive busway for commuter transit (later converted into HOV roadway)
Early 1970s	Western Europe, U.S., Japan	First major use of thyristor chopper control of electric motors
1972	BART, San Francisco	First computer-controlled rapid transit system
1970s	United States	Widespread development of innovative types of paratransit services
1974	Dallas-Fort Worth Airport	First fully automated guided transit network with driverless vehicles (AGT) in airport
1975	Morgantown, West Virginia	First AGT system in public service
Late 1970s	Western Europe, United States	Testing of AC electric motors on transit vehicles
1977	San Diego	First wheelchair-lift-equipped bus on transit line
ca. 1978	West Germany	Dual-mode trolleybus with remote trolley pole control
1979	Hamburg	Low-floor bus tested; wide use from late 1980s
From 1980s	Sao Paulo, Curitiba, Ottawa, Pittsburgh	Bus lines on separated lanes and high-frequency service; first BRT systems
1983–88	Lille, Vancouver, London, Miami	First fully automated regular transit lines
1985	Geneva	First 60% low-floor LRT vehicles
1990	Bremen	First 100% low-floor LRT vehicles
1993–2002	Lyon, Paris, Singapore	Fully automated full-size metro lines
Since 1990	Western Europe, U.S.A., Japan, Singapore	Extensive applications of Intelligent Transportation Systems (ITS) technology in transit systems

Source: Vuchic, 2005

2.4 Historical Public Transportation Policy and Finance

Historically, transit service was provided by private companies, especially in the case of streetcars just as private companies constructed toll roads and turnpikes (USDOT, 2007). Companies consolidated to generate higher profits and reduce duplicate service on routes. As early as the 1920s private public transit agencies began experiencing difficulty in maintaining infrastructure and vehicles, and private service would begin to degrade as maintenance costs were deferred and government regulation controlled fares. The private transit agency often subsidized streetcar service by engaging in private land development construction along streetcar lines. As Vuchic notes, streetcars were far from financial success since competition on parallel lines prevented operational economies of scale, government regulation of fares, and competition from private automobiles (Vuchic, 1981).

Lombardi and Hess document the history of federal funding for public transportation (2005) as depicted in Figure 2.0. The Urban Mass Transportation Act was the first federal spending bill for public transit and allocated $2.3 billion dollars. The high demand for replacing aging heavy rail vehicles and infrastructure in addition to new demands for transit service would escalate federal expenditure for public transportation. Two extensions of the 1964 Act aided transit expansion until the Urban Mass Transportation Assistance Act was passed in 1970 with $14.70 billion dollars. Both transit funding laws aided transit agencies with capital costs, but the 1974 National Mass

Transportation Assistance Act would add operational funding assistance to capital assistance as well as increase the funding for transit to $44.41 billion.

In 1983 the Federal Highway Trust Fund was amended to dedicate $0.0286 per gallon to mass transit since the rationale holds that the public benefits by subsidizing transit to reduce road congestion. Subsequent transportation spending laws have based the majority of allocated funds for transit from the Mass Transit Account of the Federal Highway Trust Fund and added smaller amounts from the general budget of the United States government. Transit agencies faced funding complications with operations when in 1998 the Transportation Equity Act for the 21st Century or TEA-21 removed operational assistance from the budget. Dedicated funding for transit was a major concern as federal funding for transit stagnated. Local and state funding such as local sales taxes would become the new methods for subsidizing transit operations and capital projects. "By the end of the 1990s, the share of transit expenses covered by federal money had declined to just 15 percent (Lombardi and Hess, 2005)"

Table 2.1 Evolution of Federal Funding for Transit Capital Projects

Year	Legislation	Authorized Funds (billions) in 2003 $	Duration (years)	Federal Funding Share (%)	Funding Category
1964	Urban Mass Transportation Act	2.23	3	66	Capital
	1966 extension	1.70	2		
	1968 extension	0.93	1		
1970	Urban Mass Transportation Assistance Act	14.70	6	66	Capital
1973	Federal-Aid Highway Act	12.43[a]		80	Capital
1974	National Mass Transportation Assistance Act	44.41	6	80	Capital (discretionary)
				80	Capital (formula)
				50	Operations (formula)
1978	Surface Transportation Assistance Act	44.02	4	80	Capital (discretionary)
				80	Capital (formula)
				50	Operations (formula)
1982	Surface Transportation Assistance Act	33.86	4	80	Capital (discretionary)
				80	Capital (formula)
				50	Operations (formula)
1987	Surface Transportation and Uniform Relocation Assistance Act	29.15	5	75	Capital (discretionary)
				80	Capital (formula)
				50	Operations (formula)
1991	Intermodal Surface Transportation Efficiency Act	42.56	6	80	Capital (discretionary)
				80	Capital (formula)
				50	Operations (formula)
1998	Transportation Equity Act for the 21st Century	46.28	6	80	Capital (discretionary)
				80	Capital (formula)
2005	Safe, Accountable, Flexible, Efficient Transportation Equity Act: Legacy for Users	52.6[b]	6	80[c]	Capital (discretionary)
				80	Capital (formula)

Source: Hess and Lombardi, 2005

2.5 Conclusion

The examination of the history of transportation infrastructure finance explored broad areas: public finance theory, financing mechanisms, and trends in the role of federal, state and local governments in transportation finance. The theory that increases in the value of land is a product of community investments originates with Adam Smith and Henry George has been applied literally to the field of transportation in the form of value capture. Each political era in the United States has experienced changing social compacts between elected officials and voters, and thus voter preferences for taxation and the burden of financing transportation infrastructure changes. Changes in transportation development, policy, and history reflect the response of the nation towards transit. The financing of transit facilities is paramount to implementation, and legal statutes can hinder or establish the legal basis for adapting to changing transit technology environments. The following chapter will explore the legal constraints for value capture strategies in the State of Texas and application to transit.

CHAPTER 3 LEGAL CONSIDERATIONS

3.0 Introduction

To provide guidance for Transportation Reinvestment Zones for on- and off-system transit, section four will examine the legal framework concerning tax increment finance in the State of Texas. The section examines the existing legislation and legislation that did not pass in the State of Texas for supporting capital transit projects. The following section will also compare financing supportive transit legislation between Texas and other states.

3.1 Legal Framework

Three existing and proposed laws focus on value capture in the State of Texas: Tax Increment Reinvestment Zones using tax increment financing authorized for use by municipalities and counties under Tax Code Chapter 311; Senate Bill 898 amending Chapter 222 which allows municipalities to enter into agreements with the Texas Department of Transportation (TxDOT) to finance freight or passenger rail systems; and Senate Bill 1266, also amending Chapter 222 which permits municipalities and counties to enter into agreement with TxDOT to establish Transportation Reinvestment Zones.

Each of the three laws or codes permits different governing bodies with authority to establish and operate for different purposes. The TIRZ code allows the governing bodies of municipalities or counties to finance public improvements. Chapter 311 Section

311.010 (b) allows the board of directors of a reinvestment zone and the governing body of the municipality or county to enter into an agreement as the agency deems necessary and does not specify what organizations or agencies are eligible for partnership agreement such as the Texas Department of Transportation. Section 311.010(b) is provided:

> (b) The board of directors of a reinvestment zone and the governing body of the municipality or county that creates a reinvestment zone may each enter into agreements as the board or the governing body considers necessary or convenient to implement the project plan and reinvestment zone financing plan and achieve their purposes.

Section 311.01005 (b) discusses bus rapid transit and rail transportation allowing:

> dedicate, pledge, or otherwise provide for the use of revenue in the tax increment fund to pay the costs of acquiring, constructing, operating, or maintaining property located in the zone or to acquire or reimburse acquisition costs of real property outside the zone for right-of-way or easements necessary to construct public rights-of-way or infrastructure that benefits the zone

Section 311.01005 (c) allows the board of directors of a reinvestment zone and the governing body of the municipality or county to "dedicate, pledge, or expend funds to pay the costs of acquiring land, or the development rights or a conservation easement in

land, located outside the reinvestment zone" based on three conditions: 1, the zone is or will be served by rail transportation or bus rapid transit; 2, acquired for preservation in natural or undeveloped condition; and 3, the land is located in the county where the zone is located. Chapter 311 in its current state permits the expenditure of funds for public transportation.

The amended code from Senate Bill 898 allows municipalities to work with TxDOT but only concerning rail infrastructure, which does not encompass all available transit modes such as paratransit, bus, or bus-rapid transit. This Bill did not however pass in the last legislative session.

The amended code from Senate Bill 1266 also permits joint governing body cooperation but does not currently permit financing for any other transportation facility operation beyond highway projects and on-system transit facilties may receive surplus funds after the primary highway project(s) have been financed. A major difference to be noted is that Chapter 311 concerning TIRZs is located in the Tax Code while Senate Bill 1266 amends Chapter 222 concerning Title 6 labeled Roadways in the Transportation Code while Railroads are Title 5. Another important point is that current transit legislation such as Chapter 451 for Metropolitan Rapid Transit Authorities, Chapter 453 Municipal Transit, Chapter 456 State Financing of Public Transportation, Chapter 457 County Mass Transit, and Chapter 461 Statewide Coordination of Public Transportation

are also located under Title 6 for Roadways. Chapter 222 mentions transit in relation to the Highway Trust Fund and that transit receives funding from a separate account derived from the Trust Fund. The Funds from the State Infrastructure Bank are allowed to "finance a purchase or lease agreement in connection with a transit project" under Section 222.074 (a-6). In summary, Senate Bill 1266 primarily amends highway financing and transit supportive language is not present.

3.2 TIRZ for Transit Inside- and Outside-Texas

In light of fiscal pressures at each level of government, interest is growing for alternative and innovative financing mechanisms. The use of value capture, and more specifically tax increment financing, is one method currently practiced in the State of Texas. Limited examples exist for the application of tax increment funds towards transit both in Texas and outside of Texas.

Transit expenditure in the State of Texas has been limited to the City of Dallas and the City of Houston, however, project plans and budgets have combined transit with associated supportive infrastructure costs such as sidewalks, street furniture, intermodal or multi-modal centers, streetscaping, coordinating linkages, or listed the name of the agency. Texas transit expenditures are not clearly defined as line items with consistent language in TIRZ documents.

A streetcar in central Portland, Oregon began service in 2001 and the financial breakdown highlights the incorporation of tax increment financing. Tax increment funds

contributed 22% to the capital infrastructure costs of the system and are derived from two TIF districts known in Oregon as Urban Renewal Areas or URAs. Both TIF districts contributed limited funds valued slightly above 10 percent of the total cost of the system (CTS, 2009).

Limited information exists analyzing the utilization of tax increment financing for funding transit infrastructure improvements. The expenditure of funds for transit in practice mirrors the level of investment in Portland. The County Economic Development Project Area Tax Increment Allocation Act of 1991 is responsible for allowing Chicago to utilize tax increment funds for transit infrastructure. Known transit expenditures include: $13.5 million towards Randolph/Washington Station; $1.2 million towards Dearborn Subway-Lake Wells; and $24 million towards the Central Loop (CTS, 2009).

The New York Avenue Metro Station in Washington, D.C. which is a public-private partnership. The cost of the station was $84 million which was supported by a known value of $25 million from the special assessment district; the contribution by the tax increment financing district is undocumented (CTS, 2009). Other subway stations in the northeastern United States have also utilized a combination of special assessment district and tax increment financing mechanisms. The Washington, D.C. area and State of Maryland is a leader in public-private partnerships. Historically, the area has been in the vanguard for joint development and now tax increment financing. Various sources document the use and consideration of tax increment financing for transit-supportive infrastructure. The Maryland Department of Transportation issues an annual TOD report

which documents the status of stations and funding sources. Only one of the six stations, Savage MARC Station in Howard County, has been documented for utilizing tax increment financing. Bonds have been issued to construct a parking garage to support transit ridership and transit-oriented development to the tune of $17 million. Tax increment financing has been considered but no documented use exists for the other five stations (MDOT, 2008).

Federal funding has historically financed capital transit projects and TIRZs provide limited- to no-funds for transit system costs beyond supporting transit oriented development. Both the New Starts and Small Starts programs provide capital funds for transit and the available documents from Sun Metro do not highlight sources of local funding.

Local jurisdictions typically have other goals in mind for TIRZ revenues. Financing transit improvements in TRIZs competes with other public goals and desired projects such as affordable housing, environmental remediation, drainage, historic rehabilitation, and more. Federal grants and funding programs exist for the other types of projects but communities require flexibility in financing and choice of projects as political and economic environments change. Federal funding of transportation is a guaranteed source from the motor fuels tax and supplies the Highway Trust Fund.

Constraints exist in the TIRZ codes that may limit transit expenditure. No more than 10 percent of the property in a proposed zone, excluding publicly owned, is used for residential. A municipality may not create a reinvestment zone or change the boundaries

of an existing reinvestment zone if the proposed zone or proposed boundaries of the zone contain more than 15 percent of the total appraised value of real property taxable by a county or school district. The added criterion, school district, denotes the dependency of school districts on property tax revenue and bonds based on temporary increased increments in property taxes. It is common for school districts to oppose tax increment financing districts because of the frozen assessed value on land and subsequent loss from potentially increased property taxes.

Current language in SB1266 does not imply expenditure of funds or revenue for public transportation except through final surplus provisions for Municipal or County TRZ's. This suggests that municipalities and counties may judiciously use their surplus revenues to pursue transit options for their region. However, this does not provide an explicit mechanism for financing mass transit options directly especially on or off-system options for which capital costs may be high like LRT and commuter rail (inter and intra-city options). Senate Bill attempted to tackle this issue by amending Transportation Reinvestment Zones or TRZs to also be used for the acquisition, construction, improvement, and operation of a freight rail, passenger rail, commuter rail, intercity rail, or high-speed rail facility or system. Chapter 311 expressly allows funding for transit. The last means of potential state funding for transit are through the utilization of the State Infrastucture Bank in accordance with the purposes of the bank, Section 222.073:

(1) Encourage public and private investment in transportation facilities both within and outside of the state highway system, including facilities that

contribute to the multimodal and intermodal transportation capabilities of the state.

The state infrastructure bank utilizes federal funds received by the state under federal law with matching state funds, but this method of financing is not based on tax increment financing even though it exhibits similar legal characteristics, public and private partnership.

Tax increment financing has been applied in other states to support transit or infrastructure in transit-service areas:

1. California – TIF for housing in transit station areas
2. Georgia – TIF used for transit infrastructure (stations) and TOD infrastructure
3. Illinois – TIF used for transit infrastructure (stations)
4. Maryland – TIF used for TOD infrastructure supporting transit (stations, parking garages, streets, sidewalks)
5. Massachusetts – TIF used for housing & TOD infra in transit station areas
6. Minnesota – TIF under development for transit
7. Oregon – TIF for rail infrastructure (streetcar)
8. Pennsylvania – TRID (TIF mechanism) for TOD & transit infrastructure (TRID is new and currently been used for conducting studies but presents the best legislation to replicate)

The state legislation best suited for replication is TRID or Transit Revitalization Investment District. Act 238 of 2004 of the Pennsylvania General Assembly authorized the creation of TRIDs for the purpose of spurring transit-oriented development, community revitalization, and enhanced community character around public transit facilities. Additionally, the law also allows for the establishment of value capture areas as a means to reserve and use future, designated incremental tax revenues for:

a.) Public transportation capital improvements,
b.) Related site development improvements and maintenance;
c.) Promoting the involvement of and partnerships with the private sector in TRID development and implementation;
d.) Encouraging public involvement during TRID planning and implementation; and
e.) Providing for duties of the Department of Community and Economic Development

The Pennsylvania law allows municipalities or counties to partner with public transportation agencies including the National Railroad Passenger Corporation whereas the TIRZ in Texas does not specifically state public transportation agencies. The TIRZ legislation does allow the board of directors for a TIRZ to establish partnerships according to their needs which can include public transit agencies. Thus, the Pennsylvania law is more limiting, but it also sends a clear signal to transit agencies that

their area of active involvement has been increased. Transit agencies and local governments are allowed to share in the tax revenues.

A TRID may be established by a local government for a geographic area or neighborhood located within 1/8 mile or up to ½ mile from a commuter rail, light rail, busway, or similar transit stop or station, including planned new station or stop. This radius from stations or stops is very explicit and restricts the extent of the TRID more than the tax increment reinvestment zone in Texas. Exceptions to this rule in Pennsylvania: an existing neighborhood improvement district, existing tax increment district, or existing urban renewal district may be used as the alternate basis for the boundaries of the TRID.

Transit authorities are given land development powers to acquire and improve property. The State of Pennsylvania like other transit-oriented development states may sell state-owned property or property purchased by the state with federal or state funds to transit agencies. The Pennsylvania Transit Revitalization Investment District (TRID) Act, specifically authorizes state public transportation agencies to work cooperatively with counties, local governments, transportation authorities, the private sector, and Amtrak to create and designate Transit Revitalization Investment Districts. The partnership creates a management entity to work with the private sector developer and create development agreements.

In summary, Texas TIRZ law does not specifically state that municipalities must partner with transit agencies but the potential for partnership is implied, whereas in the Pennsylvania TRID is explicit. Pennsylvania also has a separate tax increment financing law for municipalities and counties. The TRID states in clear language that funds can be spent on capital projects for inter-city and intra-city public transportation, whereas in Texas the municipality and TIRZ Board of Directors may or may not spend funds on public transportation, inter-city or intra-city. Senate Bill 888 like the Pennsylvania TRID would have made the distinction of fund expenditure for inter-city and intra-city transit clear and succinct. The Lone Star Rail district, a passenger and commuter rail district covering the Austin and San Antonio metropolitan regions, in addition to recent streetcar feasibility studies conducted for Austin and San Antonio express interest in the creation of tax increment financing districts to support capital costs.

Senate Bill 888 would have provided clear language to support the interest of transit agencies towards alternative funding sources. Lastly, the Federal Transit Administration rarely funds projects at the 80 percent level and sometimes at the 60 percent level. FTA expenditures are more likely to favor transit agencies that can show dedicated local sources of funding such as a TIRZ or TRID. The future passage of a bill such as Senate Bill 888 may be viewed by federal authorities as supportive state policy for transit. The bill may serve as a clear funding signal and give encouragement to the federal agency to favor Texas capital transit expansion over other competing states.

The completion is fiercer in the case of discretionary grant programs by the USDOT. Recent news by the Federal Transit Administration reports that $293 million from two program (FTA, 2010). The Urban Circulator program and the Bus and Bus Livability Program, have broken the formulaic New Starts and Small Starts process. The result was that streetcar and bus-rapid transit projects that did not exhibit a high enough rating through traditional means were awarded grants. The program spent $130 million on streetcars projects in Cincinnati, OH; Charlotte, NC; Chicago, IL; St. Louis, MO; and Fort Worth, and Dallas, TX. This represents 6 out of 65 applications and $130 million out of $1 billion in requests. The Bus and Bus Livability program spent $163 million including BRT or bus-rapid transit in New York City, NY; Stamford, CT; Chicago, IL; and Stockton, CA. The $163 million spent pales in comparison to the total $2 billion requested in the applications; ultimately, 47 out of 281 applications received funding.

Future programs such as the Livability initiative, which creates a coalition between the USDOT, Environmental Protection Agency, and Department of Housing and Urban Development or the climate change bill may also provide discretionary funds for moving capital transit projects and transit-oriented development in the State of Texas forward (Ya-Ting, 2010). If the Livable Communities Act passes (S 1619/ HR 4690) and becomes a law then the tri-agency coalition is proposed to dole out $4 billion in competitive grants for projects that integrate transportation, housing, economic development, and environmental planning. It would establish the Office of Sustainable Housing and Communities in the Department of Housing and Urban Development.

Table 3.0 TRID Planning Phase Steps

1. Municipality and Transit Agency agree to work cooperatively to create TRID
2. Municipality undertakes TRID Planning Study to determine location, boundaries and rationale
3. Municipality and Transit Agency conduct community public meeting(s) on planning study
4. Planning Study is revised and completed
5. Municipality and Transit Agency accept Planning Study's findings and recommendations
6. Municipality forms Management Entity (e.g., an Authority) to administer TRID implementation
7. Municipality and Transit Agency prepare project lists of Public Sector Infrastructure Improvements, including costs, phasing and maintenance
8. Municipality and Transit Agency coordinate with School District and County on Value Capture shares, schedule and TRID Financial Plan
9. Municipality and Transit Agency hold public meeting on TRID Implementation Program improvements
10. Municipality and Transit Agency execute Agreement on roles, responsibilities, financial commitments, management entity and defined improvements
11. TRID Management Entity solicits Developer interest
12. Development proposal accepted by TRID Management Entity and municipality
13. TRID Management Entity executes
14. Development Agreement with successful Developer, including Public Sector Improvements and Private Sector
15. Financial or Project Commitments
16. Project construction and completion
17. TRID Management Entity administers Value Capture revenues and expenditures in accordance with approved Implementation Program
18. Amendments to Agreement or TRID Plan, as required

Source: Delaware Valley Regional Planning Commission, 2005

3.4 Conclusions

Transit agencies must seek non-traditional sources of funding to compliment traditional federal, state, and local sources. Tax increment financing is one such method with two related funding mechanisms in the State of Texas, tax increment reinvestment zones or TIRZ and transportation reinvestment zones or TRZs. An additional bill did not pass in Texas which would have amended the TRZ legislation to include freight, passenger, commuter, intermodal, and multimodal forms of transit. Pennsylvania has passed similar legislation in 2005 called the Transit Revitalization Investment District Act. The Texas Department of Transportation has been conducting research into the possibility of utilizing TIF or tax increment financing for the main purpose of financing capital transit infrastructure. Both the Pennsylvania TRID and Senate Bill 888 exhibit language to support this interest, but the Texas bill did not pass and the Pennsylvania law is still too new for examination. To-date, funds from TIRZs have been expended or planned for transit infrastructure, but the funds for transit compete with other municipal funding priorities. The potential for utilizing value capture for capital transit infrastructure is possible; an examination of transportation finance options follows in the next chapter. The chapter will provide a deeper examination of the many sources of funding for transit.

CHAPTER 4 TRANSPORTATION FINANCE OPTIONS

4.0 Introduction

The financing techniques discussed briefly in the preceding paragraphs highlight the traditional methods: general obligation bonds, revenue bonds, assessment districts, fuel taxes and user fees, sales taxes, and intergovernmental transfers such as grants between the federal, state, and local governments. Each of the traditional financing techniques has will be defined, the characteristics enumerated, and additional information discussed in the following paragraphs.

The framework of financing major transportation infrastructure projects is complex, but a simplified approach to viewing financial mechanisms focuses on who benefits (general public, transportation user, and property owners) and taxing each group accordingly.

4.1 General Public

The first beneficiary group is the general public who are taxed by different levels of government based on geography. The revenue sources derived from taxing the general public are property taxes, sales taxes, and income taxes. Property taxes are taxes based on land owned by property owners. Property taxes are the traditional funding municipal funding mechanisms and local governments have focused historically on construction and

maintenance of local roads. The rationale discussed by Goldman et al justifying property taxes for transportation finance focuses first on accessibility as a determinant of land value and second, transportation services are basic public services providing broad public benefits (2006). The provision of paved public roads confers access to private land, and the provision of roads allows for local governments to provide public goods and services such as police, fire, emergency, trash collection, sewers, water mains, gas mains, electricity, and others which are reflected in the value of land. Property taxes are used in transportation finance to recapture some of the value conferred on private land from the provision of public goods and service via public roads. Property taxes represent 1.4 percent of total transit revenues and are most commonly used by small communities in Michigan, Ohio, Kentucky, and West Virginia (NCHRP, 2006).

States historically build roads for long distance, inter-city travel and thus focus on mobility where local governments focus on access. Sales taxes are taxes placed on the purchase of goods and some services. Income taxes are taxes on income earned from employment. As discussed earlier, property taxes have been the primary financing mechanisms for local revenue until the 1960s but are not commonly used to finance transportation infrastructure projects unless through bond issues. Sales taxes as will be discussed in great detail is the most common local method for financing transportation projects and as of 2001 are authorized in 33 states (Goldman et al., 2001). Sales taxes gained popularity and use after the tax revolts in the 1970s and have been increasing in use since the 1980s. The common methods for financing transportation infrastructure

based on these taxes are through general obligation bonds, revenue bonds, and sales tax measures at the local level. Less common methods at the local level include income, payroll, or employer taxes which are used to support transit in four states: Indiana, Kentucky, Ohio, and Oregon (Goldman and Wachs, 2003). The authors also point out that income taxes at the local level typically have a flat rate as opposed to federal and state income taxes which tend to be graduated rates that rise with income.

General Obligation Bonds

General obligation bonds are the original mechanisms used by state and local governments for financing major capital improvements such as roads, sewers, sidewalks, gas mains, etc. The bonds are restricted in their use and cannot be used for operation and maintenance. As the most traditional method, the bonds are the most secure and have the lowest rate-of-return. The local government pledges full faith and credit to pay the debt which translates to increased property taxes if the current property taxes are not sufficient to cover the debt. Chapman points highlights the problems facing local governments considering GO bonds to finance infrastructure: 44 states have established constitutional or statutory limits on the amount of general obligation debt allowed to be issued while 42 states require voter approval (2008).

Revenue Bonds

Revenue bonds are nonguaranteed since they are not backed by municipal full faith and credit but instead based on the "revenues" generated from operation of a facility or service. Revenue bonds are different from general obligation bonds by being less secure but also having higher interest rates. If the "revenues" from the designated source are not sufficient then the municipality may likely intervene.

Complexities with General Public Financing Mechanisms

The complexities of bonding whether using general obligation bonds, revenue bonds, or sales tax measures are important to highlight for greater contextual understanding. Dr. Chapman reviews the literature and summarizes the drawbacks of voter approval: "voters have insufficient information to make informed choices on specific infrastructure investment decisions;" they lack adequate tools to make the complex analysis involved in the public financial decision-making trade-offs; "voters are typically confronted with large numbers of initiatives, it becomes extremely difficult for them to understand the cumulative impact of their votes (2008). Garrett and McCubbins discuss the low information environments surrounding bonds and ballot measures. The researchers note restrictions on bonding capacity by state laws, bond rating agencies, and general unwillingness of voters to be taxed (2008). Like Chapman, however, they note that voters face multiple initiatives from overlapping governmental authorities and voters are not always informed about the most pressing projects which may not be the most

visible or politically popular at the time. Voters are confronted at the polls with "take-it-or-leave-it" offers or bond issues without the opportunity to amend or change the agenda setter's proposal. Lastly, the researchers point out that newspapers are the main source of information about bond and tax measures and present biased analysis, creditability and reputation of the source is difficult to determine, and newspapers are in the business of selling news that is based in conflict.

Ballot measures can also take the form of sales tax measures and at the local level such ballot measures are called local-option transportation taxes or LOTT for short. The most visible example of LOTT measures are sales tax increases for public transportation. Historically public transportation was funded by investors seeking to profit from real estate investments and operated under close municipal scrutiny (Goldman & Wachs, 2003). Transit was privately operated and constructed until being purchased by local governments in the 1950s through 1970s. The authors note that the tax revolts of the 1970s have caused a shift away from property taxes toward sales taxes and highlight acceptability by voters:

- *Increments*: sales taxes are paid in small increments as opposed to one lump sum and less noticed;
- *Non-Residents*: sales taxes tax nonresidents for use of local community infrastructure;
- *Appearance of Fairness*: sales taxes appear fair since every individual of comparable means pays roughly the same amount of tax.

Others have noted additional benefits:

- *Political* Cover: by making local tax increase subject to voter approval, state legislatures can facilitate tax increase indirectly while avoiding blame;
- *Measurable* Results: the results are measureable and address voter concerns in concrete ways;
- *Earmarking*: the use of pre-specified project lists help reassure voters that there will be minimal opportunities for politicians to make wasteful decisions;
- *Speed and Flexibility*: they can speed the construction of projects by avoiding delays or compromises from the federally mandated metropolitan transportation planning process; and some states have incentivized their use with matching funds (Goldman et al., 2001).

Sales taxes are strongly regressive where those with less income pay a higher proportion of their income compared to families from higher income strata. Sales taxes are currently used to fund transit in 16 states according to the researchers and the first cities to employ sales taxes for transit are: San Francisco, 1969; Atlanta, 1971; Denver, 1973; Seattle, 1973; and Cleveland, 1975. In "local Option Transportation Taxes: Devolution as Revolution" where Dr. Martin Wachs (2003) discusses a quiet revolution in transportation finance from federal to local governments, he enumerates the four important characteristics:

- *Direct local voter approval*: These measures typically result in projects and services near voters' homes and work places, so they personally can appreciate

them and anticipate their benefits. In an era of growing distrust of politicians, these measures provide tangible direct local benefits.

- *The taxes have finite lives*: Voters enact transportation taxes that will persist typically for fifteen or twenty years unless specifically reauthorized by another popular vote. Voters thus have a sense of control over their money. If projects don't live up to their expectations or if they fully accommodate growth and reduce congestion, the taxes could end.
- *Specific lists of transportation projects*: The taxes may be used only to build specific projects or fund specific programs, and politicians' discretion to spend the money is severely limited.
- *Local control over revenues*: The money raised locally is spent locally and for local benefit, under the control of a local transportation authority, assuring citizens that the money will not leak into other jurisdictions.

The appeal of sales tax measures are not without complications. Successful passage of sales tax measures have been empirically related to the political leanings of voters, how voters individually benefit, income, and competing modal interests (Hannay and Wachs, 2007). These breaking points lead to the need for partnership between modal advocates and successful measures are multimodal (Werbel and Haas, 2002). Surprisingly, states with high tax rates, anti-tax sentiment, and urban growth issues manage to experience high levels of support for sales tax measures (Goldman, 2007). Dr.

Wachs discusses the role of taxing authorities in the State of California and notes that the measures are passed at the county level and not regional level. The result is that a disconnect exists between regional scale transportation coordination of investments and local taxing authorities such as counties in California not spending money in tandem with the infrastructure priorities outlined in short-range and long-range transportation plans developed by the local metropolitan planning organization or MPO.

The role of the MPO is not the only policy-making authority experiencing conflict, the authority of locally elected officials is undermined and flexibility in spending is eliminated since the language of ballot measures are specific and cover long period of time during which infrastructure priorities are liable to change. By extension a third complication of sales tax measures are that popular projects are listed and systematic analysis in project selection is reduced or eliminated. Lastly, Dr. Wachs points out that the shifting the financial base from user fees to general taxes which discourages motorists from purchasing more fuel-efficient vehicles and despite both user fees and sales taxes being regressive, the effects on the poor from user fees is direct benefit. The author considers the shift to "local option transportation taxes" for funding new transportation investments as a shift in national policy without notice by the public of the future consequences or "big picture" outlook. It is likely that sales tax measures will continue to be popular as politicians are eager to lend support since the new taxes produce highly visible results addressing voter concerns (Goldman and Wachs, 2003).

Table 4.0 Transit and Local Option Gasoline Taxes

State	Allowable Uses	Voter Approval Required?	Areas imposing tax for transportation purposes	% of Pop. Taxed	Mean Per Capita Annual Revenues
Alabama	Roads, Other	No	23 of 67 counties, 60+ cities	> 56%	> $ 14
Alaska	General Revenues	No	At least one borough	> 8%	$ 5
California	Roads, Transit	Yes	None	-	-
Florida	Roads, Transit	No	All counties	100%	$ 38
Hawaii	Roads, Transit	No	4 of 5 counties	100%	$ 51
Illinois	Roads, Transit	Yes	4 of 102 counties, several cities	56%	$ 19
Mississippi	Roads & Seawalls	No	3 of 82 counties	13%	$ 17
Montana	Roads	Yes	None	-	-
Nevada	Roads	No	All counties and 1 independent city	100%	$ 41
New Mexico	Any	Yes	None	-	-
Oregon	Roads	Yes	2 of 36 counties, 3 cities	32%	$ 8
South Dakota	Roads	No	None	-	-
Tennessee	Transit	Yes	None	-	-
Virginia	Transit, Roads	No	2 regional commissions	27%	$ 12
Washington	Roads	Yes	3 cities, 1 transit district	0.1%	$ 67

Source: Wachs, 2003

Table 4.1 Transit and Property Taxes

State	Vote Required?	Areas Imposing Tax	% of Population Taxed	Annual Per Capita Revenues
California	Yes	7 districts	21%	$ 14.90
Florida	Yes	5 districts	23%	$ 8.60
Georgia	No	3 districts	6%	$ 15.20
Indiana	No	7 cities, 8 districts	29%	$ 30.20
Iowa	Some	15 cities	32%	$ 16.20
Kansas	Yes	2 cities	7%	$ 17.30
Louisiana	Yes	1 parish	10%	$ 8.30
Massachusetts	No	17 districts	92%	$ 26.90
Michigan	Some	7 districts	56%	$ 5.10
Minnesota	No	4 districts	54%	$ 3.00
Nebraska	Some	1 RR safety dist., 1 transit dist.	37%	$ 14.30
North Dakota	Some	4 cities	26%	$ 3.40
Ohio	Some	6 districts	11%	$ 8.50
Oregon	Some	7 districts	42%	$ 14.10

Source: Wachs, 2003

Table 4.2 Transit and Local Option Sales Taxes

State	Vote Required?	Areas Imposing Tax for Transit	% of Population Taxed	Annual Per Capita Revenues
Alabama	Yes	1 district	15%	$ 6.10
Arizona	Yes	2 cities	30%	?
Arkansas	No	None	-	-
California	Yes	7 counties	46%	$ 85.80
Colorado	Yes	3 counties, 1 city, and 1 dist.	59%	$ 81.60
Georgia	Yes	1 district	17%	$ 182.60
Illinois	Yes	2 districts	69%	$ 58.90
Louisiana	Yes	1 district	11%	$ 98.90
Missouri	Yes	1 county, 3 cities	34%	$ 67.40
Nebraska	Yes	?	?	?
Nevada	Yes	3 counties	85%	$ 39.60
New Jersey	Yes	None	-	-
New Mexico	Yes	2 cities	28%	$ 129.30
New York	No	1 county, 1 district	71%	$ 24.90
North Carolina	Yes	1 county	8%	$ 84.00
Ohio	Yes	6 districts	36%	$ 62.10
Oklahoma	Yes	1 county	?	?
Texas	Yes	Transit: 8 districts	40%	$ 108.30
Utah	Yes	Transit: 4 counties and 22 cities	84%	$ 33.90
Washington	Yes	Transit: 10 counties and 14 districts	87%	$ 82.60

Source: Wachs, 2003

4.2 Transportation Users

The second beneficiary group is transportation users or those who utilize transportation networks (roads, highways, toll roads, public transit, etc). The revenue sources derived from taxing the transportation users are fuel taxes, sales tax on motor fuel, vehicle registration taxes and fees, vehicle property and sales taxes, tolls, and passenger fares. Another name for the fees is user fees because they are typically applied at the point of time of use. Fuel taxes are the most common historically because they link users or beneficiaries utilizing the road system directly to improvements to the transport system. Fuel taxes are easy to administer and provide a stable revenue base. They have been the main source of revenue for highway investments at the state and federal level. Fuel taxes represent 73 to 80 percent of total state highway funding for the last 25 years but have increased at 2.4 percent compared annually while other sources have increased at greater rates annually (NCHRP, 2006). The report elaborates on use by states: motor fuel taxes and motor vehicle taxes and fees account for over 90 percent of state highway funding and 50 percent for the majority of states. In 1983 the Federal Highway Trust Fund was amended to dedicate $0.0286 per gallon to mass transit since the rationale holds that the public benefits by subsidizing transit to reduce road congestion.

Vehicle taxes are ad valorem taxes which tax motor vehicles as property similar to private real estate. Vehicle taxes include annual registration fees; annual taxes based on vehicle value such as by weight, age, body type, number of wheels; and other taxes such as vehicle rental and leases, parking, and sales. Vehicle taxes are authorized in 33

states and accounted for 2 percent of total state revenues for highway expenditures in 2004 or the second largest source of revenue for state departments of transportation (NCHRP, 2006). The report continues to point out that if states wish to raise revenues but with minimal impact on citizens, personal property taxes on vehicles are a great method. Unlike motor fuel taxes, personal property taxes on vehicles are highly responsive to inflation. Sales tax on new and used vehicle purchases has been considered by transportation finance experts to be a promising second tier vehicle-related tax and politically more feasible in the short-run compared to increasing the motor fuel tax.

The history of tolling roadways to construct, maintain, and operate inter-city travel begins with the Pennsylvania and New Jersey turnpikes in the eighteenth century. Toll roads were a common form of financing highways until the federal government passed the highway act in 1956. Toll roads have reemerged in recent decades as revenues from other sources become stagnant or decline in the face of escalating expenditures. In 2004, tolls for highway investments at accounted for seven percent of total revenues for highways at the state and local level but in Texas revenue from tolls has ranged from 2.5 to 5 percent (NCHRP, 2006).

High-occupancy toll lanes or HOT are one method of instituting tolled roadways and allow single-occupancy vehicles to buy the right to use the excess capacity available in exclusive lanes adjacent to congested non-tolled lanes on a public highway. HOT lanes are popular because they provide congestion-free travel at all times of day. Toll roads have increased in popularity despite a stagnant share of revenue because of advances in

technology such as automatic toll collection and charges that can be varied to optimize traffic flow; this is possible due to systems that meter vehicle use over an extensive network of roads and assess charges proportional to mileage (TRB, 2006). Due to funding constraints many states are considering tolling all newly constructed roads, bridges, or lanes.

Transit fares like tolls are a direct user fee based on charging consumers of transportation for their direct usage of the transport network. Transit fares have grown at 3.5 percent per year which is much less than 7.5 for state general fund state and 7.7 percent for local general fund; transit fares account for 28 percent of the total revenues used for transit expenditures at all levels of government (NCHRP, 2006). This is in comparison to 15 percent of total transit revenues derived from general funds, 1.4 percent from property taxes, and 30.1 percent by special taxes such as sales taxes.

Table 4.3 Public Transit Sources of Funding, Year 2000

Item	Percentage
Fares	25
Other revenue from transport services	3
Federal grants	
From dedicated federal fuel tax revenue	14
From general fund	3
State government sources	
From general revenue	7
From dedicated sales tax revenue	2
From other sources	9
Local sources	
From general revenue	8
From dedicated sales tax revenue	14
From other sources	16
Total	100

Source: TRB, 2006

Table 4.4 Trends in Transit Expenditures, Sources of Funds, and Transit Use

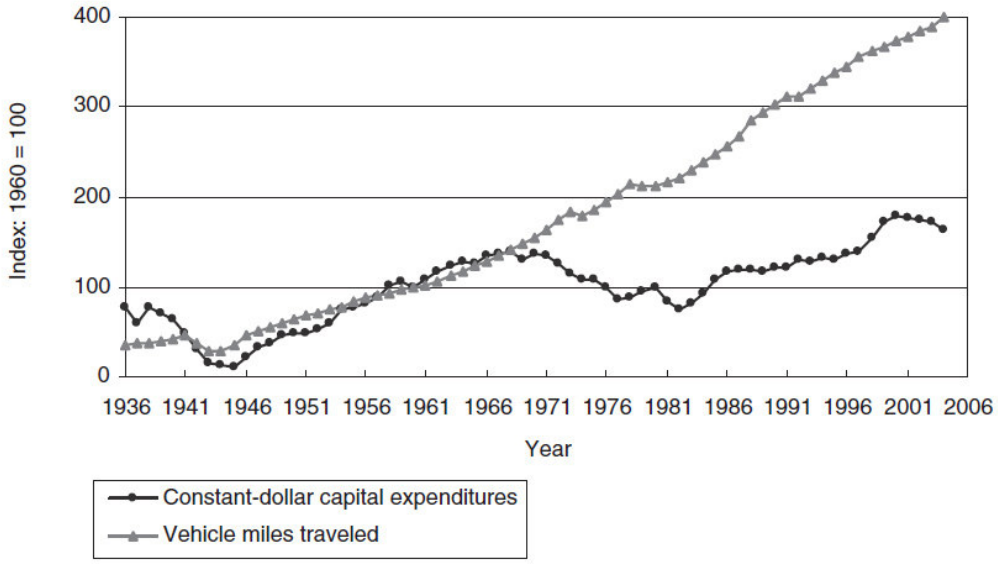
	1961	1971	1981	1991	2001	2003
Expenditures ($, billions)	1.5	2.2	12.7	22.1	36.7	41.3
Expenditures (2001 $, billions)	7.4	8.0	22.2	27.0	36.7	39.8
Capital expenditures (percent of total)				33	31	32
Federal grants (percent of expenditures)	0	13	32	17	19	17
Fare revenue (percent of expenditures)	88	74	21	27	24	22
Average fare per trip (2001 $)	0.72	0.87	0.57	0.85	0.92	0.93
Average expenditure per trip (2001 $)	0.83	1.17	2.68	3.14	3.80	4.22
Passenger trips (billions)	8.8	6.8	8.3	8.6	9.7	9.4

Source: TRB, 2006

Complexities with Transportation User Financing Mechanisms

Professionals and researchers have been quick to point out that in recent decades many changes are underway which are changing the relationship between transportation users and associated financing mechanisms. Motor fuel taxes have been the primary and dominant source of financing federal and state highway systems and to some extent, local systems. Transit has also benefited from a portion of the motor fuel tax and in select regions the proportion of ridership on transit equates to the absence of costly and space consuming urban highways. Revenue adequacy is a major concern since the motor fuel tax has flattened contrary to historical trends when interstate highways were first being constructed. "From the late 1940s to the 1960s, constant-dollar capital expenditures for highways grew at least as fast as did highway travel; since that time, while annual vehicle miles have steadily grown, the long-run trend in real capital expenditures appears nearly flat. This trend has been interpreted as evidence of chronic revenue inadequacy" (TRB, 2006).

Figure 4.0 Highway Capital Expenditures and Vehicle Miles Traveled, 1936-2004



Source: TRB, 2006

The fuel crisis of the 1970s caused a national change in environmental policy and improved vehicle emission standards and the present presidential administration is committed to renewing the vigor for improving vehicle emissions. The future of the automobile industry will be starkly different than past generations as auto manufacturers develop hybrid gasoline and electric powered vehicles like the Toyota Prius and the soon to be released Chevrolet Volt. As recently as 2001 only two auto manufacturers produced hybrid vehicles and now Ford, Honda, Lexus, Nisan, Mazda, General Motors, Mercedes, and BMW all produce hybrids. Honda Motor Company is aiming to be the first auto manufacturer to produce a zero emissions vehicle powered by hydrogen, fuel cell, and a battery. The dramatic increase in hybrid vehicles during the 2000s presents transportation

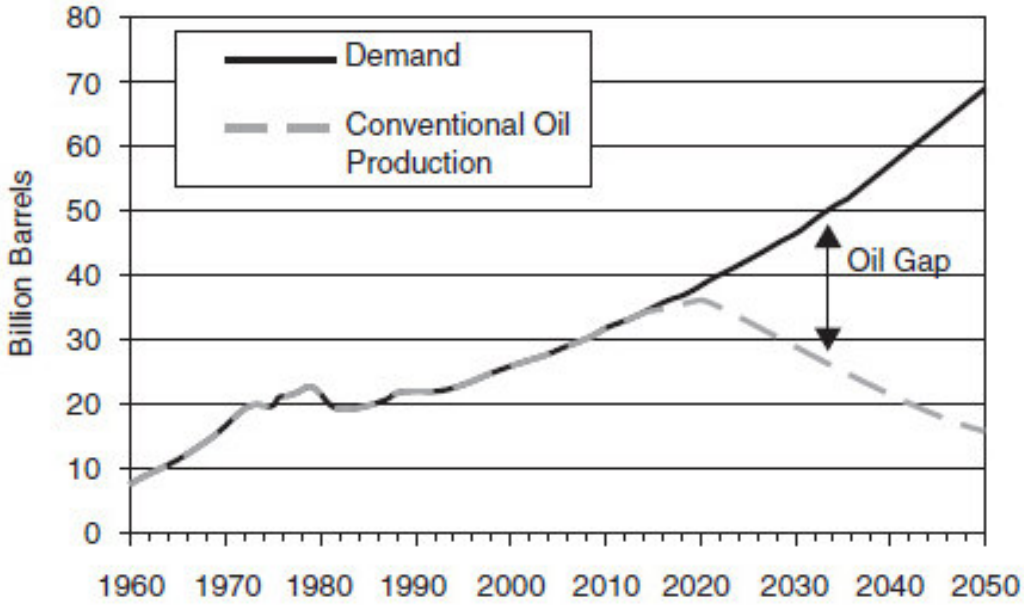
finance theorists with a major complication—the erosion of the user fee principle. Fuel-efficient vehicles weaken the link between gas taxes and the use of transportation facilities since higher emission vehicles consume less gasoline per mile and thus pay less in motor fuel taxes. Hybrids and other vehicles using alternative fuels pay less in motor fuel taxes but consume roadway capacity.

In the decades to come it is not unrealistic to consider the automotive industry transforming from primarily fuel dependent vehicles to electric vehicles and thus paying zero motor fuel taxes. Theorists have point out that the present finance system is threatened by first, advances in automotive technology, new emission standards and energy regulations; second, diminished use of traditional motor fuel taxes and the present user fee-trust fund system; and third, transportation reform that focuses on direct expenditure of funds related to user fees (TRB, 2006). The advances in automotive technology and new emission standards shrink the tax base for motor fuel taxation, but new taxation methods have been developing such as vehicle miles traveled fee, congestion charging, and refining user fees.

Advances in automotive technology and improved emission standards have led to the exploration of a mileage fee in the state of Oregon as the legislature considers the future of transportation finance. The "Oregon Department of Transportation launched a 12-month pilot program in April 2006 designed to test the technological and administrative feasibility of [Oregon Mileage Fee] concept. The program included 285 volunteer vehicles, 299 motorists and two service stations in Portland (ODOT, 2007).

The mileage fee was paid in addition to fuel taxes at filling stations and the program was deemed a success with 91 percent of participants willing to continue paying the fee, ease of technological integration, and simplicity of payment. The implication of a mileage fee would greatly improve transportation finance since the last motor fuel tax increase was in the early 1990s and the motor fuel tax like transit fares have grown at low rates annually compared to other funding sources (NCHRP, 2006).

Figure 4.1 World Oil Gap



Source: TRB, 2006

A second development in transportation finance is congestion pricing which is currently in operation in London, England and others implementing various forms of congestion pricing: Singapore; Orange County, California; and the cities of Trondheim, Oslo, and Bergen in Norway. The City of New York attempted to convince the State of

New York to permit congestion pricing in mid- and lower-Manhattan but was met with disfavor. Congestion pricing assesses the owner/operator of a motor vehicle a charge for using certain roadways during periods of high congestion. “London’s experience shows that congestion pricing is technically feasible and effective and that it is possible to overcome the political and institutional resistance to such pricing” (Litman, 2006).

The main purpose of financing mechanism is identified in its name-congestion. The pricing of urban roadways in central cities derives from urban economics where land rent is highest in the urban core of a region and land rents decline as distance from the center of the region increases. If land rent is highest in the center of regions, then would congestion by highest in the same geographical areas? The urban form of United States major cities does not adequately indicate a resolving positive answer. Major metropolitan regions where central city downtowns represent the majority share of office space, entertainment, retail, and other high traffic generating activities are prime candidates for the institution of congestion charging. Cities such as New York City and the City of Chicago would likely be the best American candidates since each boast extensive transit networks to provide an alternative to motorists avoiding the congestion charge. The current political climate does not indicate interest in congestion pricing for the near future for central city or central business district zones such as in London. The incorporation of congestion pricing as a transportation finance mechanism would be most successful in the United States if applied to major urban highways and freeways during peak travel hours. Many states and metropolitan regions are experimenting and implementing various forms

of intelligent transportation system or ITS technology which monitor travel volumes, speeds, and other criteria and currently report road conditions to motorists on electronic dynamic message signs. The employment of ITS technology will continue to be expanded primarily for transportation demand management but could realistically be enhanced to incorporate pricing.

Figure 4.2 Congestion Pricing

Winners	Losers
• Downtown bus riders. • All transit riders (due to increased funding for improvements). • Taxi riders and drivers. • Motorists with high-value trips. • Most city center businesses. • Overall city productivity. • Pedestrians and cyclists.	• Motorists with marginal-value trips. • City center businesses that depend on low-cost weekday car access. • Residents and motorists in border areas who experience spillover impacts. • City center parking revenue recipients.

Source: Litman, 2006

Indexing Tax Rates

"The greatest financial disruption experienced by transportation programs in recent decades was from about 1974 to 1982. During this period, high inflation, slow growth in travel, and the impact of the corporate average fuel economy standards in federal law combined to cause constant-dollar fuel tax revenue to decline by more than 50 percent" (TRB, 2006). The authorization of indexing tax rates to keep up with inflation is not a method used by many states but would allow motor fuel and other user related taxes to maintain buying power during periods of changes in the economic environment. The report continues to point out that states reacted by enacting variable-rate fuel taxes but the result over time has not met expectations or generated sufficient revenue. "

About 15 states tried indexing according to a variety of formulas in the 1980s, but most such taxes were rescinded because of public reaction and unpredictable revenue results" (TRB, 2006). In one case the period of lag was a decade whereas the current lag period is approaching two decades. Researchers note that indexing to the consumer price index or CPI is the best method for generating sufficient revenues during periods of rising inflation, and the method could be politically feasible by indexing an increment of the fuel tax or setting an annual cap on the rate of increase (Ang-Olson et al. 2000). A separate mechanism would have to be developed to ensure tax rates keep pace with improved vehicle fuel efficiency and other automotive technological advancements diminishing user fee revenues.

4.3 Property Owners

The third beneficiary group is property owners or those who benefit financially from increased property values from the construction or improvement of transportation infrastructure. The revenue sources derived from taxing the property owners are land value taxes, tax increment financing, special assessments, transportation utility fees, development impact fees, negotiated exactions, joint development, and air rights. Another name for these financing mechanisms is value-capture.

> Value capture is 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. Unlike building value, which derives from private capital investments, land value represents the speculative dimension of real estate. Thus, value capture is a variation of an unearned increment tax, and is based on the premise that property owners benefiting from a government-conferred locational advantage should pay some portion of the cost of public improvements from which the added value is originally derived

Source: Smith & Ghring, 2006

The practice of value-capture techniques is neither new nor widespread in the United States for generating transportation revenue in significant proportions for transit systems or highways and major roads. Several major transit systems such as Washington Metropolitan Area Transit Authority (Washington, D.C. area) or Bay Area Rapid Transit (San Francisco area) have been successful with implementing transit-joint development (TJD) whereas some Asian systems like Hong Kong entirely finance the transit system through TJD. The attention given towards making transit systems successful has shifted towards developing land around transit systems to be supportive of transit or transit-oriented development (TOD).

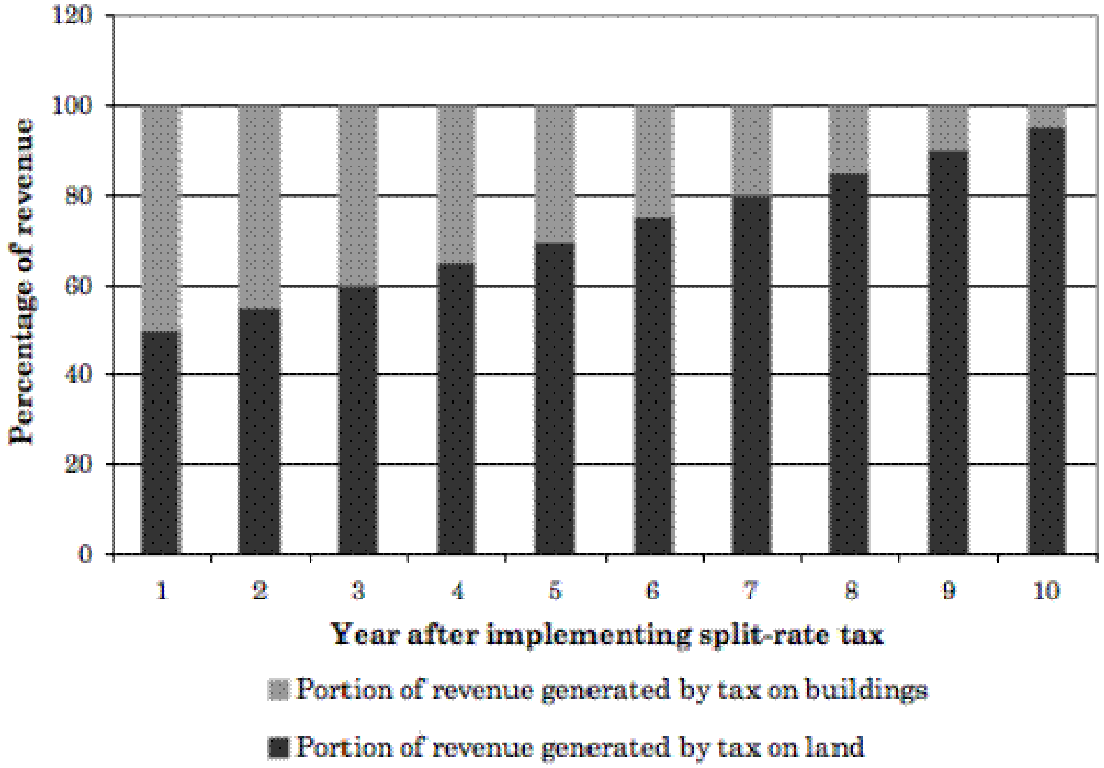
The popularity of TOD has been widespread in recent decades as billions of dollars are spend in developing land around transit stations. The potential for capturing the increased tax increments or levying a special assessment fee or other mechanisms appears promising. One study cited a 36.8 percent increase in land values for office and retail around stations as a result of the construction of the Dallas Area Rapid Transit (DART) light rail transit system (Weinstein and Clower, 1999). The City of Dallas has established many Tax Increment Reinvestment Zones (TIRZ) around DART stations, especially in the year 2005. Similar to other newer transit systems the tax increments are not purposed for direct transit capital investment such as stations, signage, and track or operations like more vehicles or drivers but for public infrastructure improvements to the sewers, streets, sidewalks, landscaping, property acquisition, streetscapes, drainage, etc. The value-capture benefit to the DART system is therefore not direct since tax

increments do not flow to the transit agency but to the City of Dallas. The role of tax increment financing as it relates to improving public infrastructure in transit served areas will be further discussed in *Chapter 5*.

Land Value Tax

The use of land value taxation (LVT) or more specifically split-rate property taxes is not a new financing mechanism but is receiving renewed attention since it is a "more efficient method of recapturing the related value while also improving the incentive structure for developers" (Junge and Levinson, 2010a). The mechanism applies throughout the entire geographic area of a municipality and represents the broadest value capture strategy. The rationale for the split-rate property tax stipulates that the current taxation structure does not encourage developers to develop on land surrounding transportation facilities since neighboring property values increase and the tax on buildings acts as a deterrent to new construction since property taxes increase due to the improvements (cost of production verse cost of ownership).

Figure 4.3 Example of Instituting a Land Value Tax



Source: CTS, 2009

The reformation of tax policy to encourage development on land surrounding transportation facility investments would reduce the cost on assessed buildings and increase the tax rate on assessed land values. Mr. Rybeck of the Washington, D.C. Department of Transportation asserts that a heavier tax levied on land than buildings would reduce speculation, make land more affordable, discourages land owners to hold out for land rents in excess of what buyers are willing to pay, and creates an environment incentivizing adjacent land owners to redevelop for a higher economic purpose and

reduces development pressures in more distant areas (Rybeck, 2004). The implications of this statement are astounding: many metropolitan areas have sought to implement growth control measures to help concentrate development in the urban core and counteract development pressures resulting in sprawl (low density dispersal of land use activities) such as an urban growth boundary but the implementation of a split-rate property tax could be less politically risky.

A general guideline for instituting the land value tax with favorable public acceptance is to shift no more than 20 percent of the taxes off buildings and onto land each year for a period of five years, or 10 percent each year for ten years (Hartzok, 1997). The state of Pennsylvania has authorized the use of the land value tax since 1913 and Maryland since 1916 but neither state has experienced widespread use except for in the case of Pittsburgh. Pittsburgh increased the land tax from twice the rate levied on buildings such that the land tax rate became nearly six times greater in 1976, but researchers point out that the land value tax served as a significant enabling factor and not the primary cause of increased office development (Junge and Levinson, 2009a).

Tax Increment Financing

In the 23 years since the passage of the Chapter 311 in the State of Texas Tax Code, the creation of Tax Increment Reinvestment Zones or TIRZs have been established across the State of Texas and primarily in large metropolitan areas. The purpose of the

statute allows for communities to establish a financial mechanism over a specified geographical zone to raise funds for constructing new public infrastructure. The financial mechanism called a TIF or tax increment financing permits property owners to continue paying taxes at the normal rate while the tax increment or increase in property value over the base is collected by the taxing jurisdiction to compensate for the expended funds of the new public infrastructure. The justification for the establish of a TIF district is to that without such a mechanism in place to finance the construction of new infrastructure private development would either not happen at all or at a much slower rate than the jurisdiction desires. Thus the designated area is labeled a reinvestment zone and is no longer living up to its maximum potential economic intensity or use in the present or projected future economy and the use of a TIF is a tool to aid in the process of generating economic development.

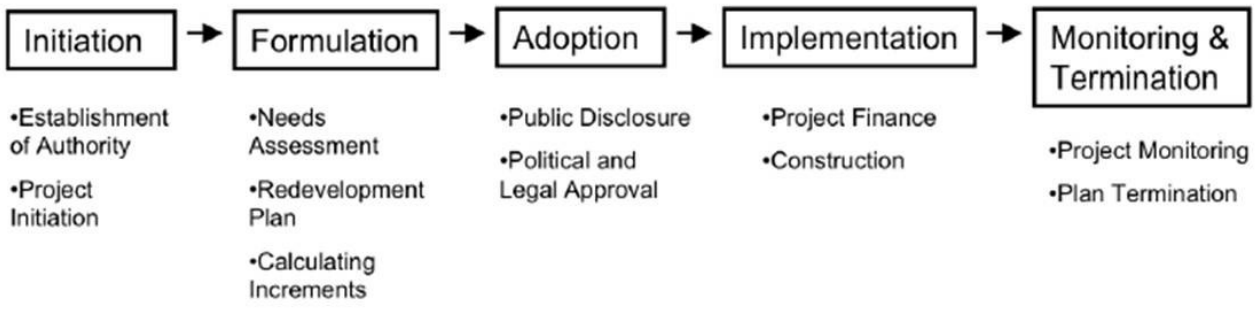
The use of a TIF has grown in popularity since origination in California in the 1950s as an innovative taxation tool for communities to accomplish goals in economic development or transportation for example. In the State of Texas communities such as Dallas have established TIF districts to encourage private economic development around transit stations called Transit-Oriented development or TOD. Houston and San Antonio have utilized TIFs for affordable single family housing or housing priced at a lower percentage than the area median family income.

A major reason for the popularity of TIFs is due in part to the decline in recent decades of federal and state dollars causing a greater share in locally generated funds

from TIFs to sales taxes to bond issues. As noted by Weber and Goddeeris, the anatomy of a TIF provides flexibility and autonomy for decision making at the local level. Brueckner points out another advantage being little voter accountability where local government decision makers can expend funds for infrastructure in sync with the changing needs of the jurisdiction as opposed to a bond issue where each individual project is listed with a dollar figure for awareness by the public.

In the second case of the bond issue critics point out that only politically popular projects are listed when other infrastructure projects are necessary but not at the attention forefront of the public. In short, TIFs are attractive as a financial tool for encouraging private economic development and construction of infrastructure because of being self-financing. A TIF provides the ability to directly link payment for infrastructure to the users who benefit most. This is known as the "Benefits Received Principle" where users should contribute to government based on the proportion received of protection or goods and services in this case. The theory of the "Benefits Received Principle" is derived from theorist Adam Smith who wrote the *Wealth of Nations* in 1776 which established the field and philosophy of economics.

Figure 4.4 TIF Process



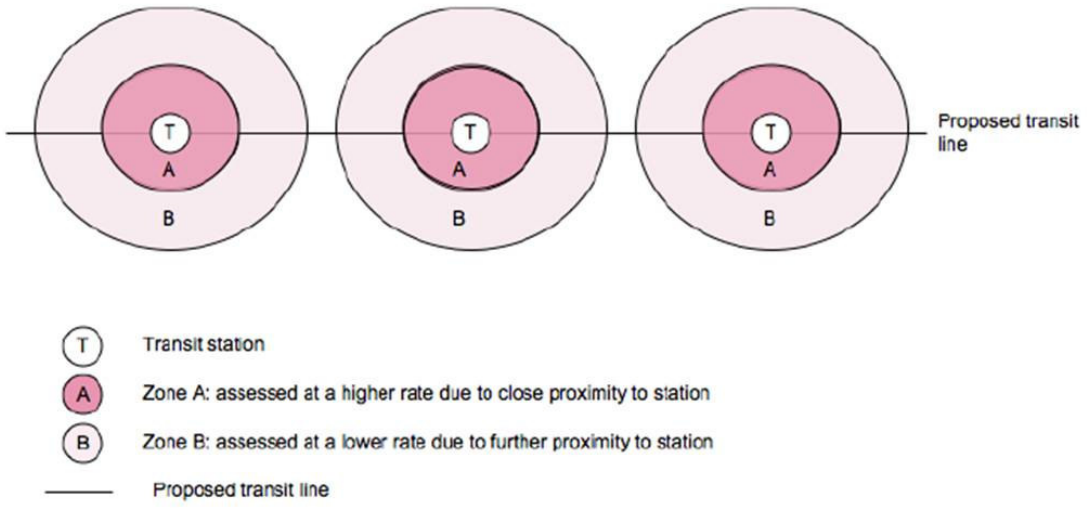
Source: CTS, 2009

Special Assessment Districts

Special Assessment Districts (SAD) or "benefit assessment districts" cover a limited geographical area and funding for infrastructure projects is derived from the charging of a "special assessment" or fee in addition to the property tax on properties adjacent or within a specified distance of the infrastructure investment. The rationale for the districts assumes property owners will obtain a special benefit from new infrastructure investment and thus the additional tax or levy on the neighboring property owners helps the municipality finance the construction and maintenance of the new facility. The science of assessment for SADs is complicated from lack of information and municipalities must make a somewhat arbitrary decision about where to draw boundaries and how to taper off the special assessment fee from the transportation facility. Similar to revenue bonds, assessment districts are not backed by municipal full faith and credit but by the special tax assessed for a specialized purpose.

Several methods have been employed to establish a basis for the assessment of properties including: estimated increases in property value; location within a zone and distance from transportation facility; amount of frontage of a parcel to an improved transportation facility; acreage; and distance from the improved facility. Researchers explain the downside of SAD: they provide few price signals to users; have a narrow base; raise a limited amount of revenue; require support from landowners, business leaders, and public officials to adopt; and are somewhat difficult to establish (Lari et al., 2009). On the positive side they provide signals to landowners regarding the costs of a transportation improvement, improve benefit equity in proportion to benefits received, and recover costs anywhere between nine percent and 50 percent of the capital cost of a project.

Figure 4.5 Special Assessment District and Transit



Source: CTS, 2009

Transportation Utility Fees

Transportation utility fees (TUF) are assessed to properties based on the amount of trips they generate. The transportation system can be compared to public utility systems like water or sewer which charge users fees per amount of consumption where high traffic generators would be charged higher fees. The first use of TUF was in fort Collins, Colorado in 1984 and increased in popular use in the state of Oregon. The calculation of the fee stems from the Trip Generation manual published by the Institute of Transportation Engineer (ITE, 2008).

Complications in terms of accuracy arise from use of the manual since residential units does not necessarily equate to number of residents and this trips; additional concerns include the proportion of burden for large properties such as parks where land is not used intensively or residential properties which contribute a lesser proportion despite consuming the highest percentage of land use on average (Junge and Levinson, 2010b). Some uses such as gas stations or convenience stores attract traffic making trips between destinations and would require alteration for a more equitable distribution of fees. The same authors point out the internal trip character of mixed-use developments or districts which would also require adoption of different standards than the Trip Generation manual suggests. The study concludes that the burden of paying the transportation utility fee shifts from residential properties to commercial properties; provides an equity improvement over the property tax; should be paired with another value capture strategy;

and could be enhanced by incorporating variables such as trip length per land use type or vehicle weight.

Researchers at the Center for Transportation Research at the University of Minnesota point out that the adoption of a TUF can be a matter of political expediency since it does not require a public referendum (CTS, 2009). The researchers also highlight complications such as TUF do not send a strong price signal to consumers of transportation services by providing little incentive to conserve transportation resources, correlation between the fee and trip generation rates is weakly established and unproven, ability-to-pay is difficult to establish since less attention is paid between income groups of users (in the case of a flat rate). A major benefit is that the fee is less sensitive to cyclical economic trends and provides a stable revenue source and can be considered politically feasible.

Development Exactions

Development impact fees like negotiated exactions are called "development exactions" because of the turning over of land, facilities, or money to a municipality, county or maintenance entity (CTS, 2009). "Development impact fees are one-time charges collected by local governments from developers for the purpose of financing new infrastructure and services associated with new development" (CTS, 2009). They are charged to new development to help recover growth-related costs and are formally calculated based on public service costs of new development. Development impact fees

are commonly used in high growth states such as California, Florida, and Texas and were not common until the 1980s according to researchers.

The study indicates the benefits: fees can be readjusted on short notice, they can be change in relation to changes in income or inflation rates, and can be adjusted as needed to meet rising demands for infrastructure services. On the negative side the fees are strongly tied to the demand for new housing and commercial space and thus cyclical, the narrower base causes significant financial risk for large and costly infrastructure improvements if projected growth rates do not occur, and less popular with developers. Additional research suggests that contrary to thought, impact fees are not *forwarded* onto the consumer but *backward* to the owners of undeveloped land (Yinger, 1998).

Negotiated Exactions are contributions from a private entity to provide land or facilities to serve public infrastructure needs (Nelson et. al., 2008). Where development impact fees are based on calculations and formulas, negotiated exactions are based on the power of political stakeholders and thus involved negotiation. Similar to development impacts fees the revenue base is narrow, successive generations of residents can be classified as free-riders since the infrastructure was paid by the initial users, and local governments enjoy the flexibility to adjust rates as changes occur with inflation, income growth, and demand for services. Both methods are popular with existing residents since new users "pay-their-way."

Air Rights

Air rights pertain to the sale or lease of development rights above a transportation facility which generates an increment in land value. The concentration of thousands of miles of roadways, railways, and other public infrastructure rights-of-way present a fixed asset to municipalities to leverage the air rights and recapture the incremental value. An accessibility effect is created around subways, metro stations, and depressed highways which give value to the airspace above the facility and incentive developers to build at much higher densities (Lari et. al, 2009). The practice of air rights in the United States begins with Grand Central Station in New York City in 1913 and has been incorporated as a financing mechanism by the Massachusetts Turnpike Authority at access points.

The researchers point out that Seattle, New York City, Columbus, Ohio and Duluth, Minnesota have incorporated the use of access rights for depressed sections of urban freeway while Washington, D.C., Atlanta, Los Angeles, and Boston have incorporated the mechanism for transit stations. Theorists consider air rights development as a form of joint development (Cervero, 2004). Complications with air rights include technical and administrative challenges in implementation; coordination between a large group of competing stakeholders from both the business and public sector; and the method will be most appealing when space is priced as a premium and the demand for real estate in an area is high (Larson and Zhao, 2010).

Additional complications mentioned by the researchers involve the modest or low revenue stream to transit agencies such as the case of Washington Metropolitan Area

Transit Authority where joint development revenues from air rights are no greater than 0.7 percent of total annual income. Matters are complicated during economic recessions when lease payments become more difficult to collect and it becomes more difficult to find new development partners. Since air rights are costly, development intensity must reach a threshold where properties can generate a significant amount of revenue. The authors highlight the benefits of air rights: lease or sale of air rights generates revenue in either a one-time lump sum payment or annual lease payment; increased transit trips and fare revenue from high intensity development; and increased property base.

Joint Development

"Joint development involves a partnership or joint venture between a transit agency and a private developer to develop certain assets [real estate]" (TRB, 1999). Joint development can be separated into jointness of timing of real estate development and supportive infrastructure and jointness of ownership by public and private parties. Public agencies can lease, sell, or land bank real estate to encourage development while private owners can contribute exactions or receive density bonuses as is the case in New York City. A major issue with joint development is revenues and expenditures where parties can participate in revenue-sharing where the provider of the infrastructure shares in the revenues from the development or cost-sharing where the private sector party participates in the provision and maintenance of the infrastructure. Joint development is by nature a public-private partnership and thus requires synergy, planning, communication, political

and financial coordination, and the willingness of both parties to accept risk. As researchers point out, joint development often attracts higher-end office and commercial tenants and traditionally houses middle- to upper-income residents (CTS, 2009). Joint development is only feasible where private sector interest is high and is further complicated by the volatility in commercial and office real estate markets. Other complications include high transaction, administrative, and managerial costs.

Safeguards are instituted to account for potentially unsecure finances such as structured financing for stable payments. The researchers note that joint development spurs other high-density development, both the public and private sector benefit, and joint development agreements are politically palatable (CTS, 2009). Joint Development has experienced limited application in the United States (Portland, Philadelphia, New York, Washington, D.C.) compared to Hong Kong where there is strong coordination between land use and transportation, strong demand for property, limited available land, and the existence of a regulatory framework that promotes linkage between transit projects and high-profit real estate projects (Rolon, 2008). The United States practiced joint development in the 19th Century with railroad companies by providing land grants to construct railroads and has been successful presently in New York City through the use of density bonuses. In simple terms joint development is a cooperative real estate transaction between private and public entities.

Figure 4.6 Joint Development Matrix

OWNERSHIP STRUCTURE	ASSET TYPE	JOINT DEVELOPMENT MODEL	COST-SHARING EXAMPLES	REVENUE-SHARING EXAMPLES
Public Property Ownership	Real Estate	Sale		
		Lease		Philadelphia, PA
		Land-banking	Washington, DC	
	Development Rights	Sale	Washington, DC Hong Kong	
		Lease	Washington, DC Hong Kong	
		Award	Portland, OR Thailand	
Private Property Ownership	Real Estate	Land Contribution • Land Readjustment • Land Acquisition • Land Consolidation	 Tokyo, Japan Taiwan Taiwan	 Taiwan
	Development Rights	Land Contribution • Commercial Industrial Mixed-use • Comprehensive Plan	 Taiwan Taiwan	
		Density Bonuses	New York, NY	New York, NY

Source: CTS, 2009

Complexities

Many complexities with value capture or taxation of property owner techniques include the difficulty of district establishment, administration, and limited revenue. Wachs blames the "politics of expediency" for the transition of transportation finance from user fee based to local option transportation taxes and borrowing methods like tax increment financing (2003c). In the case of establishing a special assessment district all property owners must be in agreement to establish the district. This method is more common among downtown and business districts where commercial property owners see

tangible results as funds pay for streetscape and aesthetic enhancements, security officers, and street and sidewalk cleaning. If property owners do not perceive real and tangible benefits, especially to profit, than the creation of a SAD may prove difficult. Many of the listed strategies such as a tax increment financing district or impact fees or transportation utility fees require more policy related and municipal or county council approval. If news media views these issues as hot button topics than politicians may experience greater difficulty, but many of the TIF districts in Dallas and Houston were initiated by petition by property owners or an association of businesses and property owners.

The administration of a value capture technique can be difficult, especially when municipal laws require agencies to evaluate if the technique is worth the cost. Private consultants may have to be hired to process the paper work, conduct regular assessed property value forecasts and projects for taxation purposes, and additional tasks. Impact fees are one example where administration may prove difficult since complex marketing and financial studies must be conducted to estimate what a fair levy or fee would be per unit of assessment.

The generated revenue from taxing property owners may not be substantial to justify the costs or generate limited revenue in general. Cherrington reports that techniques such as tax increment financing generate low rates of revenue (2008). The techniques tax or levy a limited geographic area and thus do not enjoy the wide tax base of the entire municipality or jurisdiction. The current land values may not be very high since one purpose of a financing technique such as a TIF is to attract development to

increase the assessed property value in the district. The goal and purpose of a financing technique is to generate higher revenue over the life if the technique and not necessarily generate high revenues from the outset.

4.4 Conclusion

The financing techniques discussed briefly in this section highlight the traditional methods: general obligation bonds, revenue bonds, assessment districts, fuel taxes and user fees, sales taxes, and intergovernmental transfers such as grants between the federal, state, and local governments. Transit agencies face increasing competition for funds from limited federal funds, few states are picking up the bill, and the search for alternative sources of funding is resulting in transit agencies to re-establish historical land use and transportation financing connections, namely, value capture techniques. The various value capture techniques have been discussed in detail in this chapter and often several are used in combination for revenue generation. Transportation and other public services are moving towards more direct user based fees such as fares for transit or motor fuel taxes and potential mileage or vehicle miles traveled fee for automobiles. Transit agencies experience negative externalities when increasing transit fares since many users do not have alternative means of travel, and increasing the cost of transportation for the transit dependent causes social equity complications for transportation disadvantaged. Taxation of land which increases in property values from the accessibility effect of transit is a source of revenue growing in practice and popularity.

CHAPTER 5 VALUE CAPTURE TECHNIQUES

5.0 Introduction

The framework of financing major transportation infrastructure projects is complex, but a simplified approach to viewing financial mechanisms focuses on who benefits (general public, transportation user, and property owners) and taxing each group accordingly. Value capture techniques fall under the guise of property owners as the beneficiaries and thus this report will not focus on the other categories of beneficiaries and associated taxation methods. The role of regulating land use is typically reserved for municipalities in the State of Texas and counties in many states. Few states are authorized or have established programs distributing state and federal funds to influence land use policy and by extension, transportation and economic development investments. This section will discuss state policies related to tax increment finance and transit-oriented development and examine the practice of value capture in the State of Texas.

5.1 Value Capture Policies

Historically states are concerned with inter-city policies and travel such as interstate highways or state-wide passenger rail (Amtrak) and local travel is historically reserved for local governments (Reene, 2008). A limited number of states have passed legislation related to regulating urban growth to direct development to the urban core of regions and

not the edges, to mix land use, provide for open space, encourage affordable and diverse housing choices, create walkable neighborhoods, and encourage a variety of transportation choices (Reene, 2008). Increasingly states are becoming involved in land use policy via taxation policy such as tax increment financing, housing policy via affordable housing tax credits, downtown revitalization via economic development policy, and other state-level implemented programs. In reference to transportation the use of these and other state-, metropolitan-, and municipal-level programs to influence local land use policy is through transit-oriented development or concentrating pedestrian- and transit-friendly development around transit stops or stations (TOD). The following paragraphs highlight state policy towards transit-oriented development, transit, and value capture techniques.

A report conducted by Cambridge Systematics in 2006 surveys the role of state department of transportation participation in transit-oriented development:

California

The state if California has historically avoided involvement in land use issues but the state first became interested in transit-oriented development with the Transit Village Development Planning Act of 1994. The Act was not implemented to the desired effect causing the state to issue a study called the Statewide Transit-Oriented Development Study: Factors for Success in California (2002). The 2002 study recommended a litany of

methods to improve state support for TOD and in 2006 the Transit-Oriented Development Housing Program was implemented in addition to Community-Based Transportation Planning Grants. One strategy, 2B or Targeted tax increment financing for TOD, has not been implemented. Although several documented cases in California utilize tax increment finance for transit-supportive TOD, the state has experienced political problems with tax increment finance. The main reported concern blocking the use of TIF is the conflict between the original purpose of TIF for redevelopment and the competing and newer use which is TIF for infrastructure in areas which may not be considered sufficiently underdeveloped or blighted.

Florida

The state of Florida emphasizes growth management policies to reduce the spiraling cost of new infrastructure as population continues to grow at a fast pace. The Florida Department of Transportation's Transit Office is responsible for promoting site design and land use planning. The report highlights that FDOT districts 5 and 6 (Ft. Lauderdale and Miami) support TOD through planning activities and transfer of real estate. The state does not have a specific TOD program, but engages directly and indirectly in TOD: outreach and education, design handbook, environmental review, research, selling state property to transit agencies, and funding land use planning studies.

Georgia

The state of Georgia is not considered a state directly or indirectly supportive of transit-oriented development despite the use of Tax Allocation Districts for Lindbergh Station and the Beltline TADs. The former has utilized TIF funds and special assessment funds for station and parking costs while the latter has not yet been documented for expending funds for transit. Transit service has not been constructed in the Beltline TAD whereas Atlantic Station is served by MARTA or Metropolitan Atlanta Rapid Transit Authority (CDFA, 2007).

Illinois

The state of Illinois is not considered a state directly or indirectly supportive of transit-oriented development despite the use of tax increment funds in the City of Chicago for stations. IDOT has supported TOD through its Technical Studies program and converting state-owned surface parking lots to mixed-use development. The County Economic Development Project Area Tax Increment Allocation Act of 1991 is responsible for allowing Chicago to utilize tax increment funds for transit infrastructure. Known transit expenditures include: $13.5 million towards Randolph/Washington Station; $1.2 million towards Dearborn Subway-Lake Wells; and $24 million towards the Central Loop (CTS, 2009).

Maine

Maine is not listed in the report by Cambridge Systematics, but the state passed a law supporting transit-oriented development: Transit-Oriented Tax Increment Financing Districts Act of 2009 (Maine State Legislature, 2009). The law limits designation of a development district: 25 percent of the real property within a district must either be blighted, in need of redevelopment, or be suitable for commercial or arts districts uses. Additionally, the original assessed value of a proposed tax increment financing district plus the original assessed value of all existing tax increment financing districts within the municipality may not exceed 10 percent of the total value of taxable property within the municipality. This value is 15 percent of assessed value of taxable property of a school district for the entire jurisdiction in the state of Texas.

Maryland

The State of Maryland directly supports transit-oriented development. Although the state has taken a decentralized approach and does not have formal laws, the MDOT reports annually about oversight of TOD projects and the participation of the agency. The 2008 Annual Report to the Maryland General Assembly lists six stations, but the department also coordinates between state agencies, helps in station area planning and technical plans, helps with pedestrian improvement studies, disposition of state land to transit agencies, and transit project planning. The GAO or General Accounting Office for the United States Congress reports in 2010 that tax increment activities in Maryland have

paid for parking garages at the Owings Mills station and Savage MARC station (GAO, 2010). The report also indicates that parking garages represent the biggest hurdle for all jurisdictions undertaking transit-oriented development.

Massachusetts

The State of Massachusetts like Maryland has a transit-oriented development program that coordinates state transportation, housing, community development, and environmental agencies. The program is documented as supporting $30 million in financial assistance for basic infrastructure improvements: bike and pedestrian, parking, and streets. Supportive policies include: Smart Growth Zoning Act of 2004; Transit-Oriented Development Infrastructure and Housing Support Program; Commercial Area Transit Node Housing Program; and Transportation Assessment Districts.

Minnesota

The University of Minnesota conducted a research study concerning value capture for transit finance, and issued a report to the Minnesota State Legislature (CTS, 2009). Existing policies are limited: Minnesota Chapter 202 connects funding between affordable housing, efficient land use, and transportation infrastructure. One light rail corridor and one commuter rail corridor have been constructed in the Minneapolis-St. Paul metropolitan area and future light rail and commuter rail corridors are in the

planning phases. Minnesota has been very active in utilizing tax increment financing in the past to redevelop depressed communities.

New Jersey

The State of New Jersey is highly supportive of transit-oriented development. Supportive legislation and programs include: Transit Village Initiative of 1999; New Jersey Transit-Friendly Communities Program; New Jersey Transportation Trust Fund; and New Jersey Chapter 346 providing tax credits for businesses locating close to transit hubs. The state has been very adamant about directing growth into urban centers and transit villages in order to reduce infrastructure costs and environmental impacts. The state works with communities to develop strategies to reduce demand on the state highway network. No reported cases exist on value capture being utilized in New Jersey at this time.

Oregon

The State of Oregon is labeled as indirectly supporting transit-oriented development, but the state is a national leader in growth management. State policies supportive of TOD and transit are limited to the Urban Renewal Area (457.08 Oregon Revised Statutes) law. The Portland metropolitan area boasts supportive policies: City of Portland Housing Tax Abatement Program and Metro Transit-Oriented Development Program. The Oregon Department of Transportation and the Department of Land Conservation and Development collaborate on a joint transportation and growth

management program which provides grants, design assistance, code and zoning assistance, and education and outreach. The modern Portland streetcar, initiated in 2001, has been one of the limited cases in the nation where tax increment financing (from two urban renewal areas) helped finance transit capital infrastructure.

Pennsylvania

The State of Pennsylvania is very supportive of transit-oriented development and transit. The state has developed a "how to book" for TOD, allows transit agencies to partner with local governments and developers via the Transit Revitalization Investment District Act of 2005, provides planning and implementation grants for TRID studies, helps transit agencies acquire land, and helps communities establish value capture areas. Current value capture activities are very limited but the new TRID legislation is very promising and a handful of communities have received grants to study the creation of TRIDs. Pennsylvania is one state to pay heavy attention to regarding the use of tax increment funds for capital transit infrastructure in the future.

Virginia

The state of Virginia Georgia is considered a state not directly supportive of transit-oriented development despite policies in Arlington County, Virginia and potential policies in Fairfax County. Land use is considered a local issue and transportation a state issue. Arlington County is home to the well-known Rosslyn-Ballston WMATA Orange

Line corridor, which one of the most highly regarded transit-oriented development case studies in the nation. The Dulles Silver Line project has considered using tax increment financing in combination with the design-build approach, and projections estimate a contribution of $400 million out of a total cost of $2.6 billion (GAO, 2009).

Washington

The State of Washington is labeled as a state not directly supporting transit-oriented development, however, the state department of transportation is reported as a participant in efforts by local governments to develop TOD policy. The Seattle South Lake Union streetcar was supported by special assessment funds as well as the Seattle Bus Tunnel. King County Metro in Seattle has also implemented joint development projects.

Supportive state and local policy highly enables transit-oriented development to occur. The GAO reports that transit agencies that are most successful with TOD have common characteristics: boast formal transit-oriented development policies; have in-house real estate expertise; and have developable land holdings on which to build development (2010). The Maryland Department of Transportation, Office of Real Estate has a bi-annual budget of $3 million and spends $300,000 a year on outside real estate consultants. The GAO reports six transit agencies practicing tax increment finance for transit even though after a review of practice in Texas, Houston should be added to the

list and potentially San Antonio in the future. *Table 5.0* details the limited practice of value capture in the United States. The GAO reports that the majority of special assessment, tax increment, and impact fee funds have supported basic infrastructure (streets, sidewalks, water and sewer systems, and parking) in TODs.

Table 5.0 Value Capture Practice in the United States

	Special assessment district for transit	Tax increment financing district for transit	Development impact fee for transit
Number of transit agencies out of 55 reporting use	10	6	10
Total number of uses of each strategy	17	13	22

Source: GAO, 2010

Financial Considerations

A streetcar in central Portland, Oregon began service in 2001 and the financial breakdown highlights the incorporation of tax increment financing. Tax increment funds contributed 22% to the capital infrastructure costs of the system and are derived from two TIF districts known in Oregon as Urban Renewal Areas or URAs. Both TIF districts contributed limited funds valued slightly above 10 percent of the total cost of the system. The table below breaks down the financing.

Table 5.1 Example of How TIF Contributes to Transit Finance

Portland, Oregon Streetcar Financing	$ Millions	Proportion
City Parking Bonds	28.60	28%
Local Improvement District	19.40	19%
Tax Increment (North Macadam URA)	12.20	12%
Tax Increment (South Park Blocks URA))	10.00	10%
Regional Transportation Funds	7.50	7%
Federal Transportation Funds	5.00	5%
Transportation Land Sale	3.10	3%
Transportation Systems Development	2.50	2%
Connect Oregon	2.10	2%
Misc.	2.09	2%
City Parking Fund	2.00	2%
US HUD Grant	1.95	2%
Tax Increment Funds (Additional)	1.80	2%
City General Funds	1.80	2%
City Transportation Fund	1.70	2%
Gibbs Extension Savings	0.66	1%
Transportation Fund	0.60	1%
Tram Transfer	0.15	0%
Total	103.15	100%

Source: Via Metropolitan Transit. 2010. Inter-City Rail Streetcar Feasibility Study

Limited information exists analyzing the utilization of tax increment financing for funding transit infrastructure improvements. The expenditure of funds for transit in practice mirrors the level of investment in Portland. The County Economic Development Project Area Tax Increment Allocation Act of 1991 is responsible for allowing Chicago to utilize tax increment funds for transit infrastructure. Known transit expenditures include: $13.5 million towards Randolph/Washington Station; $1.2 million towards Dearborn Subway-Lake Wells; and $24 million towards the Central Loop (CTS, 2009).

The New York Avenue Metro Station in Washington, D.C. which is a public-private partnership. The cost of the station was $84 million which was supported by a known value of $25 million from the special assessment district; the contribution by the tax increment financing district is undocumented (GAO, 2010). Other subway stations in the northeastern United States have also utilized a combination of special assessment district and tax increment financing mechanisms.

The Washington, D.C. area and State of Maryland is a leader in public-private partnerships. Historically, the area has been in the vanguard for joint development and now tax increment financing. Various sources document the use and consideration of tax increment financing for transit-supportive infrastructure. The Maryland Department of Transportation issues an annual TOD report which documents the status of stations and funding sources. Only one of the six stations, Savage MARC Station in Howard County, has been documented for utilizing tax increment financing. Bonds have been issued to construct a parking garage to support transit ridership and transit-oriented development to the tune of $17 million. Tax increment financing has been considered but no documented use exists for the other five stations (MDOT, 2008).

The existence of supportive legislation for value capture and transit enable transit-oriented development to occur with less hindrance. In the case of Pennsylvania's TRID, the use of joint power authorities or partnerships allows for increased use of tax increment and other value capture funds for supportive or capital transit infrastructure.

5.2 Value Capture and Transportation

The revenue sources derived from taxing the property owners are land value taxes, tax increment financing, special assessments, transportation utility fees, development impact fees, negotiated exactions, joint development, and air rights. A general term for these financing mechanisms is value-capture.

> [Transportation] value capture is 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 transportation projects. Based on the 'benefits received' rationale for public taxation, it proposes to recapture what is essentially publicly created value. Unlike building value, which derives from private capital investments, land value represents the speculative dimension of real estate. Thus, value capture is a variation of an unearned increment tax, and is based on the premise that property owners benefiting from a government-conferred locational advantage should pay some portion of the cost of public improvements from which the added value is originally derived
>
> Smith and Gihring, 2006

The attention given towards making transit systems successful has shifted towards developing land around transit systems to be supportive of transit or transit-oriented development (TOD). The popularity of TOD has been widespread in recent decades as billions of dollars are spent in developing land around transit stations. The potential for capturing the increased tax increments or levying a special assessment fee or other mechanisms appears promising. One study cited a 36.8 percent increase in land values for office and retail around stations as a result of the construction of the Dallas Area Rapid Transit (DART) light rail transit system (Weinstein and Clower, 1999).

The tax increments are not typically purposed for direct transit capital investment such as stations, signage, and track or operations like more vehicles or drivers. Instead public infrastructure improvements such as sewers, streets, sidewalks, landscaping, property acquisition, streetscapes, and drainage are the common expenditure items for tax increment funds. The value-capture benefit to the DART system is therefore not direct since tax increments do not flow to the transit agency but to the City of Dallas.

Tax increment funds are often viewed as supplemental funds and not as replacement funds for capital transit projects. The common goal of tax increment districts is to stimulate development by reducing the risk and costs of development in undeveloped or underdeveloped areas. The improvement of infrastructure in undeveloped or underdeveloped areas is similar to developing new land on the fringe of urban areas where existing tax payers and utility users subsidize new infrastructure construction. Tax increment funds can also be seen as subsidies; however, the funds are

not supported by taxpayers and utility users outside of the TIF district but are derived from future users. For this method of subsidization to work TIF funds must be spent strategically to encourage new development. Tax increment financing funds are collected in addition to the frozen level of property taxes at the time of district establishment, and funds grow as new development or redevelopment occurs. The reliance on future growth potential makes tax increment revenue speculative. If governments are not dedicated and able to make TIF districts successful, governments may not be able to repay the debt issued. The method is not guaranteed to work independently and requires careful attention, administration, and in some cases, additional financing tools to spur development.

Government jurisdictions are responsible in Texas for creating TIF districts and are by nature invested in the success of the districts to improve future revenue and expand the local tax base. Several factors from district initiation can be predictors of success such as larger TIF districts are more successful as well as districts located near municipal centers (Byrne, 2006). In the case of City Place in Dallas or TIRZ #1, the district is located one mile from Downtown Dallas. The district is strategically located nearest the greatest center of economic activity in the region and can receive spillover development seeking a central location for reduced price. Fejarang points out that investments in transport infrastructure reduce the demand friction around the central business district by attracting households and firms to settle around stations and properties close to the investment area or railway stations enjoy benefits from

transportation time and cost savings (1994). Whereas many researchers speak about the investment impact of transit and transportation infrastructure in general terms, Mark A. Stull, writes in the Transportation Planning and Technology Journal that "new transportation systems can be engines of economic growth, and the growth they generate can be used to pay for them, but only if they are engineered to provide more than a marginal improvement in accessibility and ridership" (2008).

The construction of streetcars, bus rapid transit, light rail transit, rapid rail transit, or commuter (regional) rail transit can be likened to roadways and expressways with differing levels of service and access. Transit networks can generate ridership high enough to serve as replacements to construction new arterial roads or expressways through sections of town with heavy travel demand and congestion. Both roadways and transit can be classified as fixed assets which act to influence or constrain economic development and growth potential in a city and region (Pagano and Perry, 2008). Both roadways and transit can also be classified as infrastructure public goods and land values reflect the value of public goods and services available to particular sites; transportation facilities and services make some sites more attractive or valuable and other not (Rybeck, 2004). Thus the introduction of fixed guideway transit service is a public good acting to make land surrounding stations more economically attractive for new development or redevelopment, and tax increment financing districts with transit service can utilize this advantage to attract development and increase tax increments.

Rybeck discuss this scenario in respect to Metrorail in Washington, D.C. where land values around Metrorail stations increased by a greater percentage than overall land values in the region because people value access to safe, affordable, and convenient transit service and employers and retailers realize that proximity to Metro brings much greater visibility and accessibility to clients, employees, and customers. Rybeck provides a caveat: "all too often, land near valuable public infrastructure (such as a subway station or major road intersection) remains vacant or grossly underutilized because landowners hold out for prices in excess of what buyers and renters will pay today, driving developers to seek cheaper sites farther away from public infrastructure" (2004). Rybeck recommends reducing speculation by instituting a lower property tax on buildings and a higher property tax on land or the land value tax (LVT) method or split-rate property tax.

The financing of transit systems is difficult and tax increment financing can be one innovative financing method to supplement other federal, state, and local funds. The combination of transit service in a TIF district improves accessibility and provides higher levels of economic potential to be obtained by the local and regional economy as well as local revenues. TIF for transit is a relatively new concept undergoing experimentation across the United States even though the practice of tax increment financing has been around for nearly sixty years. The practice in Texas where the cities of Dallas and Houston have established TIF districts around light rail stations is a major contribution to exploring the potential for TIF for transit.

Table 5.2 Features of Value Capture Policies

Value Capture Strategies	Contributor		Coordination			Timing		Space			Basis		Cost		Transport Ownership		Level of Government	
	Property Owners	Developers	Taxing Authority	Negotiation	Partnership	Before Transp. Improvement	After Transp. Improvement	On-site	Restricted Off-site Areas	Entire Jurisdiction	New Development	Old Development	Upfront (Capital)	Ongoing (O & M)	Public	Private	State	Local
Land Value Tax	●		●			●	●			●	●	●	●	●	●			●
Tax Increment Financing	●		●			●			●		●	●	●		●			●
Special Assessments	●		●			●			●			●	●		●		●	●
Transportation Utility Fees	●		●			●	●		●	●	●	●	●	●	●			●
Development Impact Fees		●	●				●		●		●		●		●			●
Negotiated Exactions		●		●		●		●			●	●	●		●	●	●	●
Joint Development		●			●	●	●	●	●		●	●	●	●	●	●	●	●
Air Rights		●		●			●	●			●		●		●	●	●	●

Source: CTS, 2009

5.3 Tax Increment Finance in Texas

Research into the state of practice of value capture techniques in the State of Texas was compiled in the Biennial Report of Reinvestment Zone for Tax Increment Financing Zone Registry (2008). The Texas Comptroller's office of the State of Texas issues the report. The use of tax increment financing in Tax Increment Reinvestment Zones or TIRZs is the primary value capture technique applied in Texas. The total number of TIRZs currently or formerly in operation is 182 with four complete and one terminated. The zones range in size from a few acres to 13,800 acres (Temple #1), but 52 TIRZs do not report acreage in the report or through online sources. List of the TIRZs are available in Appendix A detailing municipality and TIRZ number, year designated, acreage, base value, latest assessed value, and percentage increase. *Table 5.3* summarizes the basic information about TIRZs.

Urban counties (Bexar, Dallas, Harris, Tarrant, Travis) represent the vast majority of established Tax Increment Reinvestment Zones at more than 60 percent followed by rural counties at 22 percent and suburban counties, 16 percent. A second breakdown separates municipality type from county type, major urban cities (Austin, Dallas, Ft. Worth, Houston, San Antonio, Corpus Christi, and El Paso) represent 46 percent of total TIRZs; suburban cities with 30 percent, rural county municipalities with greater than 50,000 people at 12 percent; and rural county municipalities with fewer than 50,000 people at 10 percent. Both breakdowns of county type and municipality type indicate the

establishment of TIRZs is an innovative financing mechanism more commonly applied in urbanized regions.

Table 5.3 TIRZ Analysis

Variable	*Number*	
Total TIRZs	182	
Complete	4	
Terminated	1	
County Type		
Urban Counties	110	60%
Suburban Counties	29	16%
Rural Counties	40	22%
Rural Urbanized area	21	12%
Municipality Type		
Urban cities	84	46%
Suburban cities	55	30%
Rural (Less than 50,000)	19	10%
Rural (Greater than 50,000)	21	12%

Tax Increment Reinvestment Zones have been established in the State of Texas since 1982, but few were established until a dramatic spike in 1996 as represented in *Figure 5.0*. In the time period between 1995 and 1999 the highest number of TIRZs was created at 63 or 35 percent of all zones. The two subsequent time periods, 2000 to 2004 and 2005 to 2008, each experienced high numbers of zones being created at 26 percent each. All three time periods, 1995 to 2008, represent 87 percent of zones created supporting the claim that tax increment financing is a mechanism that is a recent phenomenon in Texas (TIFs were first authorized for use in the State of California in the 1950s). Urban created TIRZs mirror the overall trend, peak in second half of the 1990s

and maintained high rates in the 2000s, whereas TIRZs created in the suburbs peaked between 1995 and 199, and rural created zones peaked after the year 2000.

Figure 5.0 TIRZ Growth Trends

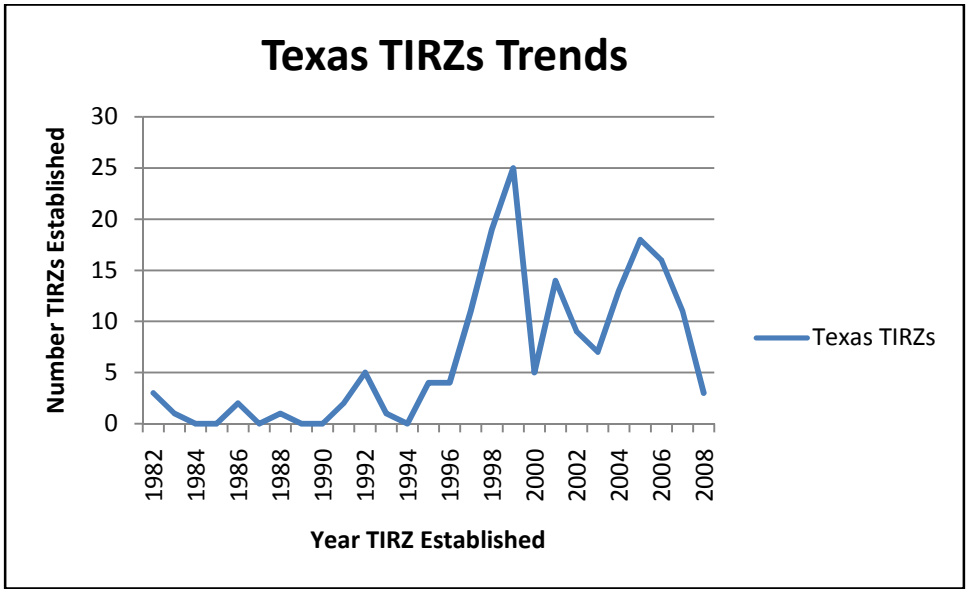


Table 5.4 depicts the percentages of TIRZs created for each time period. Two percent of the total 182 TIRZs were established in 1980-1984 and another two percent from 1985-1989. All of the TIRZs established during either time periods or 100 percent were created in rural counties such as small communities whereas in the following time period urban counties joined the trend in establishing TIRZs and out of the total created from 1990-1994, 88 percent were established in urban counties and 13 percent in rural ones.

Table 5.4 TIRZ Establishment by Time Period

Year Established	Total	Urban	Suburban	Rural
1980-1984	2%	0%	0%	100%
1985-1989	2%	0%	0%	100%
1990-1994	4%	88%	0%	13%
1995-1999	35%	48%	44%	8%
2000-2004	26%	48%	23%	29%
2005-2008	26%	50%	19%	31%
Other	4%	38%	13%	25%

After conducting a basic analysis of TIRZs in the State of Texas, the topic of effectiveness is raised: Have land values increased to a level to justify the creation of Tax Increment Reinvestment Zones? Values are missing for 49 zones or 27 percent. The second highest number of cases reports land values did not increase greater than the 100 percent threshold but the majority of these cases reflect both new zones and zones where the use of tax increment financing has not been highly effective. Thus further analysis must be conducted to weight land value increase in combination with number of years of operation. Several factors, however, contribute to less than ideal land value increases including regional economic environment, national economic environment, land use in the zone, amount of available or undeveloped land, and other micro-level characteristics. Zones with a land value percentage increase of greater than 1,000 percent represent 16 percent of cases or second highest after zones performing at less than 100 percent increase in land value. Further analysis could explore if high rates are related to low acreage or occur for large zones as well. One of the largest zones in acreage is also the highest percentage increases in land values, Midlothian #2 in Denton County, and has been in operation for around ten years. *Table 5.5* represents the numerical categorization of TIRZs per land value increase and *Table 5.6* represents the percentage categorization.

Table 5.5 Numerical Increase in TIRZ Land Values

Percentage Increased	*Total*	*Urban*	*Suburban*	*Rural*
Greater than 1000%	29	20	7	2
750%-999%	8	4	1	3
500%-749%	13	5	4	4
250%-499%	12	9	1	2
100%-249%	18	13	2	3
Less than 100%	32	13	11	8
Reporting 0%	19	7	6	6
Reporting Negative	2	2	0	0
Missing Values	49	10	21	16

Table 5.6 Percentage Increase in TIRZ Land Values

Percentage Increased	*Total*	*Urban*	*Suburban*	*Rural*
Greater than 1000%	16%	69%	24%	7%
750%-999%	4%	50%	13%	38%
500%-749%	7%	38%	31%	31%
250%-499%	7%	75%	8%	17%
100%-249%	10%	72%	11%	17%
Less than 100%	18%	41%	34%	25%
Reporting 0%	10%	37%	32%	32%
Reporting Negative	1%	100%	0%	0%
Missing Values	27%	20%	43%	33%

Transportation Expenditures for the TIRZs in the State of Texas are listed in *Table 5.8* as well as the associated total amount and percentage of the total. More than 42 percent of transportation funds are expended on the construction of streets, and the second highest category for expenditure is for infrastructure to support development. This broad category was eluded to or listed in many municipal documents and is listed with

transportation since as many TIRZs expend funds for transportation or transportation-related projects. Public infrastructure is the broad category for which funds will be spent, but other items include community facilities, parks, affordable housing programs, business facade improvements, environmental remediation, and others.

The *Table 5.8* was constructed by going through all the project plans and budgets and creating a large spreadsheet of all documented costs. The transportation related costs were then separated out and summed to paint a clear picture of how tax increment revenues have been expended in the State of Texas given available TIRZ report information. Many costs such as environmental remediation, façade improvement, schools, parks, cultural venues, and other costs are not reflected in the *Table 5.8* but in the 1-X percentage for each category of transportation expenditure. *Table 5.7* gives an example of what the matrix of expenditures looks like prior to aggregation.

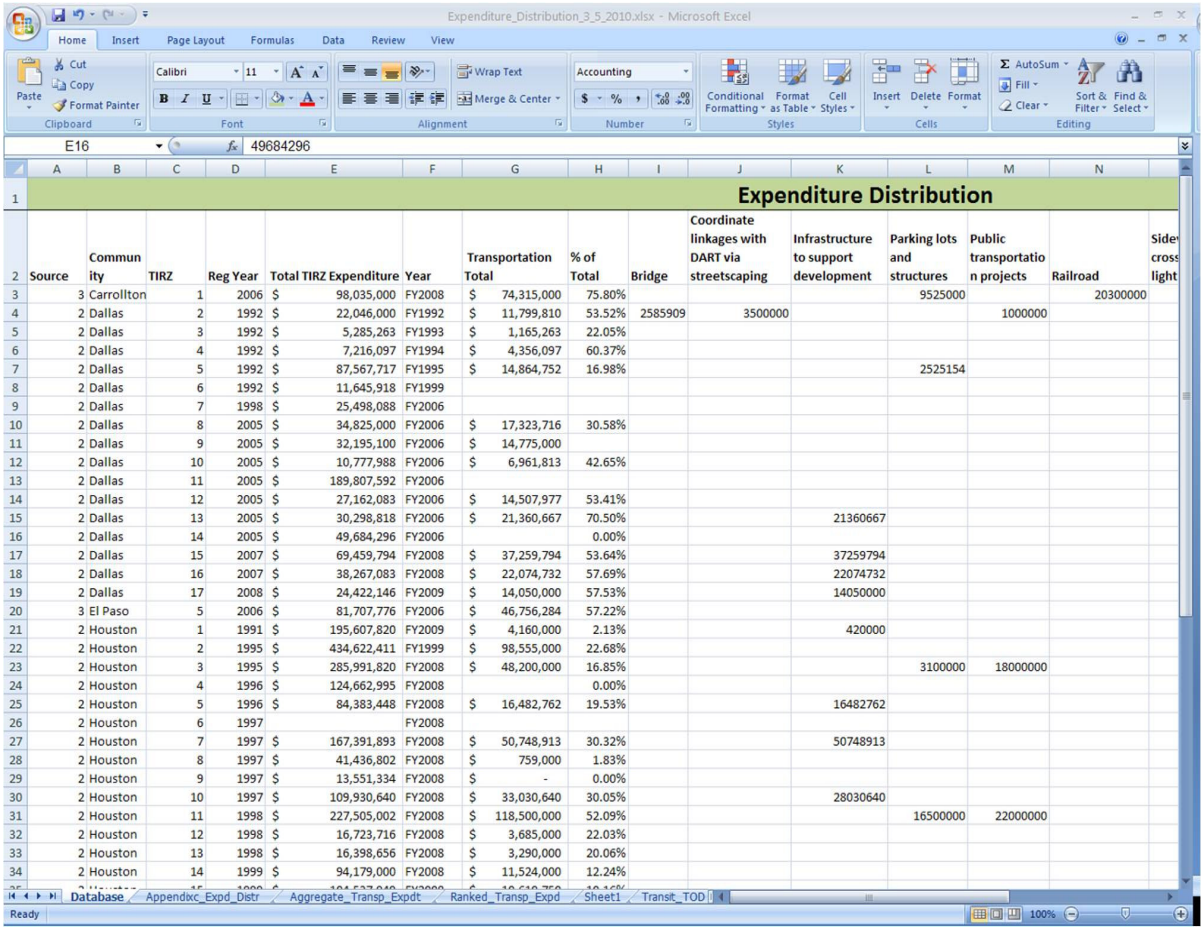
Infrastructure to Support Development

1. Street and Utility Improvements: This category includes TIF eligible expenditures for street paving and related items, infrastructure upgrades/relocation (including water, wastewater, storm sewer, gas lines, and Internet connectivity), and burial of overhead utilities.
2. Streetscape Improvements: The category includes lighting, pedestrian lighting, sidewalk and infrastructure improvements; expanding and enhancing pedestrian and vehicle continuity in the corridor; and other streetscape improvements related to specific projects.

3. Land Acquisition: The City may consider acquiring property, using eminent domain as necessary and to the extent permitted by law, to implement the TIF Plan. Potential land acquisitions may include, but are not limited to, properties needed for pedestrian safety and accessibility.

4. Transit Improvements: This category includes enhanced bus service, light rail, and modern streetcar or trolley systems.

Table 5.7 Matrix of Expenditures Example



Expenditure_Distribution_3_5_2010.xlsx - Microsoft Excel

Expenditure Distribution

Source	Community	TIRZ	Reg Year	Total TIRZ Expenditure	Year	Transportation Total	% of Total	Bridge	Coordinate linkages with DART via streetscaping	Infrastructure to support development	Parking lots and structures	Public transportation projects	Railroad	Side cross light
3	Carrollton	1	2006	$ 98,035,000	FY2008	$ 74,315,000	75.80%				9525000		20300000	
2	Dallas	2	1992	$ 22,046,000	FY1992	$ 11,799,810	53.52%	2585909	3500000			1000000		
2	Dallas	3	1992	$ 5,285,263	FY1993	$ 1,165,263	22.05%							
2	Dallas	4	1992	$ 7,216,097	FY1994	$ 4,356,097	60.37%							
2	Dallas	5	1992	$ 87,567,717	FY1995	$ 14,864,752	16.98%				2525154			
2	Dallas	6	1992	$ 11,645,918	FY1999									
2	Dallas	7	1998	$ 25,498,088	FY2006									
2	Dallas	8	2005	$ 34,825,000	FY2006	$ 17,323,716	30.58%							
2	Dallas	9	2005	$ 32,195,100	FY2006	$ 14,775,000								
2	Dallas	10	2005	$ 10,777,988	FY2006	$ 6,961,813	42.65%							
2	Dallas	11	2005	$ 189,807,592	FY2006									
2	Dallas	12	2005	$ 27,162,083	FY2006	$ 14,507,977	53.41%							
2	Dallas	13	2005	$ 30,298,818	FY2006	$ 21,360,667	70.50%			21360667				
2	Dallas	14	2005	$ 49,684,296	FY2006		0.00%							
2	Dallas	15	2007	$ 69,459,794	FY2008	$ 37,259,794	53.64%			37259794				
2	Dallas	16	2007	$ 38,267,083	FY2008	$ 22,074,732	57.69%			22074732				
2	Dallas	17	2008	$ 24,422,146	FY2009	$ 14,050,000	57.53%			14050000				
3	El Paso	5	2006	$ 81,707,776	FY2006	$ 46,756,284	57.22%							
2	Houston	1	1991	$ 195,607,820	FY2009	$ 4,160,000	2.13%			420000				
2	Houston	2	1995	$ 434,622,411	FY1999	$ 98,555,000	22.68%							
2	Houston	3	1995	$ 285,991,820	FY2008	$ 48,200,000	16.85%				3100000	18000000		
2	Houston	4	1996	$ 124,662,995	FY2008		0.00%							
2	Houston	5	1996	$ 84,383,448	FY2008	$ 16,482,762	19.53%			16482762				
2	Houston	6	1997		FY2008									
2	Houston	7	1997	$ 167,391,893	FY2008	$ 50,748,913	30.32%			50748913				
2	Houston	8	1997	$ 41,436,802	FY2008	$ 759,000	1.83%							
2	Houston	9	1997	$ 13,551,334	FY2008	$ -	0.00%							
2	Houston	10	1997	$ 109,930,640	FY2008	$ 33,030,640	30.05%			28030640				
2	Houston	11	1998	$ 227,505,002	FY2008	$ 118,500,000	52.09%				16500000	22000000		
2	Houston	12	1998	$ 16,723,716	FY2008	$ 3,685,000	22.03%							
2	Houston	13	1998	$ 16,398,656	FY2008	$ 3,290,000	20.06%							
2	Houston	14	1999	$ 94,179,000	FY2008	$ 11,524,000	12.24%							

Source: Author

Table 5.9 lists the TIRZs that exhibit existing transit service, current expansion, and future expansion. Both the Dallas and Houston regions are actively expanding light rail transit networks and incorporating TIRZs to aid in financing. El Paso and San Antonio are actively pursuing bus rapid transit. The precedent for TIRZs to fund transit has been established by the Dallas and Houston regions.

Public Transportation Projects

Dallas allocated $3.5 million for the McKinney Avenue Trolley and an additional $1 million extension. The TIRZ documents for TIRZ #2 which concerns both expenditures is confusing, labeling the $3.5 million as streetscaping and linkages to DART in the budget and listing just DART in the project plan report. Additionally, the McKinney Avenue Trolley was awarded $5 million in funds from the Federal Transit Administration for its extension. The trolley was one of six projects to be awarded Urban Circulation program funds out of 65 applicants towards a program with a budget of $130 million out of $1 billion in requested funds.

Houston TIRZ # 3 exhibits light rail service and plans to spend $18 million for transit and street improvements in the fiscal year 2010 budget but does not provide further detail. Houston TIRZ # 11 plans to spend $20 million on parks, plazas, and related transit amenities and $2 million for non-vehicular/multi-modal/intermodal systems.

Table 5.8 Transportation Expenditures ($)

Transportation Expenditure Category	Aggregated Amount	Percentage of Total Transportation Expenditure
Bridge	2,585,909	0.21%
DART: McKinney Avenue Trolley	3,500,000	0.28%
Infrastructure to support development	289,813,961	23.45%
Parking lots and structures	86,650,154	7.01%
Public transportation projects	41,080,000	3.32%
Railroad	21,100,000	1.71%
Sidewalks, crosswalks, lighting	134,255,376	10.86%
Streets	521,816,686	42.23%
Streetscapes	132,455,163	10.72%
Traffic Signals	2,540,000	0.21%

Table 5.9 Present and Future Transit TIRZs in Texas

Municipality	TIRZ #	Transit TIRZ Technology	Status
Carrollton	1	LRT	Existing service
Dallas	2	LRT	Existing service
Dallas	7	LRT	Existing service
Dallas	8	LRT	Existing service
Dallas	9	LRT	Existing service
Dallas	10	LRT	Existing service
Dallas	11	LRT	Existing service
Dallas	12	LRT	Existing service
Dallas	13	LRT	Existing service
Dallas	14	LRT	Existing service
Dallas	17	LRT	Existing service
El Paso	5	Bus	Existing Service
Houston	2	LRT	Existing service
Houston	3	LRT	Existing service
Houston	7	LRT	Current Expansion
Houston	15	LRT	Current Expansion
Houston	16	LRT	Current Expansion
Houston	19	LRT	Current Expansion
Houston	21	LRT	Future Expansion
Plano	2	LRT	Existing service
Richardson	1	LRT	Existing service

The major focus of this paper concerns the application of tax increment finance funds towards public transit investment. In reality limited documentation exists of tax increment funds being utilized for transit infrastructure such as tracks, overhead wires, rail vehicles, etc. Tax increment funds have expended for the purposes of constructing transit-supportive infrastructure such as sidewalks, landscaping, wayfinding, streetscaping, new streets, etc. Funds have also been utilized to kick start new development or redevelopment of a tax increment zone through investment in catalyst projects. The cost of developing in formerly industrial, commercial, and partially vacant districts presents challenges due to age and deterioration of district infrastructure. Developers are hesitant to develop in underdeveloped or depressed sections of town unless local governments assist in offsetting the costs. Major costs impairing development include:

a. Deteriorated structures and land clearance
b. Large tracts of vacant land
c. Faulty lot layouts
d. Unsanitary and unsafe conditions
e. Deteriorated site improvements
f. Hazardous materials
g. Higher land costs
h. Poorly maintained properties
i. Unattractive environments

j. Lack of adequate traffic corridors

k. Negative perceptions

These identified obstacles to development and others must be addressed and require a concerted effort on the part of local government working in partnership with private developers to make a tax increment district economically viable. Often additional financing methods must be combined with tax increment finance to pay for public improvements and other expenses. Consultants point out the need for image enhancement, infrastructure redesign and improvement, code enforcement, compatible zoning, and linkages to the central business district. Both the Dallas and Houston regions are actively expanding light rail transit networks and incorporating TIRZs to aid in financing. El Paso and San Antonio are actively pursuing bus rapid transit. The precedent for TIRZs to fund transit has been established by the Dallas and Houston regions. Both Dallas and Houston are approaching the maximum amount Texas allows for taxable land to be frozen in a TIF.

The City of Dallas issued reports in 2008 updating the status of TIRZ districts including what projects were completed, under construction, or planned. The City of Dallas has been pursuing redevelopment of the downtown and central urban core by utilizing the tax increment method. Many of the developments incorporate catalyst projects with TIF assistance to help launch the districts and attract additional development. *Table 5.10* lists the economic development update from the 2008 reports

for Dallas. The district number is listed in addition to the projected TIF budget and the amount of years on investment between the time the district was initiated and the 2008 report was issued. The last three columns indicate the approximate value of development: the center to columns aggregate the value of development utilizing TIF funds while the last column aggregates the amount of development not utilizing TIF funds. As the argument goes, this level of development would not have occurred without the tax increment district and TIF funds being utilized to spur initial investments.

Table 5.10 Transit TIRZs and Economic Development

TIRZ	Projected TIF Budget	Years of Investment	TIF Investment in projects	Approx Value	Projects not utilizing TIF
Dallas #2	$22,046,000	16	$6,475,374	$227,200,260	$270,840,850
Dallas #4	$ 7,216,097	16	$1,624,812	$33,294,150	$50,684,730
Dallas #5	$87,567,717	16	$57,910,000	$305,600,000	$172,700,000
Dallas #7	$ 25,498,088	10			$1,227,044,950
Dallas #8	$ 34,825,000	3	$ 4,402,000	$27,000,000	$93,027,280
Dallas #9	$32,195,100	3	$20,000,000	$750,000,000	
Dallas #10	$10,777,988	3	$1,770,000	$ 31,000,000	$72,000,000
Dallas #11	$189,807,592	3	$ 120,205,041	$365,400,000	$1,966,121,500
Dallas #12	$ 27,162,083	3	$8,074,109	$76,200,000	$44,500,000
Dallas #13	$30,298,818	3	TBD	$4,300,000	
Dallas #14	$49,684,296	3	$23,000,000	$350,000,000	$308,965,930

Dallas and Houston have valid reasons for implementing TIRZ districts in downtown and central neighborhoods. Both municipalities experienced strong demand and high office occupancy rates during the 1970s but growing suburban office corridors caused a flight of companies from downtown and central locations. The pursuit of tax increment reinvestment zones in downtown and central locations has been initiated to absorb and replace outdated office and retail space in addition to making both communities attractive environments for attracting residents and entertainment. Both communities desire downtowns to become thriving 24 hour places where residents, visitors, and workers can live, work, and play.

5.4 Conclusion

Chapter 5 Value Capture examined the concept of value capture and application of techniques, state and local policies, and the practice of value capture in the State of Texas and other states. The practice of value capture in the United States is limited but growing. The State of Texas is one of the documented (Dallas) cases for tax increment financing application in the United States even though Houston has been missed in GAO documentation. The proportion of funds utilized for supporting transit through transit-oriented development infrastructure investments is currently practiced in the State of Texas with small investments in capital transit infrastructure for the McKinney Avenue Trolley in Dallas. Growing interest in San Antonio and Austin for transit and tax

increment financing of transit infrastructure will continue to cause a transformation in the United States from TIF primarily for TOD to TIF for transit infrastructure. A major advantage of utilizing TIF is that it expressed the benefit principle where property owners who benefit from the construction of a public improvement like transit are taxed accordingly; taxes that would have gone to the municipal General Fund are redirected to investing in infrastructure in the area of TIF designation. The State of Texas is a leader in value capture for transportation. The evidence is clear that the construction of transit infrastructure helps economic development occur as evidenced by *Table 5.10*. The next chapter will explore the transportation and economic development connection in greater depth.

CHAPTER 6 TRANSIT AND ECONOMIC DEVELOPMENT

6.0 Introduction

Tax increment financing and the Texas version called TIRZ or Tax Increment Reinvestment Zone is a financing mechanism. The provision of transit in a zone provides additional accessibility or access between residential locations on the transit route and work, shopping, and entertainment destinations. The concept of accessibility, land use and transportation connection, and relationship between transit and economic development will be explored in this chapter.

6.1 Accessibility and Transit Served TIF Districts

Accessibility is a concept at the core of transportation theory and heavily influences decisions where to develop and what type of land use. Dr. Stanilov (2003) traces the empirical history of accessibility back to the "law of minimum effort" or "principle of least effort" by Mr. Losch (1954) and Mr. Zipf (1949), respectively. Dr. Cervero (1996) and Dr. Straatemeier (2008) describe the traditional role of transportation planning as focusing on movement, supply, speed and ease of movement, predict and provide, and linking spatially and temporally dispersed resources. These concepts are highly detailed and exhaustively researched, but they describe the attributes of the traditional transportation planning framework from which the accessibility-based planning framework is launched. The problem with the traditional approach is that it

emphasizes mobility or providing transportation facilities and expanding them. Cervero refers to this as automobility since it mostly entails planning for the movement of automobiles: focusing on the speed and ease of the private automobile transport mode and supplying tailored transportation facilities such as more lanes or more highways before or after demand. The theory of Down's law, governments and transportation providers cannot build their way out of congestion, is a response to the traditional approach and emphasis on mobility. This approach has been an influential and contributing factor to the low-density dispersion and spread, a.k.a. sprawl, which has dominated 20th Century urban form in America.

Dr. Susan Handy, in *Access to Destinations*, expands on the definition of accessibility as the "potential for interaction" to the "ability to get what one needs by getting to the places where needs are met". Additionally the measures of accessibility incorporate an impedance factor which reflects the time or cost of reaching destinations and attractiveness reflecting qualities of destinations or activities (2005). She highlights the importance of the choice of destinations or modes of travel for greater accessibility. Researchers Chen, Chen, and Timmerman expand on this concept saying that accessibility defines the extent to which location (dis)enables individuals to participate in different types of activities and/or in different locations (2008). Levine and Inam point to the need for higher density so that households and firms can be in close proximity to destinations and travel shorter distances (2004). Chen, Chen, and Timmerman assert that the role of density at destinations provides more opportunities (activities). The analogy

can be compared to education: a family with children locates to a school district with a high level of education and track record for sending graduates to some of the nation's best universities. The family or parents hope that the school district will adequately prepare the children for the nation's best colleges and lastly, good paying jobs. The school district like the station area is a desirable location for families and improves the chances of greater opportunity at the other end of the line, the university or in the case of accessibility and transit, the downtown and other activity centers. The potential for increased assessed land values in the tax increment financing district are not entirely based on the surrounding area of the district. Transit plays a major role in TIF districts by providing access to other station areas which may spillover economic activities to the TIF district. The economic health of the transit serviced areas is a prime indicator for the potential economic future for the transit served TIF districts.

The provision of transportation facilities linking destinations and inducing development is paramount in the realm of economic development and tax revenue generation for local governments as well as development potential and economic profit for developers. For developers, accessibility is a market determinant for the potential to build the one out of ten projects that are financially sound. A survey of developers from around the nation confirms the preference by developers to build alternative styles of development and states that the major obstacle to these types of developments is land use regulations in inner suburbs where there is the most demand (Levine and Inam, 2004). Present alternative housing trends entail traditional neighborhood development, new

urbanism, mixed-use developments, high-rise condo and apartment towers, townhouses, and lofts.

For planners, accessibility is a method by which to influence land use policy and achieve desired goals and objectives. Planners aim to encourage mixed-use development, reduce auto use, and promote community. For elected officials, accessibility promotes diverse land uses concentrating into activity center neighborhoods or districts like downtowns, which produce greater quantities of sales and property tax revenue than they consume in government services. Accessibility is a thus a *deal maker* and transit must take advantage of its increased accessibility to have an economic development effect; the next section will explore the topic of activity centers and how transit access to activity centers yields an economic spillover effect on TIF districts with transit service.

6.2 Activity Centers

The activity centers are any combination of the concentration of employment, civic places, entertainment and shopping, and high density residential. By nature, activity centers contain high proportions of these activities relative to the rest of the metropolitan region. Activity centers are hot spot destinations attractive to developers because they have a higher likelihood for being financially feasible. Transit systems that serve many activity centers provide greater potential for development and thus, generation of higher tax increment revenue and assessed land value.

Transportation connectivity in a metropolitan region allows the local economy to expand; activity centers are commonly the most connected locations in metropolitan regions or where major roads, transit, and other modal corridors intersect. Many of the rail systems built in recent years implement the advice of Sherry Ryan: the best locations for routing light rail lines should be to high concentrations of existing activity (2005). Barnes states, "the development of large, dense commercial centers" is a land use tool that can be utilized by transit for greater ridership attainment (2005). This trend is complicated by a separate trend: suburban employment centers such as "edge cities" have ceded their role as the number one location in a region for office development to edgeless cities or dispersed isolated office buildings (Lang and LeFurgy, 2003). Activity Centers like edge or edgeless employment centers should be served by transit and not just one mode. For transit ridership and associated economic development to be successful requires a dense urban form of land uses. Cervero (2006) warns policymakers that "concentrating housing near rail stops will do little to lure commuters to trains and buses unless the other end of the trip—the workplace—is similarly convenient to and conducive to using transit." The workplace, destination, or activity center is important for generating high transit ridership.

Ewing (2008) asserts that highways and transit serve as means of movement, communication, and market exchange and therefore channel growth spatially and that development should take advantage of these improved accessibility factors. Transit can be considered productive infrastructure for facilitating business. The movement of

people, information, and services is facilitated by transit which creates a tight network of concentrated firms, who value face-to-face business relations, located in activity centers. The desired result for the developer is the creation of market forces favorable for development.

6.3 Transit and Property Values

Transit's impact on economic development will be explored through research on transit's impact on property values: spatial extent, land use type, and transit technology. Each of the three variables impacts economic development in a tax increment financing zone to varying degrees. The half-mile radius spatial extent impact of transit has been standardized by the Federal Transit Administration as the commonly accepted parameter (FTA, 2004). The same parameter has been empirically proven valid in addition to research examining the ¼- and 1-mile radius from transit stations or stops. This spatial extent is empirically proven to be the typical transit catchment area or area of origin for transit riders. The published findings also categorize transit access premiums, additional price added to property based on location and access, for different property types (single-family homes, apartments and multi-family, commercial/office, and industrial), and different transit technologies (bus rapid transit, light rail transit, metropolitan rapid transit, and commuter rapid transit). *Table 6.0* lists the different transit technology type and its relation to potentially utilizing the TxDOT on-system highway network.

Table 6.0 Transit Technology Characteristics and TxDOT On-System

System Technology & Description	Service Geography	Average Speed (km/hr)	Station Spacing (km)	Typical Headway (min.)	Guideway	Typical Power Source	Interface with TxDOT On-System Hwy
Regular Bus: A road vehicle designed to carry multiple passengers. Buses vary in capacity from a dozen to several hundred passengers.	Urban	15-30	0.2 – 1.0	8-20	On street	Gasoline	User
Trolley Bus A passenger bus operating on tires and having an electric motor that draws power from overhead wires.	Urban	15-30	0.2-1.0	8-15	On street	Electric	User
Bus Rapid Transit A relatively new umbrella term for urban mass transportation services utilizing buses to perform premium services on existing roadways or dedicated rights-of-way.	Urban, Regional	25-50	0.4-1.5	10-20	Shared or exclusive ROW	Gasoline	ROW User/Partner
Streetcar: Bus on rails typically operating on city streets	Urban	15-25	0.4	8-15	On street	Electric	ROW User/Partner
Light Rail Electrically propelled rail vehicles operate singly or in trains with an overhead power supply. Utilize predominantly reserved but not necessarily grade-separated ROW.	Urban, Regional	30-60	1-1.5	5-30	Exclusive or shared ROW	Electric	ROW User/Partner
Heavy Rail An electric railway with the multi-car train capacity to handle a heavy volume of traffic. Heavy rail runs on its own dedicated track (often underground) and obtains power from the third track.	Urban, Regional	80-130	1-3	3-10	Grade-separated, Exclusive ROW	Electric	Station Access
Commuter Rail Refers to passenger trains operated on main line railroad track to carry riders to and from work in city centers. The trains are normally made up of a locomotive and a number of passenger coaches.	Regional	50-120	3—10	15-30	Exclusive ROW	Diesel or Hybrid	Station/Intersection Access

Regular bus and trolley bus technologies are considered general users of the on-system highway network since they generally travel on public roadways as their primary guideway system. Bus rapid transit, however, also utilizes the public roadway network, but may also require additional changes to the current on-system highway network such as dedicated lanes or expand the roadway. In some locations throughout the world and the United States bus rapid transit travels on separate guideways from the public roadway system. Streetcars and light rail transit are similar to bus rapid transit by potentially sharing or expanding the public roadway system as well as traveling on separate right-of-way. Heavy rail and commuter rail, however, requires entirely separate guideway system but may interface with the on-system highway or arterial roadway network through station accessibility or intersections.

Most studies highlighted in this report represent residential land uses and more specifically, single-family homes. Few studies examine commercial and apartment land use premium impacts by transit. A summary of published studies in *Table 6.1* lists the transit technology, property type studied, and the associated spatial extent from the stations. A limited number of studies have been performed with light rail transit technology type and single-family home property type being the most common. Two transit agencies in the State of Texas currently exhibit light rail transit: Dallas Rapid Transit and Houston Metropolitan. The Austin area transit authority Capital Metro and Via Transit in San Antonio are studying light rail transit. El Paso Transit and Via Transit are actively pursuing bus rapid transit with routes that could potentially utilize or alter the current roadway system. Few studies, however, have analyzed the property value premium for bus rapid transit.

Table 6.1 List of Published Studies

Study	Transit System	Type of Property Studied	Sample Maximum Distance to Station	
			(Miles)	(KM)
Landis et al. (1995)	CRT: CalTrain	Single-Family Home	0.19	0.30
Landis et al. (1995)	LRT: Sacramento	Single-Family Home	0.19	0.30
Landis et al. (1995)	MRT BART	Commercial	0.19	0.30
Weinstein (2002)	LRT: DART	Residential land	0.25	0.40
Al-Mosaind et al. (1993)	LRT: MAX, Eastside	Single-Family Home	0.25	0.40
Dueker and Bianco (1999)	LRT: MAX, Eastside	Single-Family Home	0.25	0.40
Weinberger (2001)	LRT: Santa Clara	Commercial	0.25	0.40
Garrett (2004)	LRT St Louis, MO	Single-Family Home	0.44	0.70
Munoz-Raskin (2006)	BRT: Bogota	Residential	0.50	0.80
Armstrong and Rodriguez (2006)	CRT Eastern Mass	Single-Family Home	0.50	0.80
Cervero and Duncan (2002)	CRT San Diego	Single-Family Home	0.50	0.80
Hess and Almeida (2007)	LRT Buffalo, NY	Single-Family Home	0.50	0.80
Ko, Goetz, Hagar (2009)	LRT Minneapolis	Single-Family Home	0.50	0.80
Cervero and Duncan (2002)	LRT Santa Clara	Apartment	0.50	0.80
Knaap et al. (1996)	LRT: MAX, Westside	Single-Family Home	0.50	0.80
Fejarang et al. (1994)	MRT LA	Commercial	0.50	0.80
Cervero and Duncan (2002)	Trolley: San Diego	Commercial	0.50	0.80
Chen et al. (1998)	LRT: MAX, Eastside	Single-Family Home	0.62	1.00
Rodriguez & Targa (2004)	BRT: Bogota	Apartment	0.93	1.50
Lewis -Workman and Brod (1997)	LRT: MAX, Eastside	Single-Family Home	1.00	1.61
Benjamin and Sirmans (1996)	MRT: D.C.	Apartment Rents	6.00	9.65

The premium values vary widely and are attributable to a host of factors such as transit technology, economic environment, integration of the transit route into the urban area, metropolitan area, etc. *Table 6.2* presents the studies that have determined a property value premium for single-family properties located near transit stations. Light rail transit is the most common transit technology studied but metropolitan (also called heavy- or rapid-rail transit) and commuter rapid transit technologies are also represented. The MRT or Metropolitan Rapid Transit systems studied were in the San Francisco Bay area and New York City with the highest premium for single-family housing in NYC for 12 percent of systems studied. MRT systems are also located in Boston, Philadelphia,

Washington, D.C., Baltimore, Atlanta, Miami, Cleveland, Chicago, and Los Angeles. The CRT or commuter rail studies represent three metropolitan regions or 13 percent of existing systems: Philadelphia, San Diego, and Boston. Out of the three regions, the premium for single-family development is the highest in San Diego where commuter rail follows the coastline through affluent communities and transit is not plentiful. The LRT or Light Rail Transit systems studied for single-family housing includes, Buffalo, Minneapolis, Portland, San Jose, St. Louis, and San Diego with the highest premium found in Portland, Oregon. The six systems studied represent 21 percent of existing systems.

Table 6.2 Single-Family Transit Access Premium

Transit Access Premium for Single-Family Homes (in 2000 US$ per typical home for every meter closer to the station)		
Study	**Rail System**	**Premium**
Hess and Almeida (2007)	LRT Buffalo, NY	$7.25
Ko, Goetz, Hagar (2009)	LRT Minneapolis	$6.22
Lewis -Workman and Brod	LRT: MAX, Eastside line	$2.70
Landis et al. (1995)	LRT: San Jose Light Rail	($2.60)
Garrett (2004)	LRT St Louis, MO	$36.45
Landis et al. (1995)	LRT: San Diego Trolley	$3.58
Al-Mosaind et al. (1993)	LRT: MAX, Eastside	$31.64
Chen et al. (1998)	LRT: MAX, Eastside line	$39.51
Dueker and Bianco (1999)	LRT: MAX, Eastside line	$49.68
Lewis -Workman and Brod	MRT: BART	$56.79
Lewis -Workman and Brod	MRT: New York City MTA	$82.78
Landis et al. (1995)	MRT: BART	$1.50
Voith (1991)	CRT: Philadelphia	$14.56
Cervero and Duncan (2002)	CRT San Diego	$83.58
Armstrong and Rodriguez (2006)	CRT Eastern Mass	$7.05

Multifamily housing such as apartments and condominiums are common housing types constructed within ¼- and ½- mile distance of transit stations, but the number of studies analyzing the premium effect relative to single-family homes is fewer. *Table 6.3* represents the transit access premium for apartment and multi-family property types. The findings do not reflect a high premium placed on living in multifamily residential units near transit stations regardless of metropolitan region. The findings from one bus rapid transit system are included in the list and may help San Antonio and El Paso understand the potential impact on property values as a result of future transit service.

Table 6.3 Multi-Family Transit Access Premium

Transit Access Premium for Apartment/Multi-Family Homes (in 2000 US$ per sq. meter for every meter closer to the station)		
Study	**Rail System**	**Premium**
Rodriguez & Targa (2004)	BRT: Bogota	$0.07
Cervero and Duncan (2002)	LRT LA County	$0.00
Cervero and Duncan (2002)	LRT Santa Clara County, CA	$0.24
Ko, Goetz, Hagar (2009)	LRT Minneapolis	$0.10
Cervero and Duncan (2002)	LRT San Diego	$0.27
Benjamin and Sirmans (1996)	MRT: Washington, D.C.	$0.40
Cervero and Duncan (2002)	CRT San Diego	($0.11)

Surprisingly the highest premium for commercial and office development is found in Atlanta with negative values for a few lines in San Diego. The premium for commercial and office property types is depicted in *Table 6.4.* The negative values for one commuter and two light rail transit lines in San Diego may be attributable to the route

choice and integration with the urban area. In other words, the three transit lines utilize abandoned railroad corridors through formerly industrial and depressed sections of the region. Transit lines in Los Angeles, Minneapolis, and St. Louis also follow former railroad right-of-way through industrial and depressed sections of town but property value premiums are either zero or high values. For some cities the route choice may be influential and require more time to improve property values while for others the presence of transit and accessibility in unsaturated transportation markets presents opportunity for economic development. Researchers Debrezion, Pels, and Rietveld find that the effect on commercial property mainly takes place within a quarter mile or short distances (2007). The authors highlight that the effect from heavy or metropolitan transit and commuter rail transit have the greatest effect on commercial property values. Commuter rail is found to have the greatest effect on commercial property values and presents the widest service coverage or catchment area. The main reason the authors highlight a quarter-mile is due to walking distance between station and commercial property location for the typical traveler.

Table 6.4 Commercial/Office Transit Access Premium

Transit Access Premium for Commercial/Office (in 2000 US$ per sq. meter for every meter closer to the station)		
Study	**Rail System**	**Premium**
FTA (2000)	MRT Washington, D.C.	$0.08
Nelson (1998)	MRT Atlanta MARTA	$84.75
Landis et al. (1995)	MRT BART	$0.00
Fejarang et al. (1994)	MRT LA	$0.66
Weinberger: Commercial (2001)	LRT: Santa Clara	$1.54
Weinberger: Office (2001)	LRT: Santa Clara	$0.04
Cervero and Duncan (2002)	CRT: San Diego	($0.22)
	LRT: San Diego South Line	($0.21)
	LRT: San Diego East Line	($0.03)
	LRT: San Diego Mission Valley	$1.63

Transit Access Premium Evidence from Texas

The transit access premium studies for the Dallas and Houston areas are less clear. The statistical methodology for the studies is different from other empirical studies and thus difficult to compare and make inferences. Weinstein and Clower conducted studies for different property value types at the quarter-mile spatial extent and have found various rates of percentage increase for each with retail being the highest (1999, 2002, and 2005). Pan and Ma in 2009 studied property values within a quarter-mile up to two miles distant but do not conclude quantifiable values.

Table 6.5 Property Value Premiums in Texas

Dallas		
Weinstein and Clower (1999, 2002, 2005)	1/4 mile	Retail: 36.75%
	1/4 mile	Office: 13.85%
	1/4 mile	Residential: 5.97%
	1/4 mile	Industrial: 7.68%
	1/4 mile	Property value increased 32 percent near DART stations compared with 20 percent in control group areas not served by rail.
Houston		
Pan and Ma (2009)	1/4 mile and up to 2 miles	The opening of light rail has significant positive effects on residential property values. Access to light rail stations has significant negative impacts on the values of residential properties located within a quarter mile of rail stops and the effects become insignificant between a quarter mile and two-mile distance from rail stops.

6.4 Conclusion

Transit's impact on economic development has been explored through research on transit's impact on property values: spatial extent, land use type, and transit technology. Each of the three variables impacts economic development in a tax increment financing zone to varying degrees. The half-mile radius spatial extent impact of transit is the commonly accepted parameter. Light rail transit is the most common transit technology studied, especially since the accessibility effect and increase in property values has been empirically proven in decades preceding the light rail transit boom. Knight and Trigg (1977) present the most clear and convincing evidence for the effect of rapid rail systems on surrounding property values and land use. Transit serves as a means of movement, communication, and market exchange and therefore channels growth spatially.

Developers respond to take advantage of these improved accessibility factors. The provision of transportation facilities links destinations and induces development making transit serviced areas a prime indicator for the potential economic future for the transit served TIF districts. This point is made tangible and clear by increased assessed land values in the tax increment financing district and the resulting tax revenue generation or tax increments from development.

CHAPTER 7 CONCLUSION

7.0 Introduction

Tax increment financing has the potential to help finance the construction of transportation infrastructure facilities, however, for revenues to be significant enough to pay a large portion of the capital project cost, high-density or land use intensive development must be constructed in the zone. Theorists recommend that tax increment financing be established in areas where there is a significant amount of undeveloped or underdeveloped acreage. Additional factors must also be in place such as an economic climate favorable towards intense development in the tax increment financing district; supportive local and state policy assisting with planning and financing studies, programs and grants for economic development, and policies that restrict growth on the urbanized fringe and redirect growth towards the urban core; inner-city location; and transportation infrastructure that creates accessibility in an un-saturated or under-developed transportation market. Tax increment financing has been used in a number of cases to finance transportation and more specifically transit capital projects such as transit stations, parking garages, and property acquisition. States are beginning to wake up to the potential use of TIFs for transit, but the common use of tax increment financing is for supporting transit-oriented development and transit-supportive infrastructure investments in and around stations rather than direct infrastructure support for transit agencies.

7.1 Lessons Learned

Section *7.1 Lessons Learned* expands on the major points made in the report and the lessons learned.

Theory

- Henry George stipulated that the increases in the value of land are a product of community investments, which creates a social compact between land owners and government.
- The provision of paved public roads confers access to private land, and the provision of roads allows for local governments to provide public goods and services such as police, fire, emergency, trash collection, sewers, water mains, gas mains, electricity, and others which are reflected in the value of land.
- Accessibility can be defined as the potential for interaction or the ability to get what one needs by getting to the places where needs are met.
- Transit serves as a means of movement, communication, and market exchange and therefore channels growth spatially. Developers respond to take advantage of these improved accessibility factors.

- The provision of transportation facilities links destinations and induces development making transit serviced areas a prime indicator for the potential economic future for transit served TIF districts.

Legal Considerations

- Value capture in the State of Texas is conducted through Tax Increment Reinvestment Zones using tax increment financing authorized for use by municipalities and counties under Tax Code Chapter 311 and Senate Bill 1266, which establishes Transportation Reinvestment Zones. Senate Bill 888 did not pass the Texas Legislature, but would have been an additional method; it would have focused only on rail transit technologies where Senate Bill 1266 focused on highways.
- Texas transit expenditures are not clearly defined as line items with consistent language in TIRZ documents
- Local jurisdictions typically have other goals in mind for TIRZ revenues; financing transit improvements in TRIZs competes with other public goals and priorities for funds.
- The state legislation best suited for replication is TRID or Transit Revitalization Investment District Act 238 of 2004 of the Pennsylvania General Assembly. The law requires municipalities and transit agencies to work as joint authorities and share funds.

- Texas TIRZ law does not specifically state that municipalities must partner with transit agencies but the potential for partnership is implied, whereas in the Pennsylvania TRID is explicit.
- The TRID states in clear language that funds can be spent on capital projects for inter-city and intra-city public transportation, whereas in Texas the municipality and TIRZ Board of Directors may or may not spend funds on public transportation, inter-city or intra-city.
- . Senate Bill 888 like the Pennsylvania TRID would have made the distinction of fund expenditure for inter-city and intra-city transit clear and succinct. The bill may serve as a clear funding signal and give encouragement to the federal agency to favor Texas capital transit expansion over other competing states.

Transit Funding

- The United States is facing a transportation funding crisis as the purchasing power of traditional sources erodes and becomes unstable, especially during times of recession.
- Demand for transit service has been increasing in recent years as well as competition for capital federal funds for system expansion.
- Innovative financing mechanisms such as tax increment finance and other value capture techniques present potential funding opportunities to transit agencies.

- The motor fuel tax is the primary revenue source of federal transit funds and the purchasing power of the tax has been in decline since the last tax increase was passed in the early 1990s.
- Federal funding has experienced devolution to state and local governments.
- From the 1970s onward sales taxes have replaced federal operational support and have become common funding sources for the majority of transit finance. The revenue source is unstable during times of recession, and it is constrained by commercial activity and land uses.

Tax Increment Finance

- Common application of TIF funds for transit-oriented development and transit supportive infrastructure include stations, landscaping, sidewalks, streetscaping and wayfinding, utilities and drainage, and street construction and connectivity.
- Tax Increment Financing is attractive as a financial tool for encouraging private economic development and construction of infrastructure because of being self-financing.
- Tax increment funds are often viewed as supplemental funds and not as replacement funds for capital transit projects. The common goal of tax increment districts is to stimulate development by reducing the risk and costs of development in undeveloped or underdeveloped areas.

- The reliance on future growth potential makes tax increment revenue speculative. If governments are not dedicated and able to make TIF districts successful, governments may not be able to repay the debt issued.
- Increasingly states are becoming involved in land use policy via taxation policy such as tax increment financing.
- Transit agencies that are most successful with TOD have common characteristics: boast formal transit-oriented development policies; have in-house real estate expertise; and have developable land holdings on which to build development.
- Six transit agencies practice tax increment finance for transit-supportive or capital transit infrastructure.
- Developers are hesitant to develop in underdeveloped or depressed sections of town unless local governments assist in offsetting the costs. Consultants point out the need for image enhancement, infrastructure redesign and improvement, code enforcement, compatible zoning, and linkages to the central business district

Practice of Tax Increment Finance in Texas

- Tax increment financing in Tax Increment Reinvestment Zones or TIRZs is the primary value capture technique applied in Texas.
- The total number of TIRZs currently or formerly in operation is 182 with four complete and one terminated.
- Tax Increment Reinvestment Zones have been established in the State of Texas since 1982, but few were established until a dramatic spike in 1996.

- The precedent for TIRZs to fund transit has been established by the Dallas and Houston regions.
- The State of Texas is one of the documented (Dallas) cases for tax increment financing application in the United States.
- One TIRZ in Texas expended funds for capital transit infrastructure, four others expended funds for an unspecified category called *public transportation*, and 21 districts are investing in related basic infrastructure to support transit ridership through supporting transit-oriented development.

7.2 Implications

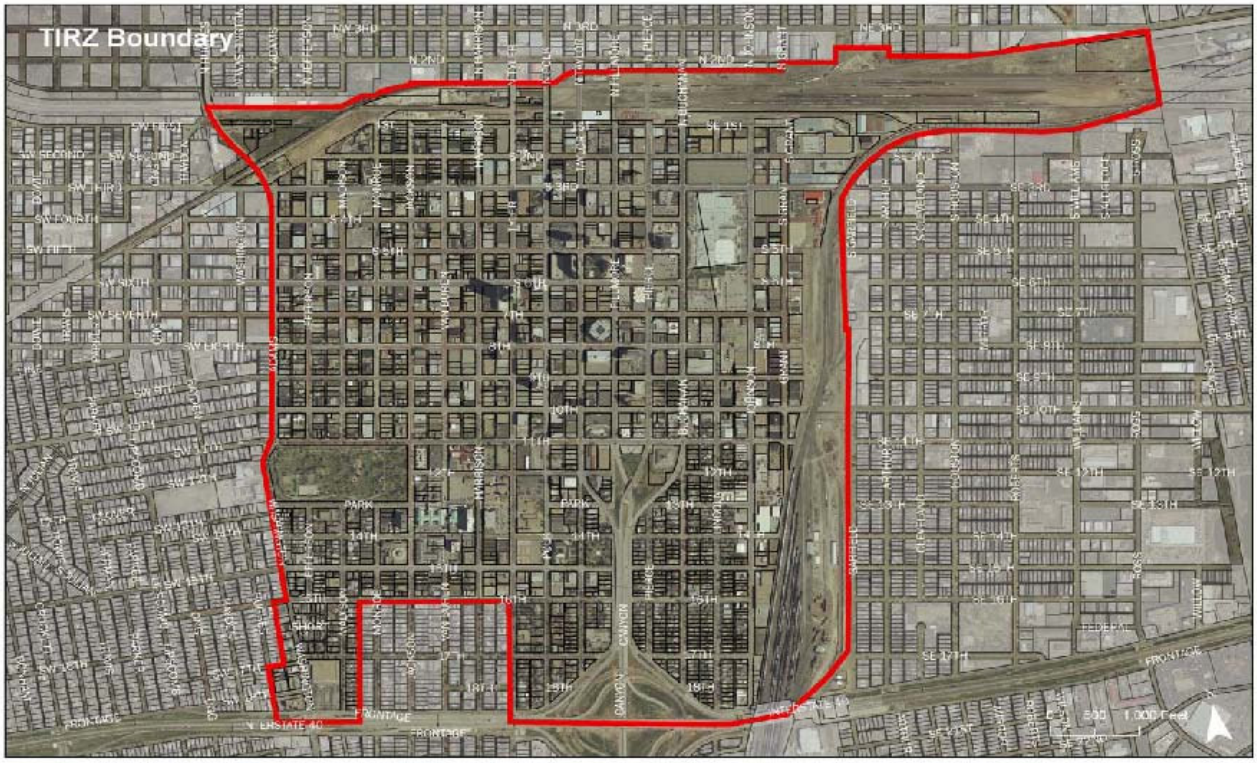
This report presented a study of tax increment financing (TIF) as a value capture technique for financing transit supportive infrastructure and development focusing on the practice in Texas. Transit agencies in Texas are some of the less than ten practicing agencies utilizing tax increment financing to support basic infrastructure investments in transit areas (a.k.a. transit-supportive and transit-oriented infrastructure) in addition to being one of a few states where agencies have supported capital transit infrastructure. The desire for increased investment in transit infrastructure coincides with increasing strains on traditional transportation funding sources for projects. Transit infrastructure, especially fixed guideway transit such as light rail-, streetcar-, rapid-, and commuter-rail, are costly to construct. Limited funding exists for transit projects at the state and local level, which is further complicated by intense competition for federal transit funds. In the

case of the Urban Circulation program, 65 applicants requested $1 billion in funds and only 6 applicants received the budgeted $130 million. In addition to expansion, transit agencies are challenged by rising operating costs to maintain and keep existing service in operation. Most transit agencies in the State of Texas rely heavily on sales taxes, but this revenue source needs to be supplemented. The federal government does not play a direct role in implementing value capture strategies, nor does the State of Texas. Federal and state policies enable local governments and transit agencies to supplement traditional sources of funding with value capture methods.

The current state of practice for value capture techniques applied in Texas represents a strong basis for transit agencies throughout the state and other states to practice tax increment finance for supporting transit. Interest is growing for alternative methods of transit finance and the tax increment method is a good supplemental method. The method may be best used for less costly transit technology types such as streetcars, bus-rapid transit, and buses. The example of the Portland streetcar provided evidence that 20 percent of the streetcar infrastructure cost was funded with tax increment dollars. Streetcar and bus-rapid transit proposals and plans in major Texas cities should consider the creation of tax increment districts to raise supplemental funds for transit infrastructure.

Appendix A

Amarillo TIRZ #1

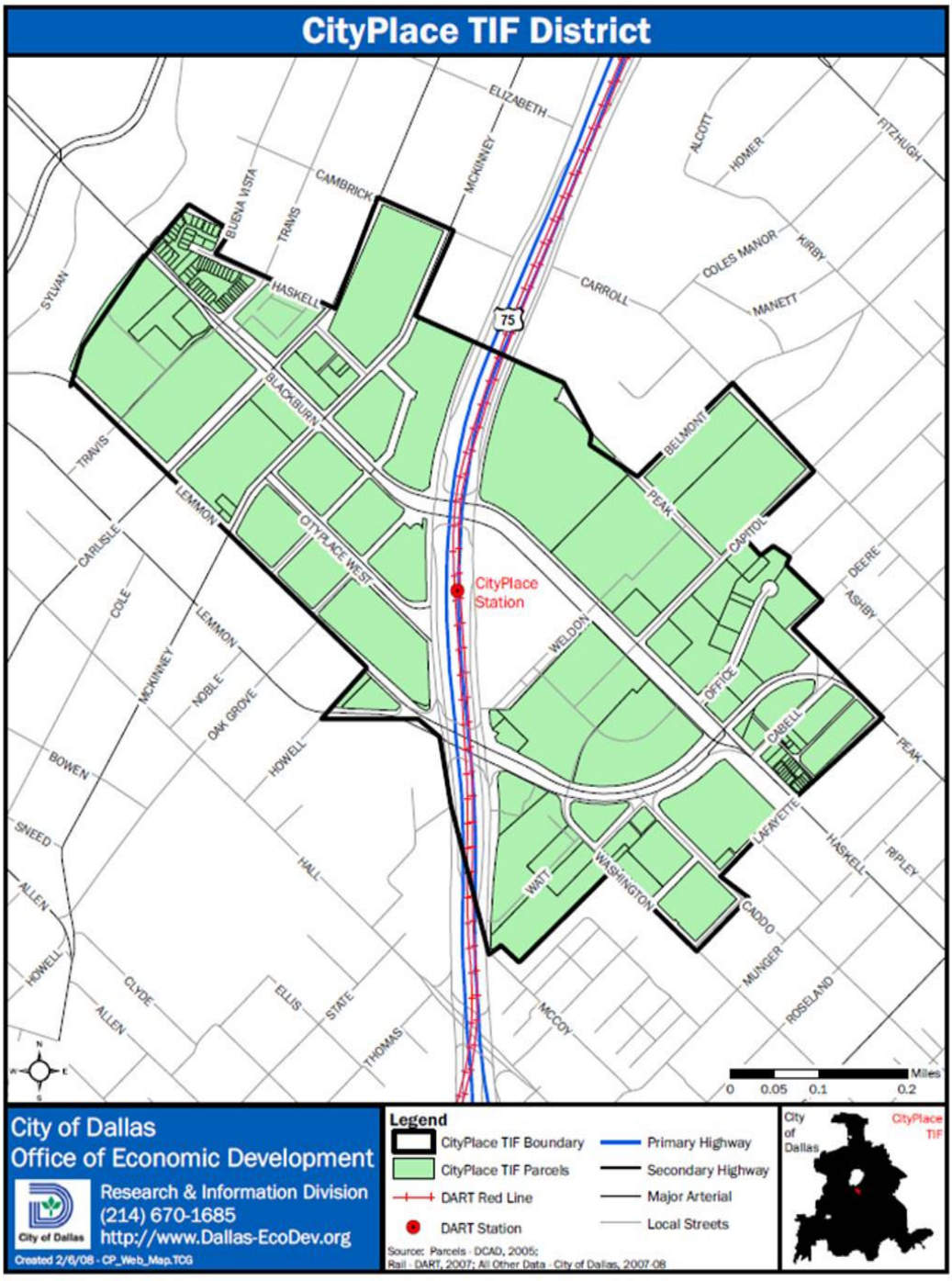


Appendix A

Carrollton TIRZ #1

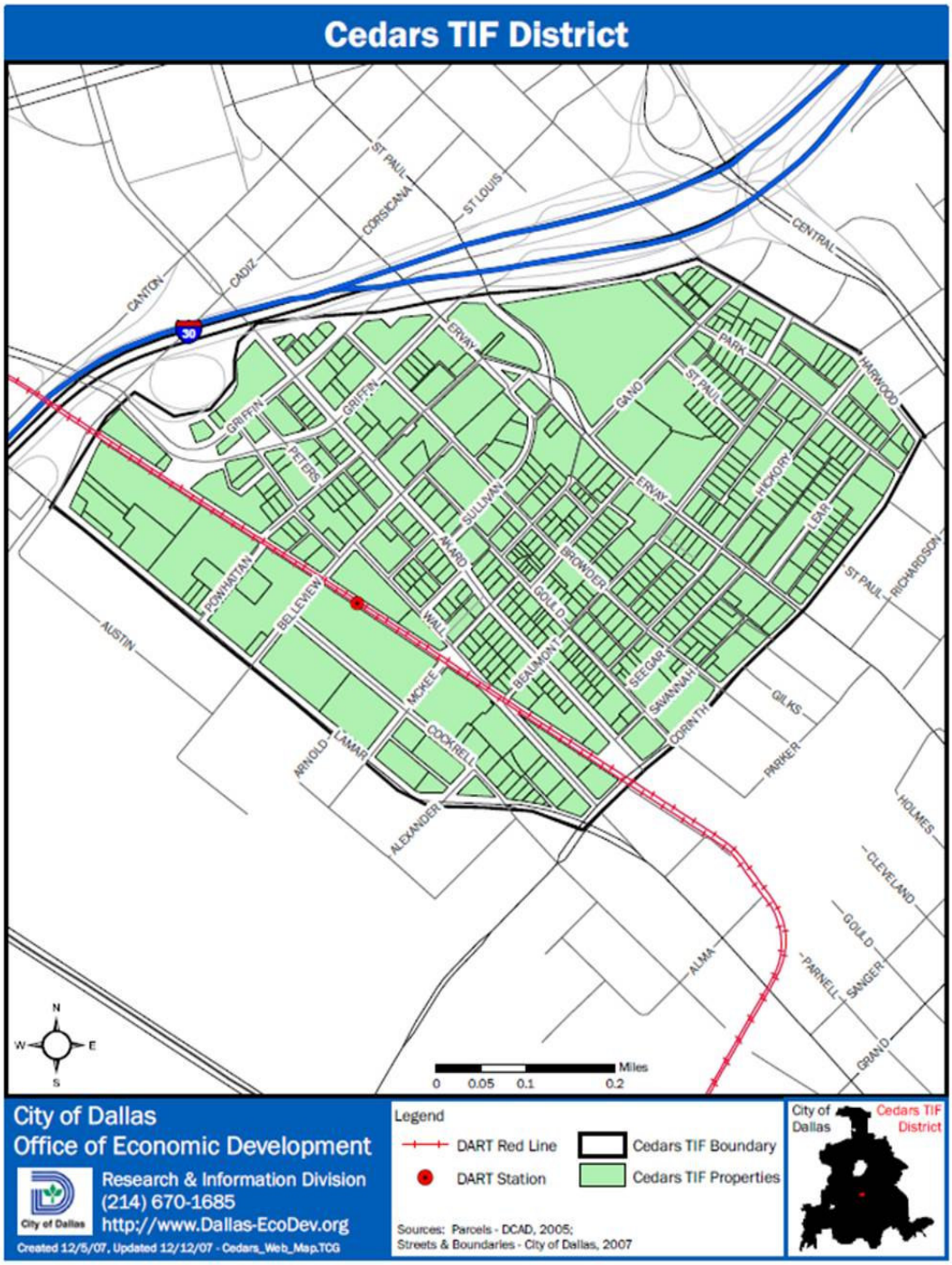
Appendix A

Dallas TIRZ # 2



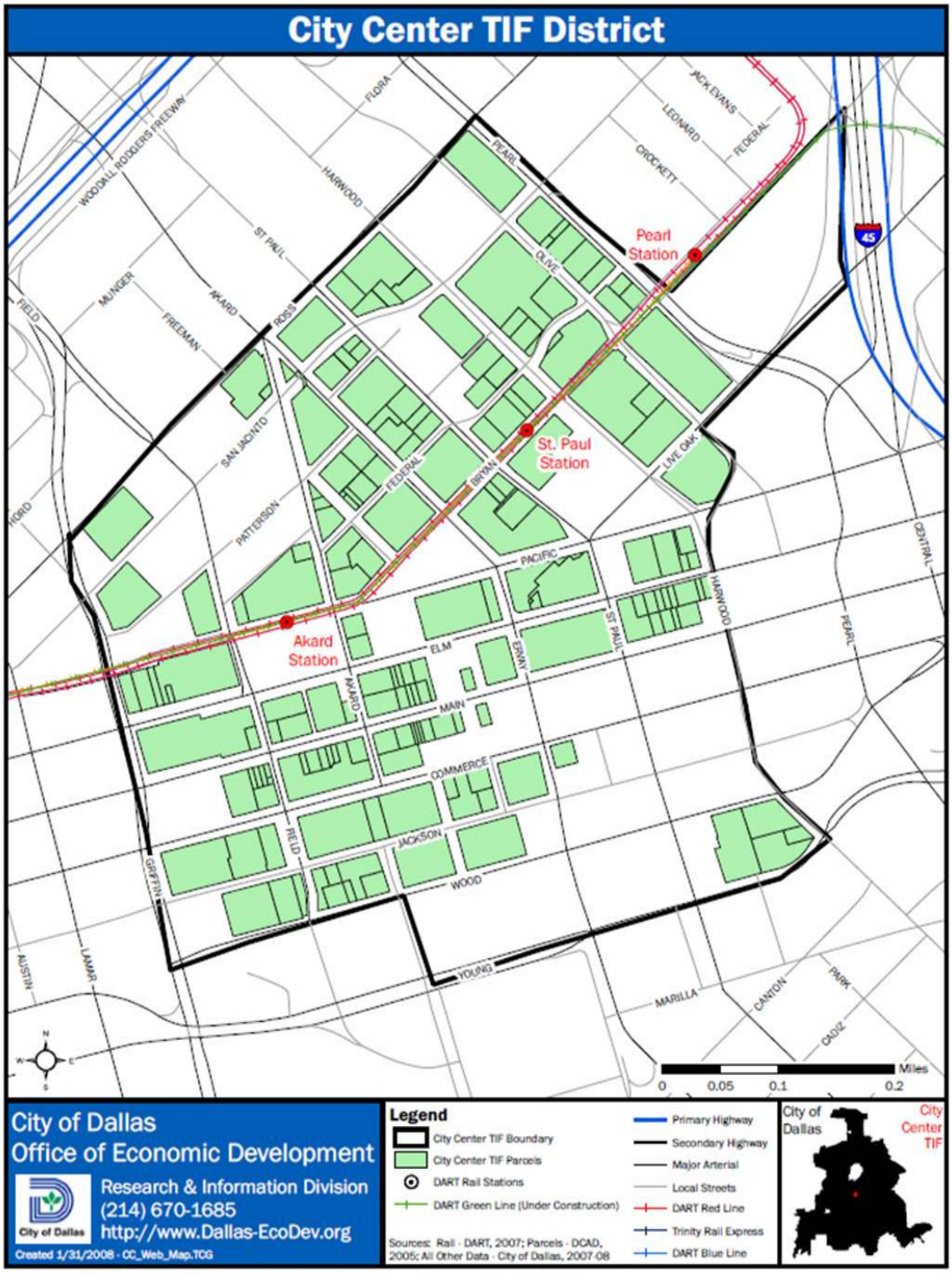
Appendix A

Dallas **TIRZ # 4**



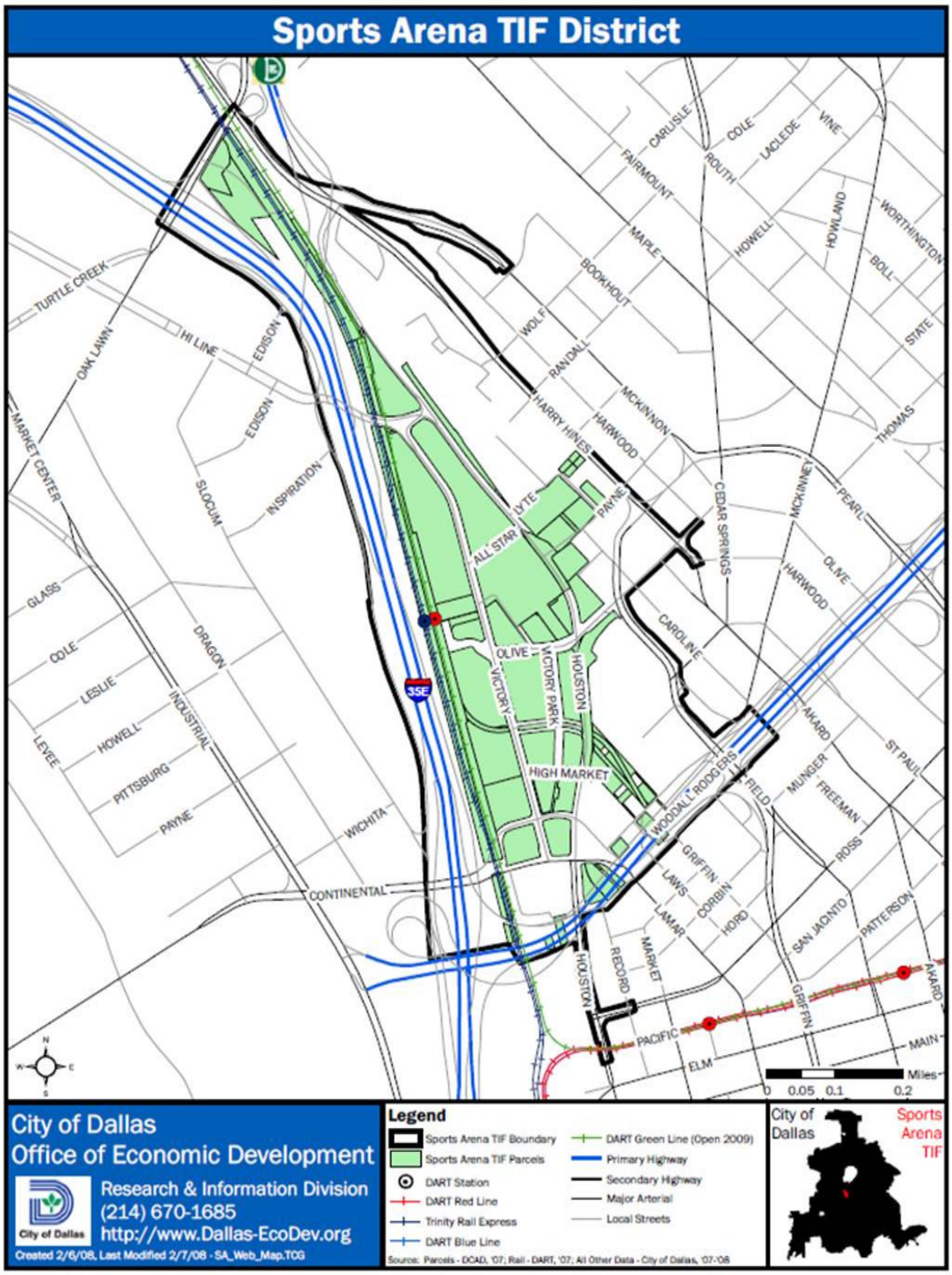
Appendix A

Dallas TIRZ # 5



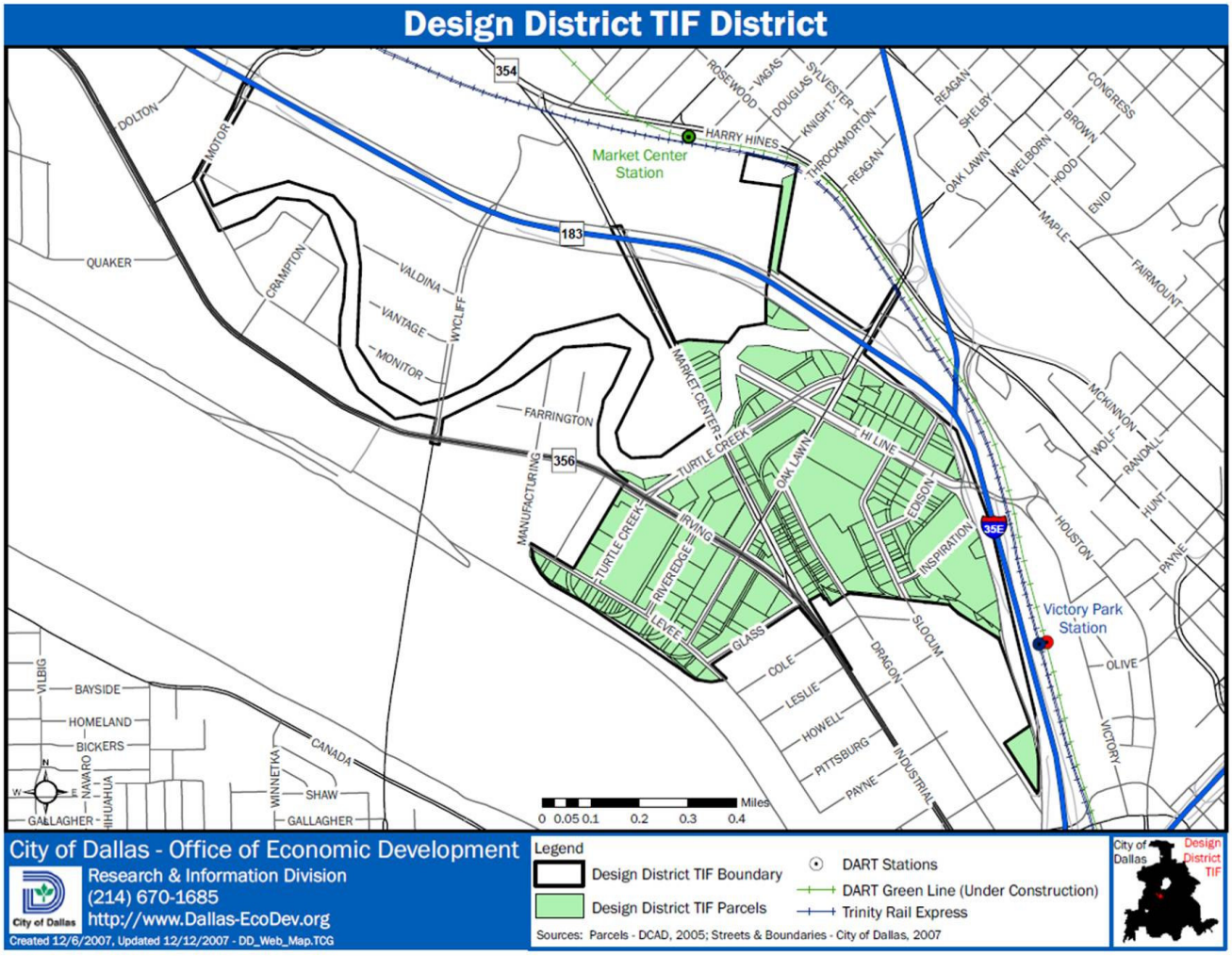
Appendix A

Dallas **TIRZ # 7**



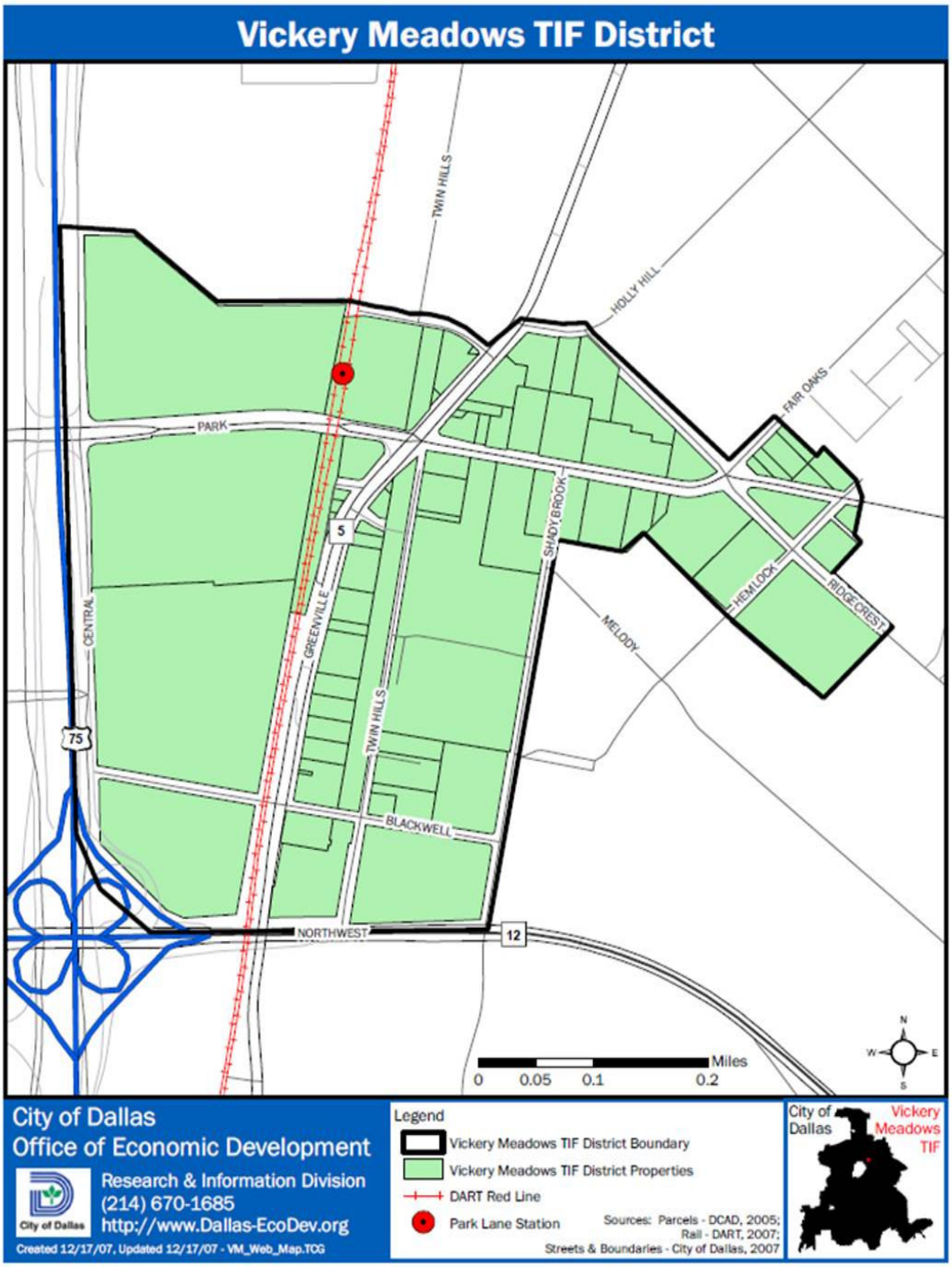
Appendix A

Dallas TIRZ # 8



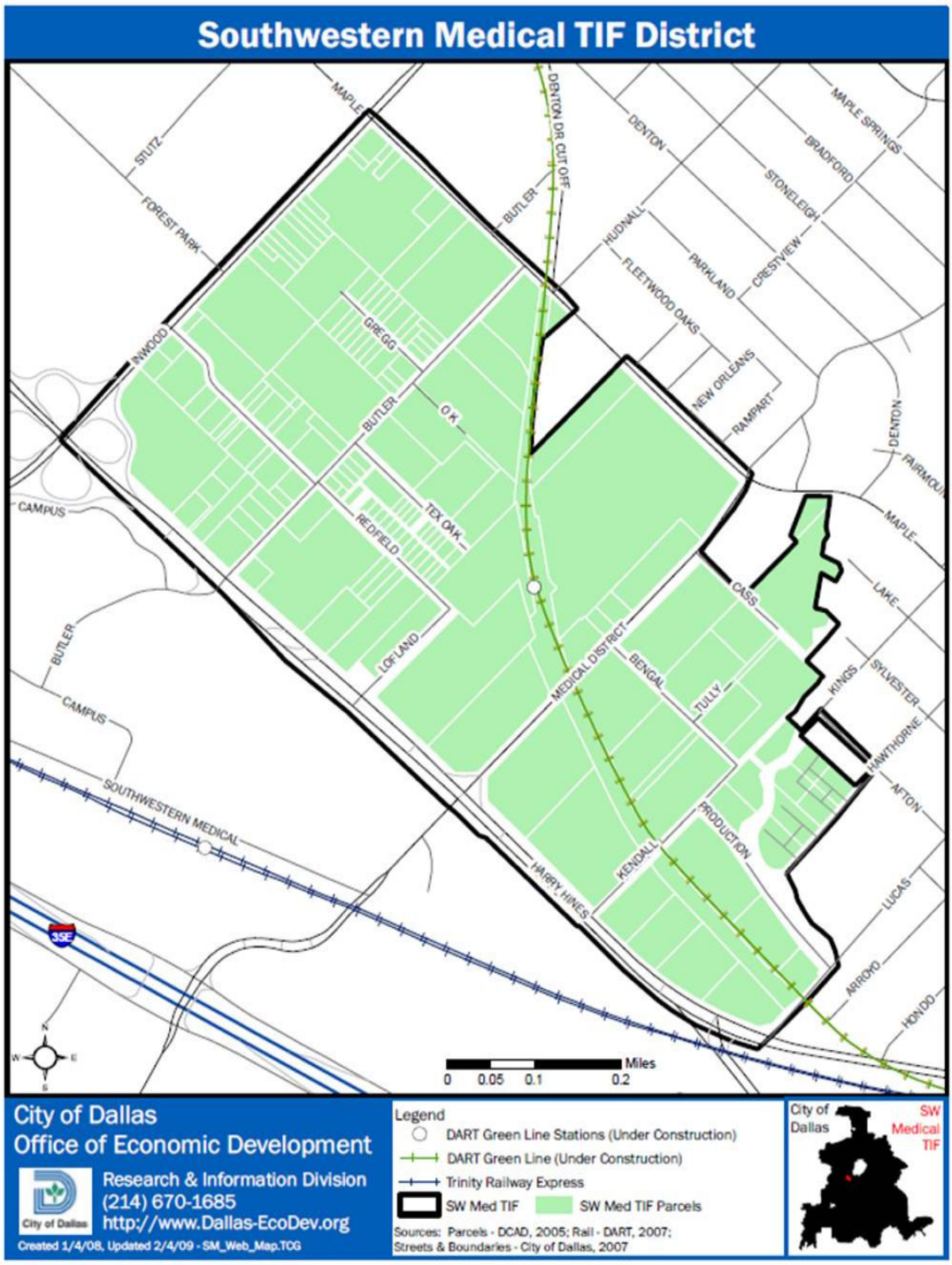
Appendix A

Dallas **TIRZ # 9**



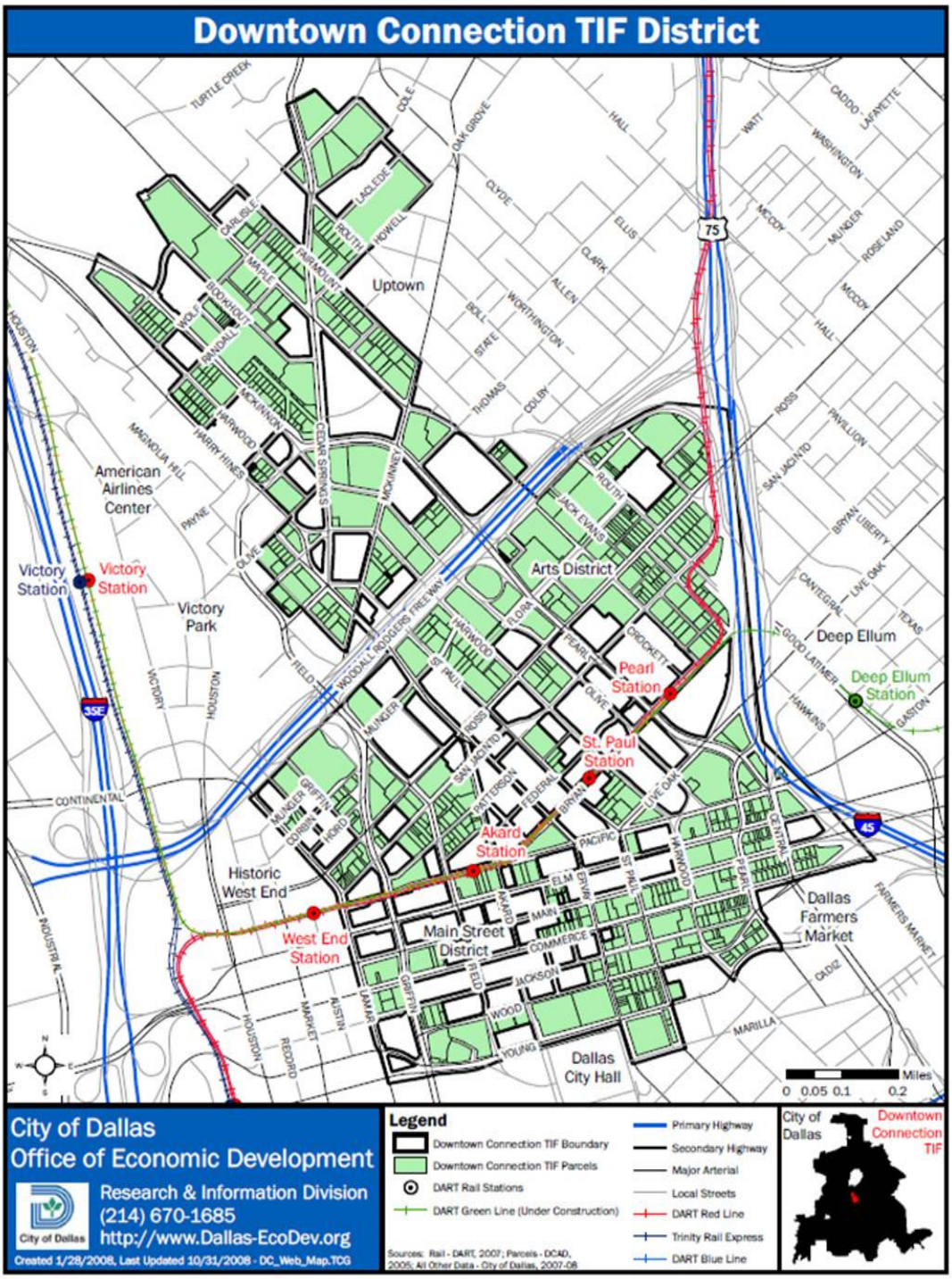
Appendix A

Dallas **TIRZ # 10**



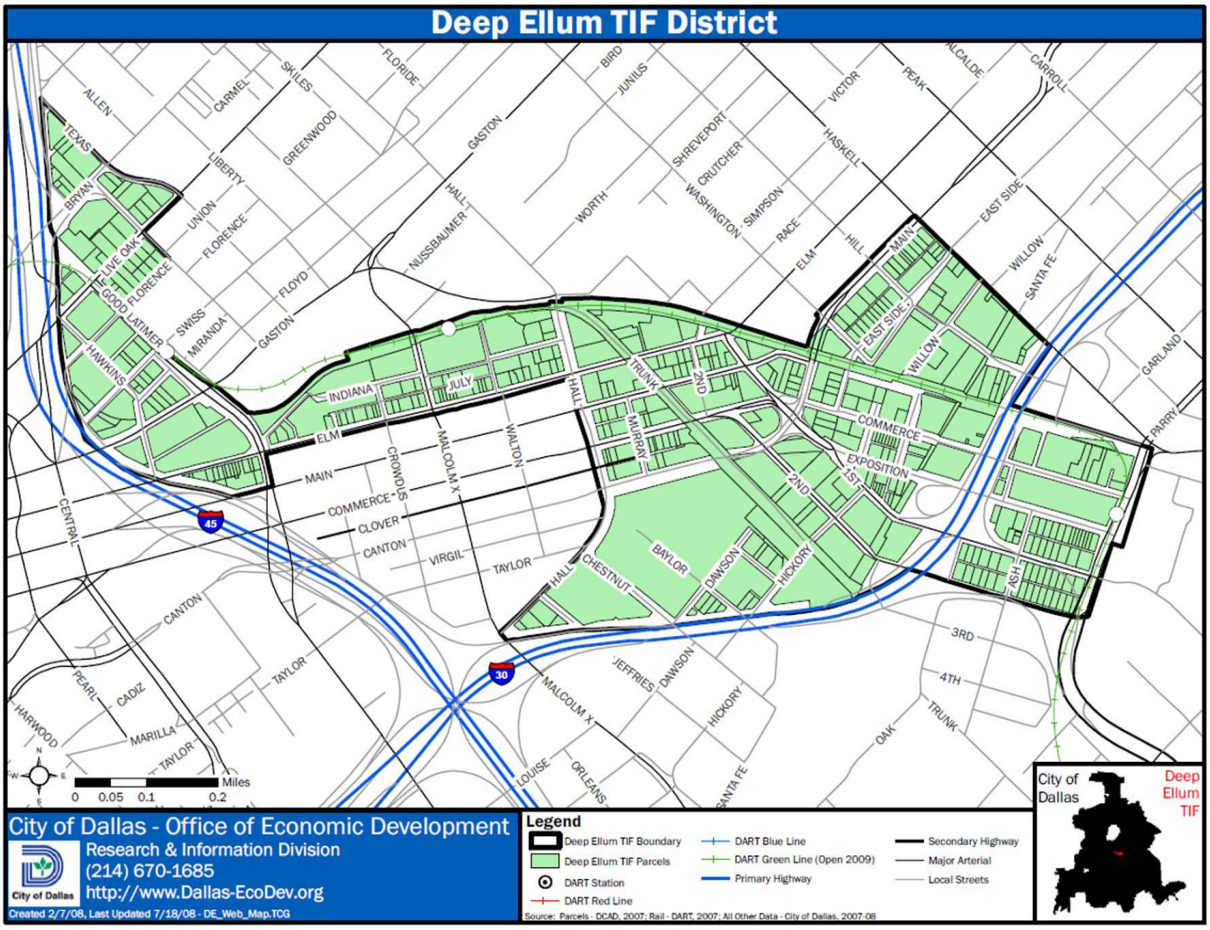
Appendix A

Dallas TIRZ # 11



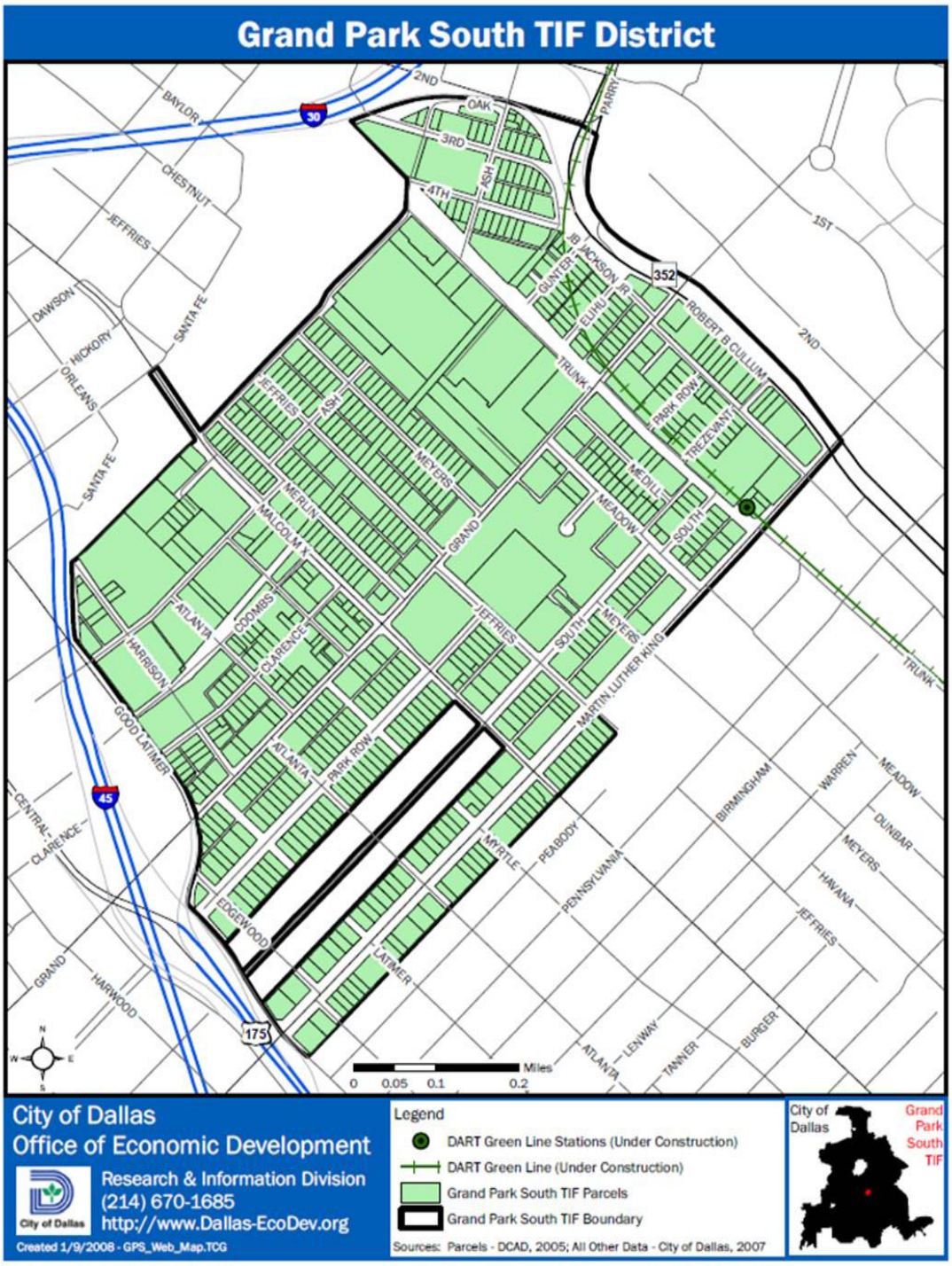
Appendix A

Dallas **TIRZ # 12**



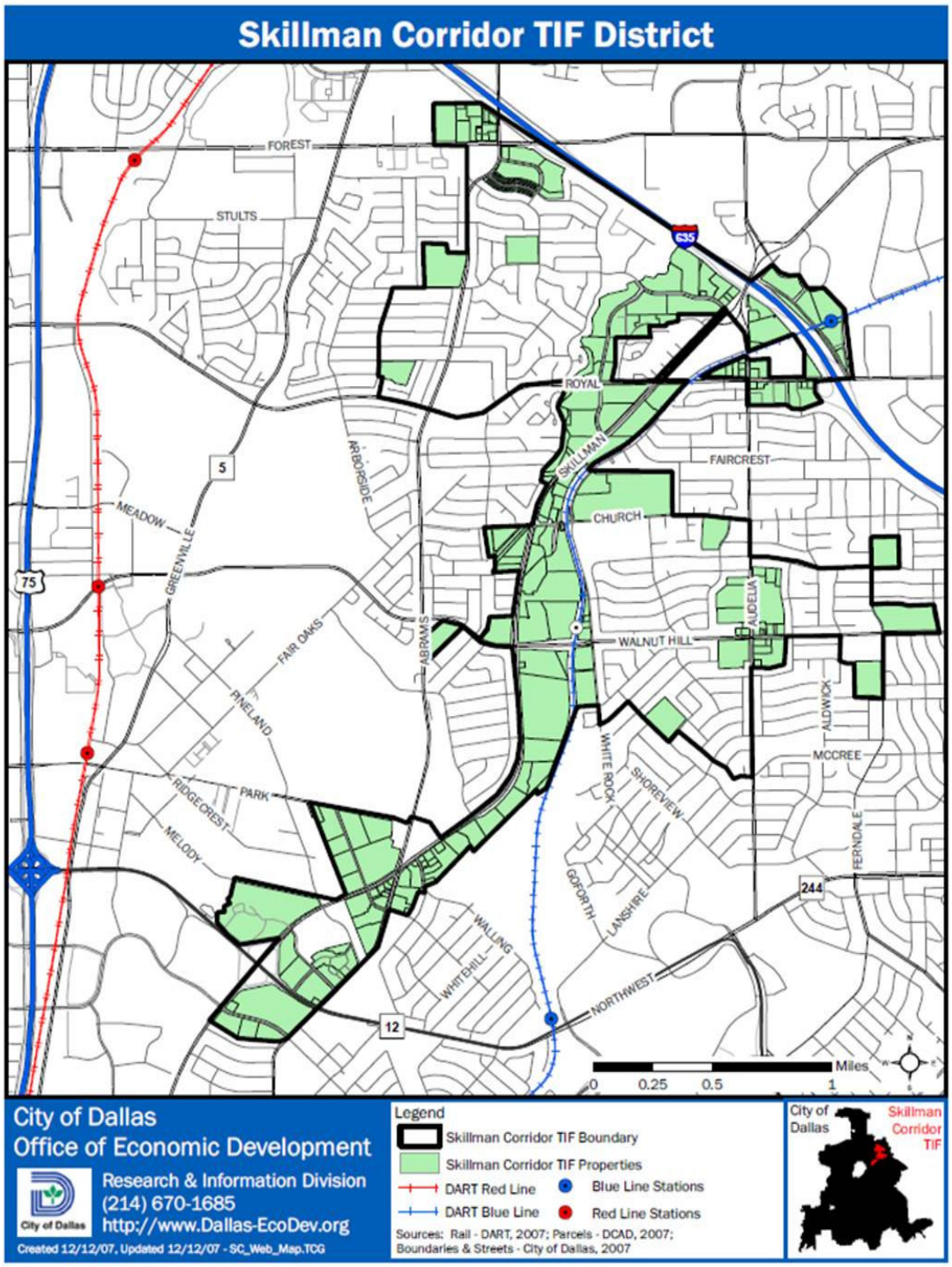
Appendix A

Dallas **TIRZ # 13**



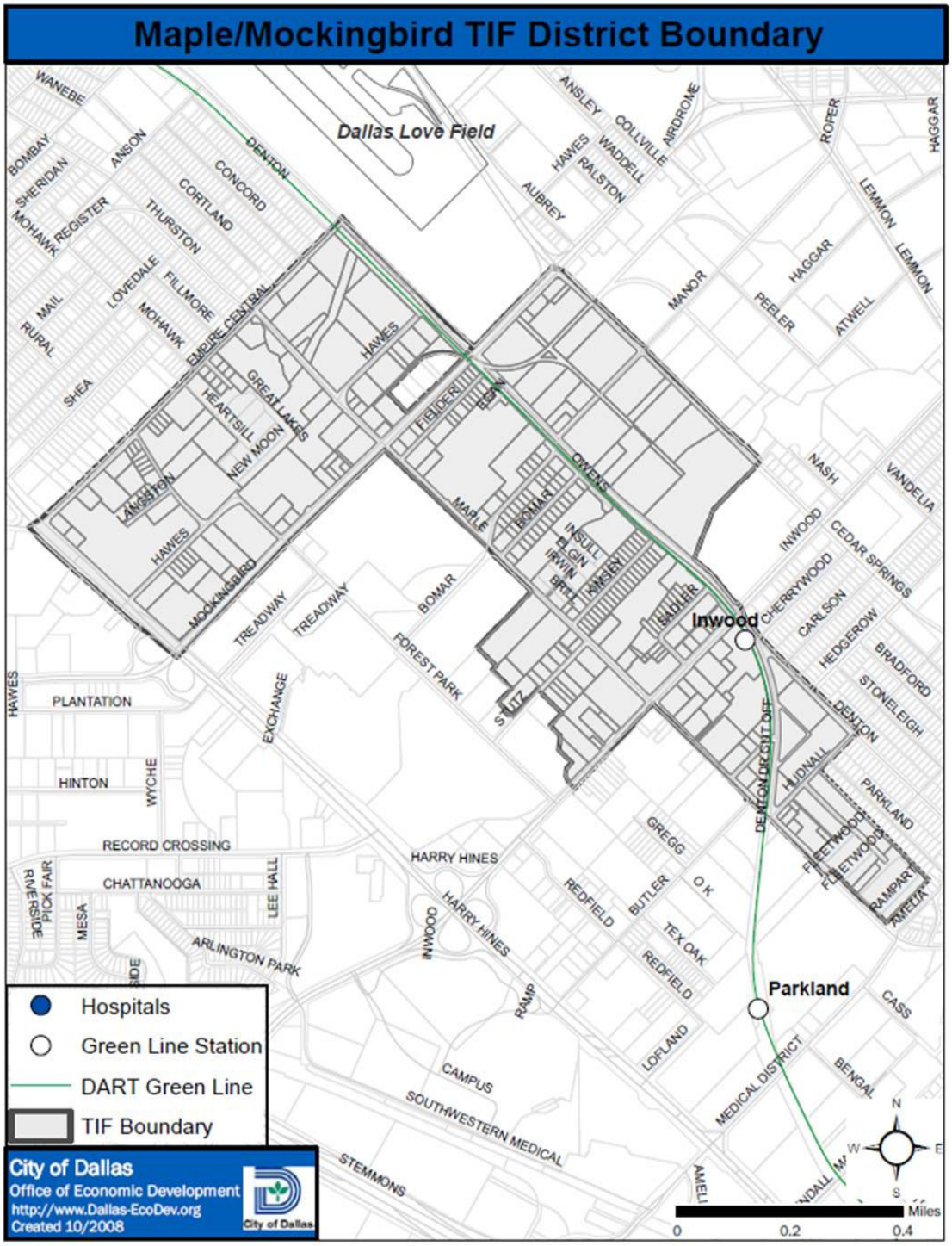
Appendix A

Dallas **TIRZ # 14**



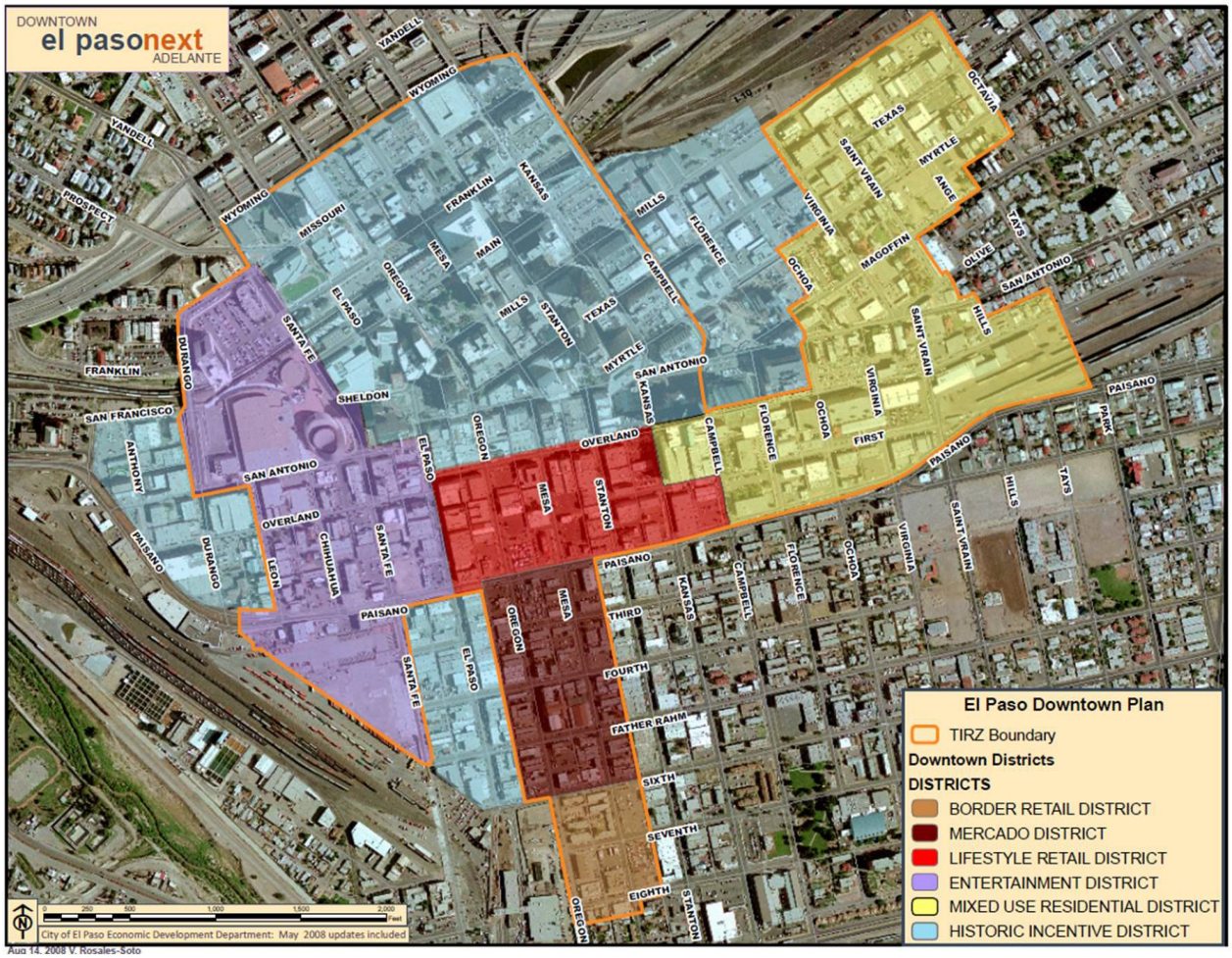
Appendix A

Dallas TIRZ # 17



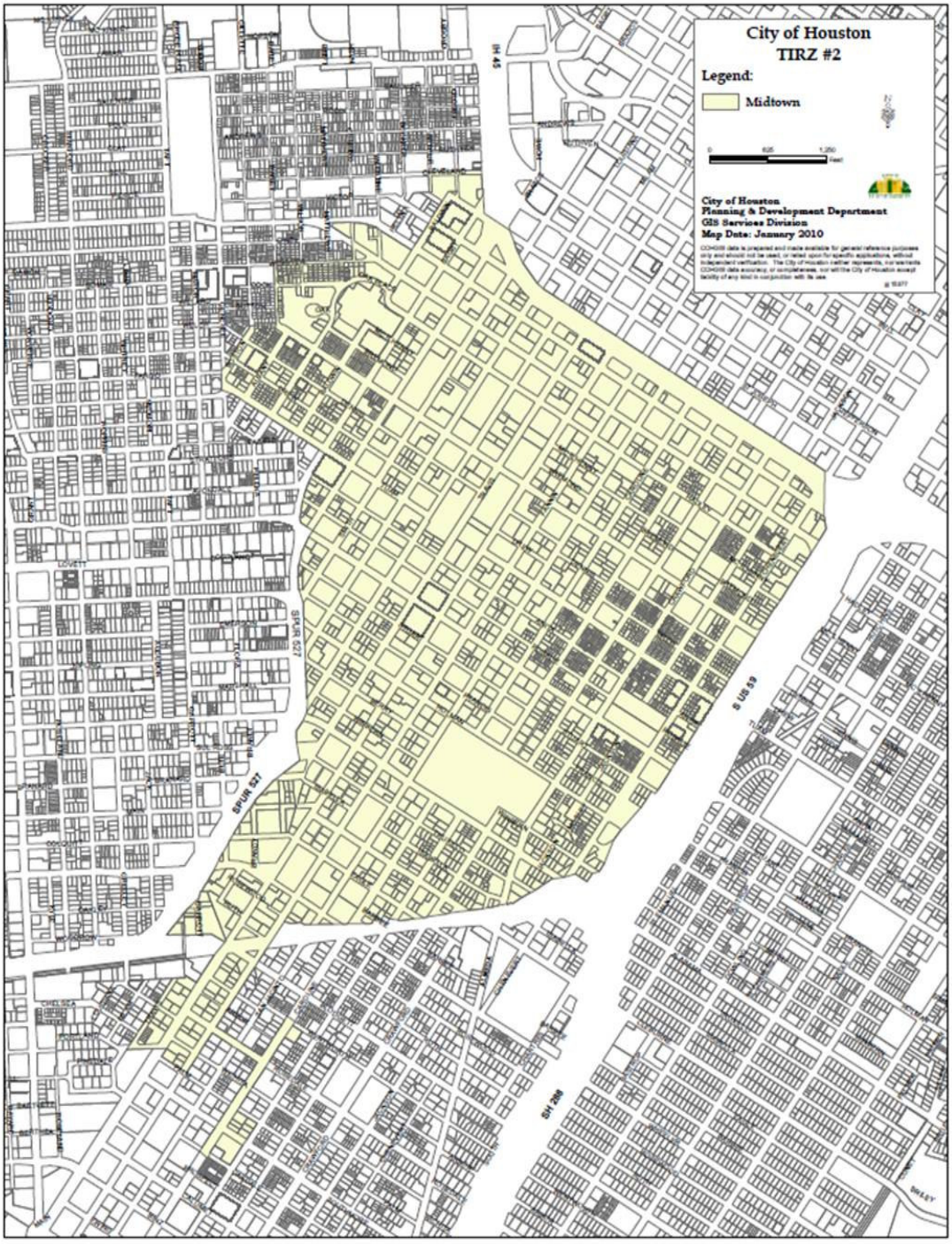
Appendix A

El Paso TIRZ # 1



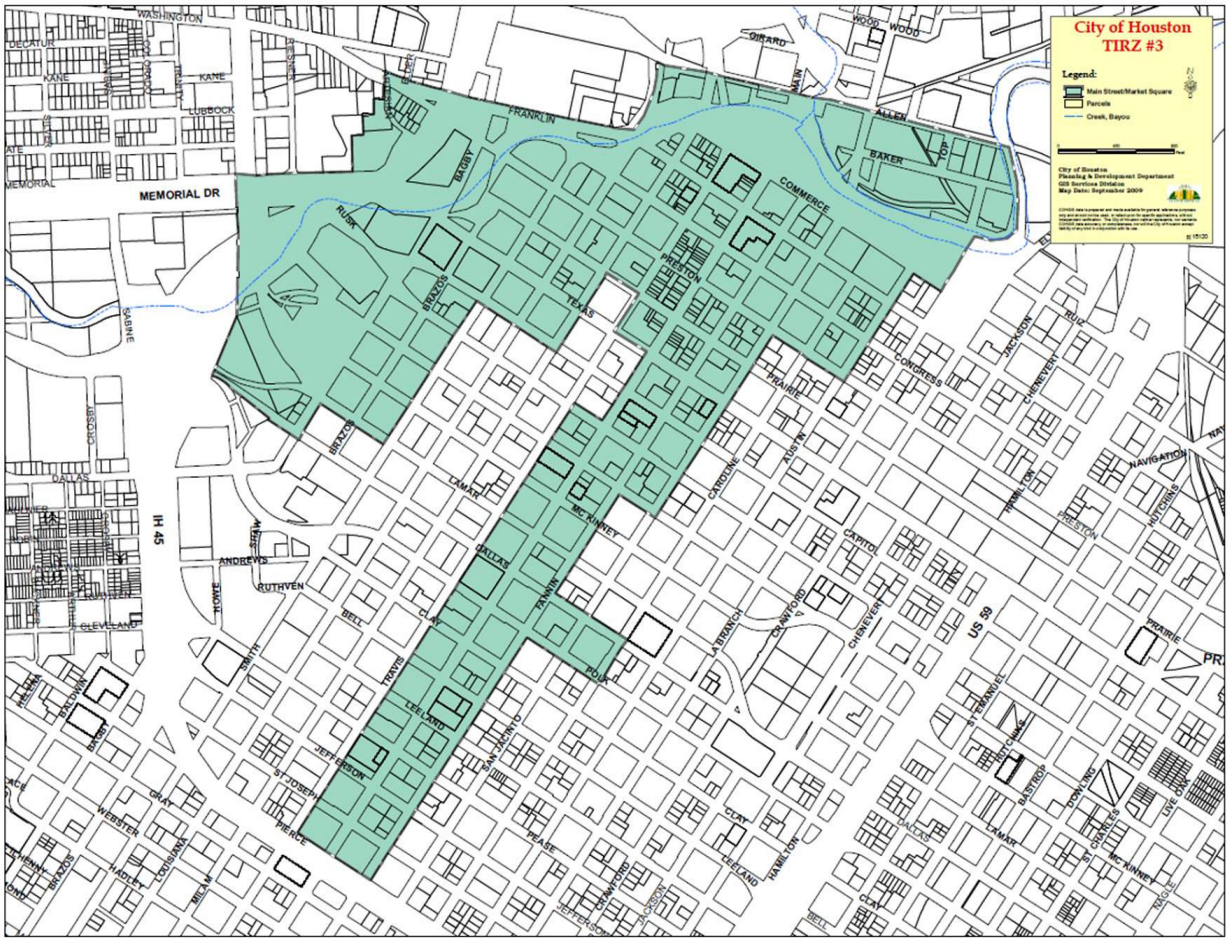
Appendix A

Houston TIRZ # 2



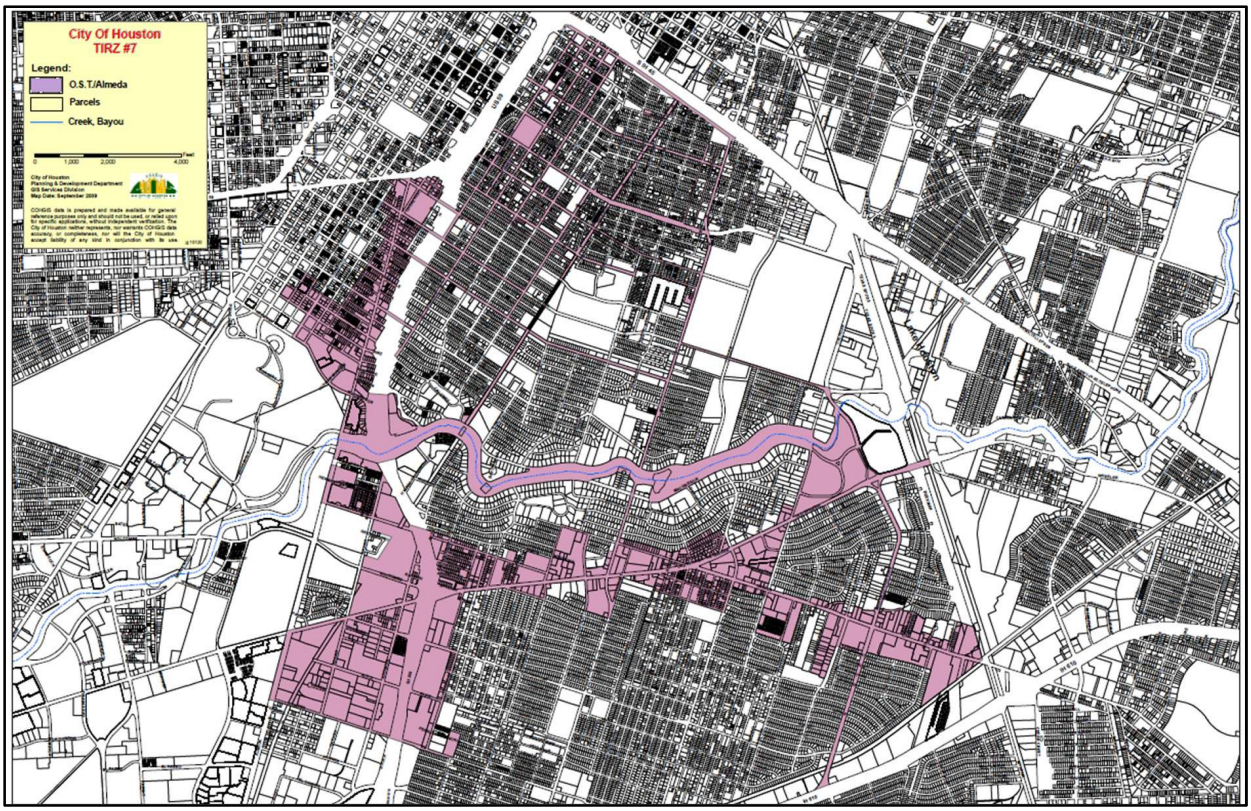
Appendix A

Houston TIRZ # 3



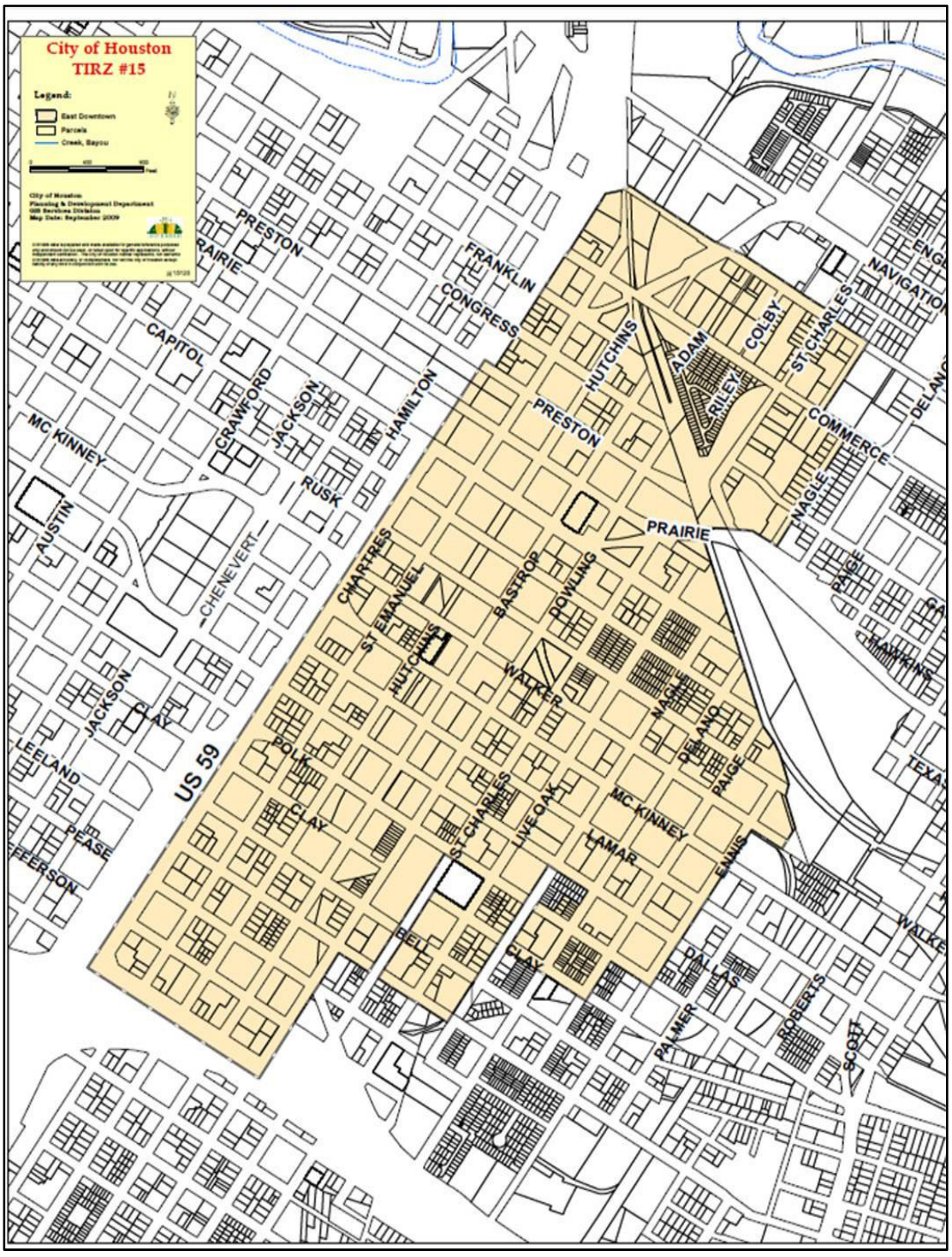
Appendix A

Houston TIRZ # 7



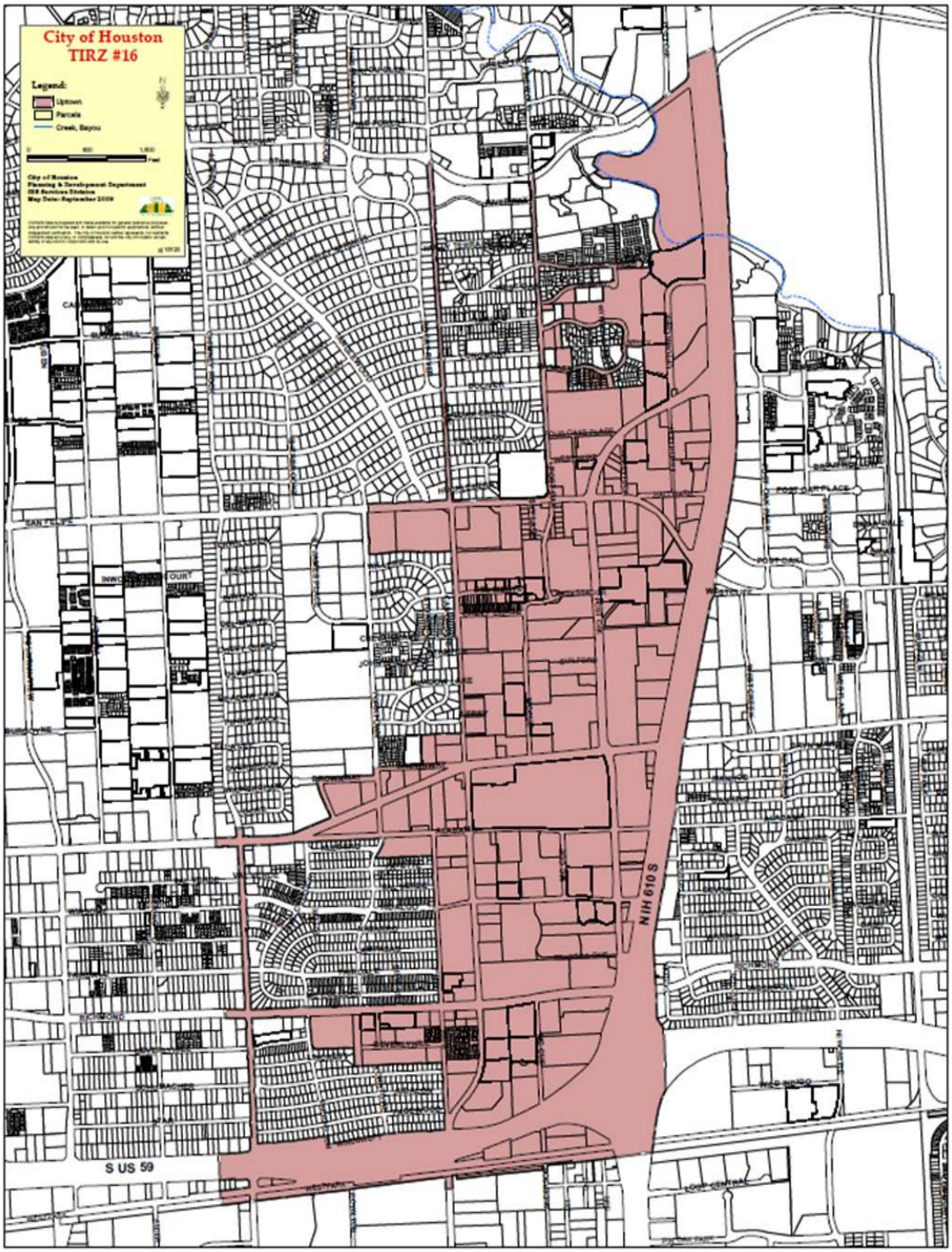
Appendix A

Houston TIRZ # 15



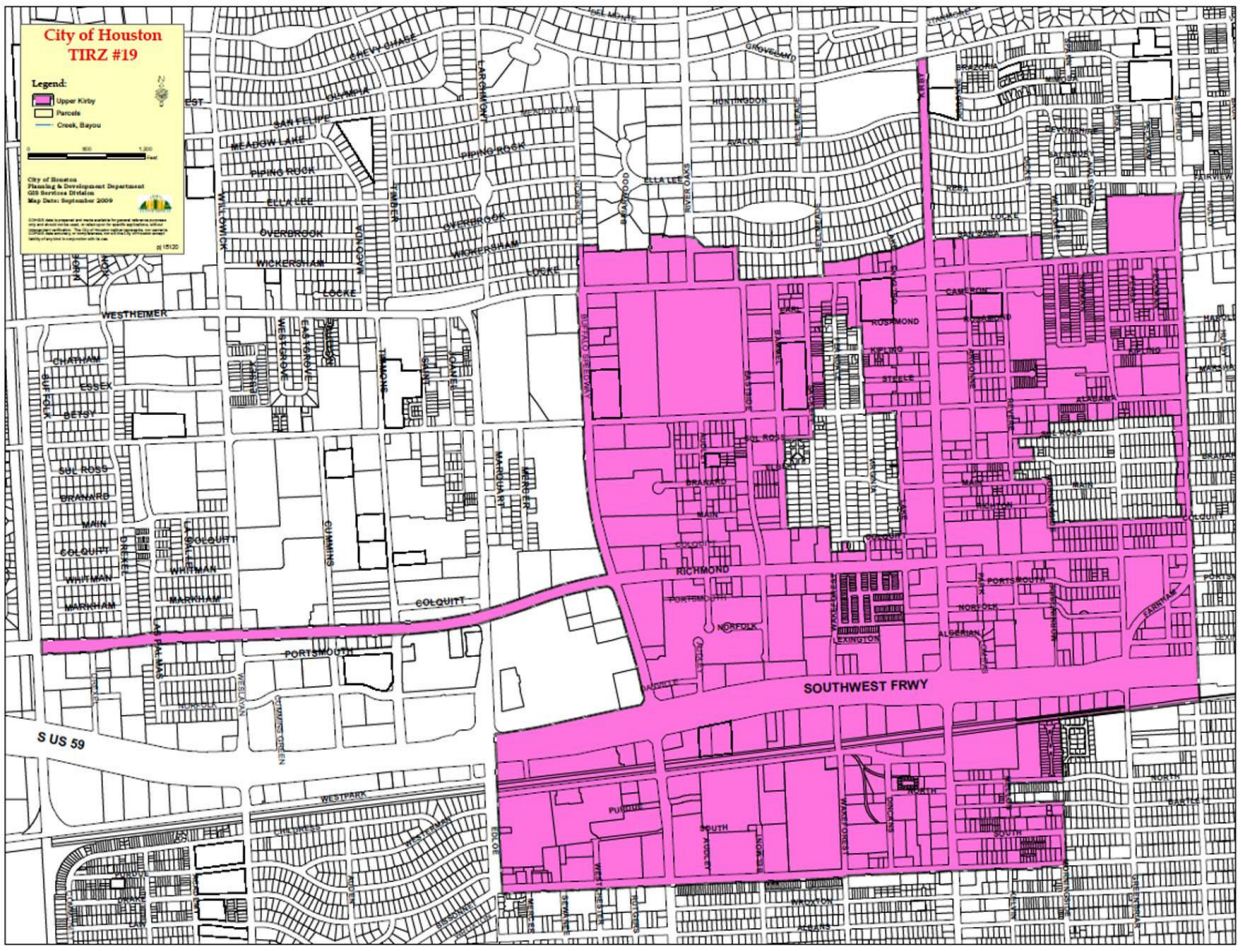
Appendix A

Houston TIRZ # 16



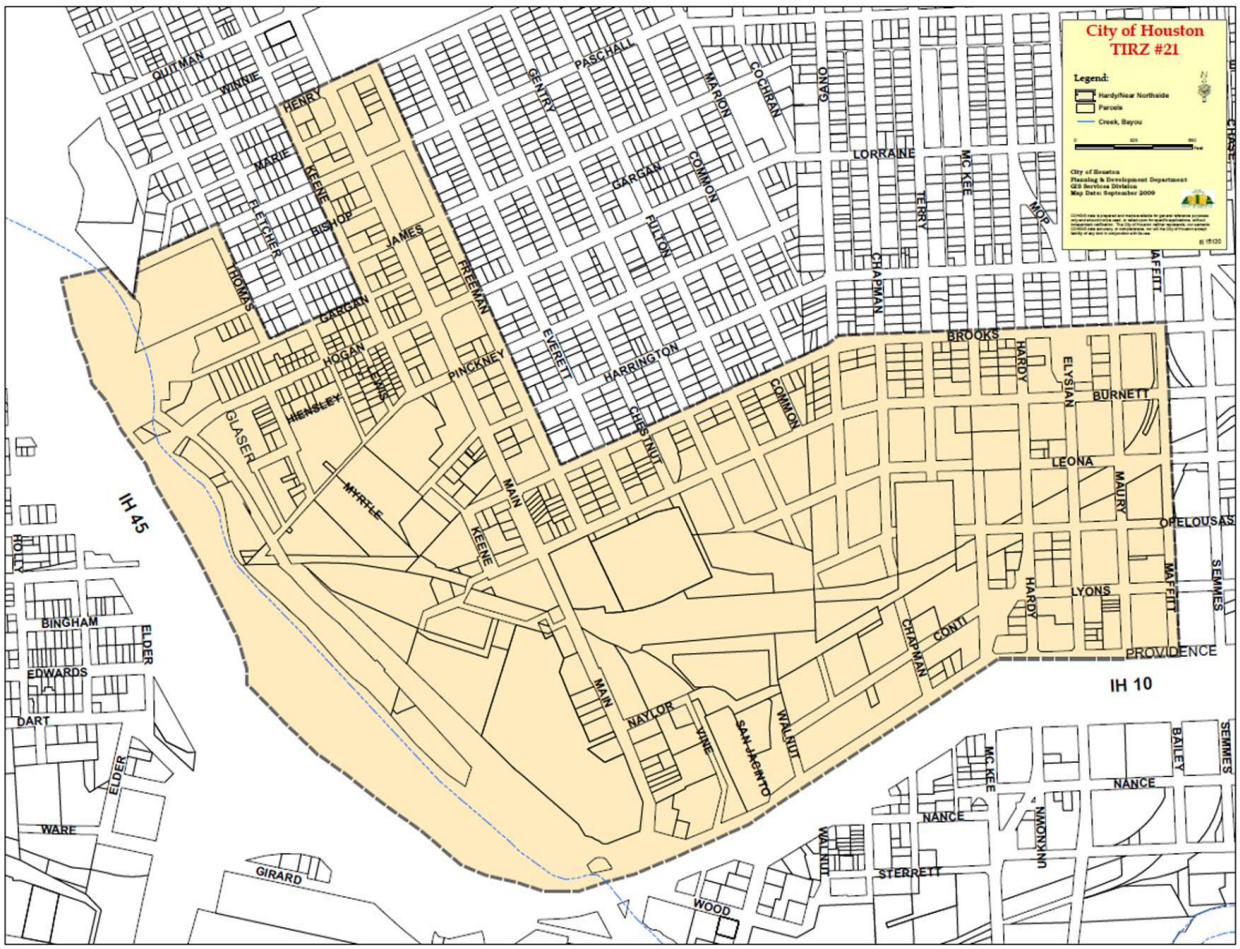
Appendix A

Houston TIRZ # 19



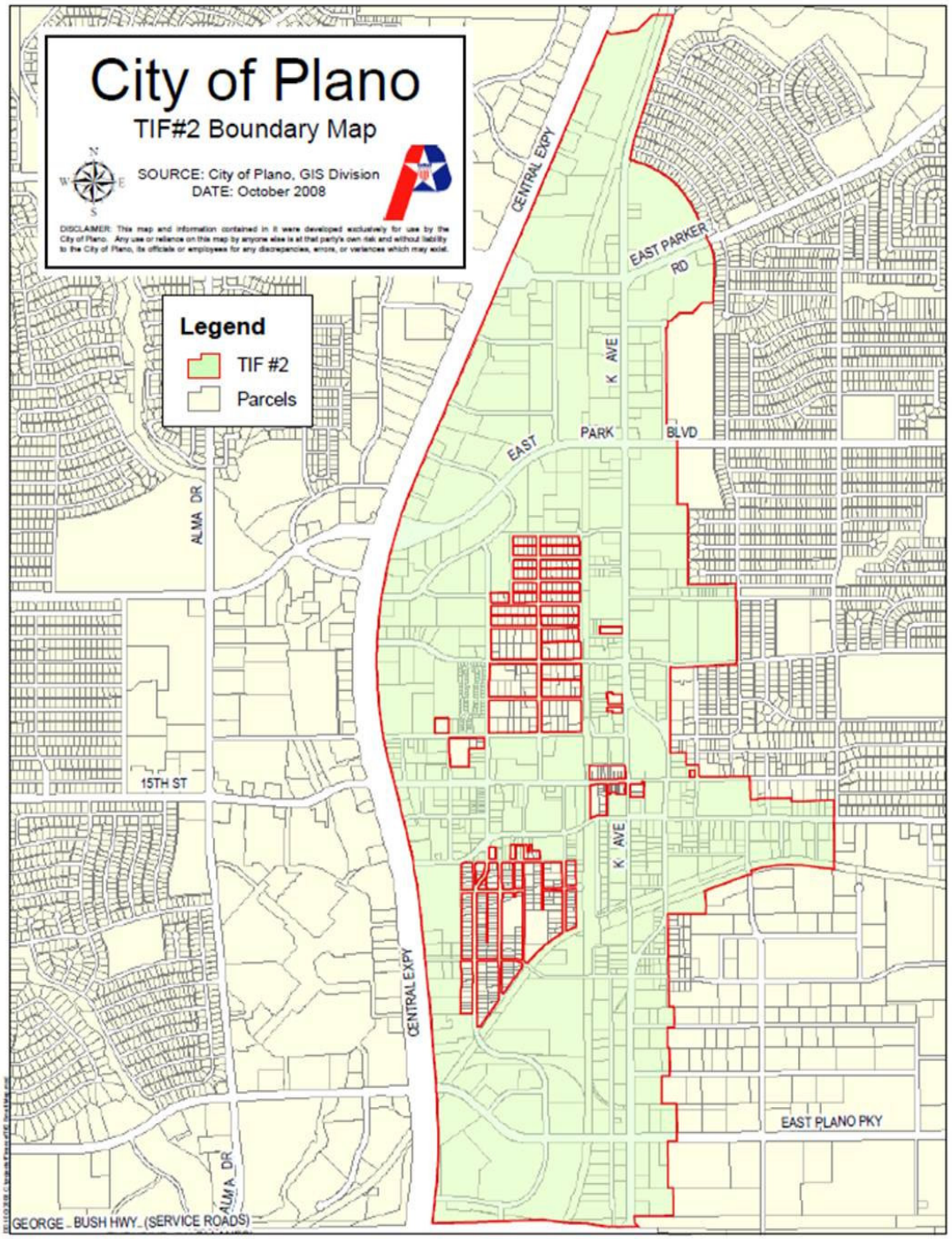
Appendix A

Houston TIRZ # 21



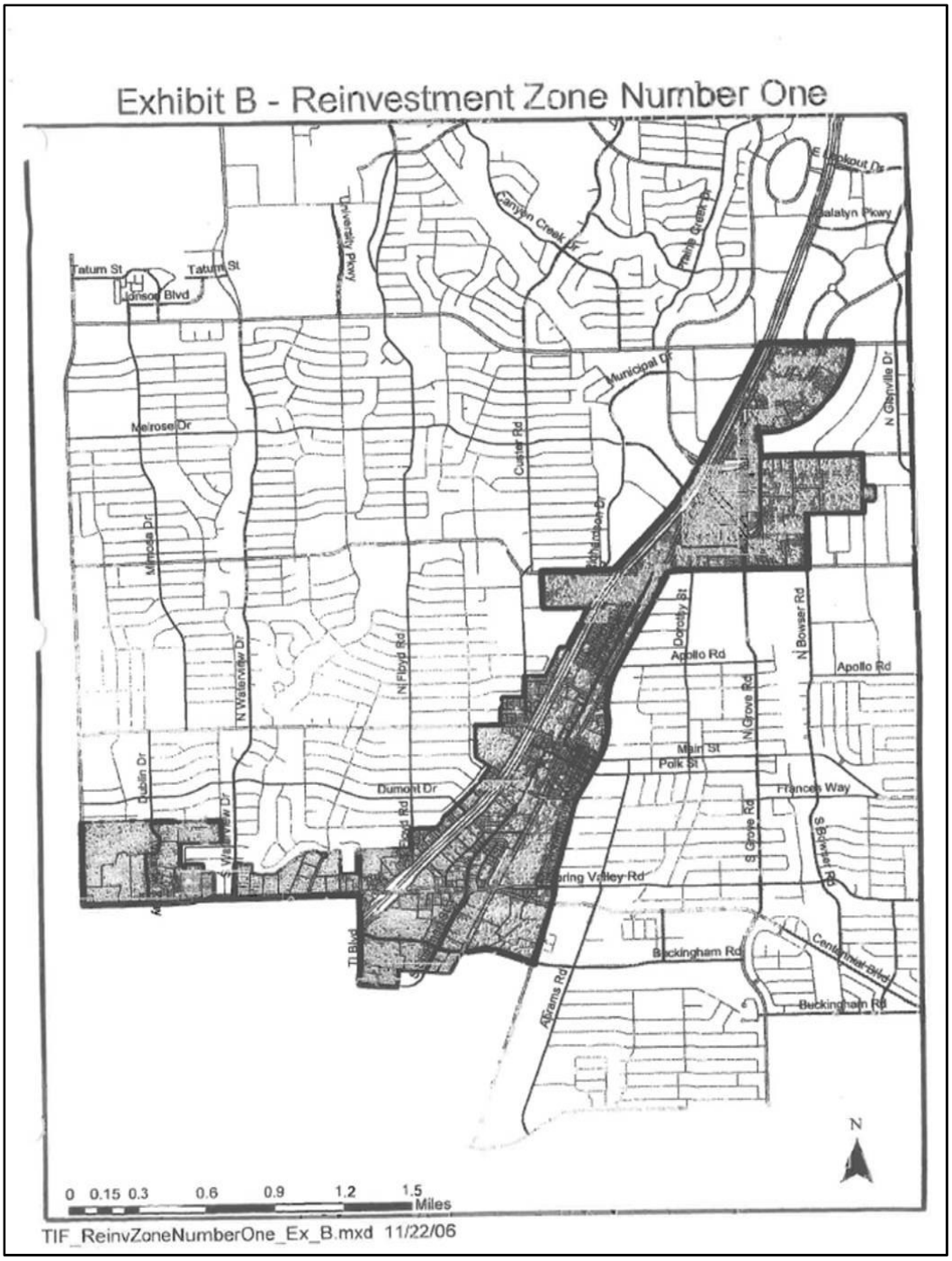
Appendix A

Plano TIRZ # 2



Appendix A

Richardson TIRZ #1



Bibliography

Al-Mosaind, M A, Dueke, K J, and Strathman, J G. 1993. "Light-Rail Transit Stations and Property Values: A Hedonic Price Approach." *Transportation Research Record*, Issue 1400: 90-94.

Armstrong, R. and Rodríguez, D.A. 2006. An evaluation of the accessibility benefits of commuter rail in Eastern Massachusetts using spatial hedonic price functions, Transportation, 33:1, 21-43.

Barnes, Gary (2005). "The importance of trip destination in determining transit share." *Journal of Public Transportation* 8 (2) p.1-15.

Benjamin, John D. and G. Stacy Sirmans. 1996. "Mass Transportation, Apartment Rent and property Values." *The Journal of Real Estate Research,* Vol. 12, No. 1.

Boschken, Herman L. (2002). Social Class, Politics, and Urban Markets: The Makings of Bias in Policy Outcomes. Stanford, California: Stanford University Press

Boschken, Herman L. (2008). "A multiple-perspectives construct of the American global city." *Urban Studies* 45 (1) p. 3-28.

Byrne, Paul. 2006. "Determinants of Property Value Growth for Tax Increment Financing Districts." *Economic Development Quarterly*, 20 (4): 317-329.

Buechner, J. K. (2001). "Tax Increment Financing: A Theoretical Inquiry" Journal of Public Economics, 81, p. 321-343.

Cambridge Systematics. 2006. The Role of State DOTs in Support of Transit-Oriented Development. Project 25-25, Task 20 National Cooperative Highway Research Program, Transportation Research Board, Washington, D.C.

Casella, Sam. 2002. "Tax Increment Financing: A Tool for Rebuilding New York." New York New Visions, Supporting Information page. http://nynv.aiga.org/resources.shtml

Casello, Jeffrey M. & Smith, Tony E. (2006). "Transportation activity centers for urban transportation analysis." *Journal of Urban Planning and Development* p. 247-257.

CDFA. 2007. “Tax Increment Finance Best Practices Reference Guide.” Council of Development Finance Agencies and International Council of Shopping Centers.

Cervero, R., and M. Duncan. 2002. Transit’s value-added: Effects of light and commuter rail services on commercial land values. Transportation Research Record 1805:8–15.

Cervero, R and Duncan, M. 2002a. “Transit’ Value-added: Effects of Light and Commuter Rail Services on Commercial Land Values.” Transportation Research Record 1805, 1-18.

Cervero, R and Duncan, M. 2002b. “Benefits of Proximity to Rail on Housing Markets: Experiences in Santa Clara County.” *Journal of Public Transportation*, Vol.5, No.:1-18.

Cervero, R and Duncan, M. 2002c. “Land Value Impacts of Rail Transit Services in San Diego County.” *Report prepared for the National Association of Realtor and the Urban Land Institute*.

Cervero, R. 1993. Transit-Supportive Development in the United States: Experiences and Prospects. US Department of Transportation, Federal Transit Administration, National Technical Information Service, Washington, D.C.

Cervero, R. 1996. Mixed Land-uses and Commuting: Evidence from the American Housing Survey. Transportation Research A 30 (5), 361-77.

Cervero, Robert. (1996). “Paradigm Shift: From Automobility to Accessibility Planning” *University of California at Berkley: Institute of Urban and Regional Development*. Working Paper 677

Cervero, R. and R. Gorham. 1995. Commuting in Transit versus Automobile Neighborhoods. Journal of the American Planning Association 61, 210.

Cervero, Robert and Kockelman, Kara. (1997). “Travel Demand and the 3Ds: Density, Diversity, and Design.” *Transportation Research D*. Vol. 2(3), pp.199-219

Cervero, R. and C. Radisch. 1996. Travel Choices in Pedestrian versus Automobile Oriented Neighborhoods. Transport Policy 3, 127-41.

Cervero, Robert (2006). "Office development, rail transit, and commuting choices." *Journal of Public Transportation* 9 (5) p. 41-35.

Chapman, J. I. 2008. "The Fiscalization of Land Use: The Increasing Role of Innovative Revenue Raising Instruments to Finance Public Infrastructure." *Public Works Management Policy*. 12 (4): 551-567.

Chen, Jason; Chen, Cynthia; & Timmermans, Harry. (2008). "Accessibility Trade-Offs in Household Residential Location Decisions." *Transportation Research Record: Journal of the Transportation Research Board*. No. 2077, Pp. 71-79.

Chen, Hong, Anthony Rufolo, and Kenneth Dueker. 1998. "Measuring the Impact of Light Rail systems on Single-Family Home Prices: A Hedonic Approach with GIS Applications" *Transportation Research Record.* 1617: 38-43.

Cherrington, Linda. (2008). "Nationwide Examples of State and Local Funds for Mass Transit." Texas Transportation Institute, University Transportation Center for Mobility, UTCM Project #08-00-19.

CTS (2009). "Value Capture for Transportation Finance: Technical Research Report." *Center for Transportation Studies, University of Minnesota*, Report Number: CTS 09-18

Debrezion, G., Pels, E., & Rietveld, P. 2007. "The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-Analysis" *Journal of Real Estate Finance and Economics*. 35:161-180

Delaware Valley Regional Planning Commission. 2005. "Transit Revitalization Investment District Act: Implementing Transit-Oriented Development in Pennsylvania: A summary of Act 238 of 2004." Presentation

Dittmar, Hank and Ohland, Gloria. (2004). The New Transit Town: Best Practices in Transit-Oriented Development. Washington D.C.: Island Press.

Dueker, K. & Bianco, M., 1999. Light-Rail-Transit Impacts in Portland: The First Ten Years. *Transportation Research Record*, 1685, pp.171-180.

Ewing, Reid. (2008). "Highway-Induced Development: Research Results for Metropolitan Areas." Transportation Research Record: Journal of the Transportation Research Board. No. 2067, pp. 101-109.

Ewing, R., and R. Cervero. Travel and the Built Environment: A Synthesis. Transportation Research Record, 1780: 87-114. 2001.

Fejarang, Robert A. 1994. *Impact on Property Values: A Study of the Los Angeles Metro Rail.* Preprint, Transportation Research Board, 73rd Annual Meeting, Washington, D. C., January 9-13.

Filion, Pierre. (2001). "Suburban mixed-use centres and urban dispersion: what difference do they make?" *Environment and Planning A* 33 p. 141-160.

FTA. 2004. "Guidelines and Standards for Assessing Transit-Supportive Land Use." United States Department of Transportation, Federal Transit Administration, Washington, D.C.

FTA. 2010. "U.S. Transportation Secretary Ray LaHood Announces $293 Million for New Transit Solutions, Economic Development Nationwide" United States Department of Transportation, Federal Transit Administration. News Releases. Date Published: 7/8/10 Date Accessed: 8/11/2010. http://www.fta.dot.gov/news/news_events_11823.html

GAO. 2009. "Public Transportation: Federal Project Approval Process Remains A Barrier to Greater Private Sector Role and DOT Could Enhance Efforts to Assist Project Sponsors." United States Government Accountability Office, Report to Congressional Committees, GAO-10-19. Washington, D.C.

GAO. 2010. "Public Transportation: Federal Role in Value Capture Strategies for Transit is Limited, but Additional Guidance Could Help Clarify Policies." United States Government Accountability Office, Report to Congressional Committees, GAO-10-781. Washington, D.C.

Garrett, T., 2004. *Light-Rail Transit in America: Policy Issues and Prospects for Economic Development.* St. Louis: Federal Reserve Bank of St. Louis, pp.1-30.

Garrett, E. & McCubbins, M.D. 2008. "When Voters Make Laws: How Director Democracy is Shaping American Cities." *Public Works Management Policy*. 13 (1): 39-61.

Goldman, Todd. 2007. "Transportation Tax Ballot Initiatives as Regional Planning Processes." *Transportation Research Record*. No. 1997: 9-16.

Goldman, T., Corbett, S., & Wachs, M. 2001. "Local Option Transportation Taxes in the United States: Part One Issues and Trends." University of California, Institute of Transportation Studies, Research Report UCB-ITS-RR-2001-3.

Goldman, Todd and Martin Wachs (2003). "A Quiet Revolution in Transportation Finance: The Rise of Local Option Transportation Taxes." *Transportation Quarterly* 57 (1): 19-32.

Handy, Susan(2005). "Planning for Accessibility: In Theory and In Practice." In: Access to Destinations by David M. Levinson and Kevin J. Krizek. Pp. 131-147.

Hannay, R. & Wachs, Martin. 2007. "Factors Influencing Support for Local Transportation Sales Tax Measures." *Transportation*. 34: 17-35.

Hartzok, Alanna (1997). "Pennsylvania's Success with Local Property Tax Reform: The Split Rate Tax." *American Journal of Economics and Sociology* 56 (2): 205-213.

Hess, D. & Almeida, T., 2007. "Impact of Proximity to Light Rail Rapid Transit on Station-Area Property Values in Buffalo, New York." *Urban Studies*, 44, no. 5/6, pp.1041-1068.

Hess, D. & Lombardi. 2005. "Governmental Subsidies for Public Transit: History, Current Issues, and Recend Evidence." *Public Works Management and Policy*. 10 (2): 138-156.

Institute of Transportation Engineers (2008). *Trip Generation*. Institute of Transportation Engineers, eighth edition.

Junge, Jason and David Levinson (2010a). "Stimulating the Effects of Split-Rate Property Taxes on Development Intensity." *89th Annual Meeting*, Trasnsportation Research Board, Washington, D.C. Paper 10-1062.

Junge, Jason and David Levinson (2010b). "Economic and Equity Effects of Transportation Utility Fees." *89th Annual Meeting*, Trasnsportation Research Board, Washington, D.C. , Paper 10-0572.

Knaap,Gerrit-Jan and Song, Yan (2005). "The Transportation-Land Use Policy Connection." In: *Access to Destinations* by David M. Levinson and Kevin J. Krizek. Pp. 91-107.

Knaap, G. J., C. R. Ding, and L. D. Hopkins. 2001. Do plans matter? The effects of light rail plans on land values in station areas. Journal of Planning Education and Research 21 (1):32–39.

Ko, K., Goetz, E., Hagar, A., 2009. "Differential Impacts on the Hiawatha Light Rail Line"

88th Annual Meeting, Trasnsportation Research Board, Washington, D.C. Paper 09-1630.

Landis, John, R. Cervero, S. Guhathukurta, D. Loutzenheiser, and M. Zhang. 1995. "Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Transit Systems." *Monograph 48, Institute of Urban and Regional Studies*. University of California at Berkeley.

Lang, Robert E. and LeFurgy, Jennifer. (2003). "Edgeless cities: examining the noncentered metropolis." *Housing Policy Debate* 14 (3) p. 427-462.

Larson, Kerstin and Zhirong J. Zhao (2010). "Air Rights as a Value Capture Strategy." *89th Annual Meeting*, Trasnsportation Research Board, Washington, D.C., Paper 10-3358.

Lewis-Workman, Steven, and Daniel Brod. 1997. *Measuring the Neighborhood Benefits of Rail Transit Accessibility.* Transportation Research Record 1576, pp. 147-153.

Levine, Jonathan; and Inam, Aseem. (2004). "The Market for Transportation-Land Use Integration: Do Developers Want Smarter Growth than Regulations Allow." *Transportation*. Vol. 31, pp. 409-427.

Maine State Legislature. 2009. "An Act To Create Jobs and Stimulate Economic Development by Making Captive Insurers Eligble for Pine Tree Development Zone Benefits." Maine State Legislature, PUBLIC Law, Chapter 627, LD 1679, 124th Maine State Legislature. Accessed: 3/22/2010. http://www.legislature.maine.gov/legis/bills/bills_124th/chappdfs/PUBLIC627.pdf

MDOT. 2008. "Annual Report to the Maryland General Assembly Senate Budget and Taxation Committee and House Appropriations Committee Regarding Oversight of Transit Oriented Development Projects." Maryland Department of Transportation, Office of Real Estate. Annapolis, Maryland.

Mueller, Peter O. (1997). "The suburban transformation of the globalizing American city." *Annals of the American Academy of Political and Social Science* 551 (1) p. 44-58.

Munoz-Raskin, R. 2006. Walking accessibility to bus rapid transit in Latin America: Does it affect property values? The case of Bogotá, Colombia. In TRB 86th Annual Meeting Compendium of Papers CD-ROM.

NCHRP. 2006. "Future Financing Options to Meet Highway and Transit Needs." Transportation Research Board, National Cooperative Highway Research Program, Web-Only Document 102. Washington, D.C.

Nelson, Nelson; Liza K. Bowles; Julian C. Juergensmeyer; and James C. Nicholas. *A Guide to Impact Fees and Housing Affordability*. Island Press, 2008.

NSTIFC. 2009. Paying Our Way: A New Framework for Transportation Finance. Report of the National Surface Transportation Infrastructure Financing Commission. February 26.

Ohland, Gloria (2005).“Value Capture: How to Get a Return on the Investment in Transit and TOD,” Reconnecting America Center for Transit-Oriented Development. http://www.drcog.org/documents/ValueCaptureTOD.pdf

Pagano, Michael A. and David Perry. 2008. “Financing Infrastructure in the 21st Century.” Public Works Management Policy 13 (1): 22-38.

Parsons Bickerhoff Quade & Douglas (1996). “Transit and Urban Form.” TCRP 16 v. 2

Polzin, Steven E. (1999). “Transportation/Land-use relationship: Public transit’s impact on land use.” *Journal of Urban Planning and Development* 125 (4) p. 135-151.

Porter, Douglas R. (1997). “Transit-Focused development: A synthesis of transit practice.” TCRP Synthesis 20

Pushkarev, B., and J. Zupan. 1977. Public Transportation and Land Use Policy. Bloomington: Indiana University Press.

Reene, John L. 2008. “Smart Growth and Transit-Oriented Development at the State Level: Lessons from California, New Jersey, and Western Australia.” Journal of Public Transportation, 11 (3): 77-108.

RITA. 2009. State Transportation Statistics 2009. United States Department of Transportation: Research and Innovative Technology Administration, Bureau of Transportation Statistics. Washington, D.C.

Rodríguez, D. A., and F. Targa. 2004. Value of accessibility to Bogotá’s bus rapid transit system. Transport Reviews 24 (5):587–610.

Rolon, Abagail. (2008). “Evaluation of Value Capture Mechanisms from Linkage Capture to Special Assessment Districts.” *Transportation Research Record*, No. 2079: 127-135.

Rodriguez, D., E. Brisson and N. Estupinan. 2009. The Relationship Between Segment-Level Built Environment Attributes and Pedestrian Activity Around Bogota’s BRT Stations. TRB 88th Annual Meeting, TRB, Washington, D.C.

Ryan, Sherry (2005). “The value of access to highway and light rail transit: evidence for industrial and office firms.” *Urban Studies* 42 (4) p. 751-764.

Rybeck, Rick. 2004. “Using Value Capture to Finance Infrastructure and Encourage Compact Development.” Public Works Management Policy 8 (4): 249-260.

Smith, Jeffery J. and Thomas A. Gihring. 2006. “Financing Transit Systems Through Value Capture: An Annotated Bibliography.” American Journal of Economics and Sociology 65 (3): 751-786.

Stanilov, Kiril. (2003). “Accessibility and Land Use: The Case of Suburban Seattle, 1960-1990.” *Regional Studies*. Vol. 37 (8), pp.783-794.

Straatemeier, Thomas (2008). “How to Plan for Regional Accessibility?” *Transport Policy*. Vol. 15, pp. 127-137.

Stull, Mark A. 2008. “Design Considerations for a 21st Centruy Ground Transportation System Basedon Value-Capture Financing” *Transportation Planning and Technology*, 31 (3): 249-275.

Sun Metro. 2009. “Alternatives Analysis Update & Strategic Plan of Action: Mass Transit Department Board Briefing, Tuesday, December 15, 2009” *El Paso Transit Corridor Alternatives Analysis*.

TRB. 2006. “The Fuel Tax: And Alternatives for Transportation Funding.” Transportation Research Board, Special Report 285. Washington, D.C.

TxDOT. 2008. Texas Transit Statistics. Texas Department of Transportation, Public Transportation Division.

USDOT. 2007. “Case Studies of Transportation Public-Private Partnerships in the United States.” United States Department of Transportation, Federal Highway Administration, Final Report Work Order 05-002. Washington, D.C.

Voith, Richard. 1993. “Changing Capitalization of CBD-Oriented Transportation Systems: Evidence from Philadelphia, 1970 – 1988.” Journal of Urban Economics, 33: 361-376.

Vuchic, Vulkan. 1981. Urban Public Transportation: Systems and Technology. Prentice-Hall, Inc: Englewood Cliffs, New Jersey.

Vuchic, Vulkan. 2005 Urban Transit: Operations, Planning, and Economics. John Wiley & Sons, Inc.: Hoboken, New Jersey.

Wachs, Martin (2003). “A Dozen Reasons for Gasoline Taxes.” *Public Works Management Policy*, 7 (4): 235-242.

Wachs, Martin (2003b). “Local Option Transportation Taxes: Devolution as Revolution.” *Access* 22: 9-15.

Wachs, Martin (2003c). “Improving Efficiency and Equity in Transportation Finance.” *Brookings Institution*, Center for Urban and Metropolitan Policy: Series on Transportation Reform, Washington, D.C.

Weber, Rachel and L. Goddeeris (2007). “Tax Increment Financing: Process and Planning Issues (Working Paper No. WP07RW1),” Cambridge, MA: Lincoln Institute of Land Policy.

Weinberger, R. 2001. "Light Rail Proximity: Benefit Or Detriment in the Case of Santa Clara County, California?" *Transportation Research Record* 1747: 104-113.

Weinstein, B. and Clower, T. 1999. The Initial Economic Impacts of the DART LRT System. Denton, Texas: University of North Texas, Center for Economic Development and Research, report prepared for the Dallas Area Rapid Transit District.

Weinstein, Bernard and Clower, Terry. 2002. "An Assessment of the DART LRT on taxable property valuations and transit oriented development." Center for Economic Development and Research, University of North Texas.

Werbel, R. A. & Haas, P. J. 2002. "Voting Outcomes of Local Tax Ballot Measures with a Substantial Rail transit Component." *Transportation Research Record*. 1799, Paper No. 02-2556: 10-17.

Ya-Ting, Liu. 2010. "Livable Communities Act Gains Momentum." Mobilizing the Region: News and Opinion from the Tri-Stare Transportation Campaign. Accessed: 8/11/2010. Date Published: 8/10/2010. http://blog.tstc.org/2010/08/05/livable-communities-act-gains-momentum/

Yinger, John (1998). "The incidence of development fees and special assessments." National Tax Journal, 51(1):23–41.

Vita

Shaun E. Tooley was born in Creve Coeur, Missouri in December 1985, son of Stephen E. Tooley and Melanie Embrey, and step-son of Carol Tooley. After completing secondary education at Pattonville High School with a strong interest in urban form and development, Shaun pursued a Bachelor of Science in Community and Regional Planning from Missouri State University. Shaun graduated with honors from Missouri State in May of 2008 and continued his education at the University of Texas at Austin seeking the Master of Science in Community and Regional Planning degree with a specialization in Transportation. Shaun has interned at the City of St. Charles, Missouri and Southwest Missouri Regional Council of Government in Springfield, Missouri while in undergraduate school. He has interned with Alliance Transportation Group and Jacobs Engineering in Austin, Texas while in graduate school. Shaun hopes to continue pursuing a career in community planning and make a relevant contribution to the field and communities in which he will be employed and serve.

Permanent addresses:
510 Forest Acres Dr,
O'Fallon, MO 63366

This report was typed by the author