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L.A. Streetcar Economic Analysis

Report & Technical Appendix

CRA/LA
BUILDING COMMUNITIES

goLAstreetcar.org

AECOM

GENERAL LIMITING CONDITIONS

Every reasonable effort has been made to ensure that the data contained in this report are accurate as of the date of this study; however, factors exist that are outside the control of AECOM and that may affect the estimates and/or projections noted herein. This study is based on estimates, assumptions and other information developed by AECOM from its independent research effort, general knowledge of the industry, and information provided by and consultations with the client and the client's representatives. No responsibility is assumed for inaccuracies in reporting by the client, the client's agent and representatives, or any other data source used in preparing or presenting this study.

This report is based on information that was current as of January 2011 and AECOM has not undertaken any update of its research effort since such date.

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This study is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.

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INTRODUCTION

Understanding that a new streetcar system is likely to enhance the long-term competitive position of Downtown Los Angeles, the Community Redevelopment Agency of the City of Los Angeles (CRA/LA) and Los Angeles Streetcar, Inc. (LASI), a non-profit organization, retained AECOM to estimate the economic impact of the proposed Los Angeles Streetcar system.

Several rout alternatives are currently being considered for the Los Angeles Streetcar (the Streetcar) system, the longest of which is a 4.75-mile loop around Downtown. This alignment, "Option 1" (see map on next page), was used as the basis for this economic study.

The economic activity created by the Los Angeles Streetcar includes not only the impacts from one-time construction and recurring operation of the streetcar itself, but also the induced impact resulting from the development of new commercial and residential property, reactivation of underutilized properties, creation of new businesses and jobs, increased Downtown tourism, increased numbers of local and overnight visitors, and spending by new employees, residents, and visitors.

These impacts have been measured against an assumed baseline growth rate for Downtown, as determined by historic trends for office, residential, and visitor and convention attendance over the past fifteen years combined with forecasts considering current and future economic conditions. As a result, the impacts discussed herein are specific estimates of induced development to the Downtown region for the next 25 years specifically resulting from or supported by investment in the Los Angeles Streetcar System.

In summary, AECOM found that, in Downtown Los Angeles, the Streetcar will support and induce:

- Development of nearly 675,000 square feet of new and rehabilitated office space, with construction costs valued at $210 million
- Development of 2,600 new housing units, with construction costs valued at $730 million, providing housing for 3,600 new residents
- 7,200 new construction jobs* over the development period, with employee compensation of approximately $500 million
- 2,100 new permanent office, retail, entertainment, and hotel jobs with employee compensation of approximately $120 million annually by the end of the study period
- 5,800 new hotel room nights from new convention and business visitors
- New retail, restaurant, hotel, and entertainment spending reaching up to $24.5 million annually over the course of the development period
- $47 million in cumulative City of Los Angeles tax revenues during the 25-year development period

This economic impact assessment of the proposed Los Angeles Streetcar System was prepared by the Economics team at AECOM, led by William "Bill" Lee, Principal-in-Charge.

Overview

This technical appendix provides a brief overview of the scope, methodology, and detailed findings of the study. The analysis consisted of three major components: a literature search and review, topical study and analysis focusing on visitor impacts; and an estimate of the economic value of the Streetcar to Downtown Los Angeles.

Analytical Framework

This study reflects findings from a literature review, interview process, and quantitative analysis. AECOM conducted an extensive literature review to examine current and relevant studies and reports, both academic and professional, attempting to quantify and qualify the economic impacts created by streetcar development and operations. Local stakeholders and developers that are likely to be impacted by the Streetcar were interviewed, as were convention and visitors bureau executives in other cities where streetcars are already operating. The market history of office, retail, and residential development in Los

* Construction jobs are reported in job-years (one year of one job)

Angeles was reviewed, with a focus on specific factors affecting Downtown Los Angeles. With this information in hand, AECOM projected baseline market growth for office, residential, and visitor-serving uses before and after introduction of the Streetcar; estimated local spending and adjusted Downtown and City capture rates based on best available data; and used the IMPLAN regional economic impact model to generate total impacts to Downtown and the City of Los Angeles. Impacts are quantified as new jobs and associated earnings, new spending at Downtown retail, restaurant, and hotel establishments, and number of new residents and visitors to Downtown.

Literature Review

The project team searched for and reviewed impact assessments of recently completed streetcar systems. A number of such reports have been completed for communities ranging from Minneapolis, Grand Rapids, Madison, Cincinnati and Sacramento to Portland; we concentrated our review on the studies that assess the impacts of recently implemented streetcar and light rail systems. In addition, we relied on information relating to changes in land value resulting from investment in fixed rail transit infrastructure, including publications by academics, planners, government agencies, and nonprofit organizations, such as Robert Cervero, E.D. Hovee & Company, the Brookings Institute, and Reconnecting America among others.

The literature review confirmed that for properties located within walking distance of an access point (such as a streetcar station), the introduction of a rail-based transit system will ultimately have a positive influence on property value and development. Benefits associated with close proximity to transit are thought to be greatest in fast-growing, congested areas with a buoyant economy and transit supportive public policies. At the same time, supportive local policies and demographics, well-designed stations, efficient and effective systems, and a strong real estate market are all key factors that allow transit to have a significant effect on property value and development. While the effect of transit on property value and development varies, the following general principles are constant:

- Rail-based transit can have a positive effect on property value.
- Properties within walking distance of a station experience the greatest benefit.
- Properties located in densely populated settings experience greater price premiums.

Interview Findings

For additional insight, AECOM interviewed local stakeholders and developers, as well as the executives from the Convention and Visitors Bureaus of major cities with an existing streetcar or light rail system. The consensus is that streetcars benefit local businesses and convention operations by providing a convenient and affordable transportation option for both residents and visitors. Residents commonly use streetcar or light rail to attend sporting events and entertainment districts, while tourists and convention delegates are given added incentive to patronize businesses and hotels within walking distance of the line. Additionally, streetcar and light rail operations provide free branding and marketing opportunities for host cities, allowing them to further define the unique nature of their offerings for a more compelling visitor experience.

Economic Value Analysis

AECOM relied on the literature review and supplemental interviews to determine direct impacts to Downtown Los Angeles and the broader region in terms of new spending, employment, and development. Direct impacts were used as inputs to a regional economic impact to determine the additional induced and indirect contributions of the Los Angeles Streetcar to the economy of the City of Los Angeles.

AECOM relied on an input-output model to estimate the total economic impact resulting from construction, operation, induced visitation, and new office and residential construction that would be supported by the proposed Los Angeles Streetcar. Input-output analysis examines relationships within an economy, both between businesses and between consumers and businesses. The analysis captures consumptive market transactions and estimates the resulting indirect and induced economic effects, and produces quantitative estimates of the magnitude of regional economic activity resulting from a specified change in the regional economy. Input-output models rely on multipliers that mathematically represent

the relationship between the initial change in one sector of the economy (such as the introduction of the Streetcar, or construction of new commercial and residential structures) and the effect of that change on other regional industries.

Impacts

Impacts addressed in this study include:

- The number of temporary (one-time construction-related) and permanent (annual recurring) jobs generated by the proposed Los Angles Streetcar system. Permanent jobs include direct streetcar system-related jobs and potential indirect and induced jobs (ex. from reactivation of the Historic Broadway Theater District).
- The estimated impact of new convention center attendance in terms of hotel revenues and visitor spending.
- The estimated number of new (induced) tourists and their anticipated spending resulting from the Streetcar. This includes an analysis of the impact to cultural institutions in the downtown area in terms of new visitation and length of stay.
- Impact of the Streetcar on retail and food and beverage sales along the route, including the resultant change in sales tax revenues.
- Changes in hotel performance metrics through the lens of new room nights, as well as the resultant change in hotel tax revenues (TOT).
- The development outlook for office and residential properties along the proposed alignment, as impacted by the proposed Streetcar, quantified in terms of increased development potential above baseline growth over a 25-year period.
- The change in property tax revenues resulting from induced development along the Streetcar route for the City of Los Angeles, including revenues that may flow through to the Community Redevelopment Agency, on an annual and cumulative basis.

LITERATURE REVIEW

INTRODUCTION

Location has the greatest effect on property value and development potential. Influences on location can be attributed to a number of factors including:

- Strength of the local economy
- Public policy and political climate
- Accessibility to valued amenities
- Characteristics of the property's improvement
- Market area demographics

Access to public transit can be considered a valued amenity. In theory, properties located near transit enjoy increased regional accessibility, more mobility options, and reduced transportation costs. This amenity value is reflected in the value of the property and the intensity of development near the transit access point. This report delivers a brief summary of literature and technical reports and studies which discuss land value increases and the associated development impacts in five metropolitan areas across North America that have introduced similar rail projects within the last 15 years.

The project team searched the databases of libraries and transit research institutes in the United States to gather relevant information on the effect rail based transit has had on property value and real estate development. In all, more than 30 academic studies and technical reports were reviewed. The summaries below provide information on those studies that were most relevant to the LA Streetcar, addressing the effect of transit on both property value and real estate development.

The included studies reviewed the following metropolitan areas, including among others: Portland, Oregon; Seattle, Washington; Washington D.C.; Dallas, Texas, San Diego, California, San Jose, California; and Tampa, Florida. These metropolitan regions are all characterized by recent population growth, downtown revitalization, status as non-traditional transit hubs and strong historical relationship with the automobile. Furthermore, all of these cities are participating in the national trend of downtown revitalization. All of these regions have rail transit systems; some like San Diego and San Jose have both commuter and light rail systems. While the age of the system, the local economies and public policies vary greatly among the selected metropolitan regions all of the studies found that rail can have a positive effect on property value and real estate development. However, the intensity of the effect varies depending on the region's public policy, market demand and quality of transit service.

IMPLICATIONS FOR LOS ANGELES

All of the studies included in this literature review confirmed that the introduction of a rail-based transit system is highly likely to have a positive influence on property value and development for properties located within walking distance of a transit access point,.

Benefits associated with a close proximity to transit are thought to be greatest and development typically most profitable, as found in the studies of Dallas, San Jose, and San Diego, in fast-growing, congested areas with a buoyant economy and transit supportive public policies.[1] However, as confirmed in Robert Cervero's extensive study on Transit-Oriented Development, supportive local policies and demographics, well-designed stations, efficient and effective transit systems, and a strong real estate market must exist for transit to have a significant effect on property value and development.[i]

[1] R. Cervero and M. Duncan. '*Land Value Impacts of Rail Transit Services in San Diego County*.' Journal of Public Transportation. 5.1, 2002, p 24; R. Cervero and M. Duncan, '*Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values*,' Transportation Research Record, 1805, 2002, pg 45; B. Weinstein and T. Clower, *'An Assessment of the DART LRT on Taxable Property Valuations and Transit Oriented Development*' Center for Economic Development and Research, University of North Texas, 2002.

Residential and commercial properties value transit for different reasons. For residential properties, improved access to transit can ease the commute to work and reduce travel cost. For commercial properties, transit access increases the number of citizens who can access the businesses, as employees or clients, and services located on the property.ii When studies evaluated both commercial and residential properties, researchers found rail transit to have a greater effect on commercial rather than residential property value. Furthermore, if both commuter and light rail systems service the area, researchers determined that commuter rail had a stronger effect on property value.[iii]

However, simply building a rail-based transit system will not automatically increase property value and stimulate development. A number of other factors must also exist for the transit system to have a positive effect on property value. These factors include the existence of public policy that encourages transit-oriented development; a community whose demographics indicate that they will be highly inclined to utilize transit; a transit system that is reliable and effective in both service and design; a strong real estate market; and station design that encourages transit use and decreases potential nuisance effects.[iv]

Furthermore, transit's positive effect on property value increases with system maturity, as the studies of San Diego, San Jose and Portland concluded. As a transit system ages, the residents and employees of the area begin to incorporate the use of the system into their everyday activities. In addition, as a system matures, it typically, as was the case in all of the regions included in this study, increases its service area and frequency of service. The members of the community place a greater value on transit access as they experience increased amenity due to the expanded service area and increase in service frequency.

While the strength of transit's effect on property value and development varies among the regions, all of the academic studies agree on the following:

- Rail-based transit can have a positive effect on property value.
- Properties within walking distance of a rail station experience the greatest benefit.
- Transit's positive accessibility effect increases with system maturity.
- Properties located in densely populated settings experience greater price premiums.

Many of the studies reviewed below utilized hedonic price modeling to quantify rail's effect on property value. Hedonic modeling is a regression model that is used to explain how consumers value the different attributes that comprise real property. The methodology attempts to control the different attributes of real property to determine if the study variable has an effect on the overall price of the property. In the case of these studies, the variable is the property's distance to a rail station or track. Weinstein's 2002 study of Dallas and Cervero's 2004 study of Transit-Oriented Development utilized interviews in addition to other research methodologies.

REVIEWS

Summary reviews of select articles and studies begin on the next page.

Pasadena Streetcar Feasibility Studies

Strategic Economics. 2010.

The Pasadena Streetcar feasibility study is technical in nature, yet presents a detailed overview of how a modern streetcar system would benefit the City of Pasadena in Southern California. After forecasting an economic baseline, the research team input incremental assumptions – using a low, medium, high approach informed by findings in other streetcar cities – to determine how a streetcar system would economically benefit the City. The study specifically analyzed potential property value, retail, and hotel impacts within 1,000 feet of the streetcar alignment concept. They found that: a 0.5% boost in retail sales would generate $42 million in additional sales; a 0.5% boost in hotel occupancies would generate over $400,000 of additional Transit Occupancy Tax revenue; with existing residential growth caps in place, the streetcar would generate nearly $1.5 million in additional property tax revenue, and without, $3.6 million. The research team thus found that the streetcar "has the potential to generate significant economic benefits for Pasadena."

Relationship Between Streetcars and the Build Environment

Rob Golem and Janet Smith-Heimer. 2009.

This study synthesizes current streetcar research and identifies specific areas where additional research is needed to fully gauge the value premium associated with streetcar systems. To accomplish this, the research authors catalogued and reviewed existing streetcar studies and then conducted interviews with 13 streetcar cities. Together, this exercise qualitatively identified that cities lack concrete financial data to convincingly articulate that streetcar systems generate economic returns to local economies, property owners, and cities at-large. The study authors have not completed a follow-up analysis.

Value Capture and Tax-Increment Financing Options for Streetcar Construction

The Brookings Institution, HDR, RCLCO, and Reconnecting America. 2008.

In 2009, the Brookings Institution led an effort to evaluate funding opportunities for a modern streetcar system in Washington D.C. The study primarily focused on land-secured financing mechanisms – such as tax increment financing districts and special assessment districts – that could potentially pay for a portion or all of the proposed D.C. streetcar capital costs. This analysis was supported by three case studies (Appendix II of the report) that analyzed assessed value increases in Portland, OR, Tampa, FL, and Seattle, WA. Each case study focused on a defined time period and analyzed property within approximately one-quarter mile to the respective streetcar lines.

Using this methodology, the study authors provide significant insight into how specific property types, location, and existing conditions help or hinder value appreciation. The study had these key general findings:

- Streetcars are powerful connectors between destinations that can make underutilized or deteriorating sites ideal for redevelopment and revitalization;
- Single-family homes did not typically appreciate in value until after the streetcar systems were operational, whereas commercial, multi-family, industrial, and vacant land realized significant appreciation during streetcar planning and construction phases; and,
- Vacant land realized the largest benefit over time, whereas commercial property appreciation tended to peak after a number of years and then decline.

Each case study had numerous exceptions and deviations, as property values are impacted by a variety of factors the report did not control through more sophisticated statistical methodology or data validation. Assessor data frequently has data gaps and inconsistencies that can only be verified by on-the-ground fact checking. For example, a large Whole Foods Market in Seattle, WA, was not present in the data set as it hadn't been updated and validated by the local assessor.

Property appreciation in the case study cities is summarized below.

Figure 1: Value Increase During Defined Time Period Compared to City Median

Property Type	% Change Compared to Median City Property Values			
	Portland (1997-2003)	Portland (2003-2008)	Seattle (2003-2008)	Tampa (2002-2008)
Single Family < .5 Acres	9.91%	19.82%		-25.99%
Single Family > .5 Acres	68.64%			
Multi-family Condos / Rental	18.66%	36.37%	48.30%	25.46%
Commercial	62.55%	0.00%		
Mixed Use			49.82%	-28.03%
Office			44.38%	-36.14%
Retail			46.07%	-14.11%
Industrial	29.11%	5.80%	44.54%	-9.89%
Hotel			45.58%	34.88%
Raw Land	75.46%	43.90%	53.14%	-60.86%

The negative trending results from Tampa markedly contrast with Portland and Seattle. This deviation is partially explained by Tampa Streetcar's varied service area, which covers high-density commercial, obsolete industrial, and single-family neighborhoods. By aggregating the data across the entire route, the study authors gloss over key themes in each sub-district. For example, property values within the Channelside retail, commercial, and convention district increased by 313%. Industrial properties along the streetcar route increased by 608%. Despite these staggering numbers, all the property along the route had a median assessed value that was 14% lower than the City at-large, demonstrating that the streetcar impacted property types differently.

The methodology for this study used county assessor data to calculate:

$$\frac{(\Delta \text{ Value of Route between Time A and Time B})}{(\Delta \text{ Value of Median City Value between Time A and Time B})}$$

Land Market Impacts of Urban Rail Transit and Joint Development: an empirical study of rail transit in Washington, D.C., and Atlanta.

Robert Cervero. 1992.

Professor Robert Cervero of U.C. Berkeley examined five light-rail transit stations in Washington D.C. and Atlanta, GA, over a 12 year period to understand if, when, and how land adjacent to the rail stations enjoyed any value premiums. Cervero's study pays special attention to office market performance at the stations, looking at such factors as lease rates, vacancies, building size, and growth potential. Overall, Cervero identified three key traits:

- Average office rents near stations increased alongside higher levels of system-wide ridership;
- Joint development projects added a $3 annual rent premium to office properties; and,
- Office vacancy rates were lower, average buildings were bigger, and shares of regional office growth were larger in stations areas with public/private joint development projects.

A multiple regression analysis was employed alongside other statistical metrics to analyze data at the selected stations. Data variables focused on: a) station-area real estate market performance, such as rents, vacancy rates, etc.; b) transit service variables, including ridership, service frequency, etc.; c) regional economic and growth factors, such as metro employment levels, regional real estate market performance, etc.; and d) station area infrastructure and development characteristics, including traffic counts, floor area ratios, etc.

In the study, office rents were found to increase sharply in anticipation of rail service. Once service was operational, annual rents increased by $4 per square foot for every 100,000 additional daily system passengers; this trend underscored that overall system ridership was more important than ridership at specific stations. Office buildings at terminal stops, moreover, rented for $3.35 less than offices near non-terminal stations.

Looking at regional data, Cervero found that office buildings along the routes had a $2-3 annual per square foot premium over similar suburban office buildings. Similarly, station areas with joint development projects enjoyed 15% office rent premiums above the regional average. Office buildings in the station areas also enjoyed lower vacancy rates and higher absorption rates, which translates into higher operational efficiencies and net income.

Capturing the Value of Transit

The Center for Transit-Oriented Development for the United States Department of Transportation, Federal Transit Administration, 2008.

The Center for Transit-Oriented Development ("CTOD") prepared a synthesis of empirical research related to transit and real estate value premiums. In general, CTOD found that an increase in accessibility to rail transit generated a value premium for real estate; these findings are summarized in below.

Summarized Value Premiums

Land Use	Range of Property Value Premium		
Single Family Residential	+2% w/in 200 ft of station	to	+32% w/in 100 ft of station
Condominium	+2%	to	+18% w/in ½ mile ft of station
Apartment	+0 to 4% w/in ½ mile of station	to	+45 w/in ¼ mile of station
Office	+9% w/in 300 ft of station	to	+120% w/in ¼ mile of station
Retail	+1% w/in 500 ft of station	to	+167% w/in 200 ft of station

Note: date aggregated from several studies.

The methodology of the report was to summarize existing literature in the field from the first new urban rail systems in the late 1970s up to the present. Within that period, there were two main waves of transit construction. In the 1970s, rail transit was provided to growing metropolitan areas that did not previously have rail systems, including Washington D.C., San Francisco, and Atlanta. In the 1980s, existing freight rail systems were converted to use as light rail in cities such as Portland, Los Angeles, and Dallas. The latter period also saw growing interest in transit-oriented development with transit agencies engaged in promoting the right kind of development near transit stations.

CTOD notes that nearly 60% of all transit trips are work-related, and in turn, much of the value created by transit depends on its ability to link employees with employment centers. CTOD further notes that most of the "real opportunities" for transit agencies and private property owners to capture value increases come from ground-up development rather than property appreciation. This statement is true in many circumstances, but it potentially glosses over the particular conditions of complex urban environments and jurisdictions that integrate significant risk into the development process.

In general, CTOD's research concludes that there are five main areas where transit can have a positive impact on value premiums and assist with the development process:

- **Marketability**: improved location and amenities increase the attractiveness of residential units, office space, and other property types that should result in higher lease rates and/or sale profits
- **Developability**: with the construction of a transit line, more sites are better positioned to be developed into transit oriented developments
- **Transit Proximity**: with ready access to rail transit, it's more likely that high-density development will be permitted and/or parking restrictions will be relaxed

- **Improved Financial Feasibility**: transit access can help improve the financial feasibility of a development because it will be more likely to receive higher rents, retain tenants longer, and operate more profitably over the long-term
- **Alternative Funding**: transit oriented developments are better positioned to participate in joint developments and partnerships with public entities to secure alternative sources of financing and/or other investments

The article further identifies specific value capture strategies – including TIF districts, assessment districts, joint development, and development fees – to "reclaim a portion of this value for purposes such as transit capital costs or operations, affordable housing, or other [public] improvements."

Extrinsic factors identified by Cervero in his 2004 study of transit-oriented development that correlate with high land value premiums are a generally healthy economy and real estate market and a supportive public policy are cited in this report. It is also noted that transit connection may not be enough on its own to attract development, but that it is particularly well-suited to channeling existing demand for development to specific locations.

Multiple Reports prepared by E.D. Hovee & Company, LLC

- Portland Streetcar Development Impacts. 2005.
- Portland Streetcar Development Oriented Transit. 2005; updated2008.
- Innovative Public-Private Partnerships. 2007.
- Portland Streetcar Economic Impacts – First Phase. 2007
- Streetcar-Development Linkage: The Portland Streetcar Loop. 2008.
- Economic Impacts of Innovative Quadrant TIGER Projects. 2009.

E.D. Hovee & Company has prepared numerous reports on the Portland Streetcar system. In general, Hovee's reports reiterate that the streetcar system and its many extensions played a catalytic role in attracting investment to Portland's central business district and redevelopment project areas. By 2005, Hovee credited the streetcar with:

- Attracting $3.5 billion of private investment within two blocks of the streetcar alignment
- Stimulating the creation of 10,212 housing units and 5.4 million square feet of commercial space within two blocks of the alignment
- Enticing 55% of all CBD development to occur within one block of the streetcar alignment

Hovee identified these findings by cataloguing the value and location of developments before and after the streetcar was announced in 1997. After 1997, newly constructed buildings within one block of the streetcar line reached 90% of the permitted Floor Area Ratio (see Tables 3 and 4), compared to roughly 35% before 1997. The same buildings also captured the vast majority (75%+) of all development in Portland's Central Business District. These facts coupled with on-the-ground reactions from the development community allowed Hovee to conclude that the streetcar played a prominent role in attracting development to Portland.

Figure 2: Realized FAR Near Portland Streetcar

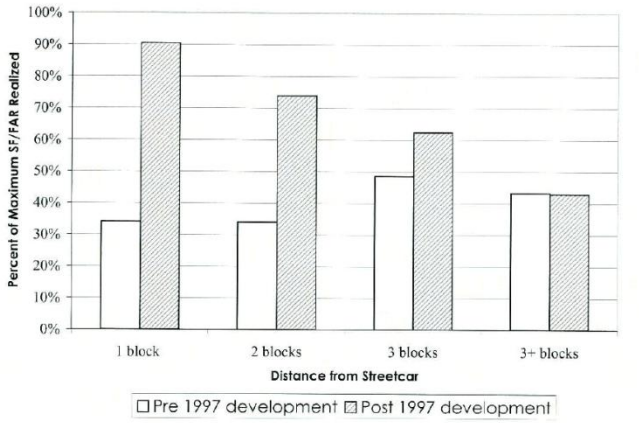
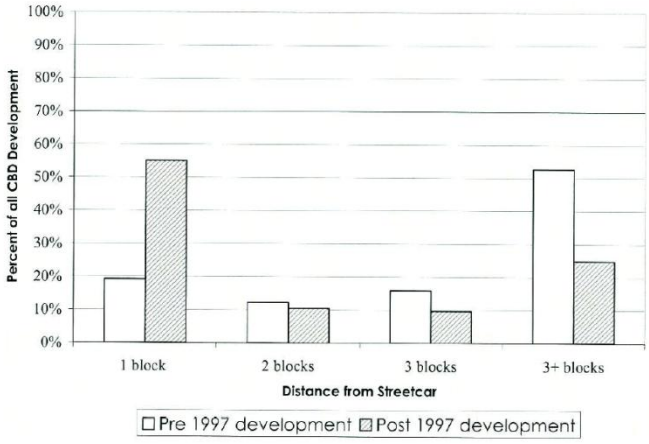


Figure 3: CBD Development in Portland



In a 2008 report, Hovee synthesized his prior research, interviews, and on-the-ground fieldwork to assert that streetcars:

1. Support dense development
2. Produce a Return on Investment
3. Amplify redevelopment potential
4. Enable development to take advantage of existing zoned development capacity
5. Reduce VMT
6. Reduce a city's carbon footprint

It's clear that the development of Portland's streetcar system coincided with significant real estate development efforts, yet Hovee did not employ regression analysis or hedonic modeling to identify and control for outside variables. In turn, Hovee's studies ultimately conclude that "more than chance has influenced Portland's development trends," but cannot definitively assert causality between the streetcar system and downtown Portland's resurgence.

The Initial Economic Impacts of the DART LRT System

Professors Bernard L. Weinstein and Terry Clower, 1999.

Bernard L Weinstein and Terry Clower, professors of applied economics at the University of North Texas, have conducted several studies of the Dallas Area Rapid Transit (DART) light rail transit system's effect

on surrounding property value and prospective development. In this initial study they focused solely on rail's effect on surrounding property value by examining four indicators taxable: property values, commercial occupancy rates, rental rates and retail sales. Using the four indicators, the study found light rail to have a positive economic impact; specifically it found there to be about a 25 percent increase in value for properties located within a quarter mile of a DART light rail station.

The DART light rail system commenced operations in 1996. In 2008, the system transported an average of 54,000 passengers per day across its 48 miles of track and 39 stations. By 2014, the system is projected to nearly double the light rail network to 90 miles and 63 stations, significantly increasing its service area.[v]

To determine the light rail system's effect on total property and land value, the study reviewed, over the period of 1994 to 1998, the change in value of 700 properties within a quarter mile of 15 DART stations. Each light rail station represented a specific neighborhood. The Dallas Central Business District was treated as a single station. Samples of 160 properties located in eight comparable neighborhoods not served by DART were used as comparison for the study. The properties were grouped into five land-use categories: retail, office, residential, industrial and vacant. While some types of property did not experienced a gain, Weinstein et al. concluded that the substantial increase in both total property and land values for properties located within a quarter mile of a DART station suggested that the system was having a positive effect. In addition, the study noted that recently announced real estate projects indicate a continued growth around DART stations.

The study found that total property value increased in 11 of the 15 neighborhoods examined. Weinstein et al. attributed the drop in value in the other four neighborhoods to characteristics unrelated to the introduction of the light rail line. As an example, the study inferred that the drop in property values for the central business district was attributable to a high level of office vacancies and the removal of some older buildings from the tax rolls. Even though the central business district experienced a drop in value, the office land-use category experienced the sharpest gain of the five land-use groups, with an average 22.6 percent gain in property value, as compared to the control group.

In addition to total property value, the study also examined the change in land value of the study group. The results for land value were similar to total property value, with an overall net gain for properties located within a quarter mile of a DART station. However, with respect to land value the greatest gain in land value occurred for the retail land-use group, with an average gain in value of 26.7 percent. The following table contains the average gain for the five land-use groups for both total property value and land value.

Figure 4: Average Percent Price Premium for Study Properties

Value Type	Retail	Office	Residential	Industrial	Vacant	All Properties
Total Property Value	4.6%	22.7%	–5.2 %	3.8%	–31.5 %	3.1%
Land Value	26.7%	10.1%	7.7%	7.7%	-22.6%	7.5%

Source: Bernard L. Weinstein and Terry Clower – "The Initial Economic Impacts of the DART LRT System"

In examining occupancy and rental rates of commercial properties, Weinstein et al. also found that the introduction of light rail had a positive economic impact. For this analysis, the study looked at 200 office buildings, retail properties and industrial sites within a quarter mile of existing DART stations. The study included rates from two years prior to the start of service because Weinstein et al. surmised that rates would rise in the anticipation of the new light rail service. For the duration of the study, Class A, Class B, Class C, industrial and strip retail had an increase in occupancy and rental rates.

Class A experienced the greatest increase in occupancy rates with properties within the study area experiencing an 80 to 88 percent increase in occupancy rates while the rest of Dallas only rose one percent. Community retail properties (defined as properties with at least one major retail anchor) experienced a slight decrease in occupancy rates and a 29 percent increase in rental rates; meanwhile, occupancy and rental rates for neighborhood retail establishments experienced a minimal positive effect. Regional mall occupancy remained at 100 percent over the course of the study while rental rates increased by 20 percent.

An Assessment of the DART LRT on Taxable Property Valuations and Transit Oriented Development

Professors Bernard L. Weinstein and Terry Clower, 2002.

This study is a follow up to Weinstein and Clower's 1999 study of DART's economic impact. While a slightly different methodology was utilized, the study found that DART continued to have a positive influence on property value within a quarter mile of the station. In addition to analyzing property value with respect to proximity to a DART station, this study also discussed how DART influenced Transit Oriented Development in the Dallas suburbs. In general, the report concluded that DART continues to have a positive effect on property value and economic development in the Dallas, Texas metropolitan region.

The study analyzed property value for all properties located within a quarter mile radius of 23 rail stations for the time frame of 1997 to 2001. Unlike the initial study, this study did not include properties within the central business district because they felt that the extensive use of tax increment financing would skew analysis of DART's impact on property value. Residential and office buildings experienced the greatest positive impact, with property values increasing by 12.6 and 13.2 percent respectively, as compared to the control group.

However, retail and industrial did not experience a significant increase in property value as a result of their proximity to the light rail station. Similar to Weinstein's previous study, the properties were grouped by land-use: residential, office, retail and industrial. Residential properties were divided into two groups: those with improvements and those that were vacant. This study utilized data from the Dallas County Central Appraisal District. The study focused on median property value for each land-use group. The following table contains the percent change in property values for the five land-use groups from 1997 to 2001.

Figure 5: Changes in Median Property Valuations, 1997-2001

Data Set	Office	Residential	Residential-Vacant	Retail	Industrial
DART Properties	24.7%	32.1%	11.1%	28.3%	13.0%
Control Group	11.5%	19.5%	0.0%	30.4%	21.5%

Source: Bernard L. Weinstein and Terry Clower – "An Assessment of the DART LRT on Taxable Property Valuations and Transit Oriented Development"

With respect to transit oriented development, Weinstein et al. conducted interviews with leaders of 15 suburban communities within the Dallas metropolitan area. The interviews consisted of five questions constructed to gauge how the communities viewed the light rail system and its influence on economic development.

The study found that all of the cities had positive views regarding the light rail system and that most were planning or constructing mixed use projects around the station. In addition, six of the non-DART cities expressed a desire to have their city integrated into the DART system. These same cities also acknowledged that the new system had become a driver for regional economic development. Overall the study found the light rail system to be welcomed and integrated into the economic development plans for the communities included in the study.

Land Value Impacts of Rail Transit Services in San Diego County

Professor Robert Cervero and Michael Duncan, 2002.

Commissioned by the National Association of Realtors and the Urban Land Institute, Professor Robert Cervero with the assistance of graduate student Michael Duncan examined the effect of light rail and commuter rail on property values in three California communities San Diego, Santa Clara County and Los Angeles County. Professor Robert Cervero is director of the Institute of Urban and Regional Development at the University of California at Berkeley and one of the most prolific academic researchers on transit and land use.

For the study of San Diego, Cervero et al. focused on both residential and commercial properties and found that properties experienced an accessibility benefit when located near either a rail line or rail station. Residential properties experienced the greatest increase when located near a commuter rail station and commercial properties experienced a 91 percent premium if located within a commercial business district near a commuter rail station.

This report utilized hedonic price modeling to determine both the commuter rail and light rail system's impact on land values within San Diego County. Cervero et al. examined the two rail based transit systems that service San Diego County: San Diego Trolley and the Coast Express Rail Service (Coaster). The San Diego Trolley, a light rail system, began revenue service in 1981 and has increased its service area several of times over its 28-year history, with its most recent expansion occurring in 2005, the extension of the Green Line. The light rail system currently has 53 stations and 52 miles of double track rail.[vi] The Coaster, a commuter rail line, operated by North San Diego Transit Development Board, began revenue service in 1995.

Cervero et al. focused on land-value premiums as they "offer an objective, transparent, and tractable means of placing a monetary value on the benefits of being near transit stations." The study utilized data from *Metroscan,* a proprietary database of all real-estate sales transactions, the 2000 Census, and data collected by the San Diego Association of Governments. Included in the study were commercial parcels sold between 1999 and 2001 and residential parcels sold in 2000. The study utilized a multiple year date range for commercial properties in order to obtain a sufficient size data set. Cervero et al. believed that a system must mature before a capitalization effect can be detected. Thus the study's date range was significant, as it constituted a substantial time period from when the rail services were introduced. Records were only included if they were within a half-mile of a rail station (either Coaster or Trolley) and if the sale price was within 10 percent of the assessed value.

The data parcels were broken into four property types: multi-family (rentals), condominiums, single-family and commercial under the assumption that capitalization effects can vary across different land uses. For the majority of property types the study found that there were appreciable land-value premiums if the parcel was located near a rail station. Commercial properties experienced the greatest premium of the four property types. Residential properties also experienced a price premium; however, premiums varied greatly by property type and rail corridor. The following is a summation of the results of the study on the four property types.

- **Single-family:** Single-family properties experienced the greatest price premium when located near non-downtown Coaster stations and a negative or nominal premium when located near a light rail station. The study assumed that these properties were comprised of higher income residents who value transit only when it improves their commute to work.
- **Condominiums:** Condominiums experienced a price premium when located near either a commuter rail or light rail station; however the premium was greater when located near a commuter rail station.
- **Multi-family (rentals):** Multi-family (rental) properties, in comparison to the other residential properties, experienced the opposite effects. Properties actually decreased in value when located in proximity to a Coaster station. However, multi-family (rental) properties benefit when in close proximity to all light rail stations.

- **Commercial:** Commercial properties experienced substantial premiums if located near downtown Coaster station or the Mission Valley commercial corridor indicating that commercial properties reap benefits if the rail station is located within an existing commercial district.

Following the summary is a table depicting the actual price premiums/discounts for each property type.

Figure 6: Price Premium by Parcel Type

Condominiums	
Rail Line	**Premium**
Trolley: South Line	4%
Trolley: East Line	6%
Trolley: North Line	3%
Trolley: Downtown	2%
Coaster	46%
Average	**12%**

Multi-Family (rentals)	
Rail Line	**Premium**
Trolley: South Line	10%
Trolley: East Line	17%
Trolley: North Line	4%
Trolley: Downtown	5%
Coaster	-7 %
Average	**6%**

Single Family	
Rail Line	**Premium**
Trolley: South Line	1%
Trolley: East Line	-1.5%
Trolley: North Line	-4.2%
Trolley: Downtown	N/A
Coaster	17%
Average	**4%**

Commercial	
Rail Line	**Premium**
Trolley: South Line	-9%
Trolley: East Line	-1%
Trolley: North Line	72%
Trolley: Downtown	4%
Coaster: Downtown	91%
Coaster: Non-Downtown	-10%
Average	**25%**

Source: Robert Cervero and Michael Duncan "Land Value Impacts of Rail Transit Services in San Diego"
Note: The Trolley is a light rail system.

San Jose, California

The following three studies all evaluated rail based transit's effect on land value in the San Jose metropolitan region. Both commuter and light rail transit systems exist in the San Jose metropolitan region. The commuter system, provided by the Joint Powers Peninsula Board under the service name of Caltrain, runs along the San Francisco peninsula connecting the cities of San Jose, San Francisco and numerous smaller cities in between.

The light rail system is operated by Santa Clara Valley Transit Authority (VTA), which services the entire San Jose metropolitan region. Commuter rail service between San Jose and San Francisco has been in existence since the region was initially developed**.** Light rail service was introduced to Santa Clara County in 1987 with an initial nine-mile segment from Santa Clara through downtown San Jose. Over the years VTA's light rail system has expanded to include 62 stations located over 42 miles of track. The most recent extension opened in 2005.[vii]

When utilizing the San Jose market as a case study one must take into account that the San Jose economy has been one of the most volatile in the United States over the last decade. In the 1990s, the San Jose metropolitan area, also referred to as Silicon Valley, was home to the information technology revolution. Real Estate, both commercial and residential, was in great demand. However, with the burst of the "dot com" bubble, the region's economy suffered greatly. Entire office parks stood vacant and commercial development essentially stopped within the region. All of the academic studies reviewed in this paper were conducted prior to the economy's downturn and are thus excellent references for regions with strong economies.

The following three studies all evaluated rail based transit's effect on land value in the San Jose metropolitan region. Academics from the University of California at Berkeley conducted the three studies. Funded by the Lincoln Institute of Land Policy, Professor Rachel Weinberger, currently assistant professor of transportation planning at the University of Pennsylvania School of Design examined rail's effect on commercial rents within Santa Clara County. Professor Robert Cervero and Michael Duncan, both of the University of California at Berkeley, conducted two studies: one focusing on commercial properties and another focusing solely on residential properties. Cervero and Duncan's study of commercial properties was prepared for the National Association of Realtors and the Urban Land Institute. All three studies found rail to have a positive effect on property located within a quarter mile of a rail station.

Commercial Rents and Transportation Improvements: Case of Santa Clara County's Light Rail

Professor Rachel Weinberger, 2000.

Professor Rachel Weinberger, in 2000, evaluated the Santa Clara Valley Transportation Authority (VTA) light rail system's effect on commercial property. The study utilizes hedonic price modeling to evaluate transit's effect over a time frame of 16 years. Weinberger's central research question was "What is the effect of proximity to light rail on commercial property values?" with the hypothesis that proximity to rail has no effect on rents. However, results of the study indicated that her hypothesis was false. The study found that properties within a half-mile of light rail stations command higher rents than comparable properties in the region. In addition, since the study spanned over two decades, Ms. Weinberger was definitively able to determine that "as the transit system matured, greater benefits accrued to the proximate properties, but in times of more intense general market pressure, the rent premium dampened."[viii]

Data for the study was extracted from a large private real estate brokerage firm's database that contained information on over 5,000 lease contracts beginning in 1984. Of the available data, the study included 3,400 lease transaction records which occurred from 1984 to 2000. The distance variable for the study was defined as the distance to the nearest light rail station. Overall the records were located in 10 of the 15 cities within Santa Clara County, with the city of San Jose constituting over a third of the records.

With respect to the distribution of leases over the date range of the study, the majority of the records occurred in 1999. The study noted that the real estate market was extremely strong in 1999. Since the records span over 16 years, periods of recession were included in the study. However, in general, Weinberger determined that commercial real estate trended upward over the time frame of the data set. The data records were separated into five distinct groups based on distance to the nearest light rail station. The following table delineates the distance distribution of the properties.

Figure 7: Distribution of Parcels by Distance

Distance	Parcels	Distribution
Within a quarter of a mile	508	13.8%
Quarter to half mile	322	8.8%
Half to three quarter mile	197	5.4%
Three-quarter to 1 mile	78	2.1%
Beyond 1 mile	2,570	69.9%
Total	**3,675**	**100%**

Source: Rachel Weinberger "Commercial Rents and Transportation Improvements: Case of Santa Clara County's Light Rail"

Utilizing hedonic price modeling, Weinberger was able to determine that there is a distinct premium associated with proximity to rail and the premium decreased as distance increased. Properties within a quarter mile of a light rail station experienced the highest premiums. A slightly lower premium existed for properties located a quarter to a half a mile from a light rail station. Weinberger could not establish a relationship between parcel location and distance to station for parcels located beyond a half mile in distance of a light rail station. However, she surmised that rail had no effect after a half a mile, as a half a mile is the typical maximum distance a pedestrian is willing to walk to access a transit station. The value premium varied by timeframe, with properties holding a higher rental premium during times of economic stress (+13%) than during times of economic boom (+5%) compared to similar properties not in proximity to rail stations.

Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values

Professor Robert Cervero and Michael Duncan, 2002.

Professor Robert Cervero and Michael Duncan also conducted a study of rail's effect on commercial land value within Santa Clara County. This study, published a year after Weinberger's, examined both the commuter and light rail systems. In accordance with Weinberger's study, Cervero et. al determined there to be a premium for parcels located within walking distance of a rail station. Commuter rail appeared to have a stronger effect on land value than light rail. Furthermore commercial land located within a central business district experienced an even greater premium. As Cervero et al. states "in a landscape of campus-style offices, auto-oriented retail strips, free and plentiful parking and super-block development, only those commercial parcels that are within walking and often visual distance of stations are worth more per square foot." [ix]

Utilizing a hedonic price model, Cervero et al. limited their study to only those commercial transitions that occurred between 1998 and 1999. Furthermore only transactions for commercial, office and light industrial properties were included in the study. The study utilized data from Metroscan, a proprietary database of all real-estate sales transactions. Cervero et al. believed that a system must mature before capitalization will be reflected in the value of land; thus the study's date range was significant as it constituted a substantial time lapse from introduction of the rail services were introduced. In addition the years 1998 and 1999 represented a period of rapid growth and escalating land prices. Cervero et al. only focused on the estimated value of the land parcel, excluding the value of the improvements. The study included 1,197 parcels that were grouped into the following specific land-use categories:

- Commercial: Business District, San Jose Central
- Commercial: Business District, Local
- Commercial: Retail not in Shopping Center
- Commercial: Community Shopping Center
- Commercial: Neighborhood Shopping Center
- Commercial: Regional or Specialty Shopping Center
- Industrial or Manufacturing: Research and Development
- Professional: Offices, Banks, and Clinics

"Professional: Offices, Banks, and Clinics" and "Commercial: Retail not in a Shopping Center" constituted over 80 percent of the data set.

The study found that commercial land located in a business district and within a quarter mile of a Caltrain commuter rail station experienced a 120 percent price premium (about $25 per square foot more than comparable properties). Cervero et al. surmised that the great premium for commercial property near commuter rail stations reflected the affordable housing crisis that was present in the region during the time of the study. "To many employers, commuter rail lines function as conduits to affordable housing, helping not only to temper wages but also recruit and retain workers."

Proximity to light rail stations conferred a 23 percent price premium, about $4 per square foot more than comparable properties. Unlike commuter rail, this premium for proximity to light rail appeared regardless

of whether the land was within a central business district. However, non-residential parcels located in downtown San Jose were worth on average $19 more per square foot than other non-residential parcels located within a quarter mile of a light rail station. Because a premium occurred regardless of the existence of a central business district, Cervero et al. noted that even a stand-alone office campus located in a single-use environment benefited by its proximity to a light rail station.

Benefits of Proximity to Rail on Housing Markets: Experiences in Santa Clara County

Professor Robert Cervero and Michael Duncan, 2002.

Cervero and Duncan also conducted a separated study of rail's effect on residential properties within Santa Clara County. The data sampling included single family, multi-family (rentals) and condominium parcels. Utilizing hedonic price modeling, Cervero et al. found that like the commercial properties, residential properties also experienced a price premium if located within a quarter mile of a rail station. With respect to light rail, only multi-family (rental) properties, defined as land zoned for apartments with five units or greater, experience a price premium, while commuter rail benefited all residential properties regardless of property type.

The data consisted of land value records for 7,100 residential parcels sold during the year 1999. The study utilized data from Metroscan, a proprietary database of all real-estate sales transactions. Cervero et al. selected the year 1999 because it was a buoyant economic period and substantial time had lapsed for the system to mature and thus enable the proximity benefits to be reflected in the property value. Cervero et al. only focused on the estimated value of the land parcel, excluding the value of the improvements. With respect to the condominium parcels, Cervero et al. prorated the share of the total land area to each unit based on a unit's share of total structure area. Of the data set it was determined that the average residential parcel was valued at over $20 per square foot while vacancy rates for rental properties was at a mere one percent. Cervero et al. inferred that the high unit value and low vacancy rate indicated a great demand for affordable housing during the year 1999.

The study found that all residential properties experienced a price premium of 20 percent when situated near a Caltrain commuter rail line. Only multi-family (rental) parcels experienced a 45 percent price premium (or $9 more per square foot) when located within a quarter mile of a light rail station. Furthermore it was determined that accessibility of residential parcels to jobs also increased land values, with a greater benefit occurring for jobs accessible via the transit network rather than the highway network. In addition, Cervero et al. inferred from the model that residential land value increased by almost $30 per square foot for every 100,000 additional jobs that were accessible via public transit within a commute time of 15 minutes or less. Overall, the study indicates that residential properties in Santa Clara County experience a substantial price premium if located within walking distance of a rail station.

Measuring the Impact of Light Rail Systems on Single Family Home Values: A Hedonic Approach with GIS Application

Professor Kenneth J. Dueker, Hong Chen and Anthony Rufolo, 1998.

Professor Kenneth Dueker of the Center for Urban Studies at Portland State University, assisted by Anthony Rufolo and Hong Chen, evaluated the effect of Portland's light rail system, the Metropolitan Area Express (MAX), on single-family property value. MAX commenced service in 1986, covering 15 miles of track with 27 stations, 5 park-and-ride facilities, and 5 transit centers. The system expanded a number of times, most recently in 2009, and currently includes 84 stations located along 52 miles of track.[x] The study used distance to rail stations to determine rail's accessibility effect and distance to the track to determine rail's nuisance effect. Results from hedonic price modeling found that as distance from the station increased property value decreased. The study also found a negative nuisance effect. The accessibility effect dominated the negative nuisance effect creating a price premium for single-family homes located in close proximity to a rail station. However, the study found that the price premium only applied to homes within a quarter mile of a rail station.

The study was a replication and extension of a 1993 study conducted by Al-Mosaind et al. Both studies found that property value decreased as distance from a rail station increased. Dueker et al.'s study was conducted on a much larger data set and used data from 1992-1994 (six to eight years after the system commenced operation). Dueker et al. determined that property value per parcel decreased at the rate of $32.30 per meter away from the station while the earlier study found the decrease to be only $21.75 per meter. Dueker et al. noted, when taking inflation into account, the difference in the decrease was significant as it demonstrated that as a transit system matured the market places a greater value on transit access.

Light-Rail Transit in America: Policy Issues and Prospects for Economic Development

Thomas A Garrett, 2004.

In 2004, Thomas Garrett, a Research Officer at the Federal Reserve Bank of St. Louis examined light rail's effect on economic development by providing a history of light rail, examining five key issues concerning the benefits of light rail, reviewing the academic literature on the subject and conducting an empirical analysis of light rail's effect on property value in St. Louis. The historical section provides a basic understanding of the history and development of rail transit systems by distinguishing the various types of rail and describing rail transit evolution from heavy commuter rail systems to modern day light rail networks. The report then discusses the five key economic policy issues that encapsulate the light rail development debate. The issues were identified as job creation, car vs. rail preference, air pollution, traffic congestion and cost efficiency and solvency.

After the background information and literature review were provided, Garrett presented his empirical analysis of MetroLink, the light rail system in St. Louis, effect on property value. MetroLink commenced service in 1993 with an initial line comprised of 16 stations stretching over 17 miles of track. Since its inception the service area was expanded several times, in 1994, 1998, 2001 and 2003. Currently, the system has 46 miles of track and 37 stations, 18 of which have park-and-ride lots.[xi]

The empirical analysis focused on residential properties sold between 1998 and 2001. The study comprised of 1,516 homes located within one mile of a MetroLink station or track in St. Louis County. Utilizing a hedonic price method, Garrett considered both the positive accessibility effect and the negative nuisance effect that rail transit is traditionally believed to have on property value. The study found that distance from a MetroLink station has a significant influence on property values. An accessibility effect occurred for homes located within a quarter mile of a MetroLink station. For every 10 feet closer to a station, property value increased on average by $140. However, beyond a quarter mile, property value actually increased as distance from the station increased. Thus, the study inferred that the positive accessibility effect only applied to homes located within a quarter mile distance of a MetroLink station.

With respect to the negative nuisance effect, the report found that proximity to the rail track did not have a negative effect on homes located less than a half mile from a MetroLink station. In fact property values of homes located within 2,300 feet and 2,800 feet (about a half a mile) of the track experienced a slight increase. After the 2,300 feet mark, for every ten feet away from the track property value increased by $12, cresting for homes located at 2,800 feet. Beyond 2,800 feet, the study found that sale prices decreased at a much greater rate; on average, for every 10 feet increase in distance the price decreased by $54. Thus, on average, a home located one mile from the track will be valued 15 percent lower than if it was located just a half a mile from the track. Garrett surmised "the relatively large decrease in property value beyond 2,800 feet compared with the small gain in value for homes located over 2,300 to 2,800 feet suggests that, for the entire sample of homes, property value decreases with distance from a MetroLink track." Thus, Garrett inferred that the proximity to the track does not have a negative effect on property value.

From the results of Garrett's study, one can determine that residential property owner's value access to MetroLink services when they are located within a five-minute walking distance (a quarter of a mile) of the station. Thus, Garrett inferred that St. Louis residents will overlook potential negative nuisance effect to

have easy pedestrian access to a MetroLink station. Since the study was conducted when the system was relatively new, Garrett called for further analysis to be conducted when the system is at the 15 and 20-year mark of service.

The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-analysis

Professor Piet Rietveld, Eric Pels and Ghebreegziabiher Debrezion, 2007.

Reitveld, P., E. Pels and G. Debrezion, 2007. "The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-analysis" University of Amsterdam, Department of Spatial Economics, Amsterdam, The Netherlands.

Professor Piet Rietveld is on the Faculty of Economics and Business Administration in the Department of Spatial Economics at Vrije University, Amsterdam. With Eric Pels, an Assistant Professor, and Ghebgreegziabiher Debrezion analyzed the methodologies used by transit-proximity valuation literature to attempt to reconcile disparate findings on the changes in property value due to transit.

The model used by the paper considers a local station effect that determines the effect on property prices within a quarter mile from transit stations. A second, global effect, determines increases in value per 250 meters of distance a property is from the station. Applying this valuation metric, the paper then identifies variables that caused systemic variation between studies of transit implementations, and found the following to be particularly relevant:

- type of property under consideration (*e.g.* residential, retail, office);
- type of railway station (*e.g.* light rail or commuter);
- the type of model used to derive the valuation;
- presence of specific variables related to accessibility;
- demographic features;
- and the time of data.

Rietveld et al. determined that railway stations have a higher impact on commercial properties as compared to residential properties at close distance from the station. Commuter railway stations have a higher impact than light/heavy rail. Accessibility features of any given location can also impact property value increases; the presence of alternative, competing access such as freeways diminishes the impact of rail access. Increasing housing stock quality also has lesser increases in value due to transit.

The paper concludes that commercial properties benefit the most from close proximity to stations, with commercial property enjoying a 16.4 percent premium while the premium for residential property is 4.2 percent for being within a quarter mile of a transit station. Residential properties, however, fare better at greater distances, where each 250 meters closer to the station a property is, residential is valued 2.3 percent higher than the equivalent commercial property.

Literature Review Notes

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ECONOMIC IMPACT ANALYSIS

INTRODUCTION

To estimate the total economic output, earnings, and employment that may be generated by the proposed Streetcar and induced development and visitation to Downtown Los Angeles, AECOM has conducted a regional economic analysis. The total economic impacts reported represent those expected to occur within the City of Los Angeles. The analysis relies on 2009 Minnesota IMPLAN Group multipliers for Los Angeles County zip codes and on data provided by the client. The analysis does not attempt to capture impacts associated with the proposed Streetcar accruing to areas outside of the City of Los Angeles. 2009 multipliers are the most current available from the Minnesota IMPLAN Group.

Based on the operating and construction budget and project details provided by the client, AECOM has estimated the economic impacts to Downtown Los Angeles and the City of Los Angeles resulting from the Los Angeles Streetcar. Impacts have been categorized as follows:

- Infrastructure improvements
    - LA Streetcar
- Changes in Visitor Spending
    - Convention Delegates
    - Downtown Leisure Visitors
- Induced Development
    - Office
        - Construction
        - Worker and business-related spending Downtown
        - Worker earnings
    - Residential
        - Construction
        - Resident spending in Downtown
        - Household spending

Impacts are further delineated as both one-time construction impacts expected to accrue to the region as a result of the development of the Streetcar, and also as recurring annual impacts as a result of the operations of the Streetcar and related development.

A number of key assumptions have been made in this analysis. These include the following:

- The analysis presents project impacts based on the assumption that the Streetcar is a new addition to the transit service offerings to the downtown area and to the region.
- Impacts from the proposed Streetcar are based on the estimated construction and operating budgets as provided by LA Streetcar, Inc.
- Direct impacts (direct regional expenditures) are the total expenditures captured in the City based on the total project budget adjusted for regional capture and trade, transportation, and wholesale margins.
- Indirect and induced impacts are developed based on the estimated direct regional expenditures causing the initial change in the economy.
- All values are presented in constant 2010 dollars unless otherwise noted.

METHODOLOGY

The following discussion provides a brief introduction to the key concepts and terms involved in a traditional economic impact analysis.

Overview of Regional Economic Analysis

AECOM relies on an input-output (I/O) model to estimate the total economic impact of the proposed Los Angeles Streetcar. Input-output analysis examines relationships within an economy, both between businesses and between consumers and businesses. The analysis captures consumptive market transactions and estimates the resulting "indirect" and "induced" economic effects.

Regional economic analysis and I/O models in particular provide a means to estimate total regional effects stemming from a change in a particular industry. Specifically, I/O models produce quantitative estimates of the magnitude of regional economic activity resulting from a specified change in the regional economy. I/O models rely on multipliers that mathematically represent the relationship between the initial change in one sector of the economy and the effect of that change on economic output, income, or employment in other regional industries.

This regional economic analysis utilizes IMPLAN multipliers (Impact Analysis for Planning), an I/O model developed and maintained by the Minnesota IMPLAN Group (MIG). The IMPLAN model draws upon data collected by MIG from multiple federal and state sources, including the Bureau of Economic Analysis itself, the Bureau of Labor Statistics, and the Census Bureau.

Regional economic analysis provides a means of estimating the significance of economic activity in a regional economy by quantifying contributions to output and employment. Because industries in a geographic area are interdependent, the total economic contribution of any one specific project will be larger than its individual (direct) effect on regional output and employment, a concept referred to as the "multiplier" effect. Industries in a geographic region are interdependent in the sense that they both purchase output from and supply input to other industries in the region. For example, consider the implications of power plant expenditures. These facilities purchase goods from producers, which in turn purchase raw materials from suppliers. Thus, an increase/decrease in the demand for inputs to the power production process will stimulate an increase/decrease in output and employment in the interdependent secondary industries.

Interpretation of Model Results

In order to estimate economic impacts using an I/O model, the analyst must first posit an initial change in output or employment in some sector. The model then translates the initial change into changes in demand for output from other interdependent sectors, corresponding changes in demand for inputs to those sectors, and so on. These effects are commonly described as direct, indirect, or induced, and are generally defined as follows:

- The ***direct effect*** represents the change in output attributable to a change in demand or supply. For example, total expenditures associated with the proposed Streetcar would represent the direct impact of the Streetcar on the economy.
- The ***indirect effect*** results from industry-to-industry transactions. This effect is a measure of the change in the output of suppliers linked to the industry that is directly affected. For example, the proposed Streetcar will purchase goods and services from City of Los Angeles suppliers, who in turn make purchases from their own upstream suppliers. When the Streetcar begins construction and then regular operations, direct and indirect suppliers will experience an increase in demand for their goods and services.
- The ***induced effect*** consists of impacts from employee spending in the regional economy. Employees of the Streetcar and affected businesses contribute to this effect.
- The ***total impact*** is the sum of the direct, indirect, and induced effects. The total effect measures the impact of an activity as it ripples throughout the regional economy.

In the subsequent section, we report the regional economic effects described above in three categories:

- ***Output*** represents the change in regional sales or revenue.
- ***Employment*** represents the change in the number of jobs in the regional economy resulting from a change in regional output.
- ***Earnings*** represent the change in gross employee wages and salaries in the regional economy resulting from a change in regional output.

This regional economic impact analysis considers annually recurring direct, indirect, and induced impacts expected to occur within City of Los Angeles as a result of the operation and maintenance of the proposed Streetcar and induced development and visitation above baseline growth. In addition, the analysis considers one-time economic impacts from construction of and capital investment in the Streetcar and induced office and residential construction.

The following discussion provides an overview of the categories of analysis, selection of input data, and development of final results.

STREETCAR DEVELOPMENT & OPERATION

Construction and operation of the proposed Los Angeles Streetcar and its employees will be a source of economic stimulus within the City of Los Angeles. The Streetcar will purchase inputs to production from within the City of Los Angeles economy, supporting jobs and employee compensation there. Demand that is met by regional suppliers will further stimulate the regional economy by supporting additional jobs and creating additional new demand for raw inputs. The employees of the Streetcar will spend their income on local retail purchases, housing, and other services. These expenditures support regional jobs in the associated industries.

In order to determine the regional economic impact of the Streetcar, this analysis considers regional versus non-regional purchases. A regional economy experiences inflows and outflows of dollars. Outflows represent leakage of purchases and dollars from the regional economy that does not support regional jobs or income within the City of Los Angeles. The analysis also relies on estimates regarding the proportion of goods and services purchased from producers in the City of Los Angeles. The proportion of supplies and labor purchased from regional suppliers is based on estimates by the client, AECOM, and IMPLAN econometric analysis and is limited by the production potential of the regional economy. In addition, some goods and services provided within the City of Los Angeles must also be adjusted to account for transportation costs, trade margins, and in the case of labor estimates, an adjustment from total employer labor costs (inclusive of benefits, taxes, etc.) to employee earnings.

Streetcar Construction

Construction of the Los Angeles Streetcar is expected to provide a significant one-time direct benefit to the City of Los Angeles economy. In addition to temporarily supporting construction labor, the project is expected to require locally-supplied construction materials. Specifically, the client anticipates that development and construction of the Streetcar itself will generate total spending of approximately $125 million over approximately four years, as shown in Figure 8. Using estimates of regional capture (called “RPC” or regional production coefficient) developed by IMPLAN and applied to the development budget, construction of the Streetcar is expected to generate $77 million in one-time direct purchases within the City of Los Angeles, consisting of locally supplied labor and inputs to construction, representing approximately 62% of the total development cost. These purchases represent the direct, one-time impact from construction of the Streetcar. Note that track and vehicle capital costs have been excluded from regional purchases, as LASI anticipates that these products will be sourced from outside the regional economy.

Figure 8: Capital Expenditures, Streetcar (One-Time)

IMPLAN Sector	Industry Description	Streetcar Budget	RPC	Local Capture
289	Railroad rolling stock manufacturing	$ 33,500,000	0.1%	$ 20,000
36	Construction of other new nonresidential structures	$ 61,845,000	100.0%	$ 61,845,000
266	Power, distribution, and specialty transformer manufacturing	$ 9,625,000	24.5%	$ 2,353,000
369	Architectural, engineering, and related services	$ 12,457,000	90.0%	$ 11,211,000
375	Environmental and other technical consulting services	$ 1,500,000	80.0%	$ 1,200,000
360	Real estate establishments	$ 360,000	70.0%	$ 252,000
367	Legal services	$ 240,000	90.0%	$ 216,000
exclude	Other real estate	$ 5,400,000	0.0%	$ -
	Capital Budget	**$ 124,927,000**		**$ 77,097,000**

Source: LASI, AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software)

Based on the anticipated capture of regional direct expenditures, AECOM estimates the direct, indirect and induced, and total regional economic impacts resulting from construction of the Streetcar. These impact estimates are presented in Figure 9.

Figure 9: One-Time Economic Impacts of Construction, City of Los Angeles (Total)

	Jobs	Labor Income($)	Output ($)
Regional Expenditures			$77,100,000
Direct Impact	540	$35,800,000	$77,200,000
Indirect & Induced	370	$20,500,000	$58,200,000
Total Regional Impact	910	$56,300,000	$135,400,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software)

Construction of the Streetcar is estimated to have a total regional impact of $135 million. The regional economic impact represents revenue generated by direct regional spending, indirect spending by construction suppliers, and employee spending in the City of Los Angeles economy. The construction phase of the proposed Streetcar is projected to support direct employment of approximately 500 jobs* with total associated wages of nearly $36 million. Indirect and induced employment is expected to yield an additional 400 jobs within the City of Los Angeles with $21 million in cumulative employee compensation. Construction of the Streetcar is anticipated to support 900 jobs* and approximately $56 million in total labor income during the four-year construction period. For purposes of this analysis, these impacts are all considered net new to the City because the Streetcar is a completely new investment.

Streetcar Operations

The annual operating budget for the Streetcar is anticipated to total approximately $5 million, per the project developer, Los Angeles Streetcar, Inc. This budget provides the basis for estimating regional economic impacts attributable to the operations and maintenance of the proposed transit line.

Based on total operating expenditures provided by Los Angeles Streetcar, Inc., adjusted for regional capture and trade and transportation margins, AECOM expects that operation and maintenance of the Streetcar will generate about $4.6 million in recurring, annual direct spending within the City of Los Angeles, representing a capture rate of approximately 93% of the total annual operating budget.

The Streetcar is anticipated to have a total recurring gross economic impact in the City of Los Angeles economy of $7.4 million (Figure 10). The total economic impact represents revenue generated by direct suppliers to the Streetcar, indirect suppliers to the Streetcar, and employee spending in the regional economy. The annual indirect and induced impact of the Streetcar on output to the region is expected to total about $2.7 million. Indirect impacts represent input producers' spending within the City, via industry-to-industry transactions. The induced impact captures employee spending on goods and services within the regional economy. The Streetcar is anticipated to directly support 50 employees with associated labor income of $3.7 million, and indirectly support approximately 20 jobs with $900,000 in employee compensation. In total, an estimated 70 jobs in the City of Los Angeles will be directly or indirectly attributable to the Streetcar.

For purposes of this analysis, these jobs are all considered net new to the City because the Streetcar is a completely new investment in Los Angeles. If there are cancellations or cutbacks to existing transportation services as a result of investment or operation in the Streetcar, then the loss of these economic activities must also be considered. Such impacts have not been estimated in this analysis.

Figure 10: Recurring Annual Economic Impacts from Streetcar Operations, City of Los Angeles

	Jobs	Labor Income ($)	Output ($)
Operating Budget			$5,000,000
Direct Impact	50	$3,700,000	$4,600,000
Indirect & Induced	20	$900,000	$2,700,000
Total Regional Impact	70	$4,600,000	$7,400,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software). Jobs rounded to nearest 10, income and output rounded to nearest 100,000

INDUCED VISITATION

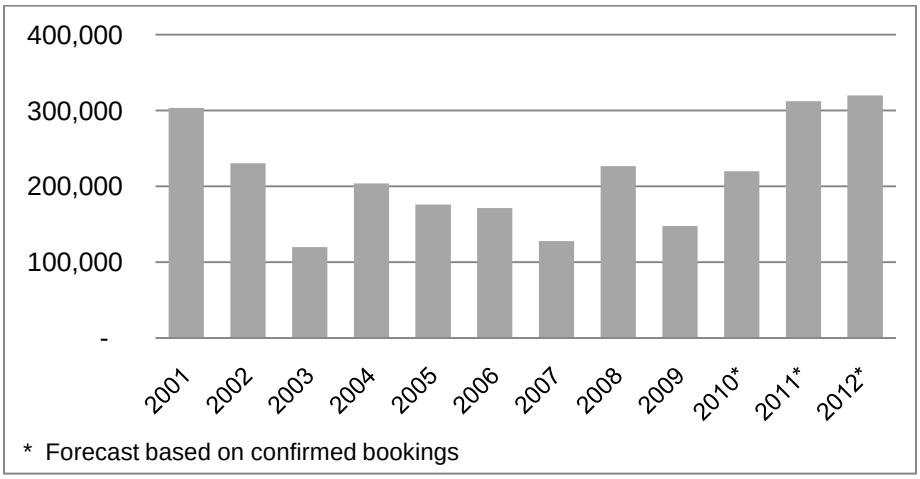
By creating a more connected and accessible Downtown, the Streetcar is likely to induce higher delegate attendance at the Los Angeles Convention Center and a longer length of stay by local and regional visitors to Downtown. The streetcar will also promote a "park-once" mentality by providing frequent, easy connections between destinations within the Downtown region, inducing local and regional visitors to increase their length of stay.

Increase in Convention Attendance

To estimate the potential impact to convention visitors, AECOM interviewed staff at the Los Angeles Convention and Visitors Bureau, reviewed published and private data on historical performance at the Los Angeles Convention Center (LACC) and the Downtown Los Angeles hotel market, and interviewed key executives at other convention centers around the country where streetcars are part of the urban fabric and integrated into convention planning.

The LACC has experienced wide volatility in room night bookings over the past decade. From 1999 to 2001, major regional competitors San Diego and Anaheim were engaged in construction, so LACC captured particularly high bookings (as evidenced in the chart below). Business travel dropped significantly during the middle part of the decade, and only recently has the forecast begun to recover. Confirmed convention bookings through 2012 indicate strong performance is likely over the next two years, helped by the opening of LA Live, including the JW Marriott and Ritz Carleton hotels, and business expectations of an improved economic outlook.

Figure 11: Convention Room Nights (City of Los Angeles)



Source: Los Angeles Convention and Visitors Bureau

Based on the five-year room night history and forecast (2008-2013), the Convention Center books an average of 245,000 room nights per year in City of Los Angeles hotels. The average convention delegate spends $314 per room night booked, while convention organizers and exhibitors spend $42 and $109 per room night (Figure 14).

Research undertaken in the course of this study indicates that the Streetcar is unlikely to induce a new convention at the LACC. Convention center staff from various cities, however, agree that the streetcar is a key amenity that makes their venues more competitive as destinations, more convenient for guests, and more likely to induce larger attendance at existing conferences. AECOM has therefore modeled three scenarios to illustrate the potential impact of a range of increases in annual room nights booked resulting from the development and marketing of the Streetcar as an amenity to conventions and other events at the LACC.

Under the moderate scenario, a modest one percent increase in convention attendance would result in 2,300 new Downtown room hotel nights and nearly $900,000 in related spending on a recurring, annual basis (Figure 15). Cumulative city revenues from parking, sales, and hotel tax would total more than $1.0 million over the study period. An increase in convention attendance related to the streetcar is likely to be a relatively rapid response that would stabilize within five years of the opening date and would be sustained over time. Total spending estimates range from $400,000 (low) to $1.3 million (high) annually depending on the scenario.

Under the moderate scenario, new convention attendees are estimated to have a regional impact of $860,000 in new output, with all of the spending assumed to be net new to the City of Los Angeles. New spending is projected to support direct employment of approximately 6 jobs with associated wages of nearly $200,000. Indirect and induced spending is anticipated to support an additional two new jobs for a total regional impact of eight net new jobs across the City of Los Angeles with approximately $310,000 in employee compensation on an annual, recurring basis.

Figure 12: Recurring Annual Economic Impacts from New Convention Spending, City of Los Angeles (Medium Scenario)

New Spending Downtown	$900,000
Net New Factor Adjustment	100%

	Jobs	Labor Income	Output
New Downtown Jobs	6	$190,000	
Direct Impact	6	$190,000	$510,000
Indirect & Induced	2	$120,000	$340,000
Total Regional Impact	8	$310,000	$860,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software)

Local Visitor Impacts

To estimate the potential impact of the Streetcar to Downtown businesses, AECOM relied on interviews, research into the Downtown Los Angeles visitor market, literature reviews, and staff expertise in development and implementation of urban transit systems and downtown revitalization. AECOM therefore modeled three scenarios to illustrate the potential impact of a range of increases in visitor length-of-stay resulting from the development of the Streetcar as an amenity to Downtown leisure visitors.

There is no single, reliable source of estimated visitation specifically to entertainment, events, and attractions in Downtown Los Angeles. AECOM developed an estimate of downtown visitation and visitor mix (employee, resident, daytrip visitor, overnight visitor) to key anchor attractions including LA Live, Staples Center, Walt Disney Concert Hall, MOCA, the Downtown Art Walk, and other venues. This was not meant to be an exhaustive list, but rather to provide a baseline visitor estimate for scenario planning. AECOM then used visitor spending data from LA Inc. to estimate the impact of a two-hour increase in the length of stay for visitors to Downtown visitor-serving business establishments.

Under the moderate growth scenario , a two-hour length of stay (LOS) increase in one percent of estimated visitors would result in $5.7 million in new food and beverage, retail, parking, and entertainment spending on a recurring, annual basis (Figure 19). Total estimates of new spending in Downtown Los Angeles range from $2.8 million (low) to $8.5 million (high) annually depending on the scenario. New spending is highly dependent on visitor capture estimates.

Cumulative city revenues from applicable sales taxes would total nearly $1.5 million over the study period. An increase in length of stay for some portion of downtown visitors is likely to be a relatively rapid response that would stabilize within five years of the opening date and would be sustained over time.

Half of the induced spending is assumed to be net new to the City of Los Angeles, with the remainder a result of substitution from one part of the City to another. Given annual Downtown spending of $5.7

million under the moderate scenario, total new regional output is approximately $3.5 million. New visitor spending is projected to support approximately 70 jobs in Downtown Los Angeles, with 30 net new to the City of Los Angeles. New spending is anticipated to support a total of 40 net new jobs across the City of Los Angeles with approximately $1.6 million in employee compensation on an annual, recurring basis.

Figure 13: Recurring Annual Economic Impacts from Increased Visitor LOS & Spending, City of Los Angeles (Medium Scenario)

New Spending Downtown	$5,700,000
Net New Factor Adjustment	50%

	Jobs	Labor Income	Output
New Downtown Jobs	70	$2,100,000	
Direct Impact	30	$1,000,000	$2,100,000
Indirect & Induced	10	$500,000	$1,500,000
Total Regional Impact	40	$1,600,000	$3,500,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software)

Visitor Impacts Summary

Under a moderate growth scenario (Figure 15 and Figure 20), combined expenditures by convention and leisure visitors would support $6.5 million in new annual spending on food and beverage, hotel, retail, and other purchases. These expenditures will support 100 new jobs in Downtown Los Angeles with total employee compensation of $2.3 million annually. Over the 25-year study period, cumulative sales tax and parking revenues of $1.5 million and cumulative hotel tax revenues of $1.0 million will accrue to the City's General Fund.

Using these estimates, AECOM estimated the total impact of induced convention and leisure visitor spending in Downtown Los Angeles in terms of jobs, spending, hotel room nights, taxes, and economic impact, induced above baseline growth by the Streetcar. Under moderate growth projections, the Streetcar is projected to induce:

- Nearly 100 new jobs in Downtown Los Angeles
- $6.2 million in retail, food and beverage, and other spending annually
- Demand for 2,300 annual room nights with $400,000 in annual room revenues
- $2.5 million in cumulative City tax revenues over the study period

There are no expected construction impacts from increases in convention attendance and downtown visitation.

Figure 14: Average Direct Spending by Convention Participant per Room Night Booked (2010$)

	Delegate	Organizer*	Exhibitor*	Total
Hotel*	$168	$0	$0	$168
Food & Beverage	$80	$11	$31	$123
Parking/Tolls	$7	$0	$0	$7
Entertainment	$4	$0	$0	$4
Retail Shopping	$15	$2	$11	$28
Other	$2	$28	$66	$97
Total	$314	$42	$109	$427

*Totals exclude staff living costs for organizers and delegates.
Source: LA Inc., LAEDC Report: The Economic Impact of Convention and Trade Show Spending in Los Angeles (2008). Values in 2010$.

Figure 15: Convention Center Scenarios: New Spending in Downtown Los Angeles (2010$)

		Low	Med	High
Dowtown Capture of New Spending				
Hotel	**95%**			
Other Spending	**75%**			
Average Convention Room Nights (2008-2012)	245,000			
Increase in Bookings		**0.5%**	**1.0%**	**1.5%**
New Downtown Room Nights		1,200	2,300	3,500
Average Delegate Hotel Spend/Night	$168			
New Spending	Spend/Night			
Room Revenues (annual)	$168	$ 196,000	$ 392,000	$ 588,000
Food & Beverage	$123	$ 113,000	$ 225,000	$ 338,000
Parking	$7	$ 7,000	$ 13,000	$ 20,000
Entertainment	$4	$ 4,000	$ 8,000	$ 11,000
Retail	$28	$ 26,000	$ 52,000	$ 77,000
Other	$97	$ 89,000	$ 178,000	$ 267,000
Total New Downtown Spending		$ 400,000	$ 900,000	$ 1,300,000

Note: Local capture of new spending estimated by AECOM. Total spending rounded to nearest 100,000.

Figure 16: Estimated City Revenues from Induced Convention Center Attendance, Annual and Cumulative

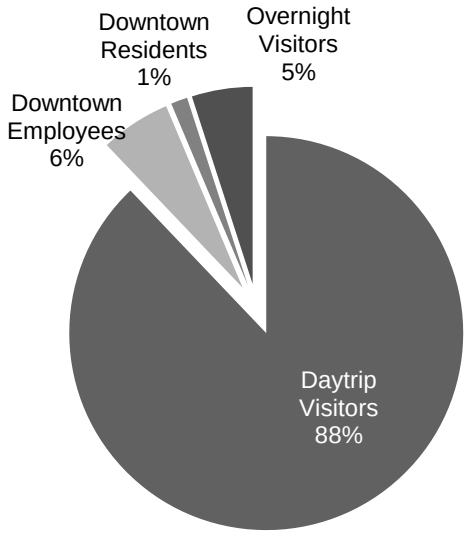
	Rate	Low	Med	High
Hotel Tax Revenues	14%	$ 27,000	$ 55,000	$ 82,000
Parking Tax Revenue	10%	$ 1,000	$ 1,000	$ 2,000
Sales Tax Revenue	1%	$ 1,000	$ 3,000	$ 4,000
Recurring Annual (by 2020)		$ 30,000	$ 59,000	$ 88,000
Total Cumulative (by 2035)		$ 516,000	$ 1,032,000	$ 1,547,000

Note: Sales tax revenues only include the portion of the sales tax that accrue to the City of Los Angeles. Values rounded.

Figure 17: Estimated Visitation to Select Downtown Los Angeles Destinations

	Estimated Annual Attendance	Daytrip Visitors	Downtown Employees	Downtown Residents	Overnight Visitors
Universe		17,900,000	250,000	43,600	23,800,000
					962,160
LA Live					
Nokia Theater	500,000	**95%**	**3%**	**1%**	1%
Regal Cinemas	1,262,000	**95%**	**3%**	**1%**	1%
Club Nokia	201,000	**95%**	**3%**	**1%**	1%
Restaurants / Other Events	13,037,000	**85%**	**8%**	**0%**	7%
Staples Center	3,800,000	**95%**	**2%**	**0.5%**	2.5%
Music Center	1,300,000	**95%**	**2%**	**1%**	2%
MOCA (at Grand)	150,000	**90%**	**2%**	**1%**	7%
Geffen Contemporary	175,000	**90%**	**3%**	**1%**	6%
California Plaza	60,000	**95%**	**4%**	**1%**	0%
Orpheum Theater	56,000	**95%**	**4%**	**1%**	0%
Downtown Artwalk	240,000	**85%**	**10%**	**5%**	0%
Fashion Institute	750,000	**70%**	**0%**	**30%**	0%
Total	21,531,000	18,923,000	1,241,000	293,000	1,074,000
		88%	6%	1%	5%

Daytrip Visitor Estimate	
Daytrip Visitors to Major Attractions	18,923,000
Gross-up Factor	**10%**
Total Attendance	20,815,000
Annual Visits per Visitor	1.2
Downtown Employee Estimate	
Downtown Employee Visitors to Maj	1,241,000
Gross-up Factor	**25%**
Total	1,551,000
Annual Visits per Employee	6.2
Downtown Resident Visitor Estimate	
Downtown Resident Visitors to Majo	293,000
Gross-up Factor	**25%**
Total	366,000
Annual Visits per Visitor	8.4
Overnight Visitor Estimate	
Overnight Visitors to Major Attractior	1,074,000
Gross-up Factor	**25%**
Total	1,343,000
Annual Visits (LA County)	0.1
Annual Visits (Downtown Hotel Gues	1.4
Total estimated visitors to downtow	**24,075,000**
Less Employees & Residents	1,917,000
Less Convention Center Overnights	**245,000**
Total overnight & daytrip visits	21,913,000



Source: LA Live, StaplesCenter.com, MusicCenter.org, The Museum Directory, ArtWalk LA, FIDM.com, AECOM

Figure 18: Visitor Spending Profile

	Downtown	
Rental Car	$228	12%
Gasoline	$56	3%
Lodging	$657	34%
F&B Eating Out	$277	14%
F&B Eating In (Groceries)	$80	4%
Admission/Entertainment	$174	9%
Shopping/Gifts/Souvenirs	$248	13%
Parking/Tolls	$39	2%
Amenities (Spa, grooming, health club, etc.)	$157	8%
Average Spending Per Travel Party	$1,916	100%

Average Party Size	2.5	
Average LOS	1.7	
Average Spending Per Visitor	$766	
Average Spending per Visitor Per Night	$451	
Typical Day	7am - 10 pm	
Hours in a Day	15	hours

Spending per Visitor per Night	2005$	2010$	2010$ Per Hour
Rental Car	$54	$60	$4.00
Gasoline	$13	$15	$0.98
Lodging	$155	$173	$11.53
F&B Eating Out	$65	$73	$4.86
F&B Eating In (Groceries)	$19	$21	$1.40
Admission/Entertainment	$41	$46	$3.05
Shopping/Gifts/Souvenirs	$58	$65	$4.35
Parking/Tolls	$9	$10	$0.68
Amenities (Spa, grooming, health club, etc.)	$37	$41	$2.76
Average Spending Per Travel Party	$451	$504	$34

Source: LA Inc, Domestic overnight visitor spending profile, 2005

Figure 19: Extended Visitor LOS Scenarios: New Spending in Downtown Los Angeles (2010$)

		Low	Medium	High
Scenario - Capture rate for extended LOS		**0.5%**	**1.0%**	**1.5%**
Captured visitors who extend LOS		110,000	219,000	329,000
Additional LOS (hours)	**2.0**			
New Spending	Visitor Spend (per Hour)	Low	Medium	High
Room Revenues (annual)	n/a			
Food & Beverage	$4.86	$1,066,000	$2,131,000	$3,197,000
Parking	$0.68	$150,000	$300,000	$450,000
Entertainment	$3.05	$669,000	$1,339,000	$2,008,000
Retail	$4.35	$954,000	$1,908,000	$2,862,000
Total New Downtown Spending (annual)	$12.95	$2,839,000	$5,678,000	$8,516,000

Source: AECOM

Figure 20: Estimated City Revenues from Induced Length of Stay by Downtown Visitors

	Rate	Low	Med	High
Hotel Tax Revenues	14%			
Parking Tax Revenue	10%	$15,000	$30,000	$45,000
Sales Tax Revenue	1%	$27,000	$54,000	$81,000
Recurring Annual (by 2020)		$42,000	$84,000	$126,000
Total Cumulative (by 2035)		$733,000	$1,466,000	$2,199,000

Note: Sales tax revenues only include the portion of the sales tax that accrue to the City of Los Angeles. Values rounded.

OFFICE DEVELOPMENT

Development Forecast: A key task in the assessment of economic impact is real estate market assessment of likely impacts on development and renovation within the Los Angeles Central Business District. This task required several steps in order to develop projections for Downtown Los Angeles. First, the study area was defined as the region bordered by the 101 Freeway on the north, the 110 Freeway on the west, Interstate 10 on the south, and Los Angeles Street on the east. Long-term office construction trends in Downtown were reviewed from 1970 to present.

Detailed data on office space construction, demolition, occupancy and absorption in the study area were examined to calculate long-term construction requirements in five-year increments. In the fourth quarter 2010, the Downtown Los Angeles office market consisted of approximately 260 buildings, with 53.2 million square feet of total rentable building area (RBA), average vacancy of 12.2%, and an average rent (full-service gross or FSG) of nearly $30 PSF, as reported by CoStar, a leading provider of commercial real estate data in the United States . The Downtown Los Angeles office market constituted approximately one-third of occupied space in the City of Los Angeles, and 13% of occupied space in Los Angeles County. The average annual demand for new space, including construction and demolition, totaled approximately 483,000 SF per year from 1996 to 2010.

A **Base Case** scenario forecast of Downtown office construction requirements was developed for the next 25 years (*study period*: 2011 to 2035), based on historical five-year averages and adjusted for current economic conditions and typical real estate cycles. Under the Base Case, total new office development over the study period is expected to total 13.3 million square feet in Downtown Los Angeles.

A second development scenario, **with Streetcar**, was prepared in a similar manner, forecasting office construction after introducing Streetcar improvements to Downtown Los Angeles. Scenarios were informed by the literature review, interviews, and the team's expertise and experience analyzing urban transit impacts on real estate development. Under the with Streetcar scenario, total new office development over the study period is expected to total 13.9 million square feet in Downtown Los Angeles.

The induced office development impact of the Streetcar is the difference in the amount of constructed office space between the **Base Case** and **with Streetcar** scenarios. This value, approximately 675,000 square feet,[2] served as the basis for estimating the number of additional new Downtown office employees, associated retail and restaurant spending, new hotel room demand by business users, and the additional ancillary service space and employment required to service the new business activities, including retail, food and beverage, etc. Construction cost factors were estimated using multiple sources, including RS Means and local developer interviews, among others. Using an average vacancy rate of 12.0% and an average employment density of 250 square feet per employee, the office development induces 1,700 new office-related jobs and an additional 100 new jobs in supportive services such as retail and restaurant.

Based on the estimated average spending by office workers in downtown central business districts, total new spending on food and beverage and retail and convenience goods is estimated to reach $6.1 million annually by 2035. This supports 17,500 square feet of new retail and restaurant space, and 60 new jobs.

Additionally, AECOM estimates that each new office employee will support demand for 2 new hotel room nights on an annual basis, based on research into the Los Angeles County hotel market and business travel volume. This results in 3,500 new hotel room nights annually by the end of the study period, with associated spending of nearly $1.4 million annually in Downtown Los Angeles (Figure 25).

Using these estimates, AECOM estimated the total impact of new office development in Downtown Los Angeles on jobs, spending, hotel room nights, taxes, and economic impact, induced above baseline growth by the Streetcar. The Streetcar is projected to create:

[2] Spending by office workers and business visitors induces another 20,000 SF of supportable development

- 1,800 new jobs by 2035
- 700,000 new square feet of development
- $7.0 million in retail, food and beverage, and other spending annually
- Demand for 3,500 annual room nights with $475,000 in annual room revenues (Figure 21)
- $7.5 million in total direct spending by office workers and business visitors
- $10.0 million in cumulative city tax revenues over the study period (details provided in Figure 27)

Figure 21: Summary Impact on Downtown Los Angeles: Induced Office

	Jobs (cum.)	Gross SF (cum.)	Construction Cost (cum.)	F&B Spending (annual)	Retail Spending (annual)	Other Spending (annual)	Room Nights (annual)	Room Revenues (annual)
2011-2015	65	25,000	$6,692,000	$125,000	$113,000	$14,000	125	$17,000
2016-2020	320	124,000	$34,429,000	$623,000	$564,000	$68,000	600	$85,000
2021-2025	840	323,000	$93,766,000	$1,619,000	$1,466,000	$176,000	1,600	$221,000
2026-2030	1,500	571,000	$170,353,000	$2,864,000	$2,593,000	$311,000	2,900	$390,000
2031-2035	1,800	695,000	$208,647,000	$3,487,000	$3,157,000	$378,000	3,500	$475,000
Total Annual (2035)	1,800	695,000	$208,647,000	$3,487,000	$3,157,000	$378,000	3,500	$475,000

Note: Values are an average annual snapshot for each year in the five-year period. For example, in 2017, the Streetcar is anticipated to support 320 jobs in 124,000 cumulative square feet of new office space, with 600 new hotel room nights demanded during the year. Gross square footage includes office and supportive retail and food and beverage space.

Economic impacts were estimated for both the construction impacts and the ongoing annual operating impacts from new worker spending and compensation across the City of Los Angeles. These results are presented below.

Based on the anticipated capture of direct expenditures, AECOM estimated the direct, indirect and induced, and total regional economic impacts resulting from construction of the new office development. The region is defined as the City of Los Angeles. These impact estimates are presented below. AECOM has assumed that 40% of new office space induced by the streetcar is net new development to the City of Los Angeles, with the remainder representing redistribution of existing businesses and employees from other areas of the City into Downtown. With an estimated cost of $209 million, construction of new office (and supportive retail and food and beverage space) is estimated to have a total cumulative regional impact of $140 million. The construction of new office is projected to support direct employment of approximately 600 jobs* with associated wages of $41 million. Indirect and induced employment is expected to yield an additional 390 jobs* with $21 million in employee compensation within the City of Los Angeles. In sum, construction of new office, above baseline growth expectations, will support 1,000 jobs* with $62 million in cumulative labor income during the 25-year development period.

Figure 22: One-time Economic Impact of Construction: Induced Office & Related Development
City of Los Angeles

Construction Cost			$209,000,000
New Construction (SF)			695,000
Net New Factor Adjustment			40%
	Jobs	Labor Income ($)	Output ($)
Direct Impact	590	$41,000,000	$81,000,000
Indirect & Induced	390	$21,000,000	$59,000,000
Total Regional Impact	980	$62,000,000	$140,000,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software). Values in 2010$

* Construction jobs are reported in job-years (one year of one job)

As quantified above in Figure 21, the new employees and business visitors will be a source of economic stimulus within the City of Los Angeles, spending their income on local retail purchases, housing, and other services. These expenditures support regional jobs, earnings, and output. AECOM estimated that 35% of new Downtown office workers were net new to the City of Los Angeles, with worker compensation of 120% of the average annual compensation per worker in Los Average County reported by BLS. With total annual wages of $105 million (Figure 23) and direct spending of $7.5 million (Figure 21)in Downtown Los Angeles annually by 2035, new office workers and business visitors create total regional output of $22 million annually. In addition to 600 net new office jobs, they are expected to support the creation of 140 additional net new jobs in the City of Los Angeles by the conclusion of the study period, with recurring annual employee compensation of $7.3 million.

Figure 23: Recurring Economic Impact: Office Worker & Business Visitor Spending Impacts

Office Jobs (New to Downtown)	1,700
Net New Factor Adjustment	35%
Net New Office Jobs to City	600
Avg. Labor Income	$60,500
Total Labor Income (Downtown)	$103,000,000

	Jobs	Labor Income ($)	Output ($)
New Office Workers	600	$36,000,000	n/a
Direct Impact	30	$700,000	$1,700,000
Indirect & Induced	110	$6,600,000	$20,000,000
Total Regional Impact	140	$7,300,000	$22,000,000

Recurring annual impact at project build-out, assumed to be 2035. All values in current 2010$.

Figure 24: Office Supply, Downtown Los Angeles

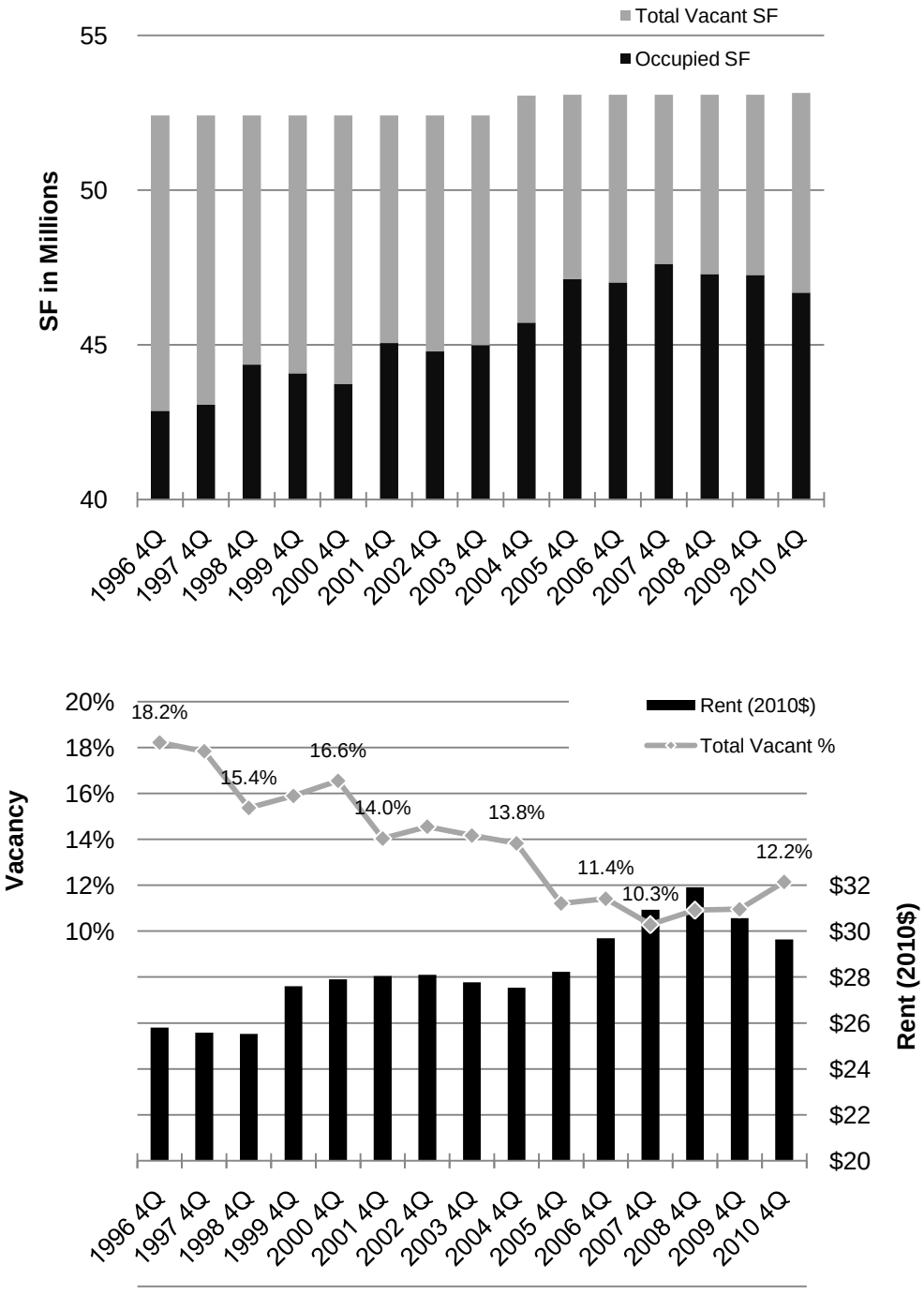
Period	# Bldgs	Total RBA	Total Vacant SF	Total Vacant %	Occupied SF	Occupied %	Total Average Rate (Nominal)	Total Average Rate (2010 Constant $)	Occupied SF Downtown as Share of City	Occupied SF Downtown as Share of County
2010 4Q	257	53,147,207	6,457,438	12.2%	46,689,769	87.8%	$29.64/fs	$29.64	34.8%	13.3%
2009 4Q	256	53,082,473	5,816,430	11.0%	47,266,043	89.0%	$30.21/fs	$30.56	34.9%	
2008 4Q	256	53,082,473	5,794,290	10.9%	47,288,183	89.1%	$31.80/fs	$31.92	34.4%	
2007 4Q	256	53,082,473	5,460,668	10.3%	47,621,805	89.7%	$29.77/fs	$30.93	34.2%	13.1%
2006 4Q	256	53,082,473	6,060,330	11.4%	47,022,143	88.6%	$27.66/fs	$29.69	34.0%	
2005 4Q	256	53,082,473	5,951,805	11.2%	47,130,668	88.8%	$25.22/fs	$28.22	34.3%	
2004 4Q	255	53,053,273	7,336,794	13.8%	45,716,479	86.2%	$23.56/fs	$27.54	34.4%	13.1%
2003 4Q	254	52,418,273	7,426,910	14.2%	44,991,363	85.8%	$23.00/fs	$27.78	34.3%	
2002 4Q	254	52,418,273	7,629,740	14.6%	44,788,533	85.4%	$22.67/fs	$28.10	34.6%	
2001 4Q	254	52,418,273	7,357,833	14.0%	45,060,440	86.0%	$22.02/fs	$28.05	34.9%	
2000 4Q	254	52,418,273	8,675,859	16.6%	43,742,414	83.4%	$21.20/fs	$27.90	34.0%	13.1%
1999 4Q	254	52,418,273	8,330,549	15.9%	44,087,724	84.1%	$20.30/fs	$27.60	34.5%	
1998 4Q	254	52,418,273	8,057,301	15.4%	44,360,972	84.6%	$18.34/fs	$25.52	35.3%	
1997 4Q	254	52,418,273	9,350,652	17.8%	43,067,621	82.2%	$18.12/fs	$25.57	35.0%	
1996 4Q	254	52,418,273	9,550,465	18.2%	42,867,808	81.8%	$17.99/fs	$25.79	34.9%	13.5%

	Total RBA	Total Vacant SF	Total Vacant %	Occupied SF
Net Change (1996-2010)	729,000	(3,093,000)		3,822,000
Net Change: 14 year avg.	52,000	(221,000)	14.8%	273,000
CAGR	0.10%			0.6%
Avg Demo 14 Yrs of Occupied Space				152,000
Construction Need/Year with 12.0% Equilibrium Vacancy			**12.0%**	**483,000**

Average Construction Required per five-year period	2,416,000 SF
Average Demo per five year period	864,000 SF

Source: Costar, AECOM

Figure 25: Office Supply & Performance, Downtown Los Angeles



Source: Costar. Rents are full service gross in constant 2010$.

Figure 26: Office Development Scenarios - Base Case & With Streetcar

Construction Need/Year with 12.0% Equilibrium Vacancy	483,000
Average Construction Required per Five-Year Period	2,416,000
Average Demolition of occupied space per 5-year period (w/ vacancy)	864,000
Average Gain in Occupied Space per 5-year period	1,551,000

Time Period	Base Factor	Factor with Streetcar	Difference	Base Case Office Construction (SF)	Office Construction with Streetcar (SF)	Difference (SF)
2011-2015	**0.780**	**0.790**	1.3%	1,884,000	1,908,000	24,000
2016-2020	**1.160**	**1.200**	3.4%	2,802,000	2,899,000	97,000
2021-2025	**1.200**	**1.280**	6.7%	2,899,000	3,092,000	193,000
2026-2030	**1.250**	**1.350**	8.0%	3,019,000	3,261,000	242,000
2031-2035	**1.100**	**1.150**	4.5%	2,657,000	2,778,000	121,000
Total 2011-2035	1.098	1.154	5.6%	13,261,000	13,938,000	676,000
	Average Annual Construction 2011-2035:			530,000	558,000	27,000
				Total induced SF due to Streetcar		*5.1%*

Time Period	New Construction	Rehab	New Build (SF)	Rehab (SF)	Total (SF)	Total Construction Value	Cumulative Construction Value
2011-2015	**60%**	40%	14,000	10,000	24,000	$6,522,000	$6,522,000
2016-2020	**65%**	35%	63,000	34,000	97,000	$27,054,000	$33,576,000
2021-2025	**75%**	25%	145,000	48,000	193,000	$57,973,000	$91,550,000
2026-2030	**80%**	20%	193,000	48,000	242,000	$74,882,000	$166,432,000
2031-2035	**80%**	20%	97,000	24,000	121,000	$37,441,000	$203,873,000
Total 2011-2035			512,000	164,000	676,000	$203,873,000	$203,873,000
		Dev Cost PSF @	**$350**	**$150**			

Source: CoStar, developer interviews, RS Means, AECOM, and literature review. Values rounded to nearest 1000.

Figure 27: Office - Induced Employment based on new occupied space

				Square Feet/Emp.	250
	Change in Occupied Office (SF)			New (Induced) Office Employment	
	Base Case Δ (SF)	With Streetcar Δ (SF)	Difference (SF)	Employment	Cumulative Employment
2011-2015	1,210,000	1,225,000	16,000	60	60
2016-2020	1,799,000	1,861,000	62,000	250	310
2021-2025	1,861,000	1,985,000	124,000	500	810
2026-2030	1,939,000	2,094,000	155,000	620	1,430
2031-2035	1,706,000	1,784,000	78,000	310	1,740
Total 2011-2035	8,516,000	8,950,000	434,000	1,700	1,700
Annual Average	341,000	358,000	17,000		

Note: Occupied space calculated at 12.0% average vacancy. Values rounded.

Figure 28: Office Worker Spending

	2003$ Downtown Ample	2010$ Downtown Ample
Total Spending		
Lunch	$1,257	$1,518
Retail	$2,259	$2,728
Convenience	$1,432	$1,729
Dinner/Drinks	$692	$836
Total	$5,640	$6,811
Spending: Closer to Office		
Lunch	$1,257	**$1,518**
Retail & Convenience	$1,403	**$1,694**
Dinner/Drinks	$201	**$243**
Total	$2,861	**$3,455**
Spending: Closer to Home		
Lunch	$0	$0
Retail & Convenience	$2,288	$2,763
Dinner/Drinks	$491	$593
Total	$2,779	$3,356

Source: ICSC, Office Worker Spending Closer to Office, for Downtown Central Business Districts with Ample Services

Figure 29: New Spending, Office Workers

	F&B	Retail	Total Spending
2011-2015	$109,000	$109,000	$218,000
2016-2020	$546,000	$546,000	$1,092,000
2021-2025	$1,420,000	$1,420,000	$2,840,000
2026-2030	$2,513,000	$2,513,000	$5,025,000
2031-2035	$3,059,000	$3,059,000	$6,118,000
Total 2011-2035	$3,059,000	$3,059,000	$6,118,000

Note: Values rounded to nearest 1000.

Figure 30: Office-Induced Supportive Services: Square Footage, Construction Cost, Jobs

	F&B SF	Retail SF	Total SF	Total SF Cumulative	Construction Cost (period)	Construction Cost (cumulative)	Jobs (period)	Jobs (cumulative)
2011-2015	310	310	620	620	$156,000	$156,000	2	2
2016-2020	1,200	1,200	2,500	3,100	$624,000	$780,000	8	10
2021-2025	2,500	2,500	5,000	8,100	$1,248,000	$2,029,000	17	27
2026-2030	3,100	3,100	6,200	14,400	$1,561,000	$3,589,000	21	48
2031-2035	1,600	1,600	3,100	17,500	$780,000	$4,370,000	10	58
Total 2011-2035	8,700	8,700	17,500	17478.99	$4,370,000	$4,370,000	60	60

Sales PSF	$350	$250	Dev Cost PSF @	$250	300	SF/Emp

Source: ICSC, RS Means, AECOM

Figure 31: Office Generated Hotel Rooms

Los Angeles Overnight Visitor Market Segmentation, 2009[1]		
International	19%	
Domestic-Business	16%	
Domestic-Leisure	30%	
Domestic -Visiting Friends or Relatives (VFR)	35%	
Domestic		
Leisure	65%	
Business	16%	
Estimated International Visitor Distribution		
Leisure	7%	*Assumes a similar share compared to Domestic*
Business	4%	
VFR	8%	
Estimated Hotel Users[1]	***57%***	
Total Overnight Leisure	65%	
Total Overnight Business	35%	

LA County Hotel Market, 2009	
Room Supply	97,000
ADR	$114.20
Average Occupancy	64.30%

[1] *Estimated Hotel Users excludes the share of domestic and international overnight visitors that are visiting with friends or relatives. International visitors are distributed by the same ratio as the Domestic Leisure, Business and VFR visitors.*

Room Nights	
Available Room Nights	35,289,000
Adjusted Average Occupancy[2]	70.0%
Room Nights Per Employee	
Occupied Room Nights Business	8,592,000
LA County Employment	4,272,000
Occupied Business Room Nights/Employee	**2.0**

[2] *Average Occupancy in LA County was 64.3 percent in 2009.*
This was in the height of the recession, occupancy rates are typically closer to 70 percent in a stable economy.

Source: Los Angeles Convention and Visitors Bureau, AECOM

Figure 32: Office-Generated Hotel Business

Business room nights/emp. **2.0**

	Room Nights	Room Nights (cum.)	Room Revenues	F&B	Parking	Entertain-ment	Retail	Other	Total Annual Spending
Spending/room night			**$136**	**$123**	**$7**	**$4**	**$28**	**$97**	
2011-2015	125	125	$17,000	$15,000	$1,000	$1,000	$4,000	$12,000	$49,000
2016-2020	500	620	$85,000	$76,000	$5,000	$3,000	$18,000	$60,000	$246,000
2021-2025	1,000	1,620	$221,000	$199,000	$12,000	$7,000	$46,000	$157,000	$641,000
2026-2030	1,250	2,870	$390,000	$352,000	$21,000	$12,000	$81,000	$278,000	$1,134,000
2031-2035	620	3,500	$475,000	$428,000	$25,000	$15,000	$98,000	$339,000	$1,380,000
Annual by 2035	3,500	3,500	$475,000	$428,000	$25,000	$15,000	$98,000	$339,000	$1,380,000

Source: Los Angeles Convention and Visitors Bureau, AECOM

Figure 33: Summary Impact on Downtown Los Angeles: Induced Office

	Jobs (cum.)	Gross SF (cum.)	Construction Cost (cum.)	F&B Spending (annual)	Retail Spending (annual)	Other Spending (annual)	Room Nights (annual)	Room Revenues (annual)
2011-2015	65	25,000	$6,692,000	$125,000	$113,000	$14,000	125	$17,000
2016-2020	320	124,000	$34,429,000	$623,000	$564,000	$68,000	600	$85,000
2021-2025	840	323,000	$93,766,000	$1,619,000	$1,466,000	$176,000	1,600	$221,000
2026-2030	1,500	571,000	$170,353,000	$2,864,000	$2,593,000	$311,000	2,900	$390,000
2031-2035	1,800	695,000	$208,647,000	$3,487,000	$3,157,000	$378,000	3,500	$475,000
Total Annual (2035)	1,800	695,000	$208,647,000	$3,487,000	$3,157,000	$378,000	3,500	$475,000

Note: For display purposes, this table duplicates Figure 21. Values are an average annual snapshot for each year in the five-year period. For example, in 2017, the Streetcar is anticipated to have support 320 jobs in 124,000 cumulative square feet of new office space, with 600 new hotel room nights demanded in that year (and every year in the period 2016-2020)

Figure 34: Estimated City Revenues from Induced Office Development

	Hotel Tax	Sales Tax	Property Tax	Total
	14%	1%	0.34%	
2011-2015	$2,000	$1,000	$23,000	$26,000
2016-2020	$12,000	$6,000	$118,000	$136,000
2021-2025	$31,000	$15,000	$322,000	$367,000
2026-2030	$55,000	$26,000	$585,000	$665,000
2031-2035	$67,000	$32,000	$716,000	$814,000
Total Annual (by 2035)	$67,000	$32,000	$716,000	$814,000
Total Cumulative (by 2035)	$832,000	$395,000	$8,818,000	$10,045,000

Note: Property tax is a conservative estimate based only on construction costs of new buildings. Actual value will be based on sales value including land. Property taxes will be split with CRA/LA based on actual property location. City capture rate of annual property tax revenues is based on 2009 assessed value as reported by Los Angeles County Assessor and actual City of Los Angeles property tax revenues as reported in the City Budget. Sales tax revenues only include the portion of the sales tax that accrue to the City of Los Angeles.

RESIDENTIAL DEVELOPMENT

A process similar to the office forecasting method was used to estimate the impact of the Streetcar on Downtown residential development and ancillary services, with the historic construction average based upon an 11-year history. This timeframe was selected because the current Downtown housing environment was significantly impacted by adoption of the Adaptive Reuse Ordinance in 1999.

Development Forecast: This task required several steps in order to develop projections for Downtown Los Angeles. The study area was held consistent with the region studied for office development potential, defined as the region bordered by the 101 Freeway on the north, the 110 Freeway on the west, Interstate 10 on the south, and Los Angeles Street on the east.

Detailed data on residential construction, occupancy, and absorption in the study area were examined over the past 11 years to calculate long-term construction requirements in five-year increments for Downtown Los Angeles. In the fourth quarter 2010, the Downtown Los Angeles office market consisted of approximately 28,700 units, with a residential population of 43,600, and an additional 1,500 units under construction, as reported by CRA/LA and DC Bid/DowntownLA.com. The Downtown Los Angeles housing market constituted approximately two percent (2.0%) of units in the City of Los Angeles, and less than one percent (0.8%) of occupied space in Los Angeles County. The average annual development of new residential space over the past decade totaled nearly 1,600 units per year from 1999 to 2010.

A **Base Case** scenario forecast of Downtown residential construction requirements was developed for the 25-year study period (2011 to 2035), based on the recent historic averages, then adjusted for current economic conditions and typical real estate cycles. Under the Base Case, total new residential development over the study period is expected to total 18,700 residential units in Downtown Los Angeles (Figure 33).

A second development scenario, **with Streetcar**, was prepared in a similar manner, forecasting residential construction after introducing Streetcar improvements to Downtown Los Angeles. Scenarios were informed by the literature review, interviews, and the team's expertise and experience in analyzing urban transit impacts on real estate development. Under this scenario, total new residential development over the study period is expected to total 21,300 units in Downtown Los Angeles (Figure 33).

The induced residential development impact of the Streetcar is the difference in amount of constructed residential space between the **Base Case** and **with Streetcar** scenarios. This value, approximately 2,600 units, served as the basis for estimating the number of additional new Downtown residents, associated retail and restaurant spending, and the additional ancillary service space and employment required to service the new residential activities. Construction cost factors were estimated using multiple sources, including RS Means and local developer interviews, among others. Using an average vacancy rate of 10% and an average household size of 1.5 persons per unit, the residential development induces 3,600 new residents about expected baseline growth (Figure 30).

Based on the estimated service area square footage required by residents for supportive retail and food and beverage close to home, new residents will support approximately 40,000 square feet of ancillary service space, with new spending on food and beverage and retail and convenience goods expected to reach $10.5 million annually by 2035 (Figure 36). This will support 120 permanent new jobs (Figure 35).

Using these estimates, AECOM estimated the total impact of new residential development in Downtown Long Angles on jobs, spending, taxes, and economic impact, induced above baseline growth by the Streetcar. The Streetcar is projected to create:

- 120 direct new jobs by 2035 (Figure 35)
- 2,600 residential units and nearly 40,000 new square feet of ancillary development (Figure 35, Figure 42)
- $10.5 million in retail and food and beverage, and other spending annually (Figure 35)
- $34 million in cumulative city tax revenues over the study period (Figure 45)

Figure 35: Summary Impact on Downtown Los Angeles: Induced Residential

	Jobs (cum.)	Gross SF (cum.)	Construction Cost (cum.)	F&B Spending (annual)	Retail Spending (annual)	Residential Units (cum.)
2011-2015	0	0	$0	$0	$0	0
2016-2020	30	9,000	$186,648,000	$1,277,000	$1,402,000	670
2021-2025	70	20,000	$402,012,000	$2,751,000	$3,020,000	1,400
2026-2030	100	29,000	$588,661,000	$4,029,000	$4,422,000	2,100
2031-2035	120	36,000	$732,236,000	$5,011,000	$5,501,000	2,600
Total Annual (2035)	120	36,000	$732,236,000	$5,011,000	$5,501,000	2,600

Note: Values are an average annual snapshot for each year in the five-year period. Gross square footage includes supportive retail and food and beverage space.

Economic impacts were estimated across the City of Los Angeles for both the construction impacts and the ongoing annual operating impacts from new resident spending and household income. These results are presented below.

Based on the anticipated capture of direct expenditures, AECOM estimated the direct, indirect and induced, and total regional economic impacts resulting from construction of the new residential development. The region is defined as the City of Los Angeles. These impact estimates are presented below. AECOM has assumed that 45% of new residential units induced by the streetcar are net new development to the City of Los Angeles, with the remainder representing redistribution of existing development from other areas of the City into Downtown.

With an estimated cost of $730 million, construction of new housing (and supportive retail and food and beverage space) is estimated to have a total cumulative regional impact of $550 million (Figure 41). The construction of new housing is projected to support direct employment of approximately 5,200 one-time jobs* in Downtown, and approximate 2,300 net new jobs across the City of Los Angeles with associated wages of $162 million (Figure 36). Indirect and induced employment is expected to yield an additional 1,500 jobs* with $83 million in employee compensation within the City of Los Angeles. In sum, AECOM estimates that construction of new housing, above baseline growth expectations in Downtown Los Angeles, will support 3,900 jobs* with $245 million in cumulative labor income during the 25-year development period (Figure 36).

Figure 36: One-time Economic Impact of Construction: Induced Residential & Related Development City of Los Angeles

Construction Cost			$732,200,000
Units			2,630
Net New Factor Adjustment			45%
	Jobs	Labor Income ($)	Output ($)
Downtown Workers	5,180	$361,000,000	n/a
Direct Impact	2,330	$162,000,000	$320,000,000
Indirect & Induced	1,530	$83,000,000	$232,000,000
Total Regional Impact	3,860	$245,000,000	$551,000,000

Source: AECOM, Minnesota IMPLAN Group, Inc. IMPLAN System (data and software)

As quantified above, the new residents will be a source of economic stimulus within the City of Los Angeles, spending their income on local retail purchases, housing, and other services. These expenditures support regional jobs, earnings, and output. AECOM estimated that 40% of new Downtown residents (slightly fewer than the number of new housing units) were net new to the City of Los Angeles,

* Construction jobs reported in job-years (one year of one job)

with annual household income at nearly $100,000, based on survey data collected by the Downtown Center Business Improvement District, which is significantly higher than the average household income in Los Average County. With total annual household income of $235 million and direct spending of $10.5 million in Downtown Los Angeles annually by 2035, new residents create total regional output of $79 million annually (Figure 37). In addition to 120 direct new jobs in Downtown Los Angeles in supportive service sectors such as retail, they are expected to support the creation of 510 net new jobs across the City of Los Angeles by the conclusion of the study period, with recurring annual employee compensation of $27 million.

Figure 37: Recurring Economic Impact: Resident Spending Impacts

New Households	2,370
New Residents	3,600
Net New Factor Adjustment	40%
Net New Households to City	950
Avg. Household Income	$99,200

	Jobs	Labor Income ($)	Output ($)
Direct Downtown Jobs	120	$3,100,000	n/a
Direct Impact	50	$1,200,000	$2,800,000
Indirect & Induced	460	$26,000,000	$76,000,000
Total Regional Impact	510	$27,000,000	$79,000,000

Recurring annual impact at project build-out, assumed to be 2035. All values in current 2010$.

Figure 38: Residential Supply, Downtown Los Angeles

	1999	2010	Change	CAGR	Change (units)	Annual Change (units)
Downtown	11,630	28,740	147%	8.6%	17,100	1,600
City of Los Angeles	1,335,000	1,417,000	6%	0.5%	82,600	7,500
Los Angeles County	3,259,000	3,432,000	5%	0.5%	173,000	16,000

Existing Housing Stock	Affordable Units	Market Rate Rental Units	Market Rate Condos	Market Rate Total Units	Total
Existing as of December 31, 1998	8,400	2,400	800	3,300	11,600
Constructed since Adaptive Reuse Ordinance (ARO)	2,700	10,100	4,400	14,500	17,100
Existing Subtotal	11,000	12,500	5,200	17,700	28,700
Under Construction Subtotal	200	700	600	1,300	1,500
Existing and Under Development Total	11,300	13,200	5,800	19,000	30,300
Population Estimate (Current)					43,600
Population Estimate (Future with Development)					2,300
Population Estimate Total					45,900

Source: DCBid Source: Downtown LA BID: Downtown Los Angeles Housing Information, AECOM

Figure 39: Distribution of Units by Neighborhood

District	Condo	Apt	Total
Arts	11.3%	5.3%	7.0%
Bunker Hill	9.3%	11.5%	10.8%
City East	0.0%	2.9%	2.1%
City West	7.4%	17.1%	14.3%
Chinatown	0.0%	0.4%	0.3%
Civic Center	0.0%	6.0%	4.3%
Fashion	4.9%	1.7%	2.6%
Financial	6.8%	6.8%	6.8%
Historic	18.6%	22.8%	21.6%
Jewelry	1.4%	1.2%	1.2%
Little Tokyo	8.2%	2.9%	4.4%
South Park	27.3%	19.2%	21.5%
Union Station	0.0%	1.9%	1.3%
Warehouse	4.7%	0.5%	1.7%
Total	100%	100%	100%

Note: Highlighted items fall within the Downtown Study Area for purposes of this analysis
Source: DCBid Source: Downtown LA BID: Downtown Los Angeles Housing Information, AECOM

Figure 40: Residential Development Scenarios - Base Case & With Streetcar

Average Construction of Downtown Units (annual)	1,560
Percent of Downtown Units in CBD	66%
Average Annual Consturction in CDB	1,030
Average Construction Required per Five-Year Period (Historic Average)	5,160

Time Period	Base Factor	Factor with Streetcar	Difference	Base Case Housing Construction (units)	Housing Construction with Streetcar (units)	Difference (units)
2011-2015	**0.680**	**0.680**	0%	3,510	3,510	0
2016-2020	**0.720**	**0.850**	18%	3,710	4,380	670
2021-2025	**0.950**	**1.100**	16%	4,900	5,670	770
2026-2030	**0.670**	**0.800**	19%	3,450	4,120	670
2031-2035	**0.600**	**0.700**	17%	3,090	3,610	520
Total 2011-35	0.724	0.826	14%	18,700	21,300	2,600
		Average Annual Construction		930	1,060	130
		Five-Year Average		4,670	5,320	660
					Total Induced	*14%*

Source: DC Bid, developer interviews, RS Means, AECOM, and literature review. Values rounded.

Figure 41: Residential Development Cost

Const. Cost/Unit	**$275,000**

	By Period	Cumulative
2011-2015	$0	$0
2016-2020	$184,000,000	$184,000,000
2021-2025	$213,000,000	$397,000,000
2026-2030	$184,000,000	$581,000,000
2031-2035	$142,000,000	$723,000,000
Total	$723,000,000	$723,000,000

Source: Developer Interviews, RS Means, AECOM. Values rounded.

Figure 42: Residential - Induced Supportive Development and Jobs Based on New Residents

Induced SF	Retail SF	F&B SF	Total SF	Cumulative Jobs	Jobs by Period
2011-2015	-	-	-	0	0
2016-2020	6,000	4,000	9,000	30	30
2021-2025	12,000	8,000	20,000	70	40
2026-2030	18,000	12,000	29,000	100	30
2031-2035	22,000	14,000	36,000	120	20
Total	22,000	14,000	36,000	120	120

Induced SF/Resident	**6**	**4**	**300**	SF/Emp

Note: Induced SF/Resident based on City/County taxable sales estimates, CA Department of Finance population, and AECOM. Values rounded.

Figure 43: New Spending, Residents

Induced SF	Retail Sales	F&B Sales	Total Sales		Construction Cost
2011-2015	$0	$0	$0		$0
2016-2020	$1,402,000	$1,277,000	$2,680,000		$2,315,000
2021-2025	$3,020,000	$2,751,000	$5,771,000		$4,985,000
2026-2030	$4,422,000	$4,029,000	$8,451,000		$7,300,000
2031-2035	$5,501,000	$5,011,000	$10,512,000		$9,081,000
Annual by 2035	$5,501,000	$5,011,000	$10,512,000	Total by 2035	$9,081,000

Sales PSF	**$250**	**$350**	Cost PSF	**$250**

Note: Values rounded to nearest 1000. Source: ICSC/Dollars and Cents, RS Means, Developer Interviews, AECOM

Figure 44: Summary Impact on Downtown Los Angeles: Induced Residential

	Jobs (cum.)	Gross SF (cum.)	Construction Cost (cum.)	F&B Spending (annual)	Retail Spending (annual)	Residential Units (cum.)
2011-2015	0	0	$0	$0	$0	0
2016-2020	30	9,000	$186,648,000	$1,277,000	$1,402,000	670
2021-2025	70	20,000	$402,012,000	$2,751,000	$3,020,000	1,400
2026-2030	100	29,000	$588,661,000	$4,029,000	$4,422,000	2,100
2031-2035	120	36,000	$732,236,000	$5,011,000	$5,501,000	2,600
Total Annual (2035)	120	36,000	$732,236,000	$5,011,000	$5,501,000	2,600

Note: For display purposes, this table duplicates Figure 35Figure 37. Values are an average annual snapshot for each year in the five-year period.

Figure 45: New City Revenues, Resident Spending & Property Taxes

	Residential Units (cum.)	Construction Cost (cum.)	Residential Spending
2011-2015	0	$0	$0
2016-2020	670	$186,648,000	$2,679,000
2021-2025	1,400	$402,012,000	$5,771,000
2026-2030	2,100	$588,661,000	$8,451,000
2031-2035	2,600	$732,236,000	$10,512,000
Total Annual (2035)	2,600	$732,236,000	$10,512,000
Annual Taxes (by 2035)		$2,500,000	$100,000
Cumulative Taxes (by 2035)		$32,800,000	$1,400,000

APPENDIX

INTERVIEWS

Project staff conducted interviews with the following individuals and institutions during December 2010 and January 2011.

Dennis Allen, Urban One, Los Angeles Streetcar (Los Angeles)

Jim Atkins, Merlone Geier Partners (Los Angeles)

Jeff Blosser, Portland Convention and Visitors Bureau (Portland, OR)

David Gray, David Gray Architects (Los Angeles)

Raymond Ha, Fred's Mexican Restaurant (San Diego)

Steve Hayes, Tampa Bay and Company (Tampa, FL)

Barbara Kirklighter, LA Inc. / Los Angeles Convention and Visitors Bureau (Los Angeles)

Franciscus Loukrezis, LA Inc. / Los Angeles Convention and Visitors Bureau (Los Angeles)

Eric Metz, Urban One, Los Angeles Streetcar (Los Angeles)

Rocky Rockefeller, Private Developer (Los Angeles)

Carola Ross, AEG/LA Live (Los Angeles)

JR Riddle, Urban One (Los Angeles)

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