

# C A S E S T U D Y

*Is Transportation Stimulating?*

## CASE STUDY REPORT

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# Introduction

## Summary

Transportation is a vital part of a nation's economy. This case first introduces the transportation investment in The American Recovery and Reinvestment Act of 2009 (ARRA 2009), which brings rise to the question, "why is transportation stimulating?"

As a bit of first exploration, the case introduces the relationship between the transportation industry and the macroscopic economy as well as the relationship between the transportation industry and other major industries. This, in turn, forces the reader to ask, "how does transportation stimulate the economy?"

The next part of the case explains the immediate impact of transportation investment via job creation and long term impacts like reducing congestion, improving safety, and economic vitality.

The last section of the case is a "Case within a Case" that introduces the Hiawatha Light-Rail Transit corridor in the Twin Cities. The discussion focuses on the construction of the LRT corridor and its impact on the local economy, especially with regard to real estate.

## List of Actors

While the identification of specific stakeholders is relegated to the narrative on several pertinent examples, the routine actors typically include:

- Federal, state, and local governments
- Taxpayers and the populous in general
- Private contractors
- Affected industries

## **Timeline of Events**

**1800s:** President Thomas Jefferson proposed the construction of a system of trade that connected people throughout the country. This system involved roads, rivers and railroads. It also included the digging of waterways.

**From 1832 to 1850s:** Boats traveled along man-made canals which strengthened local economies.

**1860s-1900s:** Railroads replaced canals and expanded quickly across the United States to serve industries and the growing economy. With the new way of transportation, the flow of business changed.

**Early 1900s:** Public transportation such as the electric streetcar appeared in a growing number of cities.

**1920s:** Mass-produced vehicles became common throughout North America and the automobile industry soon became one of the most important industries that affects the economy.

**1950s:** The interstate highway system has had a profound effect upon the American economy and contributed significantly to improved economic efficiency and productivity.

**1970s-2000s:** Vehicle miles travelled increased dramatically while the lane-miles of road remained almost the same. Transportation problems such as congestion and deteriorating road and bridge conditions greatly restrict the U.S economic development.

**December 18, 1991:** The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) is signed into law. The Bill embodies the renewal of our surface transportation programs to address the changing needs for America's will to create jobs, reduce congestion, and rebuild our infrastructure.

**June 9, 1998:** The Transportation Equity Act for the 21st Century signed into law. It authorized the federal surface transportation programs for highways, highway safety, and transit for the 6-year period of 1998-2003.

**August 10, 2005:** The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is signed into law. It represents the largest surface transportation investment in our Nation's history.

**February 17, 2009:** The American Recovery and Reinvestment Act of 2009 (ARRA) is signed into law. It is intended to provide a stimulus to the U.S. economy in the wake of the economic downturn. Transportation investment is one of the primary core investments.

### **Maps of Locations**

Figures, as necessary, are located within the respective narrative sections.

# Narrative

## **The American Recovery and Reinvestment Act of 2009**

The American Recovery and Reinvestment Act of 2009 (ARRA) is an economic stimulus package enacted by the 111th United States Congress in February 2009. The first crucial step of the bill is to create and save three to four million jobs, prevent further economic downturn, and begin the process of transforming the country for the 21st century. The bill supplies a total of \$787.2 billion in economic recovery tax cuts and thoughtful and carefully targeted priority investments (US House of Representatives, 2009).

The package contains targeted efforts in:

- Clean, efficient, American Energy
- Transforming our economy with science and technology
- Modernizing roads, bridges, transit and waterways
- Education for the 21st Century
- Tax cuts to Make Work Pay and create jobs
- Lowering healthcare costs
- Helping workers hurt by the economy
- Saving public sector jobs and protecting vital services

The short term task is to try to prevent the loss of millions of jobs and get the economy moving. The long term task is to make the needed investments that restore the ability of average middle income families to increase their income and build a decent future for their children (US House of Representatives, 2009).

Transportation is one of the core infrastructure investments in the act. Transportation investments focus on creating jobs, rebuilding the nation's crumbling roads and bridges, modernize public buildings, and put people to work cleaning our air, water

and land. What follows are the major branches of transportation investment (ARRA 2009):

- \$27.5 billion for highway and bridge construction projects and \$1.5 billion for competitive grants to state and local governments for transportation investment. It is estimated that states have over 5,100 projects totaling over \$64 billion that could be awarded within 180 days.
- \$750 million for Capital Investment Grants for new commuter rail or other light rail system; \$750 million to modernize existing transit systems; \$6.9 billion to purchase buses and equipment needed to increase public transportation and improve intermodal and transit facilities. Public transportation saves Americans time and money, saving as much as 4.2 billion gallons of gasoline and reducing carbon emissions by 37 million metric tons each year.
- Amtrak: \$1.3 billion to improve the speed and capacity of intercity passenger rail service. The Department of Transportation's Inspector General estimates the North East Corridor alone has a backlog of over \$10 billion.
- High Speed Rail and Intercity Passenger Rail Grants: \$8 billion to advance the development of high speed rail and to improve the intercity passenger rail service in corridors across the nation. The States for Passenger Rail Coalition estimates that there are over \$1.5 billion in projects that are ready-to-go.
- Airport Improvement Grants: \$1.1 billion for airport improvement projects that will improve safety and reduce congestion. An estimated \$49.7 billion in eligible airport infrastructure projects are needed between 2009 and 2013.
- Transportation Security Administration Explosive Detection Systems: \$1 billion to install Aviation Explosive Detection Systems and checkpoint screening systems in the nation's airports, improving security, and making life easier on travelers by speeding security lines. Funds are competitively awarded based on security risk.

- Border and Ports of Entry: \$720 million to construct GSA and Customs and Border Protection land ports of entry to improve border security, make trade and travel easier and reduce wait times.
- Coast Guard: \$240 million to rehabilitate and repair Coast Guard infrastructure and obstacles to navigation.

The United States is not the only country that was afflicted in the current economic crisis. Many other countries have the similar experiences. To reply to the most serious economic recession after the Great Depression, many countries carried out corresponding stimulation package. For instance, the Chinese government also announced an economic stimulation plan at the end of 2008. The total investment is about 4,000 billion RMB (about \$583.9 billion). Their transportation investment occurs mainly in rail, highway, and airports, amounting to about 1,800 billion RMB (\$262.8 billion), almost half of the total investment (National Development and Reform Commission of China Website, 2009).

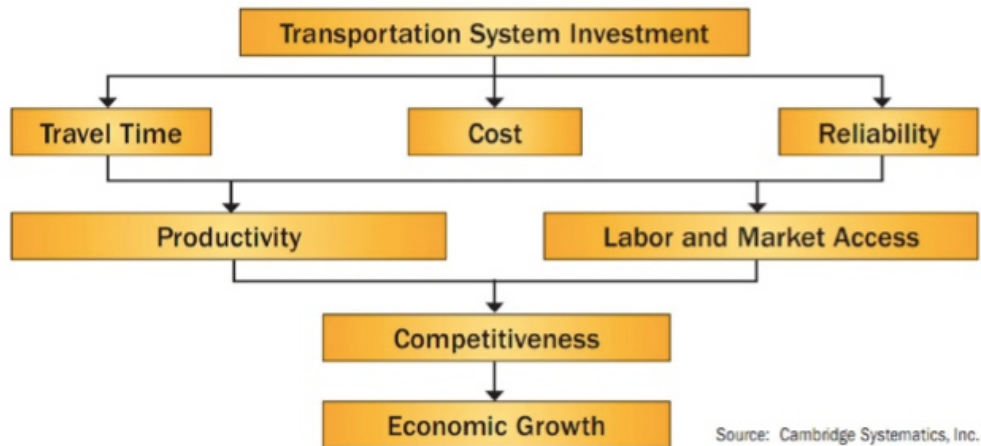
Different countries with different domestic situations simultaneously choose transportation as a crucial industry in the process of economy recovery. This this interesting phenomenon sparks the question: “why does transportation stimulate?”

### **Transportation and the Economy**

Transportation is a vital part of the nation’s economy. Businesses, consumers, and government spend about 10% of the U.S. gross domestic product (GDP) on transportation each year (U.S. DOT, 2006). During different time periods, many major transportation systems (such as the Mississippi River or Great Lakes waterway system, transcontinental railway system, or the interstate highway system) all played or are playing a key factor in the growth of the U.S. economy.

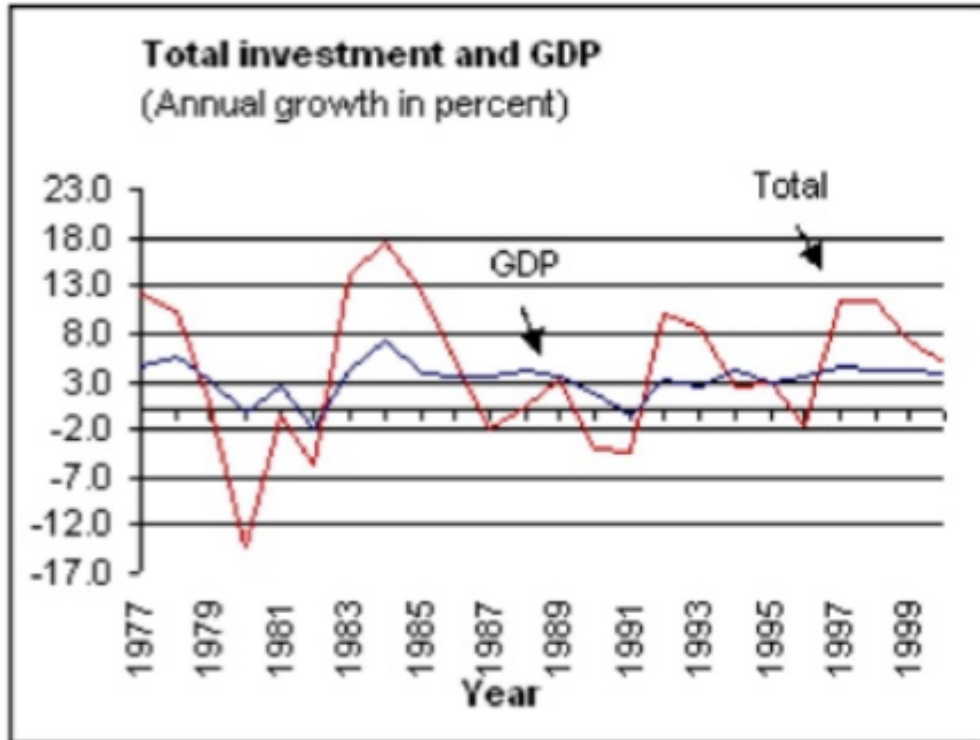
The link between transportation investment and economic growth are illustrated in Figure 1. Similar to land, labor, technology, and capital, transportation is a key input to production and economic activity. Investment in transportation—whether to increase

capacity or to improve service—reduces travel time, lowers trip cost, and improves travel-time reliability. For individuals as well as for businesses, these improvements translate into greater productivity and better access to labor and markets, making industries more competitive and enabling economic growth (Cambridge Systematics, Inc 2008).



**Figure 1:** Relationship between transportation investment and economic growth

Many researchers have studied the relationship between public infrastructure investments (such as transportation, energy, water) and GDP growth. According to a recent British study, on average, a 10% increase in public infrastructure capital stock increases GDP by around 2%. (The Eddington Transport Study, 2006). Figure two shows the relationship between total transportation investment and GDP growth in United States from 1977 to 2000. From this figure we can see that transportation investment and level of the economy rise and fall simultaneously. Of this overall transportation investment, investment (including household expenditure) in rolling stock accounted for 83.3%, and that in transportation infrastructure and in other transportation equipment, 14.2% and 2.5%, respectively. (DOT, 2004)



Source: Bureau of Transportation Statistics (2004)

**Figure 2:** Growth in Transportation Investment Compared with Growth in GDP

According to a publication released by the Transportation Research Board in 2002 (NCHRP, 2002), transportation investment could benefit the economy in a variety of aspects. First, transportation investment boosts industry competitiveness and productivity and enhances household well-being. A well-developed transportation system reduces the cost of production and distribution by lowering barriers to mobility, giving the industries more sources of labor, providing a diverse selection of raw materials, and ensuring a broad customer base. It gives households access to a broader range of higher-paying jobs, a wider selection of consumer goods, and better housing options. Second, transportation reduces economic losses associated with accidents. Each year, traffic accidents create significant drain in the economy and any investments to improve the safety of the nation’s transportation infrastructure can mitigate these losses. Third, transportation investment creates jobs. Nearly 18 million people were employed by transportation or related industries in 2002 in the United States—13.5% of the total U.S. employment (Cambridge Systematics, Inc, 2002).

Transportation is also closely related to other major industries of economy. Five major economic sectors account for 84% of the U.S. economy. Four—agriculture and natural resources, manufacturing, retail, and services—are among the largest users of transportation. The fifth—the transportation sector itself—is a provider of transportation equipment and services (Cambridge Systematics, Inc, 2008). The agriculture and natural resource industries often ship to domestic and international markets commodities which are heavy, bulky, and relatively low value per ton. In addition, most of the commodities need to be shipped long distances. As the manufacturing industry spreads to a much wider area rather than one generation ago when manufacturing employment was concentrated in the Northeast and the Great Lakes, manufacturing logistics require a higher standard in vehicles and in the interstate highway system. Trucking and the highway system have allowed manufacturing to spread out across the country. The retail industry in the United States is characterized by the tremendous variety of products it delivers to millions of consumers in domestic and international markets. Worldwide sourcing has been a common trend in the retail industry, and many of the consumer products sold by retailers in the U.S. market are now manufactured in China, Mexico, India, and Vietnam. This specialty of the retail industry requires sophisticated logistics channels that put significant demands on the nation’s intermodal transportation system. The services sector is very dependent on transportation systems to get access to workers. The services sector has been automating many functions, but the majority of its services are still delivered in person. This means that effective service delivery depends on the mobility of both the service provider and the consumer of services.

## **Job Creation**

In a report from the Political Economy Research Institute (PERI) at the University of Massachusetts at Amherst, researchers James Heintz, Robert Pollin, and Heidi Garrett-Peltier define the three types of job creation that can occur via transportation spending: *direct job creation* “refers to the jobs directly involved in constructing the new infrastructure projects,” *indirect job creation* “refers to the jobs created when supplies are purchase for the infrastructure projects,” and *induced jobs* “are created when the overall level of

spending in the economy rises, due to workers newly receiving incomes when they are hired to build the infrastructure projects, and to produce supplies for the project.”

Though it may be surprising to some, infrastructure investments are an excellent way to stimulate job creation: 18,000 total jobs are created for every \$1.0 billion in new investments spending (including induced, indirect, and of course direct jobs), compared to only 14,000 total jobs created for every \$1.0 billion in spending due to household spending levels generated by a tax cut.

But where are these jobs created? The vast majority are attributed to construction, typically on the order of 40% in a normal infrastructure investment. In a typical spending year, 641,000 construction jobs will be created from projects deemed “normal” in the federal spending scheme; in contrast, a “high-end investment scenario” defined by the PERI researchers (analogous to The American Recovery and Reinvestment Act of 2009) should create over 1.0 million new jobs. Manufacturing also sees some stimulus from transportation spending, with ten percent of the total job creation attributable to this sector. This works out to around 146,000 new jobs in a “typical” spending cycle, or 252,000 new jobs in a “high-end” spending cycle.

But why is transportation such an effective means of job creation? For one, it is a highly labor-intensive industry that depends largely upon domestic-created materials. Little can be done to outsource (especially overseas) manual or skilled labor, and (similarly) most transportation-related goods and materials are sourced from stateside suppliers, due largely to their time-sensitive and volatile natures. Furthermore, the PERI report suggests that “public investment improves private sector productivity” as “improving the U.S. infrastructure in all four main areas--transportation systems, public school buildings, water management, and energy transmission--will improve U.S. competitiveness by contributing toward a lower-cost environment than would be possible un-

der our aging stock of infrastructure.” Today’s impetus of promoting a “green” culture of sustainable and environmentally-conscious practices is highlighted in public and private mandates, and, as the PERI researchers note, “all public infrastructure projects promote a clean-energy economy by raising the efficiency of production, and thereby lowering the overall demand for energy for a given level of production.”

### Long Term Impact of Transportation Investment

Traffic congestion is an annual \$78 billion “hidden tax” on the American economy and productivity. It also causes 4.2 billion hours of travel delay and 2.9 billion gallons of wasted fuel annually (ARTBA, 2009). It is therefore no surprise to see that congestion has increased steadily during the past 25 years. Vehicle miles travelled increased 94.5% percent from 1982-2006 while the lane-miles of road only increased 6.6% (Figure 3).

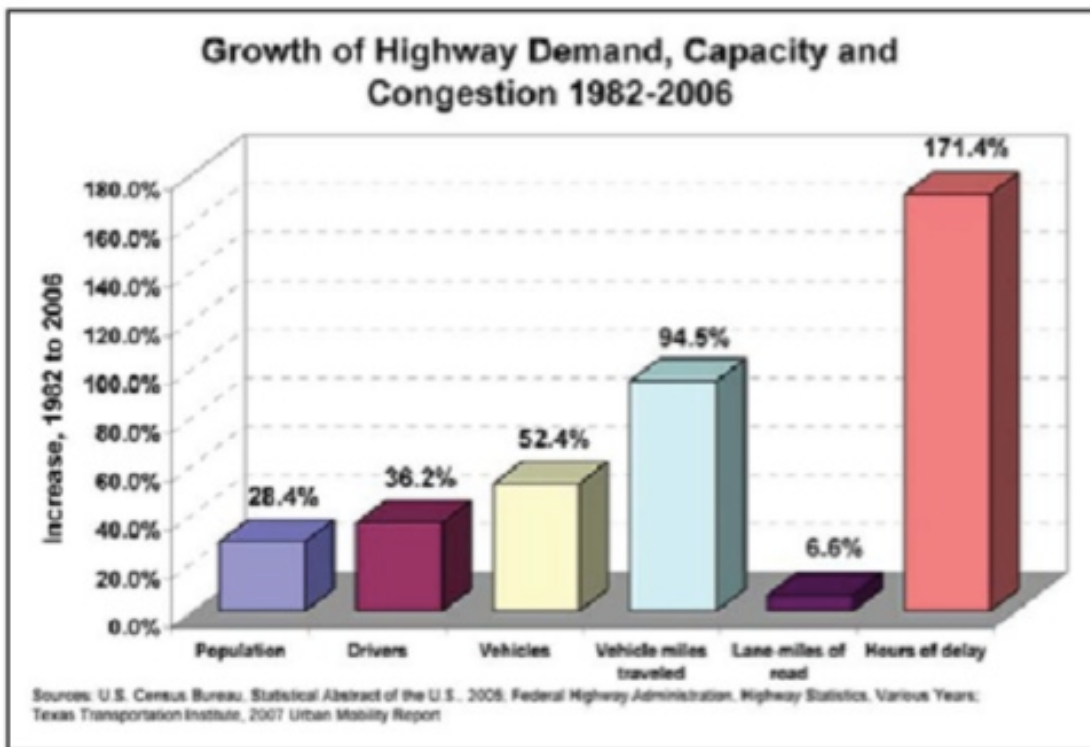


Figure 3: Growth of Highway Demand, Capacity and Congestion

The federal government realized the importance of the congestion problem, and several bills were signed into law to promote transportation investment. The highway and transit investment law—known as the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is the largest surface transportation investment in United States' history. SAFETEA-LU addresses many challenges facing the transportation system today and one of the largest is reducing traffic congestion which will in turn save time and fuel, decrease vehicle emissions, lower transportation costs, allow more predictable and consistent travel times, and provide safer highways (FHWA, 2005).

While improvement of highway infrastructure is the major way to reduce congestion, SAFETEA-LU also established some programs to reduce congestion by managing traffic. A real-time system information management program provides the capability to monitor traffic and travel conditions of the major highways of the U.S. in real time. With the information available, one can improve the security of the transportation system, address congestion problems, support improved response to weather events and surface transportation incidents, and facilitate national and regional highway traveler information (FHWA, 2005). SAFETEA-LU also gives states more options for using road pricing to manage congestion such as the Value Pricing Pilot program and Express Lanes Demonstration Program. In addition, SAFETEA-LU gives more vehicles the right to use HOV lanes (e.g. public transportation vehicles, low-emission and energy-efficient vehicles, etc.)

According to National Highway Traffic Safety Administration (NHTSA), in 2005, more than 43,440 people were killed in crashes on U.S. roads and another 2.7 million were injured (Cambridge Systematics, Inc. 2008). The NHTSA reported that highway crashes cost Americans more than \$230 billion annually, including the cost of medical bills, lost wages, legal fees and delays—which is more than two percent of the nation's GDP. About ten percent of crash cost was paid for with public revenues, adding \$200 annually to the tax bill of every household in the U.S.

Although alcohol and speeding are major factors in fatal highway crashes, we still need better roads. Based on the NHTSA's Traffic Safety Facts, in 2005 almost 12,500 fatal highway crashes were attributable to roadside obstacles. These accidents could have been prevented by widening roadways, installing crash guards and crash-friendly devices, and installing better pavement markings (NHTSA, 2005).

In 1996, the Federal Highway Administration (FHWA) published a report which claimed that many highway improvements, such as adding turn lanes, improving sight distances, removing roadside obstacles, and installing medians to separate traffic had cost-benefit ratios ranging from a low of 3 to high of 27 (FHWA, 1996). That means one dollar invested in highway improvements returned \$3 to \$27 in reduced costs of highway crashes. Today the ratio should be even higher because of higher traffic volume, higher medical costs, and repair costs.

People usually think that construction of transportation infrastructure or expanding existing facilities have negative impacts on the environment. However, in many cases it is not true. Transportation investment may provide new opportunities for environmental protection and even enhancement.

Transportation investment can improve air quality and energy efficiency. In many cities, transportation investment encourages a change to vehicles that run on cleaner alternative fuels such as compressed natural gas or ethanol. For example, in New York City, where taxis account for about ten percent of all vehicle miles traveled, the Alternative Fuels Taxicab Program provides financial incentives for taxi owners to adapt their vehicles to run on CNG or to purchase new CNG vehicles. Taxi owners are reimbursed for the cost of the conversion (Cambridge Systematics, Inc. 2002). Transportation investment aimed at congestion relief also benefits the environment. Research has shown that hard acceleration and deceleration causes emissions to rise sharply. If the average arterial speed increases from 10 to 20 mph, hydrocarbons (HC) will reduce roughly 40 percent and NO<sub>x</sub> emissions will reduce about 20 percent.

Transportation investment can also encourage environmentally-friendly modes of transport such as ridesharing, public transit, bicycling and walking. Ridesharing and

public transit reduce both congestion and total vehicle miles traveled. Bicycling and walking can help reduce pollution and greenhouse gas emissions, since both of the transportation mode are zero-emissions.

### **Case within a Case: Hiawatha LRT**

According to Maxfield Research (a Twin Cities real-estate consulting firm that specializes in “supporting developers, planners, and financiers of senior housing, multi-family housing, government-sponsored projects, and commercial developments”), the Hiawatha Light-Rail Transit corridor is a prime example of Transit Oriented Development (TOD), “a means of promoting smart growth and creating walkable, mixed used developments . . . within close proximity to transit lines or stations.” Like the development of streetcar lines that ignited corridor development in the Twin Cities more than 50 years ago, the Hiawatha line allows residents in the TOD corridor to become less reliant upon transportation in personal vehicles by promoting and simplifying the use of a well-connected public transit system, walking, biking, etcetera.

Averaging 28,000 riders each day, the Hiawatha LRT attracts a large percentage of new transit riders, according to the Metropolitan Council (Hiawatha’s “owner”), which is due in part to the large number of new multi-use developments that have budded along the corridor since the line’s opening. As of 2006--the most recent year for which Maxfield has data--the Hiawatha line has seen in its proximity the construction of at least 520 for-sale units, proposals for at least 249 more for-sale units, construction of 61 rental units, and proposals for over 817 more rental units (the majority of which have now been built).

As for a few examples, the construction of the 90-unit *Minnehaha Place Condominiums* was one of the first along the corridor, and features one, two, and three bedroom units with base prices from \$131,000 to \$231,000. The majority of the building was sold out prior to the advent of construction, and all units were sold before the line even opened.

*Olin Crossing*, located near the 50th Street LRT Station, features 48 condos in one and two bedroom configurations. It was also completely sold out before the line's opening, and open units are quickly nabbed in the seldom chance that they again enter the market. Finally, *The Reflections Condominiums*--the largest project along the TOD corridor at 267 units and 16 stories--showcases a myriad of floorplans ranging from the simple-one bedroom (\$180,000) to grand penthouse estates (\$700,000 and up). Again, the majority of the building is sold-out, primarily due to its convenient proximity to Bloomington Central Station, a "43-acre mixed-use transit oriented development . . . built around the Hiawatha Line and will include over 1,100 high-density residential units, full-service hotel, office and retail uses, and a walking trails and open space surrounding a two-acre park" in which "approximately 10,000 people will live and work."

The Center for Transportation Studies at the University of Minnesota also reports the following figures regarding how the Hiawatha line has stimulated the local economy:

- The Hiawatha Line produced an increase of \$47.1 million in residential property-value between 2004 and 2007.
- Single-family homes near the line sold for 4.2 percent more than homes in a comparison area.
- Homes located closer to stations experienced higher property values due to increased transit accessibility.
- The negative effect on property values near the light-rail line due to nuisances like noise was much smaller than the positive effect on those properties.
- The average value of each single-family home located near a light-rail station increased more than \$5,000.
- The average value of each multi-family property located near a light-rail station increased more than \$15,500.
- A significant amount of new housing construction occurred—183 percent more than would be expected.

As Maxfield also notes, the changing demographics of American society--aging baby boomers, an influx of immigrants, a younger generation that prefers denser development, etc.--the demand for more TOD is sure to grow in the next decade. With the opening of the Northstar Commuter Rail, and the planned Central and Southwest Corridors, the successful and stimulating developments that have populated the Hiawatha LRT are increasingly likely to now bud elsewhere.

# Bibliography

American Road & Transportation Builders Association. 2009. "A New Vision & Mission for America's Federal Surface Transportation Program"

<<http://www.artba.org/mediafiles/newreauthorizationsummary.pdf>>.

Bureau of Transportation Statistics. 2004. Transportation Investment and GDP, Some Concepts, Data, and Analysis. DOT.

<[http://www.bts.gov/programs/economics\\_and\\_finance/transportation\\_investment\\_and\\_gdp/2004/pdf/entire.pdf](http://www.bts.gov/programs/economics_and_finance/transportation_investment_and_gdp/2004/pdf/entire.pdf)>.

Cambridge Systematics, Inc., The Benefits of Transportation Investment: Economic, Environmental, Community and Social, Congestion Reduction. Prepared for the National Cooperative Highway Research Program (NCHRP) Transportation Research Board, Washington, D.C., 2002.

Cambridge Systematics, Inc. 2002. Environment benefits of transportation investment

<[www.transportation.org/sites/planning/docs/nchrp22\\_2.pdf](http://www.transportation.org/sites/planning/docs/nchrp22_2.pdf)>.

Cambridge Systematics, Inc. 2008. The Transportation Challenge MOVING THE U.S. ECONOMY

<<http://www.uschamber.com/publications/reports/0804transportationchallenge>>.

"Development Riding on the Hiawatha LRT." Maxfield Research, n.d. Web. 11 Nov. 2009.

<[http://www.maxfieldresearch.com/documents/sitelines-winter\\_2006.pdf](http://www.maxfieldresearch.com/documents/sitelines-winter_2006.pdf)>.

The Eddington Transport Study: The Case For Action: Sir Rod Eddington's Advice to Government, Prepared for HM Department of the Treasury, U.K., December 2006.

<<http://www.dft.gov.uk/about/strategy/transportstrategy/eddingtonstudy/>>.

Federal Highway Administration. The 1996 Annual Report on Highway Safety Improvement Programs. Report # FHWA-SA-96-040. April 1996.

"How Infrastructure Investments Support the U.S. Economy." P.E.R.I., n.d. Web. 10 Nov. 2009.

[http://www.peri.umass.edu/fileadmin/pdf/other\\_publication\\_types/green\\_economics/PERI\\_Infrastructure\\_Investments](http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/PERI_Infrastructure_Investments)>.

National Highway Traffic Safety Administration. Traffic Safety Facts 2005. Report # DOT HS 810631.

National Development and Reform Commission of China Website

<http://www.sdpc.gov.cn/>>.

Public Law 111-5 111th Congress: American Recovery and Reinvestment Act of 2009.

SAFETEA-LU: A summary of highway provisions (2005), Federal Highway Administration

[http://www.apwa.net/Documents/Advocacy/SAFETEA/Summary\\_SAFETEA-LU\\_HighwayProvisions.pdf](http://www.apwa.net/Documents/Advocacy/SAFETEA/Summary_SAFETEA-LU_HighwayProvisions.pdf)>.

Table M-6, Transportation Statistics Annual Report 2006. U.S. DOT, BEA Accounts Data, 2005-2006.

[http://www.bts.gov/publications/transportation\\_statistics\\_annual\\_report/2006](http://www.bts.gov/publications/transportation_statistics_annual_report/2006)>.

"The Transportation Challenge." The Transportation Challenge. Bureau of Transportation Studies, n.d. Web. 11 Nov. 2009.

[http://www.bts.gov/publications/transportation\\_and\\_the\\_economy/pdf/entire.pdf](http://www.bts.gov/publications/transportation_and_the_economy/pdf/entire.pdf)>.

"Understanding the Impacts of Transitways." UMN Center for Transportation Studies, n.d. Web. 11 Nov. 2009.

[www.cts.umn.edu/Publications/ResearchReports/pdfdownload.pl?id=1222](http://www.cts.umn.edu/Publications/ResearchReports/pdfdownload.pl?id=1222)>.

U.S. House of Representatives. 2009. SUMMARY: AMERICAN RECOVERY AND RE-INVESTMENT.