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Description and Interpretation of Case Studies: Handbook for Practitioners

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TABLE OF CONTENTS

Preface i
P1. Project Products and Reports..i
P2. Acknowledgements ii

1. Introduction..1
1.1 Project Background and Overview 1
1.2 Use of the EconWorks Web Site 2
1.3 Organization of the Report 4

2. Case Study Projects 5
2.1 Range of Transportation Projects Covered 5
2.2 Definitions of Project Types 6

Rules of Thumb 11
3.1 Typical Project Averages..11
3.2 Project Motivation 13

4. Lessons Learned for Case Study Interpretation..14
4.1 Types of Benefits and Impacts Covered 14
4.2 Interpretation and Use of Case Studies..15
4.3 Avoiding Misuse of Data Base 17

5. Conduct of Future Case Studies...23
5.1 Preliminary Steps..23
5.2 Data Collection 24
5.3 Interview Guide 29

6. Lessons Learned for Future Project Planning...33
6.1 How project details affect outcomes..33
6.2 Land Use Goals...33
6.3 Consensus-Building..34
6.4 Visioning...35
6.5 Zoning & Site Preparation 36
6.6 Real Estate Market Conditions 38
6.7 Integration with Larger Projects 39
6.8 Projects Supporting Specific Companies and Industries 39

6.9 Conclusions: Recommendations for Future Planning 40

LIST OF TABLES

Table 1. Types of Case Study Projects 5
Table 2. Median Cost per Mile by Project Type 11
Table 3. Average Number of Construction Years by Project Type........ 12
Table 4. Ratios of Job Impact, Project Cost, Type and AADT 13
Table 5. Mix of Motivations for Projects 13
Table 6. States within Each Region........ 26
Table 7. Data Sources for Background Information........ 27
Table 8. Employees per Sq. Ft. of Development, by Building Type........ 28

LIST OF FIGURES

Figure 1. Average Automobile Daily Traffic 12

PREFACE

P1. Project Products and Reports

This document is one of a series of technical products from SHRP2 Project C03, *Interactions between Transportation Capacity, Economic Systems, and Land Use.*

As of June 2015, the original web tool Transportation Project Impact Case Studies (TPICS) was rebranded into the web tool EconWorks. To provide guidance on the new web tool format, this document has been updated to reflect the new changes, although other resources documents may still refer to the original TPICS web tool.

EconWorks Web Tool. One of the products is a web-based database tool that contains 132 case studies: 100 original case studies, 5 added in 2014, 7 added in 2016, and 20 added in 2017. These cases include the economic and development impacts of highway and transit projects, along with analysis tools for screening, viewing and analyzing them. The web site can be accessed via the EconWorks web site sponsored by the:

- American Association of State Highway and Transportation Officials (AASHTO) found at: https://planningtools.transportation.org/13/econworks.html

Technical Documents. The project also produced a series of technical reports, which can all be viewed and downloaded from the EconWorks web page by selecting the Research Reports button under the Project Tools category within the green banner on top. These reports include:

Case Study Analysis

- EconWorks User Guide (Instructions for Use)
- Description and Interpretation of Case Studies: Handbook for Practitioners (current document)
- Case Study Design and Development
- Data Dictionary

Research Methods and Findings

- Economic Impact Data Analysis Findings
- Highway Economic Impact Case Study Database and Analysis Findings
- SHRP2 C03 Final Report (TRB format)

P2. Acknowledgements

Contract. This project was conducted under a contract from the National Academy of Sciences and Engineering, through the Strategic Highway Research Program II (Capacity Program, Project C03), to Economic Development Research Group, Inc.

Supervision. The project was undertaken with oversight from staff of the Strategic Highway Research Program, with direction from Stephen Andrle and David Plazak. The project benefitted from review provided by Oversight Panel of the SHRP2 Capacity Program.

Contractors. The case studies and technical reviews were conducted by a team comprised of Economic Development Research Group and subcontractors: Cambridge Systematics, Wilbur Smith Associates, Texas Transportation Institute and Susan Moses & Associates.

The original TPICS (Transportation Project Impact Case Studies) data base and web tool were designed and developed by Economic Development Research Group and implemented by ICF Consulting.

The EconWorks web tool was designed and developed by CH2MHill and will be managed by AASHTO.

1 INTRODUCTION

This chapter provides an overview of the research project elements and description of the handbook target – which focuses on use of the database of economic impact case studies and the EconWorks web tool.

1.1 Project Background and Overview

Project. The Strategic Highway Research Program II (SHRP2), Capacity Project C03 was entitled: *Interactions between Transportation Capacity, Economic Systems, and Land Use*. This project produced a series of reports on methods, models and case studies that examined the economic and development impacts of highway capacity investments projects.

Case Study Database. The most notable accomplishment of this project was the development of 100 original highway, freight, and transit-oriented case studies, with 32 additional cases added which (a) compared pre-project and post-project changes in economic and land development conditions, (b) contrasted them with corresponding conditions for a base of comparison, and (c) included both quantitative impact measures and qualitative assessments based on local interviews.

This collection of case studies, completed in 2010, 2014, 2016, and 2017 was compiled with the goal of including all known pre-post highway impact studies in the US, plus available English language studies from Canada and abroad. Members of the project team then conducted additional quantitative and qualitative data collection and analysis to bring all of the cases up to a similar standard of comparability. (For further information on the case study development process, readers are referred to technical documents on "Case Study Design" and "Case Study Development," as described in the Preface.)

EconWorks Web Tool. The case studies were put into a web-based viewing and analysis system called "EconWorks." This system includes: (a) a *case study search function* that allows for user-defined screening and selection of relevant cases, (b) a *case study viewer* that provides user access to impact measures, discussion text, maps and related documents, and (c) an *impact estimation calculator* that shows the average and expected range of impact associated with any user-defined project profile. In addition, the web tool provides access to d) *Wider Economic Benefit (W.E.B.) Analysis tools (SHRP2 C11)* for evaluating Accessibility, Connectivity, and Reliability. For further information on this system, readers are referred to a separate document, EconWorks User Guide, which can be accessed as described in the Preface.

The EconWorks system was designed to assist transportation agencies in project planning and evaluation, by providing agency staff and interested stakeholders with a means for establishing the range of job, income and development impacts typically associated with various types of transportation projects in different settings.

Methodology Working Papers. A final aspect of this project was a series of working papers that reported on research findings regarding (a) stakeholder needs for improved assessment of economic impacts, (b) available metrics for portraying economic impact performance and impacts, and (c) needs for improvement to current economic impact assessment model tools. (For further information on the working papers, readers are referred to the list of additional project documents described in the Preface.

This Handbook is designed to complement other products of this project, by providing guidance on the interpretation of case study findings and appropriate use EconWorks system as part of broader transportation planning and economic evaluation processes.

1.2 Use of the EconWorks Web Site

Case Study Content. The EconWorks web site provides a national database of before-and-after case studies assessing the economic development and related impacts of highway and highway-multimodal projects. The data base includes:

- *Project descriptors* – Project Type (Access Road, Limited Access Road, Bypass, Connector, Beltway, Bridge, Interchange, Widening, Freight Terminal, Station, Line Extension, and New Line), and Project Size (in miles, lane-miles, $ cost).
- *Context (Setting)* descriptors – Region (US BEA region or international), Urban/Rural/Mixed/Core classification, Economic Distress level, and Average Daily Traffic level, Population Density, Topography.
- *Project Motivation* –Nine different categories such as: air access, rail access, border access, marine port access, site development, labor market, delivery market, tourism, and congestion mitigation / air quality. Note that a project can have multiple motivations.
- *Impact measures* – narratives and pre- and post- construction data describing changes in economic development (jobs, income, output) and land development (investment, property value) characteristics of local area.

"Case Study Search" Feature. EconWorks includes a feature allowing to search for relevant case studies that fit specific search criteria, and to review a wide range of impacts for specified types of projects. The search criteria include *project type* (e.g., bypass, local access road, interchange, bridge), *project size* (e.g., miles, dollars) and *project location setting* (e.g., region of the US, urban/rural/mixed/core context and economic distress level).

The motivation for this search feature is to enable transportation planners to identify prior cases that are roughly similar to those that they are now considering in their plans, so that they can get an idea of the likely range of impacts and types of additional factors to be considered. The feature is also designed to assist planners who can find themselves pulled between the optimism of highway investment proponents (who may argue that major highway investment will automatically bring local economic prosperity) and the pessimism of highway opponents (who may argue that highways will destroy communities without supporting any economic growth). Many transportation professionals are aware from past experience that economic impacts of highway investments are seldom as extreme (or as simple and straightforward) as the expectations of either group. However, they need to be able to cite a body of national case studies to help establish a more realistic range of expectations, and to refer to actual "real world" experiences to provide a solid basis for further public discussion. The case study database and EconWorks search feature together address that need.

"Assess My Project" Estimation Feature for Sketch Planning. EconWorks also provides users with the ability to estimate the potential or likely economic consequences of particular projects that they may be considering for selection and implementation. This feature is designed to support "sketch level" project planning and evaluation, which is an initial "back of the envelope" type of estimation in which rough estimates are made of the likely magnitude of economic impacts associated with implementing (or not implementing) various types of projects in various types of locations.

Of course, any particular proposal for a new project is unlikely to have a "perfect match" -- where the exact same type of project of the same size was implemented in an identical type of setting in the same part of the country. The estimation tool uses a powerful "interpolation engine" to estimate the likely range of impacts for any given project proposal, based on evidence from available cases that share various degrees of similarity with the proposed project.

Use in Project Planning. The economic impact values provided by "Assess My Project" are appropriate for a *sketch planning* level of analysis in which a project is proposed for a given setting, but there is not yet much specific local information available on project engineering design, cost or traffic impacts.

Once more detailed analysis has been done to address those specific issues, a detailed economic impact analysis model (using commercially available tools, outside the scope of this project) can be applied to develop more specific estimates of local project benefit/cost or economic impact outcomes. However, the sketch planning level of analysis enabled by EconWorks fills a void by providing an initial basis for economic impact estimation at an early stage in the project planning and assessment process -- when an initial screening of proposals and alternatives can be useful.

Use for Research and Policy. The case study database has been subject to statistical analysis as reported in the separate report on *Meta Analysis Findings*. The content of this database clearly shows that the economic impacts of highway projects vary widely – many are positive, some are negative, and others appear to be negligible. Of course, the range of outcomes also depends on the type and size of project, and the spatial scale at which impacts are being measured – which may vary from local block to community, county or statewide perspectives.

While the preceding finding (that impacts differ by type of project and measurement perspective) is not surprising, it still has critical importance for broader policy analyses. After all, the mix of highway capacity projects being implemented in the US has been changing over time -- shifting from rural to urban, and from intercity connectors to congestion reduction, and from bypasses to bridges. And costs have risen reflecting higher urban land costs and greater investment in context sensitive design and environmental impact mitigation. The case studies and EconWorks tool can be used to show how changing project mix leads to changing cost profiles and economic impacts. This information can enable future national studies of the economic impact of transportation investment to be more sensitive to differences in project mix and spatial perspective.

Future Updates. EconWorks was designed as a tool that can be continually updated with new case studies as they become available, and with data updates to existing cases when such data becomes available. The system is designed to apply to any type of transportation project. However, at this time the system is only populated with highway and highway-related intermodal case studies, consistent with the defined mission of the SHRP2 program.

1.3 Organization of the Report

This report is organized with five additional chapters.

- Chapter 2 defines project types and discusses their features.
- Chapter 3 provides “rules of thumb” concerning the range of highway & transit project impacts, drawn from the report on data analysis findings.
- Chapter 4 presents lessons learned for case study interpretation.
- Chapter 5 discusses guidelines for conducting new case studies.
- Chapter 6 provides lessons learned for highway project planning.

2 CASE STUDY PROJECTS

This chapter defines and summarizes the types of transportation projects covered in the case study database.

2.1 Range of Transportation Projects Covered

The EconWorks database was first built with a generic design for pre/post case studies of economic impact for any type of project or combination of modes. However, to be consistent with the SHRP2 (Strategic Highway Research Program) legislation for funding, the original 100 cases involved highway system or highway/rail intermodal interchange facilities. Since then, additional transit-only project types have been added (e.g. new line, station, & line extension).

The projects are classified into twelve categories based on their differences in access control, network connectivity location or objective. For each type, effort was made to span the widest possible range of urban/rural/mixed/core settings and locations across the US. Definitions of the project types follow in the section which follows.

Table 1. Types of Case Study Projects

	Type of Project	# of cases in the database
A	Limited Access Road	17
B	Beltway	9
C	Connector	12
D	Bypass	13
E	Bridge	10
F	Interchange	15
G	Access Road	8
H	Highway Widening	13
I	Freight Intermodal	10
J	Line Extension	4
K	New Line	9
L	Station	12
	Total	132

2.2 Definitions of Project Types

Each project type has its own unique combination of features. Some, such as the limited access highways between cities, tend to be long. Others, such as connectors and bypass roads, tend to be significantly shorter. Yet others, including access roads to office and industrial parks, tend to be short. And others, such as bridges, interchanges and intermodal terminals, are sited at specific locations. The rest of this section describes the unique range of features associated with each type of project.

(A) Limited Access Road Projects. Limited Access (LA) highways are multi-lane roadways designed to handle high vehicle volumes traveling at high-speeds. Travel lanes in either direction are separated by distance or crash barriers. They are typically free of traffic lights and stop signs, and accessible only via periodic on/off ramps and interchanges with other Limited Access highways. Crossroads are bypassed by grade separated bridges and underpasses. Most of Limited Access highway case studies feature interstate routes; however, case studies also cover a US Highway (Robert P. Casey Highway US 6), a link in the Appalachian Regional Highway System (Corridor B in Tennessee), and a State Route (SR 29 in Wisconsin).

Because they are designed to handle high volumes of traffic, Limited Access highways are typically built to provide access to metropolitan markets from outlying areas, or access across metropolitan areas. Where they pass through rural areas, they do so primarily to connect metropolitan areas and/or to connect rural agricultural areas with metropolitan markets and other modes of transportation such as airports, marine ports or rail terminals often located in metropolitan areas. The case study database contains 14 Limited Access highway case studies, 5 in metropolitan contexts and 9 in mixed contexts.

The limited access highway projects tend to be longer than some of the other types of highway projects in the case study database. The shortest measured 6 miles (I-515 in Henderson, NV), while the longest measured 325 miles (I-81 in VA). I-27 between Lubbock and Amarillo (124 miles) and I-29 in Iowa (161 miles) exemplify the median length of LARs in the database of 143 miles. As noted above, LA highways are designed to handle high volumes of traffic, which in combination with their length, explains relatively high lane miles and AADT levels. Lane miles ranged from 32 for the Robert P. Casey Highway in Pennsylvania to 1,300 for I-81 in Virginia, with a median of 632 lane miles. Daily traffic (AADT) ranges from 900 for SR 29 in Wisconsin to 240,000 for I-81 in Virginia. Median AADT is 46,150.

(B) Beltway Projects. Beltway projects are circumferential highways (typically freeways) typically built around the fringe of cities. They often are designed to link satellite activity centers – which can include housing, retail, and major employers – that spring up outside the center of cities.

The case study database contains eight urban beltway projects. Some of these projects represent an entire beltway, while others represent construction of just one part of a beltway.

Thus, the projects ranged from 3 miles to 62 miles in length, with a median of 28 miles. They ranged from 21 to 372 lane-miles, with a median of 110.

The beltway routes are all fairly heavily traveled, with AADTs ranging from 20,100 for the I-469 Bypass in Fort Wayne, Indiana, to 190,100 for Beltway 8 in Houston. Beltway projects tend to have relatively high levels of traffic, and the median AADT of 88,000 for beltways was the highest median among all case study project categories.

(C) Connector Project. Connectors provide highway access between two highways, such as SR-56 in San Diego, CA, or between a highway and an attraction such as an airport (e.g. US 281 in San Antonio, TX), tourist destination (Ozark Mountain Highroad SR 465), or employment corridor (US 460 in Blacksburg, PA). The case study database contains 8 case studies of connector projects, two in rural areas, two in metropolitan areas and 4 in mixed settings.

The shortest connector in the database is I-705 in Washington (1.5 miles) which connects I-5 with Downtown Tacoma and Port of Tacoma, while the longest is the Southern Connector (16.0 miles) which links I-85 to Downtown Greenville, NC. The median length is 7.8 miles, as exemplified by the Ozark Mountain Highroad in Branson, MO (7.5 miles) and US 281 in San Antonio (8.0 miles). In terms of lane miles, US 25 in Kentucky is the smallest project at 4.4 lane miles, while the Southern Connector is the largest at 80.0 lane miles. Median size is 35.0 lane miles. The Ozark Mountain high road is the most lightly traveled at 2,970 AADT while the Southern Connector is most heavily traveled at 147,000 AADT. Median AADT for all case study connector projects is approximately 16,900.

(D) Bypass Projects. Bypasses are highway realignments that divert traffic flow around built-up towns or other urbanized areas to allow long-distance through traffic to avoid mixing with slower local traffic. (Typically, an option to drive through the town center is maintained.) Bypasses are designed to improve efficient traffic flow for long distance travel by keeping it away from areas with stop-and-go traffic, and to increase safety by reducing the mixing of long distance trucks with local pedestrians.

Bypasses are most commonly built in rural areas, and 8 of the case studies are in rural contexts. However, the diversion route may also be built inside a metropolitan area. Four of the case studies in the database are in metropolitan areas, and one additional case study project is in a mixed urban/rural context.

Bypass projects in the database range in length from 2.2 miles to 26.0 miles, with a median length of 5.5 miles. In terms of lane miles, they range from 7.2 to 52.0 with a median of 20.0 lane miles. AADT ranges from 3,700 on the Bennington Bypass (VT-279) to 60,700 on the Wichita Northeastern Bypass, with a median of around 19,600.

(E) Bridge Projects. Bridges span natural environmental features, such as bodies of water and canyons as well as manmade features including train tracks and other roadways. The

EconWorks database contains 10 case studies of bridge projects, 4 in metropolitan contexts, and 3 each in mixed and rural contexts. Bridge lengths vary widely, from less than 0.1 miles to 12 miles, with a median of 1.1 miles. Lane miles range from minimum of 0.18 lane miles for the Potato Hill bridge to 73 lane miles for the Missouri Route 370 Bridge, with a median of 4 lane miles.

Bridge projects spanned a range of rural roads and major urban highways, so they reflected a wide range of variation in traffic volume. The Potato Hill Bridge has the lowest AADT at 4,920 while the Missouri Route 370 Bridge has the highest AADT at 60,000. The median AADT for all bridge project case studies is 21,050.

(F) Interchange Projects. An interchange is a connection between two limited access roads where they intersect. The case study database contains 12 interchanges, ten in metropolitan settings and two in mixed settings. Interchanges are essentially a single point, or points in each direction of connection, with no length at all. Four of the interchanges do have lengths reflected in the case study database, however, length is not a meaningful metric by which to understand interchange projects.

The most lightly traveled case study interchange is Commerce Parkway/I-70 in Hays, KS with an AADT of 1,700 while the most heavily traveled is Dallas High 5 with AADT of 500,000. In fact, the latter was the most heavily traveled of any EconWorks project in any category. The median for all interchange projects is 53,450 AADT.

Interchange project costs range from $4.7 million for Commerce Parkway to $348.3 million for the Big I in Albuquerque, NM (I-40 and I-25). Central Freeway in San Francisco ($55.5 million) and I-70 & 110th St in Kansas City, MO ($60.4 million) are examples near the median project cost of $57.9 million.

(G) Access Road Projects. An access road is built for the specific purpose of providing access to new development sites, typically for industrial use. Some access roads support the development of a mix of employment-related uses, such as light industrial, office and commercial activity. Some are built to support the development of new industrial or business parks, and others are built to allow for the expansion of existing parks by providing access from a new direction.

In comparison with other project types, access roads are the shortest (miles and lane miles), least traveled (AADT), and least expensive (cost and cost per mile). However, an access road had the highest median jobs per million in project cost of any projects in the database, and access roads as a whole had the highest median number of jobs created per million in project cost.

Of the access road case studies in the case study database, 5 of the access roads are built in rural areas and 2 are built in metropolitan areas. Access roads are more common in rural areas where the road network is limited, and undeveloped land is prevalent, and far less common in metropolitan areas where the road network is already robust and land is largely built-out.

Access roads are relatively short. Case study examples ranged from lengths of 1 mile to 2.8 miles, with a median of 2.0 miles, while lane miles ranged from 2.0 to 10.8 with a median of 4.0. Trips on access roads are almost exclusively made by tenants, suppliers, distributors, customers and employees, thus annual average daily traffic (AADT) depends on the size of the industrial area and type of businesses located there. Case study project AADTs ranged from just 360 to 62,300, with a median of 5,500.

(H) Highway Widening Projects. Highway widening projects typically increase highway capacity by adding lanes. The case study database covers 9 widening projects, 4 in metropolitan contexts, 2 in rural contexts and 3 in mixed contexts. The shortest segment widened was the North Central Dallas Expressway (US 75) at 8.6 miles, while the median length widened was 24.8 miles of the Santan Freeway in Maricopa County, AZ. The longest widening was 243.5 miles of Corridor J from Chattanooga, TN to London, KY. Corridor J was also the highest in terms of lane miles, at 974. This was well above the median lane miles of 85.0 (for the reconstruction of I-15 in Salt Lake City). The I-70 Glenwood Canyon project represented the least lane miles (50).

Corridor Q represented the median traffic volume with an AADT of 24,000. I-86 in New York State's Southern Tier represented the lowest AADT at 13,000, while the Dallas North Central Expressway (US 75) had the highest AADT at 242,000.

Widenings tend to be expensive, in part because they typically involve extensive right of way acquisition.

(I) Intermodal Freight Terminals. Intermodal freight terminals allow for freight to be transferred between truck and rail modes. The case study database covers 10 freight intermodal terminals, 6 in metropolitan contexts, 2 in rural contexts, and 1 in a mixed context. Facilities measuring volume by TEU (Twenty-Foot Equivalent) handled annual container volumes ranging from 30,000 TEUS at Devens Intermodal Rail Terminal, to 1.5 million TEUS at Center-Point Intermodal Center in Elwood, IL, with a median of 285,000 TEUS per year. Facilities that measure volume in metric tons handled between 73,600 metric tons (Huntsville, AL) to nearly 4.2 million metric tons (Bayport TX). Two facilities, Worldport at DIA and Tchoupitoulas Corridor, handle bulk cargo, ranging from 224,400 metric tons at the former to more than 3 million metric tons at the latter.

(J – L) Transit Projects. Originally classified as Intermodal Passenger Terminals, transit-oriented projects have been re-classified into the following project types:

(J) Transit: Line Extension. Line extension projects extend transit access into new areas with the addition of one or more stations and typically involve light rail (LRT) and heavy rail (HRT) transit modes. The case study database covers 4 of these types of projects with two of them extending to provide access to airports (Airport Max Red Line and BART to San Francisco Airport).

(K) Transit: New Line. New transit line projects provide new transit service into new areas with the addition of one or more stations. These projects can cover any mode however the case study database primarily covers bus rapid transit (BRT) and light rail (LRT) which consists of 9 total cases. Some projects are focused on mobility for transit-dependent groups (Valley Metro Rail (Phase 1), economic development opportunities (South Lake Union Street Car), access to major areas of interest (Hiawatha Light Rail line- downtown, Mall of America, & airport), or to connect employment centers (Healthline / Euclid Corridor).

(L) Transit: Station. Transit stations allow passengers to transfer between some combination of bus, light rail, commuter rail, heavy rail with other modes. The case study database covers 12 transit station cases, all in metropolitan contexts. Rural and mixed contexts lack the population density necessary to support this type of mass transit facility. Transit station cases in the database accommodated passenger volumes ranging from 720 weekday riders for the Anderson Regional Transportation Center in Woburn, MA, to more than 10,000 weekday riders for MARTA's Lindberg Station (Atlanta, GA).

3 RULES OF THUMB

This chapter provides typical average values associated with the unit cost and economic impact of various types of transportation projects in different settings. The data is drawn from the case studies and statistical analysis of project findings.

These values are intended to be used only for initial "sketch planning" processes in which there is a screening of alternative types of projects and an assessment of the likely magnitude of economic impact -- based only on the most basic data regarding the proposal and setting. These typical values are not intended to substitute for detailed analysis of the economic impacts expected to occur given more specific information on the facility design, location, traffic use and projected impact on facility use and travel conditions faced by users. More detailed factors are provided in the separate report: *Economic Impact Data Analysis Findings*.

3.1 Typical Project Averages

Project Cost. Among the case studies, project costs ranged from $1.50 per mile (in $M's) to more than $200 per mile (in $M's). Table 2 shows median cost/ mile by project type.

Table 2. Median Cost per Mile by Project Type

Project Type*	Median Cost per mile ($M's)
Access Road	$1.50
Beltway	$20.37
Bridge	$42.08
Bypass	$7.16
Connector	$24.58
Limited Access Road	$15.41
Widening	$16.23
Line Extension	$200.31
New Line	$75.38
All Projects	$19.77

*Freight terminals, Stations, and Interchanges were not included

Project Time Duration. Among the case studies, project duration ranged from widely depending on project type and scale. Table 3 below shows length of construction by project type.

Table 3. Average Number of Construction Years by Project Type

Project Type	# of Cases	Mean	Median
Access Road	8	4.4	3.0
Beltway	9	10.2	12.0
Bridge	10	3.0	2.0
Bypass	13	3.8	3.0
Connector	12	4.3	3.5
Interchange	15	3.1	3.0
Intermodal Freight	10	4.9	2.0
Limited Access Road	17	13.3	12.0
Widening	13	9.8	8.0
Station	12	3.8	3.0
Line Extension	4	4.5	4.5
New Line	9	3.7	3.0
Total	132	6.1	4.0

Traffic Level. The case study projects generated average traffic ranging from 10,000 cars per day to nearly 100,000. Figure 1 shows average daily traffic level by project type.

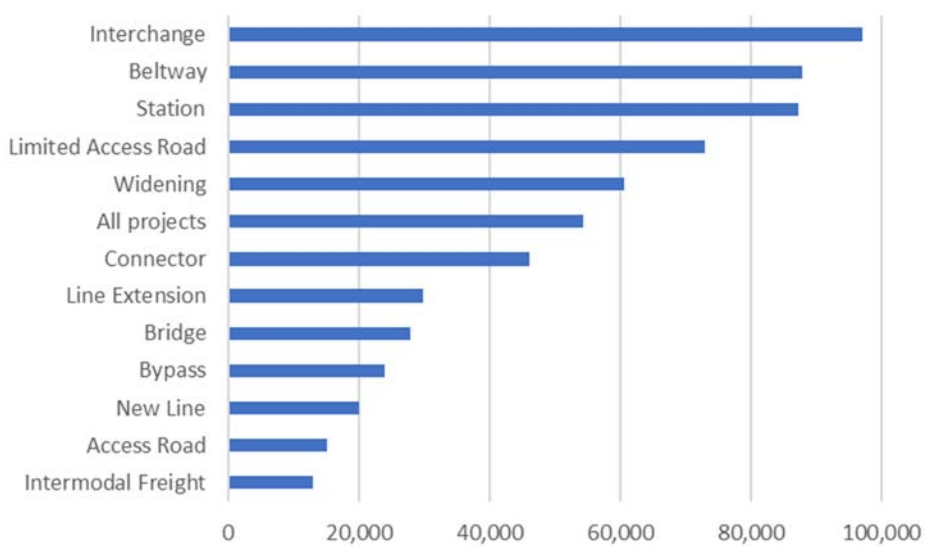

Figure 1. Average Automobile Daily Traffic

Employment Impact. Overall, 85% of the case study projects had measurable impacts on job growth, based on pre/post measurement and an assessment of the relative roles played by the highway projects. Average job impact can be viewed in terms of a ratio to dollars spent or traffic served; both are presented below.

Table 4. Ratios of Job Impact, Project Cost, Type and AADT

Project Type	Mean Cost / Job	Mean Jobs per 1,000 AADT
Access Road	$33,365	28
Beltway	$65,117	166
Bridge	$174,527	184
Bypass	$39,757	65
Connector	$169,789	28
Interchange	$52,037	21
Intermodal Freight	$221,586	134
Limited Access Road	$275,084	115
Widening	$172,588	84
Line Extension	$323,870	95
New Line	$256,780	401
Station	$60,735	24
All Projects	$167,570	80

3.2 Project Motivation

Highway project impacts should be viewed relative to the project motivation. For some projects, the enhancement of business productivity and business attraction is a major motivation; for other projects the motivation is focused on other issues. The mix of motivations driving case study projects is summarized below.

Table 5. Mix of Motivations for Projects

Project Motivation	Highway	Freight Intermodal	Transit
Improve Access to Airports	23	2	3
Improve Access to Rail	5	6	1
Improve Access to Int'l Border	4	1	0
Improve Access to Marine Port	8	2	0
Facilitate Site Development	49	2	20
Improve Labor Market Access	32	0	8
Improve Delivery Access	35	3	0
Facilitate Tourism	30	0	1
Mitigate Congestion / Air Quality	58	0	17
# of Cases	97	10	25

4 LESSONS LEARNED FOR CASE STUDY INTERPRETATION

The case studies are not only the source of quantitative data on project characteristics and results; they are also the source of substantial qualitative data obtained from interviews with local public and private sector representatives. The interplay of both sources provides a basis for careful consideration of the case study findings and their interpretation. That is the focus of this chapter.

4.1 Types of Benefits and Impacts Covered

The case studies that were conducted (and are populated in the EconWorks web tool) focused on economic development impacts. Economic development impacts are those that occur in close proximity to the transportation investment (the actual distance varying by type and location of the investment), and result from retention of existing businesses, expansion of existing businesses, or attraction of new businesses due to the improved access provided by the transportation investment.

It is important to realize that EconWorks does not measure all economic impacts that might result from a transportation investment. Economic impacts not measured include efficiency benefits, such as travel time savings and operating cost savings. These benefits are often realized by firms some distance from the actual transportation investment (sometimes hundreds of miles away), and the impacts are difficult to identify through interviews with local officials and businesses. There are several projects included in the EconWorks database where it is clear that these efficiency benefits have been realized. These include many of the longer highway investments, such as *Interstates 16, 26, 27, 29, 68, 81, 86* and *476*, and *Corridors B, D, J* and *Q*. Also, all of the intermodal cases, both rail and air (*Ayer Intermodal, Auburn Intermodal, Global III IM Terminal, WorldPort at DIA, Fairburn UP IM Yard, Port of Huntsville, Tchoupitoulus Corridor,* and *Alliance IM Logistics Park*) have wide-reaching economic impacts. Other tools, such as econometric models, should be used to estimate the potential economic efficiency benefits of transportation infrastructure investments.

Similarly, EconWorks does not attempt to measure the economic impacts of changes to air quality, noise and vibration, neighborhood cohesion, environmental justice and many other types of benefits or dis-benefits often evaluated as part of the environmental impact assessment of transportation investments. While there have been attempts to measure the economic effects of some of these impacts, they generally have minimal impact on economic development.

Economic development benefits can be measured in terms of jobs, sales, income and investment. The case studies relied heavily on the employment impacts because municipalities and economic development officials collect data on and report employment impacts more frequently than other impacts. Also, individual businesses are more willing to share information about employment levels than sales. When possible, data on private and public investment resulting from each case study project was collected, measured in terms of square feet of development by type (e.g., retail, office, industrial), number of housing units, and/or dollars of investment. Changes in property values provide another measure of the economic impacts of the transportation investment. The EconWorks database includes information on both investment and property value impacts for many of the case studies, although this data was not available in all instances.

4.2 Interpretation and Use of Case Studies

The case studies conducted for this project are intended to inform initial screening and sketch planning processes, by providing insight into the range of benefits typically occurring from various types of highways in various types of settings. The case studies can provide an estimate of the likely range of impacts that typically occurs, and as such they can be used at public meeting to temper both negative and positive impacts. However, they are not meant to replace more careful local analysis of transportation and economic conditions, nor use of transportation and economic impact models needed for more detailed planning. Key factors to consider are summarized in the text that follows.

The case studies in EconWorks do provide a rich database for understanding how different types of transportation investments affect a local or regional economy. However, the cases are spread over several different types of projects located in many different regions. Many of the cases are complex. Some were built in phases over many years and others have several component parts. Some were built specifically to encourage economic development, while others were built primarily for congestion relief. Many of the projects combined the transportation investment with other public policies or incentives to achieve the greatest benefits possible from the investment.

The *Economic Impact Data Analysis Report* (a separate volume) identifies the specific levels of economic impacts that might be expected by type, location, size, and other characteristics of transportation investments. However, because of the range of additional local factors and considerations that may be applicable, it is difficult to draw strong conclusions about expected impacts of future investments based solely on the empirical data analysis. Instead, the users of EconWorks should look for individual cases that best mirror their own projects, and review not only the data for those cases, but also the accompanying narratives. The narratives provide detail about each case that is not captured in the database. For example, the narratives include a detailed description of supportive public policies and incentives adopted in conjunction with the transportation investment that often helped boost the economic development impacts of the investment. These might include land use regulations (e.g., zoning changes), financial incentives (e.g., establishment of TIF districts), public land assembly, additional infrastructure investments, or similar policies included in a comprehensive economic development program. The narratives also detail local economic conditions, such as plant closures or new investments that can affect how the transportation investment impacts the economy.

The EconWorks tool is intended to help policymakers and transportation agencies understand the range of impacts that might result from a particular type of transportation investment. It works well for initial project screening and sketch planning. It is also intended to help transportation planners understand what steps can be undertaken to help affect the project outcome by providing information about supporting policies that can work with the transportation investment to attain positive economic development impacts.

EconWorks can be used to screen a range of potential transportation investments to help identify those most likely to result in positive economic benefits. Used in this way, the tool can help in programming transportation investments in a transportation improvement plan, particularly if economic development benefits to a region are an important consideration in the transportation programming.

EconWorks may also be used as one tool (but not the only tool) for screening alternative proposals for a single transportation investment. In an alternatives analysis, planners may be evaluating a range of transportation solutions ranging from a new interchange to a bypass. EconWorks can provide some sense of the magnitude of economic development impacts that might accrue from each of these alternatives. However, since EconWorks does not measure efficiency and productivity benefits, and because each investment is unique, the EconWorks tool is *not* intended to be used as the sole measure of potential impacts in this type of analysis. Further, for more detailed environmental impact analyses, EconWorks cannot provide the level of detail and location-specific analysis necessary to accurately measure potential impacts for individual projects. For both alternatives analysis and environmental impact studies, analysts need to rely on site-specific analysis, local data, and interviews with local officials. Economic models should be used to estimate productivity and efficiency impacts, as well as indirect and induced impacts.

EconWorks does provide a mechanism for conducting a "reality check" of potential impacts from a transportation investment and can be used to reign in both the positive and negative claims that might be touted by project supporters or opponents. An understanding of the range of impacts of types of projects can be used at public meetings or press briefings to help provide a realistic range of the potential impacts of a project.

The tool can also be used to help identify supporting strategies that can be adopted to bolster the economic development impacts of a transportation investment. Many of the case studies describe additional land use tools (e.g., zoning for mixed use development) and incentives (e.g., adoption of tax increment financing districts or foreign trade zones) that worked in conjunction with the transportation investment to stimulate investment and job growth. By reading the case study narratives, users of EconWorks can gain an understanding of the types of land use and economic development tools that can be adopted to garner the biggest positive development impact from a transportation investment.

As practitioners use EconWorks, it is important to remember that each project is unique. Each is built in a distinct locality and economic climate that will affect how much economic development impact can be expected. Because of this uniqueness and the limited size of the EconWorks database, users may sometimes find that their projects fall outside the parameters of the EconWorks database. As more projects are added to the database over time, this issue will diminish.

4.3 Avoiding Misuse of Data Base

The case studies show that economic development impacts that have occurred as a result of individual transportation investments depend on a myriad of factors. These include the location of the project (e.g. rural vs. urban), the economic condition of the surrounding area, supporting policies and incentives, the length of time since project completion, and the type of project, as well as other factors. This section of the guidebook provides a discussion of how reliability of the database may differ due to these factors and provides examples that help the user understand variability in the accuracy of measuring impacts among different projects. It is organized in terms of seven key findings:

(#1) EconWorks is best at capturing the full economic development benefits of transportation investments that serve a small, isolated geographic area.

These include access roads, bypasses in more rural areas, and interchanges. This is because the effects are more contained, often occur in conjunction with or over a short time after the transportation improvement is completed, and, in the case of more rural examples, may be the only new economic activity occurring in an area. *US 25 Kentucky (Dry Ridge Connector)* illustrates this point. The 2.2-mile connector was built for two reasons: to take truck traffic off the downtown streets of Dry Ridge and to provide direct access to an area east of the town slated for industrial development. The impact of the bypass is clear. There has been some expansion at the industrial park east of the town and some small offices have located near the intersection of the bypass with the north-south highway serving the region. There has not been any additional economic development activity in Dry Ridge since the bypass was built.

The ability to measure impacts through the case study approach decreases as the region served by the project expands and areas of more diverse economic activity are included in the impact area. The *Topsham Bypass* project in Maine demonstrates this. While the project is similar to the Dry Ridge project in that it was built, in part, to remove traffic from downtown Topsham streets, the project also improves access to Brunswick, ME and US Route 1, a heavily traveled tourist route. The economic development impacts of the roadway in Topsham are easily measured as local officials and developers could point to the role the road improvement played in several development projects. However, the impacts become less clear in Brunswick, where the bypass delivers people to the coastal highway more efficiently, but where the decommissioning of a major military installation had overarching negative economic impacts that were difficult to segregate from the impacts of the bypass.

Isolating impacts became even more difficult in projects serving large, growing metropolitan areas. The *Blue Route (I-476)*, which is a major connector in the western suburbs of Philadelphia, is a good example of how difficult it can be to measure the impact of a transportation project that provides inter-regional economic benefits in a growing corridor. The Blue Route has had some very clear impacts in the area around its interchange with I-76, as well as in the City of Chester at the southern terminus of the route and these could be identified through the case study approach. However, the Blue Route provides benefits to travelers and shippers that reach at least as far south as Baltimore, but it is impossible to capture all those impacts in a case study approach. These impacts become more dissipated and obscured by other economic influences the farther away one moves from the transportation investment itself. In addition, improvements to the heavy rail transit system and other area roadways occurred over the same time that the Blue Route was developed, making it difficult to isolate impacts associated solely with the Blue Route construction.

(#2) Impacts proved easiest to substantiate for the area in the immediate vicinity of the transportation investment.

This is a corollary of the first point, above. Isolating impact measures such as number of jobs, square feet of investment, dollars of investment, and changes in property values proved easiest for smaller projects where new development occurred immediately adjacent to the new transportation facility, particularly in areas that are more isolated and not impacted by other concurrent activities. The tool does a good job of capturing new development, and business expansion and attraction at firms that benefit from nearby access to the transportation investment. Local officials often have worked with developers and firms that are interested in locations near the new transportation facilities and thus have a clear understanding of the relationship between the facility and local economic development.

The relationship between the facility and business growth becomes more difficult to measure for firms using the facility for pass-through shipments, inter-regional business, or accessing an expanded labor pool. For example, the *Henderson (NV) I-515* project completed an important link between Las Vegas and points south. However, the case study focused on the impacts in the City of Henderson, not possible employment impacts in downtown Las Vegas (15 miles north) where the highway expansion was one of many factors influencing growth.

Both the *I-476* and *Henderson I-515* projects represent extensions to an existing interstate roadway. This meant that the impacts that occurred were also related to a previous highway investment not captured in the database. The implications are two-fold. First, there is a symbiotic relationship between the newer investment and older investment, leading to a greater impact than would have been realized by either investment alone. Secondly, some of the impacts that could be related to the highway extension may be occurring many miles away along the first investment. These impacts are difficult to capture in the analysis.

For intermodal and transit projects, this issue is more pronounced. For intermodal facilities, much of the impact accrues to manufacturing firms that are scattered throughout a broad region, not at the intermodal facility itself. For example, the *Ayer Intermodal Facility* in Massachusetts provides rail connections to rail service throughout the United States and to ports with international connections. The *Auburn Intermodal Facility* in Maine has direct rail service to Canada, with connections to west coast shipping terminals serving the Far East. The

Huntsville Air Intermodal Facility provides air access worldwide. The companies that use these facilities for shipping are located over a broad region, not just within a few miles of the facility itself. The job and sales impacts are felt nationally and are not captured in the case study approach.

The transit examples are focused on the development around the stations. How did these station investments spur economic growth and development within walking distance to the stations? This is generally the focus of analyses that are interested in identifying transit-oriented development impacts around stations. However, one of the greatest impacts of transit stations is to provide access to city employment centers. They support a broader regional economy, and none of the direct jobs supported by the stations may occur at the stations. In fact, at many of the stations included in EconWorks, the development impacts were concentrated in housing investments because that was the goal that cities established for station areas. The stations provide an opportunity for the occupants of this housing to access work sites without autos.

In some cases, such as the *Colma Station* on BART's airport extension line, development of affordable housing around stations was a prominent goal. This goal has been achieved. However, because non-profit housing development in the station area does not generate property taxes, the economic impacts of the station development that are easily measured in monetary terms, such as property tax revenue, understate the overall impact of the station development.

(#3) It is difficult to isolate the impacts of a transportation investment from other supporting, concurrent public policies.

In many of the case studies, the transportation investment was made in conjunction with other public policies and incentives aimed at stimulating economic growth. A good example of this is the *I-70 110th Street Interchange* in Kansas City, KS, a project that had substantial job creation and investment impacts. The interchange was one of five major public initiatives that together led to several major private sector investments, significant job creation, and measurable increases in property values. Other initiatives cited as important to the development included state STAR bonds to pay for infrastructure (repaid with the increase in retail sales tax collected in the area after completion of the project), rezoning of 1,600 acres of land to accommodate mixed-use development, assembly of a 400 acre development site by the city and county, a payment in-lieu-of-taxes paid by the developer of the Kansas City Speedway, and unification of the City and County governments.

According to those interviewed for this project, no single one of the public policies adopted in the vicinity of the interchange could have attracted the scale of development that has occurred. It is the whole package of incentives that have resulted in the magnitude of development in the area. While the numbers reported in the database have been adjusted to reflect that not all the development is due to the highway interchange, it is impossible to fully separate out the impacts as the package of incentives worked to produce a larger impact than what might otherwise have occurred. This is an important lesson for those planning a transportation investment with a goal of stimulating economic growth. By marrying the investment with other economic development tools, the potential for positive economic development impacts can be significantly improved.

The *I-70 100th Street Interchange* is just one case that points to the need to bundle additional incentives with the transportation incentive when the object is to stimulate economic development. In the case of the *Anderson Regional Transportation Center*, the site cleanup was the most significant catalyst for development, because without the site cleanup, the land could not have been developed. At the same time, without the three types of transportation improvements made to the site, it would not have been possible to develop the site at the level it has been developed.

In some instances, land use considerations and regulations have superseded market forces to direct the type of development that has occurred in the vicinity of the investment. This is particularly true for some of the transit cases, where "smart growth" concepts are often part of pre-development planning. In the latter cases, sometimes communities are more interested in long-term land use considerations than more immediate economic impacts.

(#4) EconWorks provides a single snapshot in time and may miss impacts that happened in the past, as well as impacts that have not yet been realized.

The impacts included in the EconWorks database reflect a snapshot in time, recording the economic development impacts at the time the case study was conducted. For older projects, the data does not reflect turnover that may have occurred over many years. A project completed in 1985 might have attracted businesses in a particular industry soon after it opened, but these businesses may have since closed or moved elsewhere. Similarly, structural changes in the economy, such as the collapse of the oil industry in the 1980s, changes in agricultural production and shipping processes, reductions in basic manufacturing, and the collapse of the dot.com industry, may mask some of the impacts of older projects. Examples where structural economic changes have affected the impacts of the transportation investments include *US 281* in San Antonio, *I-29* in Iowa, and the *I-95 Interchange* in Peabody, MA.

At the same time, the database includes several projects completed in the early to mid-2000s. The potential of many of these projects may not yet have been realized, in part because of the effects of September 11, 2001, followed by the economic downturn that occurred in 2008 and from which many communities have not yet recovered. A good example of a project whose impacts have not yet been realized because of broad economic trends is the *WorldPort* facility at the Denver International Airport. This project was commissioned in 2000 to provide additional cargo facilities for shipping to national and international markets. However, the crash of the dot.com industry in 2000/2001, followed by the September 11th attacks and the recession of 2008 stymied the anticipated demand for new space at the facility. The project has not recovered, and the expected economic development impacts have not been realized to date.

There are also projects in the database for which impacts continue to occur and are not captured in the data included in EconWorks. One example is *SR 29* in central Wisconsin. Between

1988 and 2000, the state of Wisconsin expanded this road from a two-lane highway to a four-lane highway. By 2001, over 6,000 jobs had been created in the corridor as a result of the improved access it provides. Communities within the corridor continue to improve local infrastructure and development sites to attract even more jobs to the corridor. The economic development impacts are expected to continue to accrue well into the future.

(#5) The timeframe for realizing impacts varies considerably among the case study projects.

There are several reasons for this variation. First, the economic conditions of the region in which a project is built will significantly affect the project's economic development impact. Second, some projects were built in anticipation of future growth, while others were built to accommodate more growth in an already expanding area.

The *E-470 Highway* in the Denver region is an example of a project built in anticipation of future growth, the impacts of which have also been affected by changes in the regional economic climate. The 47-mile long road was built through rural communities east of the city of Denver in an area expected to support the next wave of development. The E-470 is the primary factor determining where within eastern Denver County this development occurs. The development is now occurring and is expected to continue for several decades. However, the economic impact of this highway has been slowed by the collapse of the dot.com industry in the early 2000s, and by the more recent recession of 2008-2010. The area remains targeted as the next development corridor, as evidenced by plans to expand fixed guideway transit service to the corridor.

Similarly, in some instances, transportation investments have been made to help kick-start a local or regional economy. The results of this strategy are mixed, and in some cases, it will take many more years to really understand the magnitude of the transportation investment on overall regional growth. The *I-86 Corridor* through southwestern New York State is a case in point. The highway links communities that once relied on heavy manufacturing, such as steel and auto parts production. Between these old economic centers, the highway passes through farmland and hills. Each community along the road markets the access improvement that the highway provides in hopes of attracting new industry to the region. The highway has, in fact, helped to attract some new tourist-related businesses, as well as some light manufacturing facilities to the region. Still, many parts of the region remain remote, the labor force is aging and requires retraining, and distance to major markets remains considerable. Economic development officials are pursuing additional strategies, such as the development of specialty industrial parks, to enhance the potential of the highway for attracting new jobs. The impact of the highway will likely continue to be realized, but because of the inherent nature of the region, may take years to reach its full potential for economic development.

Another factor that can affect how long it takes for a project to generate economic development impacts is the regulatory climate of the locality in which the project is built. The *Sunset Transit Center* demonstrates this point. At the time the transit center was being planned, Washington County adopted land use regulations that required higher density residential and mixed use development in the vicinity of the station. The regulations mirrored the land use regulations put in place around transit stations in many parts of the Tri-Met service area. However, Washington County was still very suburban in character and at the time the station opened through the current year (2010), the market for higher density housing and mixed-use development has not yet emerged. Thus, some of the development anticipated for the station area has not yet occurred, primarily because the market does not match the regulatory environment. In this case, the County is unconcerned, more interested in ensuring that when development *does* happen, it will support regional land use goals than in realizing incompatible development in the short term.

(#6) Data collected for more recent projects will be more accurate than that collected for older projects.

It is much easier to accurately capture the economic development impacts of more recent projects than of projects built many years ago. First, in some instances, there are few people still around to talk to about projects built over twenty years ago. *Interstate 68* in western Maryland was built over 23 years between 1966 and 1999. Many of the current municipal staff in towns along the corridor were not working in the region when the highway was constructed and needed to rely on old documents or information handed down by word of mouth over many years to provide input into the case study. Further, the time span of the project coincided with many broad, national economic trends that affected the economic development potential of the road. For example, computers became commonplace in industry, manufacturers became reliant on just-in-time deliveries, and the broader national economy transitioned from a manufacturing base to a service base. When the highway was built, it was expected to be heavily used by manufacturers. Much of the impact of the highway has been to encourage tourism, including resort destinations and second home development. Ferreting out impacts of older projects is particularly difficult in metropolitan areas, where so many factors combine to influence development patterns. Example projects that fell into this category include *US 281* in San Antonio and *I-476 -the Blue Route* through Philadelphia's western suburbs.

(#7) The economic development impacts of a transportation investment can be difficult to isolate.

When there are many things going on, it is difficult to parse out the impacts of the transportation investment relative to other factors. The more economic activity in an area, the more difficult it is to sort out impacts. In some instances, the major goal of the case study projects was congestion relief, often because of an already growing economy. The case study approach could capture some of the economic development impacts, particularly if interviewees could identify businesses that stayed only because of the congestion relief or a new business that located in a place because of the new access but could not capture all the firms that stayed or expanded because of congestion relief. Examples of this type of project include the *Central Artery/Tunnel Project* in Boston, *Arizona Loop 101* in Phoenix, and the *Dallas High Five Interchange*.

5 CONDUCT OF FUTURE CASE STUDIES

The EconWorks system has been designed to allow practitioners to add new case studies to the database over time. This section provides guidance on how to conduct new case studies, and how to add them to the system. This chapter presents five basic steps recommended for conducting case studies:

1) Review completed case studies within the database that are similar to the project you will be adding
2) Collect and assemble background documents and literature about the case
3) Collect and assemble background empirical case data
4) Conduct case study interviews
5) Write a detailed narrative based on case data and interviews

5.1 Preliminary Steps

Review of Similar Case Studies

The EconWorks database includes case studies of transportation projects throughout the United States and abroad. The cases currently represent twelve project types and six geographic regions and are further categorized by urban/rural/mixed/core character, and economic distress. Each case study includes a data set, a narrative describing the project and its impacts, a list of agencies and businesses interviewed, and a list of supporting documents. Reviewing cases within the system before conducting new case studies can help the researcher identify potential sources of background information, the types of people or organizations that should be interviewed and provide insights into the types of questions that can be asked to elicit the most useful data and information. The EconWorks database can be sorted by project location, type, cost, etc. to help the researcher identify those projects that most closely correspond with his or her project.

Collection of Background Documents and Literature

All transportation projects are part of a broader regional context that is the product of economic, environmental, political and other influences. As a starting point for each case study, it is useful to gain an understanding of the context in which the project has been introduced and matured. An internet search should be undertaken to gain general knowledge of the project and the region in which it was built. Good places to start include wikipedia.com, aaroads.com and state DOT websites, as well as local economic development agency web sites. A web search of the project itself can turn up environmental impact reports and other project-related documents, as well as newspaper articles about the project. It is also useful to search the name of the community and any development projects related to the investment of which you are aware. The literature search will provide the researcher with a general understanding of the project and can be used to help tailor interview questions to collect the best information for understanding the project and its impacts, and for relating the story of the project in the project narratives. Any useful documents or web sites should be recorded for entry into the system.

5.2 Data Collection

EconWorks includes a detailed data set for each case study. Those adding new cases to EconWorks will need to collect background demographic and economic data on a local, regional and statewide basis to populate the database. This data can usually be collected from published sources. It is unlikely that the researcher will be able to fill in all fields; however, s/he should try to fill in as much of the data as possible. The categories of data are:

a) **Project Data** – general information about the project
b) **Project Settings** – information about the project's local area
c) **Pre/Post Project Data** – economic measures before and after the project's completion
d) **Net Impacts** –the economic effects attributed to the project

5.2.1 Project Data

These descriptors are needed for setting up the case and for comparing to others. This kind of data will usually be the first collected for a given case. Those factors in bold are required for a case to be included in the system.

1. **State**
2. **City**
3. **Impact Area** – list of counties in the study area. Before you begin interviews, you can estimate the impact area based on the counties through which the project passes or in which it is located. However, for some large projects, you might discover additional counties of impact through the interview process.
4. **Description of project** – one or two sentences describing the project. See existing case studies for sample project descriptions.
5. **Project Sponsor –** agencies that funded the project
6. **Related Links** – type hyperlinks
7. **Relevant Attachments** – type the names of the studies that provide useful information and post copies to the database. This will be filled in upon completion of the case study.
8. **Research Firm** – consultants that performed previous study (such as an environmental impact statement)
9. **Project type** (limited access roads, widening, bypasses, connector links, interchanges, bridges) – the project type must match one of the categories in the EconWorks system. For projects that include more than one type of infrastructure investment, select the most dominant.
10. **Project cost** (planned and actual) - be sure to specify dollar year, if not the year of construction, as all dollars will need to be converted to constant dollars for comparison among cases. Note

also that for multi-year projects, costs may have incurred in different years. All costs must be converted into constant year dollars.

11. Project length (miles)
12. Initial study date – date of pre-project study (e.g. EIS)
13. **Construction start and end years**
14. Post-construction study date – date of post-project study
15. **GIS latitude/longitude coordinates** – these will be used to get a satellite view of the project on Google Earth
16. AADT (average annual daily traffic), Average Weekday Passenger Trips (transit), or both (note year and location of count).

5.2.2 Project Settings

These variables are used for sorting projects within the EconWorks system and will allow users of the system to search for projects that best match their own. Factors in **bold** are required for the database.

These variables are used for sorting projects within the EconWorks system and will allow users of the system to search for projects that best match their own. Factors in **bold** are required for the database.

1. **Class Level** (metropolitan, rural, mixed, & core) – Cases where all counties were part of a Core Based Statistical Area (CBSA) were classified as metro or rural if none were located within a CBSA. Multi-county cases that had a mix of counties both located and not located in a CBSA were classified as mixed. However, in some cases, based on local interviews and awareness of connections with the surrounding communities, changes in class level classifications may have been altered by the analyst. All cases located in core areas were also considered to be metro.

2. **Economic distress** (unemployment level relative to region) – to calculate, divide the unemployment rate of the study area by the unemployment rate of the region.

3. **Region** (New England/Mid-Atlantic, Southeast, Great Lakes/Plains, Southwest, Far West/Rockies) – The states that fall into each of these categories are shown in Table 6.

Table 6. States within Each Region

	mprising the Region
New England/ Mid-Atlantic	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Southeast	Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, N. Carolina, S. Carolina, Tennessee, Virginia, W. Virginia
Great Lakes/ Plains	Illinois, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
Southwest	Arizona, New Mexico, Oklahoma, Texas
Far West/ Rockies	Colorado, Idaho, Montana, Utah, Wyoming, Alaska, California, Hawaii, Nevada, Oregon, Washington

4. **Population density (**population per square mile)
5. **Population growth rate** (+/- percent annually) – this will be based on the pre- and post-study years. The pre-year should be the year before construction began. The post year should be five to ten years after construction was completed.
6. **Employment growth rate** (+/- percent annually) - this will be based on the pre- and post-study years. The pre-year should be the year before construction began. The post year should be five to ten years after construction was completed.
7. **Income growth rate** (+/- percent annually) - this will be based on the pre- and post-study years. The pre-year should be the year before construction began. The post year should be five to ten years after construction was completed.
8. **Economic market size** (population within 40 minutes)
9. **Airport travel time distance** (minutes) - For long projects, you will need to identify where the distance is measured from. This information can go in the description field next to the data entry box.
10. **Extent of mountain terrain**[1] Extent of mountain terrain is a topographical measurement provided by the National Atlas, U.S. Department of Interior (using a rating of average slope that ranges from 1 to 21). It is one of six characteristics that describe the physical characteristics of a county than enhances the location as a place to live. The topography scale ranges from 1 (flat areas) to 21 (high mountains).

5.2.3 Pre and Post-Project Data

Socioeconomic data needs to be collected before and after the construction of the project. This will help in measuring the effects of the project on the local area. Data in **bold** is required for the study area's counties and state. Try to fill in as many blanks as applicable to the project (for instance, local data would not be needed for a multi-county case). Data for the non-bold categories are also highly desirable, and every effort should be made to obtain this information.

[1] http://www.ers.usda.gov/Data/NaturalAmenities

Table 7 lists some potential sources of data. For local data, city web sites, assessors' data and local censuses can be helpful. Some of this data may need to be collected through the interview process. Be sure that all sources are documented in the description field next to each data entry box.

Table 7. Data Sources for Background Information

Economic Measurement	Local Source	County / State Source	Website
Per Capita Income	City-data.com	BEA	city-data.com, bea.gov
Distress Level	BLS, Census	BLS	bls.gov, factfinder.census.gov
Employment*	CBP, Econ Census	BEA	census.gov/econ/cbp, census.gov/econ/census07
Sales	CBP, Econ Census, local comptroller	CBP, Econ Census	census.gov/econ/cbp, census.gov/econ/census07
Taxes	auditor, tax reports, Dept of Revenue	Tax Revenue Division	Local-Sales tax, County-Property tax, State-Income tax
Population	US Census	US Census	factfinder.census.gov
Property Value	US Census, County Appraiser	US Census (ACS)	factfinder.census.gov/servlet/DownloadDatasetServlet?_lang=en
Population Density	Local data & US Census	US Census	census.gov/popest/gallery/maps/

** Note that the employment impacts should be measured as place of work employment. This is the number of people working at locations within the study area, regardless of where they live. This is different than employment of the local labor force, which measures the employment level of the local population*

<u>Net Impacts</u>

Net impacts indicate the change in employment or other impact metrics between a pre-project year and a post-project year, which may reflect the result from a mix of positive changes (such as new jobs created at one part of the study area) and negative changes (such as job loss elsewhere in the study area).

When viewing the data for cases already in EconWorks, you will notice that the *pre-year* is the year before construction begins (or close to it) and the *post year* is several (most typically three) years after project completion. The post year selection depends on the type of project. The full economic effects of an access road may take one or two years while the full effects of an interstate may take five to ten years. Users may wish to wait until after conducting interviews before selecting a post year. They should also make use of the description field to explain the source and dollar year of measurement for all such data.

1. Key industries - important industries to the local area. This may be different for the pre and post years.
2. **Economic Distress -** unemployment level relative to region

3. **Per-capita Income** (local, county, state)
4. **Jobs** (local, county, state)
5. Business sales (local, county, state)
6. Tax revenue (local, county, state) – use the description field to identify what taxes are included in the calculation for each geographic region
7. **Population** (local, county, state)
8. Property values (local, county, state) – median house price

5.2.4 Activity Directly Attributed to the Project

The attribution of causality for observed economic impacts is an important consideration. In other words, the impact of a highway project is *not* necessarily the difference between pre- and post-construction economic measures. For instance, if there are 5,000 local jobs before a highway's construction and 6,000 after its construction, this does not mean that the highway is responsible for creating 1,000 jobs. There are many other factors that may have come into play during the highway's construction period that may have had nothing to do with the project.

The most likely source for direct impacts attributable to the project will be interviews with local public officials and private sector representatives (such as Chamber of Commerce types of organizations). You may need to probe to get interviewees to come up with a jobs estimate. Jobs can also be estimated if you are able to identify the square feet of development by type built because of the transportation improvement. Table 8 shows rules of thumb for the number of employees per thousand square feet of development by type of development.

Table 8. Employees per Sq. Ft. of Development, by Building Type

Type of Development	Square Feet per Worker	Workers per 1000 SF
Warehouse	1,000	1.00
Industrial	480	2.08
Retail	450	2.22
Office	240	4.17
Hotel	1,500	0.67

Source: Urban Land Institute

5.2.5 Indirect and Induced Economic Impacts

The direct effects observed as part of the previously-described data collection process appear as changes in nearby economic activity (most commonly measured as additional jobs) that are directly attributable to the project. However, that change in direct economic activity also leads to broader impacts on the economy. The broader impacts are referred to as (a) "indirect" effects – growth in local suppliers of goods and services to the directly growing businesses, and (b) "induced" effects -- income re-spending on consumer purchases by the additional workers, which supports retail and service jobs.

The total economic impact on jobs is calculated through a multiplier that is calculated as the ratio of:

[total direct + indirect + induced job growth] / [direct job growth].

Similar ratios are applied to calculate total impact on wage income and business output. For the cases built to date, economic multipliers were obtained from the IMPLAN model for the average of typical manufacturing and office industries. Different multipliers were obtained for each county relevant to each of the transportation projects. The results covered the following impact measures:

A similar multiplier ratio is economic as the indirect and induced effects will be calculated by the system.

1. Total Jobs (sum of direct, indirect and induced effects)
2. Income or Wages (sum of direct, indirect and induced effects)
3. Business Output or Sales (sum of direct, indirect and induced effects)

The detailed data fields are provided in the categories listed above. Please enter the data specified for each field along with a source and description in the column to its right. This is for keeping track of dollar years and data sources, as well as any necessary explanations about data. See information for existing case studies for examples of explanatory notations.

5.3 Interview Guide

While some of the empirical impact data can be collected via public sources (as listed above), there are some types of impacts that require local information. In addition, the case studies should include information about causal factors affecting project impacts (including both transportation programs and non-transportation considerations). To obtain this local information, the researcher must conduct interviews with key local private sector and public-sector participants and observers, as well as review available local documents. The product of the interviews should be to develop a coherent narrative describing the planning, implementation, and results of the project.

An interview guide is provided below. The questions need not be followed verbatim. These are simply guidelines for the type of information to be collected. Interviews are generally more effective if they are more conversational as opposed to asking a numbered series of questions. Therefore, when starting off with the interviewee, tell them what we are trying to accomplish with this database and why we are interested in their project. Also, you may wish to add to these questions or tailor them based on information you have gathered through the collection of background information.

Types of Information

Additional Empirical Data – The researcher may not have been able to fill in all the empirical data needed for the database from published sources. You should ask interviewees for help filling in any missing data, making sure to note the data source. If the pre and post data is already available, then ask the interviewee to validate or elaborate on it. It will also be useful to get qualitative information from them to either reinforce or substitute empirical measures.

Project Impacts – These questions provide the key information about the economic and land use impacts of each project.

- Describe the land use changes because of the project
- How has the project affected property values? (pre and post measures)
- Has there been any new construction activity because of the project? (pre and post measures)
- How much of the pre and post changes are attributed to the project? (go through the list of available impacts data, including employment, tax revenues, retail sales, etc.)
- Do you have other before and after measures available? (go through list of impact measures that you do not have)
- Do the direct impacts and total economic impacts accurately describe the influence the project has had on the area? (go through the list of economic impacts)

Special Aspects of the Project Setting and Planning - These questions will focus on planning and development issues to provide more context for the project's existence and impact.

- Describe all components of the transportation improvement project (e.g., interchange and access roads) and identify the component of the project that had the greatest influence on the project impacts.
- What were the key motivations driving the need for this project?
- Describe the societal or environmental implications of the project. (emissions, safety, sprawl)
- How has the project affected the capacity for future development? Ask about the changes to the housing and labor markets.
- Describe the local community involvement in the project.
- What were the roles of various stakeholders & public agencies in supporting or modifying the project?
- Describe the size of the project's area of influence.
- What were the economic and land use considerations in project planning and implementation?
- How were economic and land development considerations analyzed? (try to get a copy of any study that was done)
- How were these considerations communicated to the public?
- Describe any other key analysis issues or performance measures used in project prioritization and planning processes.
- What other factors contributed to the project impacts (e.g., local land assembly, zoning changes, economic development incentives, etc.?)

- Has the project improved intermodal connections? Have there been impacts of improved network and intermodal connections to economic growth?

5.3.1 Types of Interviewees

The interviews will focus on filling in missing pieces of empirical information about highway impact outcomes, and additional explanatory insight into causal factors affecting those outcomes.

There should be a minimum of four interviews (one from each type below) conducted for each case study. More interviews may be necessary or desirable. As you conduct interviews, ask for additional contacts that may be able to provide important insights or data.

1. ***Staff of the transportation agency that built the project* –** to provide project characteristics, pre/post transportation data, and information on notable aspects of project planning and implementation;
2. ***Staff of the local or regional planning agency* –** to provide information (and refer us to other appropriate data sources) on changes in local land use and development, and relative roles of the highway project in affecting it;
3. ***Staff of a chamber of commerce or local economic development agency*** – to provide information on how the highway project affected business growth and investment, job growth, and its role relative in economic growth relative to other local initiatives and factors (such as economic development incentives of land use regulatory changes); and
4. ***Developer or Private Business Owner*** – to provide information about the role of the investment in economic growth from the perspective of the private sector.

You may wish to tailor interview questions based on the category of interviewee. The database contains a field for listing each of the agencies or organizations represented by the interview process. This field should be filled in by the researcher.

Constructing a Narrative

A full understanding of the impacts of a transportation investment cannot be obtained through a review of data alone. The information collected through the interviews will provide important input for understanding the data and the broader context in which the project impacts occurred. Thus, the researcher will need to construct a narrative that clearly lays out this information.

The narrative should be a relatively brief (3-5 page) story of how the project came about and its impacts on the local area. The structure should be in the following order:

- **Synopsis –** A one paragraph summary of the history of the project and its outcomes. This should include a brief description of the project and its location, the dates of construction, the cost of the project, and the impacts in terms of jobs created or types of businesses attracted.

- **Background –** Describe the local area to provide context for the project. This should include a description of the transportation connections, such as interstates or major highways that serve the area, the distance to an airport, and other transportation amenities. There should also be a section about economic history of the region, population and employment trends, and other factors that provide context for the transportation investment.
- **Project Description and Motives -** Describe the project (type, cost, etc.) and why it was built.

Project Impacts

- **Transportation Impacts –** Discuss implications of the project on local transportation, such as changes in average annual daily trips, travel time savings, or other factors.
- **Demographic, Economic, and Land Use Impacts –** Discuss pre and post construction data and impacts attributed to the project (from interviews and previous studies), such as new firms attracted, firms retained, employment impacts, changes in land use, etc.
- **Non-Transportation Factors –** Discuss other factors that influenced the outcomes of the project (e.g. land use, infrastructure, business climate, low cost of living; supportive public policies and incentives). This factor will need to be considered when developing an estimate of the project impacts. If several factors combined with the transportation investment to create a climate for economic growth, the transportation investment can only be attributed a portion of the overall growth. How this growth is distributed among factors should be discussed with interviewees.

Resources

- **Citations –** list of studies and links to websites used in the case study.
- **Interviews Conducted –** include organizations represented through the interview process.

Guidance for constructing narratives can be obtained by reviewing the narratives that have been provided for the case studies in the system. These will provide helpful guidelines of how the narrative should flow. Make sure to follow the same outline as found in the existing narratives.

6 LESSONS LEARNED FOR FUTURE PROJECT PLANNING

6.1 How project details affect outcomes

design, implementation, agency coordination and project packaging (or lack thereof) can affect outcomes – packaging projects with other tools to leverage investment – database only shows fraction – read cases to see entire picture - no impact because too soon, no impact because failed, no impact because doesn't have localized impacts

6.2 Land Use Goals

In order to identify projects that will meet local economic development goals and objectives, it is important to first define these. For most transportation projects, a major consideration should be where to direct growth in the region. New transportation infrastructure sparks investment and development when and where sites are available for development or redevelopment and the real estate market is favorable. Transportation improvements have a profound impact on the growth and development of the area, influencing land uses and having profound impacts on quality of life, availability of support services, and a community's tax and employment bases. Land use impacts of major highway infrastructure need to be anticipated and planned for, particularly in growing areas. Some impacts have been planned, others have been unintentional. The first step in project planning is to define community needs and project goals and objectives.

In the growing town of Verona, a suburb of Madison, WI, nearby suburbs had been expanding toward the north, in the direction of Madison. The *Verona Bypass* is an orbital belt constructed at a radius of 1.5 miles around the town center. The town reacted proactively by annexing the area served by the bypass, effectively doubling its residential, tax, and employment base. Before the project, development had been sprawling in an east-west pattern along Highway 151 and Highway 69, and to the north, toward the Madison city limits. After the bypass was built, development began to fill in more evenly in the area south of the city center. Improved access to new greenfield commercial and housing sites on the city's south side spurred new development in this area, which had been farmland before the bypass was built. New investment, producing 4,000 jobs, was attracted by the bypass. By shifting the city's boundaries south, the Main Street District became the core of the city and its position as the major locus for local services has been strengthened.

Likewise, by constructing the *Route 441 Bypass* around the city center of Appleton, WI, planning agencies sought to balance the pattern of the city's growth to the southeast and helped to fill in the pattern of sprawl that had developed along the city's arterial roads. The new bypass has attracted 1,750 new jobs, including a regional headquarters of Time Warner.

Arizona Loop 101 in Phoenix, a 62-mile beltway around Phoenix's outer suburbs, was built to accommodate growth in the metro area. The beltway reduced commuting times between previously-distant suburbs. In response to the high volumes of traffic capacity enabled by Loop 101, mixed-use lifestyle-oriented "mega-developments" began to locate on sites near planned exits, transforming open space into high-density hubs of mixed use development. Loop 101 fueled the growth of suburban satellite cities such as Glendale and Scottsdale that provided sites and infrastructure for future growth. There are now 100,000 jobs and 400,000 residents within the Loop 101 corridor.

Likewise, *Arizona Loop 202 (Santan Freeway),* a loop around the southeastern quadrant of outer Phoenix, has shaped the growth of the region, directing it away from Southeast Phoenix's Mountain Park region. The new freeway enabled the construction of 12 million square feet of commercial development and creation of 50,000 jobs along this high-density corridor, where the growth of major satellite cities like Chandler and Gilbert has been fueled.

Whereas beltways have the effect of shaping growth, bypasses often have the effect of strengthening the central business districts that they skirt. The *Route 26 Bypass i*n Fort Atkinson, WI, the *Neuse River Bridge* that bypassed downtown New Bern, NC and the *Third Road Bridge* in Augusta, ME removed long-haul traffic that was congesting historic city centers, leading to safety and environmental enhancements that created jobs in new tourist-serving and entertainment businesses.

6.3 Consensus-Building

Major determinants of successful project outcomes are factors related to the political environment. These include project leadership, consensus-building, inter-agency cooperation, community support, public advocacy, and effective partnership building among both private and public agencies.

The *Emerson Park Metro Station* offers an example of effective consensus building. The new light rail station has been the cornerstone of revitalization of the dynamic Emerson Park neighborhood in East St. Louis, IL, one of the poorest cities in the country. The Emerson Park Development Corporation (EPDC) fought to convince regional, state, and federal agencies to back their vision for the revitalization of their neighborhood. EPDC convinced agencies to move the station from a site where it would have performed as merely a park and ride facility to their neighborhood. The $3 million station opened in May of 2001. In the past 6 years, ridership has more than doubled. An estimated $65 million has been invested in new housing development on sites surrounding the station. EPDC effectively harnessed federal and state grants and built relationships with private developers, who built new housing here for the first time in more than half a century.

When CSX announced plans for the new *Fairburn Intermodal Center* in Atlanta's far eastern suburbs, Fairburn residents were opposed to the facility due to the traffic congestion impacts that were anticipated. Realizing that the local citizenry had limited veto power over the new Intermodal Center, residents led a campaign to work with CSX rather than against them. They organized the South Fulton County CID to identify, prioritize, and provide funding for transportation improvements to accommodate the additional traffic and abate inconvenience for area residents. The CID has undertaken a number of new road, overpass, and signaling projects to improve the flow of road traffic and to alleviate delays at at-grade rail crossings. The intermodal center has attracted warehousing and logistics operations that have created 1,500 new jobs in Fairburn, adding millions to the state and local tax base.

6.4 Visioning

One of the most effective tools for gaining consensus on the future of an area in which a new transportation project is planned is visioning. This is an exercise that allows all interested parties, including the local planning authorities, regional and state funding authorities, developers, and other interested agencies, to develop and to agree on a clear vision for the future of the site. On the visioning agenda are items such as uses, densities, heights, parking, and access for pedestrians, commuters, and vehicles.

Failure to achieve such a consensus of key stakeholders yields poor results. In the case of *Boca Raton Station*, the city, the transit authorities, and private developers could not agree on a vision of what was possible and appropriate for a 2.5-acre site next to the station that was slated for transit-oriented development. The City's development plan for the site endorsed a mid-rise commercial development of 70,000 square feet. But Tri-Rail, the transit authority and the owner of the station site, favored a development proposal for a mixed-use development of over a million square feet. After many years of consideration, negotiation, and debate, Tri-Rail and the City failed to achieve consensus on the plan. By late 2007, the Great Recession began to soften the real estate market, resulting in the withdrawal of all TOD plans for the site.

In the case of the *LBJ-Skillman DART Station* TOD, there was an amply-sized 50-acre TOD site. The site is poorly connected for both pedestrians and vehicles and there has never been a clear concept for its development. IN 2010, a planning process was initiated to develop a workable vision for the site and to provide it with needed pedestrian, transit, and road connections.

The *Neuse River Bridge*, by contrast, emanated from a clear vision of project goals and desired outcomes on the part of planning agencies and of the community. The bridge was relocated from historic downtown New Bern, NC, where it was choking the Victorian street pattern, to a site out of town, eliminating congestion that visibly improved the city center, attracted more tourists, and created jobs. The project has won three national awards for excellence in highway design.

Also, a winner of multiple awards for highway design is the new *Phelan Boulevard* project in

St. Paul, MN. The success of this project is built on effective community mobilization and consensus-building regarding the future of a blighted patch of East St. Paul, MN. The project brought former residents together with new immigrant residents from South America and Asia. The new vision for the area as a center for corporate and health care office park-type development has yielded over 2000 well-paying jobs.

6.5 Zoning & Site Preparation

The most effective way to control the outcomes of transportation projects is by zoning to restrict land uses. Locating new transportation projects in areas with a good supply of sites for development and redevelopment is critical if a local area is to get the maximum economic impacts from a new highway project.

In cases of bypasses in places where planning authorities do not want to encourage growth along highways, sites are zoned for agricultural use, which generally permits only very low-density housing. Water and sewer infrastructure is not extended to these sites. In the case of the *Bennington, VT Route 279 Bypass*, no development has occurred along the 43-mile bypass due to restrictive zoning and lack of infrastructure. The bypass has had no impact on existing businesses in the city, in accordance with the goals of planning authorities.

The main planning objective of the Fort Atkinson, *WI Bypass*, was to encourage investment in the city's historic Main Street downtown district, which has proven to be a magnet for tourists. The bypass removed truck and other through traffic from Main Street, a narrow four-lane road with parking on both sides. This resulted in a significant improvement in the environment and in pedestrian safety. Assessed values in the downtown Tax Incremental Financing (TIF) district have doubled since 2000 to $22.8 million.

In the cases of the Verona, WI Bypass and the Appleton, WI Bypass, mentioned earlier in these chapters, sites along the bypass were zoned for commercial development and developers were recruited with Tax Increment Financing incentives. Although the bypass corridor was not originally in the city, Verona annexed the area surrounding the bypass in order to plan for growth and to enhance its employment and tax base.

The case of the *Cattaraugus Access Road* in the small city of Olean, NY demonstrates what can happen when serviced sites near freeways are made available. Under this project, a new two-lane, two-mile long arterial was built that connected an industrial site in Cattaraugus County, NY with I-86. Completion of the road and associated water and sewer infrastructure has led to the development of several industrial sites as well as a strip retail/commercial center. The $3 million project leveraged an additional $5 million in private investment that brought 100 new jobs paying $2.5 million in wages to this remote community of 14,000 in Upstate New York.

The *U.S. 460 Bypass* in Blacksburg VA provides a direct connection between I-81 and Virginia Tech. The ten-mile long bypass was completed in 2002 at a cost of $87 million. Sites provided in the privately-developed Falling Branch Corporate Park on the bypass have yielded nearly

750 new jobs in technology spinoffs and startup firms. Likewise, sites provided by private developers in the vicinity of the *I-435 Overland Park Interchange* just outside of Kansas City generated 17,500 jobs.

The award-winning Phelan Boulevard in St. Paul, MN is a new 2.5-mile urban access road built along a blighted rail corridor in St. Paul, MN. This provided access to hundreds of acres of previously-landlocked contaminated industrial sites for redevelopment. Funding was mustered from federal, state, foundation, and private sources for the cleaning and redevelopment of sites along the attractive boulevard that have attracted an estimated $500 million in private investment. The new boulevard has breathed new life into some of the city's oldest neighborhoods and has brought an estimated 2,000 jobs within reach of some of the city's poorest residents. The project has won eleven national and state awards for excellence in planning, design, and economic development.

By contrast, the *Corridor D* project, which created the 170-mile US-50 that connects I- 77 in Parkersburg, WV with I-79 in Clarksburg, had limited impact on industrial attraction in the corridor, due to lack of public funds to extend water and sewer service to sites. Instead, lack of restrictive zoning resulted in low-density residential development supported by wells and septic systems that began to draw population from the two older cities anchoring the study corridor. From 1970 to 2001, the populations of the cities of Clarksburg and Parkersburg declined by 33% and 25% respectively, as residents began to move to fringe locations brought within commuting range by the new highway.

The benefits of the six-mile long *Veteran's Parkway* in Savannah, GA have mainly been in transportation time savings on trips to Savannah's Southwestern periphery. The new parkway has not yet had a discernible impact on land use or economic development because most of the surrounding sites are unbuildable due to wetland conditions and to aviation flight paths in the vicinity.

With positive planning measures, funding, and incentives, highway projects in even the lowest-income areas can attract jobs and investment. The new 2.5-mile *Phelan Boulevard* project, built in one of East St. Paul's oldest and most blighted neighborhoods, has attracted $400 million in private investment and 2,000 good-paying jobs. The project created an attractive, landscaped boulevard through a former swath of industrial blight. This was accomplished through an aggressive program of acquisition, cleaning, and subsidizing the sale of hundreds of acres of blighted industrial land.

Likewise, *Emerson Park Metro Station* in East St. Louis, IL, one of the country's most deprived cities, shows that site assembly, development incentives, and community activism mobilize transportation investments to turn blighted communities around. The Emerson Park Metro Station has been the cornerstone of revitalization of this dynamic neighborhood. An estimated $65 million has been invested in new housing development on blighted sites surrounding the station.

6.6 Real Estate Market Conditions

Real estate market conditions in local project areas have a pronounced effect on project outcomes, with more affluent areas usually, but not always, benefitting more than more depressed economic areas. Case studies of urban beltways connecting a number of disparate areas illustrate this well.

In the case of *Arizona Loop 101* in Phoenix, a 62-mile beltway through semi-rural areas on the fringe of Phoenix, the more affluent towns in the western suburbs (such as Scottsdale, Tempe, Chandler, and Gilbert) attracted large-scale corporate parks, entertainment complexes, shopping malls, and higher density housing. The less affluent towns outside of East Phoenix became bedroom communities for these cities, linked by Loop 101.

The I-*295 Bypass* in Richmond, VA passes through Henrico County, where the median income is 75% of the metro average. This area got most of commercial development because it had the strongest real estate market. Like residents, most businesses prefer a "good address" if they can afford it. Henrico County has the resources to plan positively to attract large scale development to key sites. (The county also provided important site prep by assembling and providing utilities to large sites at interchange exits, attracting mega-scale commercial development.)

Interstate 394 in Minneapolis' affluent western suburbs spurred a significant amount of redevelopment in the established suburban enclave of St. Louis Park as older, low density residential and retail uses were cleared for new commercial buildings. Although the corridor lost over 3,000 jobs in small retail establishments, it gained 12,500 positions in other service sectors for a net gain impact of over 9,400 jobs – a 30% increase. The new *I-435 Interchange* in the prime Kansas City suburb of Overland Park attracted major corporate, tourism, health care, and medical center development, with 17,500 jobs.

In contrast, only 75 new jobs were created by the $31.6 million *I-35/ US 290 Interchange* in Austin, TX. This project, built in a lower-middle income area of Austin, demonstrates that a major access improvement will not spark redevelopment in areas with property values that are too low to support higher prices and rents. Likewise, the *Big I Interchange* in downtown Albuquerque had virtually no impact on development in its vicinity due to the city's lagging economy, demonstrating that congestion relief does not necessarily generate new jobs and investment.

The new *Interstate 105* connecting LAX with low-income communities in East Central Los Angeles had little impact on the surrounding area. No proactive planning measures were put in place to encourage site assembly and redevelopment of potential key sites. Again, this is due to the poor investment climate in East LA, which was exacerbated by the 1992 riots that occurred shortly before the project was completed.

Timing of projects vis-à-vis economic cycles has a profound impact on project outcomes, at least in the short term. Projects completed during the early years of the millennium showed much more positive results than those completed in the later part of the decade. These entered the market during a down cycle during which little to no new commercial development has been undertaken. Examples of projects whose performance has not yet achieved results due to the current economic downturn are *Boca Raton TOD* outside of Miami, *DART TOD* in Dallas, *and Bayport Intermodal Terminal* in Houston.

6.7 Integration with Larger Projects

Transportation investments made as part of larger development projects usually have more profound economic impacts than those undertaken as solo projects. *BNSF Railroad Logistics Park Chicago* (LPC) in Elwood, IL, 40 miles southwest of Chicago, was built as part of the redevelopment program for Joliet Arsenal. A funding package of $80 million in local, state, and federal EDA funding was assembled to build and expand the road network to support the $1 billion, 9 million square foot Logistics Park. LPC has produced 2,000 jobs, supporting 40% growth in the population of the Village of Elwood. Since the park opened in 2002, a total of $1 billion has been invested by ten firms who occupy 9 million square feet within the 770-acre park. Eventually, the park will be expanded to 6,000 acres with a Union Pacific Railroad Intermodal Terminal with up to 25,000 jobs.

The *Alliance Global Logistics Hub Park*, which was focused around an intermodal terminal, was spearheaded by Perot Real Estate who speculatively acquired 17,000 acres near the Fort Worth cargo airport and worked to bring BNSF Railroad intermodal terminal on site. Perot donated land and engineering studies for a new $6.8 million highway connecting the industrial park with the Intermodal Yard. Within eight years of the development's opening, private investors developed 8 million square feet of commercial space, bringing 8,500 new jobs to the area. The Logistics Hub has sparked the growth of a new sub-region of the northwest DFW Metroplex.

6.8 Projects Supporting Specific Companies and Industries

Transportation projects that are designed to support specific companies and industries tend to be more successful than un-targeted projects. For example, the *I-435 Interchange* in Overland Park, KS was built as part of a package to retain Sprint in the Kansas City metro area. The project attracted many other large development projects, producing 17,500 jobs.

Many successful projects were undertaken to support tourism industries. The *I-70 Glenwood Canyon*, which double-decked I-70 through the Glenwood Canyon in Central Colorado, is one of the most spectacular stretches of interstate highway ever built. The project supported tourist industries, producing 2,400 jobs. The Isle of Palms Connector, a new bridge to a resort island in the Charleston, NC metro area, produced 2,800 jobs in tourist-serving industries on the mainland side of the bridge, where sites were available.

Other transportation projects have been built to support tech industries, with notable results. The *U.S. 460 Bypass* in Blacksburg, VA provides a direct connection between I-81 and

Virginia Tech. The ten-mile long bypass was completed in 2002 at a cost of $87 million. Nearly 750 new jobs in technology spinoff firms have been produced in this corridor.

6.9 Conclusions: Recommendations for Future Planning

As is detailed in Chapters 1 and 4, the EconWorks tool is useful for project sketch planning. It should be used to assist transportation agencies to set priorities among projects according to broad estimates of economic impacts of possible projects. EconWorks can be useful for illustrating general expectations of proposed transportation projects for public forums to illustrate the level of outcomes that citizens can expect for various projects according to project type, location, size, and socio-economic profile. EconWorks should be used to shortlist a long list of potential projects but should not be used to make decisions among alternatives for different projects, nor to measure impacts for detailed planning studies, nor for Environmental Impact Statements. These need careful analysis of the individual circumstances that will determine project performance, as are described in this Chapter.

In order to forecast potential project outcomes, it is necessary to look into the contextual factors that are the real determinants of project outcome. As we have discussed, foremost among these are factors related to effective planning processes, including the ability to achieve consensus among agencies, community groups, and developers regarding economic development goals for the project. But perhaps the key factor determining the magnitude of economic impacts is the availability of serviced sites in the project area. Other important considerations are real estate market conditions and timing in regard to economic cycles. As a general rule, highway-related projects that are integrated with larger economic development initiatives and overall economic development strategies tend to have more profound impacts than stand-alone projects.

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