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Downtown Los Angeles Streetcar Economic Analysis

Technical Appendix

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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 will enhance the long-term competitive position of Downtown Los Angeles and the LA region as a whole, Los Angeles Streetcar, Inc., a non-profit organization, retained AECOM to estimate the economic impact of the proposed Downtown Los Angeles Streetcar.

The Downtown Los Angeles Streetcar (Streetcar) is currently studying several route alternatives. The route option used for this economic study is a 3.4 mile loop connecting the Civic Center, Historic Core, Fashion District, Financial District, Staples Center and L.A. Live, the Convention Center, South Park, and the Jewelry District. It does not include the proposed Grand Avenue extension, which remains an option but is not currently funded via the Downtown-approved Community Facilities District.

The economic activity created by the Downtown Los Angeles Streetcar will include not only the impacts from one-time construction and recurring operation of the Streetcar itself, but also the induced impacts resulting from the development of new commercial and residential property, reactivation of underutilized properties, creation of new businesses and jobs, increased numbers of Downtown residents, increased Downtown tourism, increased numbers of local and overnight visitors, and spending by these 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 30 years specifically resulting from or supported by investment in the Downtown Los Angeles Streetcar.

AECOM found that, in Downtown Los Angeles, the Streetcar will support and induce more than $1.6 billion in new development, over 25,000 jobs in the City of Los Angeles, and millions of dollars in new city and county tax revenues. Specific impacts include:

- Development of 784,000 square feet of new and renovated office space valued at $259 million
- Development of 4,500 new housing units, providing housing for 7,400 new residents, valued at $1.337 billion
- Development of 126,000 square feet of retail, entertainment, and hospitality-related uses by the end of the study supported by new spending by employees, residents, and visitors to Downtown, valued at $31 million
- 7,700 new hotel room nights from business and convention visitors annually by the end of the study period
- 9,400 new construction jobs[1] in Downtown alone (for streetcar, commercial, and residential construction) over the study period, and more than 17,400 construction-related jobs in the City of Los Angeles
- 4,700 permanent new office, retail, entertainment, and hotel jobs located Downtown by the end of the study period, and more than 8,500 total jobs in the City of Los Angeles
- $87 million in unrestricted tax revenues to the City of Los Angeles during the study period
- $67 million in restricted tax revenues to LAUSD and Los Angeles Community Colleges during the study period

This economic impact assessment of the proposed Downtown Los Angeles Streetcar was prepared by the Economics & Planning team at AECOM, led by Gaurav Srivastava (Project Director) and Christine Safriet (Project Manager), with Lance Harris and Kevin Feeney (Economic Analysts).

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.

[1] Construction jobs are reported in job-years (one year of one job)

Analytical Framework

This study reflects findings from a literature review, interview process, and quantitative analysis. The research team updated an extensive literature review conducted in 2010 during the original iteration of this report 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. The market history of office, retail, and residential development in Los Angeles were reviewed, with a focus on specific factors affecting Downtown Los Angeles. With this information in hand, the research team 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, as well as to Los Angeles County, the State of California, and the United States as a whole. 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, the research team relied on information relating to changes in land value resulting from investment in fixed rail transit infrastructure, including publications by academics, planners, government agencies, consultants, 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 a transit 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 patterns. 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 well-connected systems, and a strong real estate market are all key factors that allow transit to have a significant effect on property value and development patterns. While the effect of transit on property value and development patterns 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, the research team interviewed local (Downtown and City of Los Angeles) stakeholders and developers, as well as the executives from the Los Angeles Convention Center and Visitors Bureau. In the previous iteration of this report, the research team also interviewed executives from the convention and visitors bureaus of cities with an existing streetcar or light rail system. The consensus from interviewees is that Streetcar will 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 frequent 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 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

The research team 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 Downtown Los Angeles Streetcar to the economy of the City of Los Angeles.

The research team relies 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 Downtown 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 construction (one-time construction-related) and permanent (annual recurring) jobs that will be generated by the Streetcar and incremental office, residential, and ancillary development.
- The development outlook for office and residential properties along the proposed alignment, as impacted by the proposed Streetcar, quantified in terms of incremental development above baseline growth over a 30-year period.
- The estimated impact of extended stays by convention attendees in terms of hotel revenues and visitor spending.
- The estimated number of new tourists and their anticipated spending resulting from the Streetcar.
- Impact of the Streetcar on Downtown retail and food and beverage sales, 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.
- Impact of induced spending by new Downtown workers and residents at the city, county, state, and national level.
- The property tax revenues resulting from incremental development along the Streetcar route estimated to accrue to the City and County of Los Angeles.

Relationship to Previous Study

AECOM conducted an economic analysis of the Streetcar in 2011 to estimate the potential benefits of the construction and operation of the Streetcar on Downtown Los Angeles. The 2011 study examined benefits over 25 years (from 2010 to 2035) and used the City of Los Angeles as the sole region for economic modeling. The current study has taken the original approach and updated relevant data, including new projections for baseline and induced growth of office development, residential development, and leisure visitation, as well as new construction and operating costs for the Streetcar itself. Areas of major difference include:

1) Expansion of the region of analysis from the City of Los Angeles to also include Los Angeles County, the State of California, and the United States as a whole;
2) Extension of the study period from 25 to 30 years;
3) Revision of the property tax allocation for unrestricted revenues to the City of Los Angeles based on more detailed available data;
4) Inclusion of select restricted property tax revenue streams in the tax calculations;
5) Adjustment of local spending expectations based on new survey data;

6) Reporting of financial values in constant 2014 dollars vs. constant 2010 dollars; and
7) Revisions of the baseline and induced growth expectations of office and residential development in Downtown. The residential housing market in particular has experienced a strong recovery from the 2007 housing collapse and economic recession, and ongoing supply combined with the existing depth in the residential pipeline suggests a much stronger market in the future compared to the original 2010 projections.

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.[2] 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]

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

[2] 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.

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. In addition to the select articles presented herein, the research team reviewed a number of articles regarding issues related to economic development for proposed streetcar systems throughout the U.S. since 2010.

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 Built 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 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

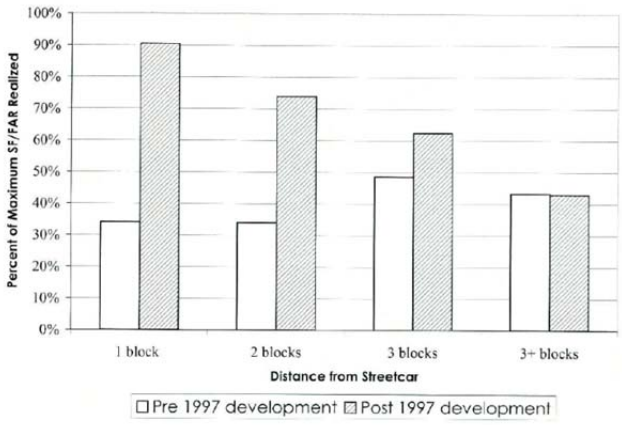
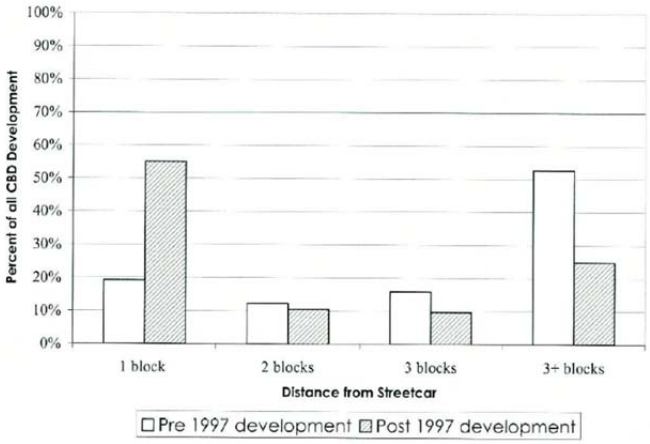


Figure 3: CBD Development in Portland



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: Light and Commuter Rail Services and 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.

Rietveld, 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.

Columbia Pike Transit Initiative: Comparative Return on Investment Study

HR&A Advisors, Inc. (2014)

The County Boards of Arlington County and Fairfax County adopted the streetcar as the preferred transit alternative along the Columbia Pike transit corridor, enabling a high capacity service for the growing and increasingly congested corridor. In response to constituent questions on the benefits of a streetcar service versus an enhanced bus service, Arlington County, Virginia ("The County") retained HR&A Advisors, Inc. (HR&A) to prepare an updated and comparative return on investment analysis of the streetcar alternative versus an enhanced bus alternative.

The study compares the value of streetcar service versus an enhanced bus service across several dimensions, including economic and fiscal benefits generated, the ability to support the County's development and place-making goals, and the anticipated timing of these impacts. A key consideration noted in the study was that the Columbia Pike Transit Initiative is intended not simply as a mobility solution, but an opportunity for integrated land use and transportation planning that enhances the quality of place of the corridor.

To produce the study, HR&A analyzed current real estate conditions along the transit corridor, conducted a detailed review and data analysis of the real estate and economic impacts of previous transit investments elsewhere in the United States, and engaged with the local real estate and retail community

to understand their perceptions of the impacts of streetcar versus enhanced bus service. Based on the analysis, HR&A prepared an economic model that compares the net benefits, in terms of real estate value generated, to Arlington and Fairfax Counties of a streetcar or enhanced bus service versus baseline (no build) conditions over a 30-year period. HR&A also developed estimates of the number of jobs supported and County tax revenues generated by each transit service versus baseline conditions.

HR&A's analysis noted that the investment in transit increases demand for locations along the corridor because it improves mobility for residents, workers, and visitors moving along the corridor and creates a place-making amenity that serves to brand the corridor and enhance the character of its public realm. The transportation benefits and higher quality of place are estimated to impact real estate along the corridor by property value appreciation for existing properties along the corridor and a faster pace and greater extent of future development along the transit corridor as the development community responds to an increase in the corridor's desirability by delivering new product.

Over 30 years, HR&A estimates that streetcar could:

- Create between $3.2 billion and $4.4 billion more in net incremental benefits over and above baseline conditions;
- Support 6,600 new jobs in the transit corridor over the amount that would existing under baseline conditions; and
- Generate between $455 million and $1.5 billion more in local tax revenues over and above baseline conditions.

Projecting the Impacts of a Proposed Streetcar System on the Urban Core Land Redevelopment: The Case of Cincinnati, Ohio

Elad Mokadi, Diana Mitsova, Xinhao Wang, 2013

The study projects the impacts of the proposed Cincinnati streetcar alignment on the urban core land redevelopment. Streetcar supporters argue that the development of the transit infrastructure will increase development activities, while opponents suggest that such projects will have no impact on development. Reconstructing the major arguments behind this public debate, the study incorporates ten spatial criteria to model land use changes. The criteria are integrated in three scenarios: a baseline scenario, which does not include the streetcar alignment and two scenarios based on the supporters' and opponents' narratives.

The results indicate that the arguments of both streetcar supporters and opponents have some validity. The streetcar project is anticipated to enhance economic development. The projected impacts in land use indicate that commercial development will be coming to the area over the next decade. The results also reveal that the impact of the streetcar will not be extensive beyond the adjacent streets.

In summary, the study estimated that over the next 10 years the major impacts of land use change will be limited to the streets adjacent to the streetcar alignment. However, with the study also noted that with supporting public policy, land use changes are expected to extend to the urban core.

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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, the research team has conducted a regional economic analysis. The total economic impacts reported represent those expected to occur within the City of Los Angeles, the County of Los Angeles, the State of California, and the United States. The analysis relies on 2012 IMPLAN Group multipliers for each study region and on data provided by the client. 2012 multipliers are the most current available from the IMPLAN Group.

Based on the operating and construction budget and project details provided by the client, the research team has estimated the economic impacts to Downtown Los Angeles and the City of Los Angeles resulting from the Downtown 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 and regionally
        - Worker earnings
    - Residential
        - Construction
        - Resident spending in Downtown and regionally
        - 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 impacts based on the assumption that the Streetcar is a new addition to the transit service offerings to Downtown Los Angeles 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.
- Impacts are based on new visitation and development to Downtown Los Angeles over baseline projections, and the resulting changes to final demand are then applied to the City, County, State, and U.S. Adjustments for shifts in demand from one region to another (net new adjustments) were not estimated, as no reliable source was available.
- All values are presented in constant 2014 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

The research team relies on an input-output (I/O) model to estimate the total economic impact of the proposed Downtown 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 IMPLAN Group LLC. The IMPLAN model draws upon data collected by IMPLAN 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, the total operating budget associated with the proposed Streetcar would represent the direct impact of the Streetcar operations 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 on-going 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 sales or revenue in the region of study.
- ***Employment*** represents the change in the number of jobs in the economy in the region of study resulting from a change in regional output.
- ***Earnings*** represent the change in gross employee wages and salaries in the economy in the region of study 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 (City), Los Angeles County (County), State of California (State), and the United States (U.S.) as a result of:

- One-time economic impacts from construction of and capital investment in the Streetcar and incremental office and residential construction.
- Ongoing operation and maintenance of the proposed Streetcar and
- Ongoing operations and spending related to incremental office and residential development and
- Ongoing leisure and convention visitation in Downtown Los Angeles above projected baseline growth

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

STREETCAR DEVELOPMENT & OPERATION

Construction and operation of the proposed Downtown Los Angeles Streetcar and its employees will be a source of economic stimulus within the City of Los Angeles, the County of Los Angeles, the State of California, and the United States. 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 economic impact of the Streetcar on the region of study (city, county, state, nation), 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 region. The analysis also relies on estimates regarding the proportion of goods and services purchased from producers in the region. The proportion of supplies and labor purchased from regional suppliers is based on estimates by the client, the research team, and IMPLAN econometric analysis and is limited by the production potential of the regional economy. In addition, some goods and services provided within the region 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. These adjustments are automatically applied using the IMPLAN modeling software.

Streetcar Construction

Construction of the Streetcar is expected to provide a significant one-time direct benefit to the City of Los Angeles, LA County, the state, and the nation. 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 $200 million over approximately two 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 nearly $123 million in one-time direct purchases within the City of Los Angeles, consisting of locally supplied labor and inputs to construction, representing approximately 61% of the total development cost.

Figure 8: Streetcar Capital Expenditures and Regional Capture in City of Los Angeles (One-Time)

IMPLAN Sector	Industry Description	Streetcar Budget	RPC	City Capture
289	Railroad rolling stock manufacturing	$53,608,000	0.1%	$54,000
36	Construction of other new nonresidential structures	$84,982,000	100.0%	$84,982,000
266	Power, distribution, and specialty transformer manufacturing	$18,920,000	19.1%	$3,614,000
369	Architectural, engineering, and related services	$30,645,000	90.0%	$27,581,000
375	Environmental and other technical consulting services	$ 3,954,000	80.0%	$3,163,000
360	Real estate establishments	$308,000	70.0%	$216,000
367	Legal services	$2,966,000	90.0%	$2,669,000
exclude	Other real estate	$4,617,000		-
	Total Capital Budget	$200,000,000		$122,279,000

Source: LASI, AECOM, Implan Group LLC IMPLAN System (data and software). Values rounded to nearest 1,000.

When the impacts of the Streetcar are considered at the county, state, county, and national level, the share of services and materials purchased within the region is expected to increase, particularly for track and vehicle capital costs. Based on IMPLAN's estimates of regional capture, 62% of the capital budget is expected to be spent within the county, 71% within the state, and 93% percent of goods and services are expected to be captured within the nation.

Figure 9: Regional Capture of Streetcar Construction Expenditures in County, State, and U.S.

IMPLAN Sector	Industry Description	County	State	United States
289	Railroad rolling stock manufacturing	2.0%	27.4%	91.1%
36	Construction of other new nonresidential structures	100%	100%	100%
266	Power, distribution, and specialty transformer manufacturing	2.7%[3]	22.9%	75.1%
369	Architectural, engineering, and related services	100%	100%	100%
375	Environmental and other technical consulting services	100%	100%	100%
360	Real estate establishments	100%	100%	100%
367	Legal services	100%	100%	100%
exclude	Other real estate			
	Total Regional Capture	$124,450,000	$141,858,000	$185,900,000
	% of Capital Budget	62%	71%	93%

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Values rounded to nearest 1,000.

Based on the anticipated capture of regional direct expenditures, the research team estimates the direct, indirect and induced, and total regional economic impacts resulting from construction of the Streetcar. These impact estimates are presented in Figure 10.

[3] Regional capture rates are determined by comparing local demand for industry commodities compared to the local supply. The lower regional capture rate for power equipment at the county level is a function of the county having fewer producers of power equipment relative to the regional demand than the City.

Figure 10: One-Time Economic Impacts of Construction, By Region

Construction Budget			$200,000,000
Economic Impacts	Jobs	Labor Income	Output
City			
Direct Impact	750	$56,300,000	$122,300,000
Indirect & Induced	540	$33,400,000	$ 89,800,000
Total City Impact	1,290	$89,700,000	$212,100,000
County			
Direct	770	$58,600,000	$124,400,000
Indirect & Induced	620	$37,100,000	$96,800,000
Total County Impact	1,390	$95,700,000	$221,200,000
State			
Direct	820	$63,400,000	$141,900,000
Indirect & Induced	910	$56,400,000	$155,800,000
Total State Impact	1,730	$119,700,000	$297,600,000
U.S.			
Direct	940	$66,900,000	$185,900,000
Indirect & Induced	1,810	$106,000,000	$334,200,000
Total National Impact	2,750	$172,900,000	$520,100,000

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Employment figures rounded to nearest 10; output and labor income rounded to nearest 100,000. Impacts in larger jurisdictions are inclusive of smaller jurisdictions.

Construction of the Streetcar is estimated to have a total impact of $212 million to the City of Los Angeles. The economic impact represents revenue generated by direct regional spending, indirect spending by construction suppliers, and employee spending in the City's economy. The construction phase of the proposed Streetcar is projected to support direct employment of 750 jobs with total associated wages of $56 million. Indirect and induced employment is expected to yield an additional 540 jobs within the City of Los Angeles with $33 million in cumulative employee compensation. Construction of the Streetcar is estimated to support 1,290 jobs and $90 million in total labor income during the construction period. Impacts increase as the study area is expanded to include the county, state, and U.S.

Streetcar Operations

The annual operating budget for the Streetcar is anticipated to total approximately $7 million per year, per 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, the research team expects that operation and maintenance of the Streetcar will generate $6.8 million in recurring, annual direct spending within the City of Los Angeles. The budget was allocated to materials and labor based on the 2014/2015 operating budget of the Portland Streetcar. Anticipated labor and materials expenditures were modeled separately in the IMPLAN modeling software (see Figure 11). The types of commodities purchased with the materials budget are based on IMPLAN's predefined industry spending pattern for the local passenger transit sector.

Figure 11: Streetcar Operating Budget Allocation

Expenditure Category	Streetcar Budget	% of budget	IMPLAN Activity
Labor	$3,767,000	55%	Labor Income Change
Materials	$3,047,000	45%	Industry Spending Pattern: Local Passenger Transit (Sector 430)
Total Annual Operating Budget	$6,814,000	100%	

Source: LASI, AECOM, Implan Group LLC IMPLAN System (data and software) and TriMet 2014. Values rounded to nearest 1,000.

The Streetcar is anticipated to have a total recurring gross economic impact of $12 million to the City (Figure 12). 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 City is expected to total about $5 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 40 employees with associated labor income of $3.8 million, and indirectly support approximately 20 jobs with more than $1 million in employee compensation. In total, an estimated 70 jobs in the City of Los Angeles will be directly or indirectly attributable to Streetcar operations.

Figure 12: Recurring Annual Economic Impacts from Streetcar Operations, City of Los Angeles

Operating Budget			$6,800,000
Economic Impacts	Jobs	Labor Income	Output
City			
Direct Impact	40	$3,800,000	$6,800,000
Indirect & Induced	20	$1,400,000	$5,100,000
Total City Impact	70	$5,200,000	$11,900,000
County			
Direct	40	$3,800,000	$6,800,000
Indirect & Induced	30	$1,500,000	$5,200,000
Total County Impact	70	$5,300,000	$12,000,000
State			
Direct	40	$3,800,000	$6,800,000
Indirect & Induced	30	$2,000,000	$6,600,000
Total State Impact	80	$5,800,000	$13,400,000
U.S.			
Direct	40	$3,800,000	$6,800,000
Indirect & Induced	50	$3,000,000	$10,300,000
Total National Impact	100	$6,800,000	$17,100,000

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Employment figures rounded to nearest 10; output and labor income rounded to nearest 100,000. Impacts in larger jurisdictions are inclusive of smaller jurisdictions.

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.

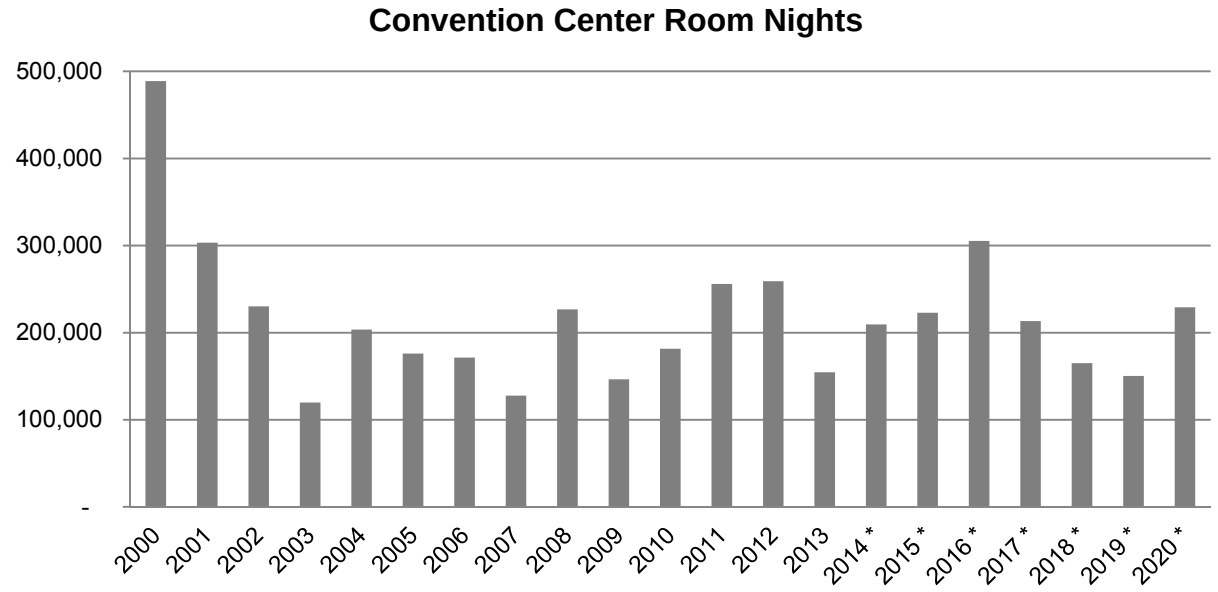
Increase in Convention Attendance

To estimate the potential impact to convention visitors, the research team 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 in year 2000 and 2001, with the highest bookings (nearly 500,000 room nights) occurring in 2000. Business travel dropped significantly from 2005 to 2009, and only recently has the forecast begun to recover.

From 2009 to 2012, convention room nights grew during the economic recovery, but fell significantly in 2013. Convention bookings through 2016 indicate improved performance is likely over the next two years. Longer term prospects are still being developed and so are not reflected in the projections, which only include confirmed bookings.

Figure 13: Convention Room Nights in City of LA



Source: Los Angeles Convention and Visitors Bureau. * = Forecast based on confirmed bookings.

Based on the most recent five-year room night history and forecast (2010-2015), the Convention Center books an average of 214,000 room nights per year in City of Los Angeles hotels. The average convention delegate spends $439 per room night booked, while convention organizers and exhibitors spend $180 and $189 per room night (Figure 16).

Research undertaken in the course of this study indicates that the Streetcar is unlikely to induce a new convention at the LACC. During interviews, convention center staff from various cities with Streetcar and Light Rail in close proximity to their convention venues indicated 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. The research team has therefore projected a one percent increase in convention attendance to illustrate the potential impact of an increase in annual room nights booked resulting from the development and marketing of the Streetcar as an amenity to conventions and other events at the LA Convention Center. Interviews with multiple executives from LA Convention Center confirmed their plans to use Streetcar as a marketing tool that would substantially increase the hotel rooms available to convention guests and therefore expand the size of the convention bookings once Streetcar is completed.

This projected one percent increase in convention attendance would result in 1,925 new Downtown room hotel nights and approximately $670,000 in related spending on a recurring, annual basis (Figure 17). 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.

New convention attendees are estimated to have a regional impact of $600,000 in new output to the City of Los Angeles. New spending is projected to support direct employment of 6 jobs with associated wages of $240,000. Indirect and induced spending is anticipated to support an additional three jobs for a total city impact of nine new jobs across the City of Los Angeles with approximately $390,000 in employee compensation on an annual, recurring basis.

Figure 14: Recurring Annual Economic Impacts from New Convention-Related Spending

Total New Spending			$ 670,000
Economic Impacts	Jobs	Labor Income	Output
City			
Direct	6	$240,000	$620,000
Indirect & Induced	3	$150,000	$390,000
Total	9	$390,000	$1,010,000
County			
Direct	6	$240,000	$620,000
Indirect & Induced	3	$160,000	$420,000
Total	9	$400,000	$1,040,000
State			
Direct	7	$230,000	$620,000
Indirect & Induced	4	$220,000	$580,000
Total	10	$450,000	$1,200,000
U.S.			
Direct	7	$220,000	$640,000
Indirect & Induced	6	$300,000	$900,000
Total	13	$520,000	$1,540,000

Source: AECOM, IMPLAN Group, LLC. IMPLAN System (data and software). Employment figures rounded to nearest whole number; output and labor income rounded to nearest 10,000. Impacts in larger jurisdictions are inclusive of smaller jurisdictions. At the state and national levels, estimates of labor income are modeled based on state and national averages for worker compensation. This yields somewhat smaller total values for labor income compared to the City and County, where average worker compensation is higher than state and national averages.

Local Visitor Impacts

To estimate the potential impact of the Streetcar to Downtown businesses, the research team 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. The potential impact of an increase in visitor length-of-stay resulting from the development of the Streetcar was projected 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. An estimate of downtown visitation and visitor mix (employee, resident, daytrip visitor, overnight visitor) to key anchor attractions including LA Live, Staples Center, Grand Park, Walt Disney Concert Hall, MOCA, the Downtown Art Walk, and other venues was developed. This was not meant to be an exhaustive list, but rather to provide a baseline visitor estimate for scenario planning.

Visitor spending data from Los Angeles Tourism and Convention Board was used to estimate the impact of a two-hour increase in the length of stay for one percent of projected visitors to Downtown visitor-serving business establishments.

The projected two-hour length of stay (LOS) increase in one percent of Downtown visitors results in $4.7 million in new food and beverage, retail, parking, and entertainment spending on a recurring, annual basis (Figure 22). Total estimates of new spending in Downtown Los Angeles range from $2.2 million (low) to $6.5 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 more than $1 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.

Given annual Downtown spending of $4.7 million under the moderate scenario, total new regional output is approximately $5 million. New visitor spending is projected to support approximately 50 jobs in Downtown Los Angeles. New spending is anticipated to support a total of net new jobs across the City of Los Angeles with approximately $2.3 million in employee compensation on an annual, recurring basis.

Figure 15: Recurring Annual Economic Impacts from Increased Visitor LOS & Spending

New Spending Downtown			$ 4,700,000
Economic Impacts	Jobs	Labor Income	Output
City			
Direct	50	$1,600,000	$3,100,000
Indirect & Induced	10	$700,000	$1,900,000
Total	60	$2,300,000	$5,000,000
County			
Direct	50	$1,600,000	$3,100,000
Indirect & Induced	10	$800,000	$2,000,000
Total	60	$2,300,000	$5,100,000
State			
Direct	50	$1,500,000	$3,100,000
Indirect & Induced	20	$1,100,000	$2,900,000
Total	70	$2,500,000	$6,100,000
U.S.			
Direct	60	$1,600,000	$3,500,000
Indirect & Induced	30	$1,700,000	$5,300,000
Total	90	$3,300,000	$8,800,000

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Employment figures rounded to nearest 10; output and labor income rounded to nearest 100,000. Impacts in larger jurisdictions are inclusive of smaller jurisdictions. At the state and national levels, estimates of labor income are modeled based on state and national averages for worker compensation. This yields somewhat smaller total values for labor income compared to the City and County, where average worker compensation is substantially higher than state and national averages.

Visitor Impacts Summary

Based on the projected growth in convention visitation and downtown leisure visitor length of stay induced by Streetcar (as shown in Figure 17 and Figure 23), combined expenditures by convention and leisure visitors would support $5.4 million in new annual spending on food and beverage, hotel, retail, and other purchases. These expenditures will support nearly 60 new jobs in Downtown Los Angeles with total employee compensation of nearly $2 million annually. Over the 30-year study period, cumulative sales tax and parking revenues of more than $1 million and cumulative hotel tax revenues of more than $1 million will accrue to the City's General Fund.

Using these estimates, 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, was estimated. Under moderate growth projections, the Streetcar is projected to induce:

- Nearly 60 new jobs in Downtown Los Angeles
- $5 million in retail, food and beverage, and other spending annually
- Demand for 1,900 annual room nights with $400,000 in annual room revenues
- More than $2 million in cumulative City tax revenues over the study period

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

Figure 16: Average Direct Spending by Convention Participant per Room Night Booked (2014$)

	Attendees	Organizer	Exhibitor
Lodging	$211	$16	$0
Transportation	$74	$5	$15
Food & Beverage	$97	$45	$24
Retail	$36	$0	$0
Recreation	$21	$0	$0
Space Rental	$0	$39	$10
Business Services	$0	$76	$141
Total	$439	$180	$189

*Totals exclude staff living costs for organizers and delegates.
Source: From LA Tourism and Convention Bureau, by email 2014. Based on analysis by Tourism Economics. Values in 2014$.

Figure 17: Convention Center Scenarios: New Spending in Downtown Los Angeles (2014$)

		Low	Med	High
Dowtown Capture of New Spending				
Hotel	**90%**			
Other Spending	**75%**			
Average Convention Room Nights (2010-2015)	213,914			
Change in Occupancy		**0.5%**	**1.0%**	**1.5%**
New Downtown Room Nights		963	1,925	2,888
Average Hotel ADR	$156			
Average Hotel Sales/Convention Night	$207			
New Spending* / Convention Night	Spend/Night (2014$)			
Room Revenues (annual)	$211	$ 203,000	$ 405,000	$ 608,000
Food & Beverage	$97	$ 78,000	$ 155,000	$ 233,000
Parking	$9	$ 7,000	$ 14,000	$ 21,000
Entertainment	$21	$ 17,000	$ 33,000	$ 50,000
Retail	$36	$ 29,000	$ 59,000	$ 88,000
Other	$0	$ -	$ -	$ -
Total New Downtown Spending	$373	$ 334,000	$ 666,000	$ 1,000,000

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

Figure 18: Estimated City Revenues from Induced Convention Center Attendance

	Sales & Parking Tax		Hotel Tax	
	Annual Spending	Collections 1.0%*	Hotel Revenues	Collections 14.0%
2016-2020	-	-	-	-
2021-2025	$130,500	$2,000	$203,000	$28,000
2026-2030	$261,000	$4,000	$405,000	$57,000
2031-2035	$261,000	$4,000	$405,000	$57,000
2036-2040	$261,000	$4,000	$405,000	$57,000
2041-2045	$261,000	$4,000	$405,000	$57,000
Cumulative		$87,000		$1,276,000

Note: Sales tax revenues only include the portion of the sales tax that accrue to the region. Hotel, Sales, and Parking taxes do not accrue to the U.S. Values rounded. * Parking tax rate of 10% applied to spending on parking only.

Figure 19: Estimated Tax Revenues from Convention Center Attendance to County and State

	Sales Tax		
	Rate	Annual at Build-out	Cumulative
County	1.5%	$4,000	$83,000
State	6.5%	$16,000	$361,000

Note: Sales tax revenues only include the portion of the sales tax that accrue to the region. Sales taxes do not accrue to the U.S. Values rounded.

Figure 20: Estimated Visitation to Select Downtown Los Angeles Destinations

Event Attendance by Downtown Residents and Workers

	Work Only	Live Only	Work + Live	Student
Population	225,000	27,400	25,000	6,000
Median Activities/Events Attended per year downtown				
Shopping/dining	8.7	32.5	34.7	22.5
Events and entertainment	8.2	14.7	15.8	13.3
Art museums or galleries	2.0	3.2	3.2	3.0
Convention	1.0	1.5	1.6	1.8
Other	0.8	1.7	2.0	2.3
Primary outing adjustment				
Shopping/dining	5%	5%	5%	5%
Events and entertainment	100%	100%	100%	100%
Art museums or galleries	100%	100%	100%	100%
Convention	0%	0%	0%	0%
Other	0%	0%	0%	0%
Activities/events attended per year (adjusted)				
Shopping/dining	0.4	1.6	1.7	1.1
Events and entertainment	8.2	14.7	15.8	13.3
Art museums or galleries	2.0	3.2	3.2	3.0
Convention	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0
Total outings downtown				
Shopping/dining	98,213	44,552	43,413	6,735
Events and entertainment	1,838,250	401,684	394,250	79,620
Art museums or galleries	447,750	88,776	80,750	18,180
Convention	-	-	-	-
Other	-	-	-	-
Total	2,384,213	535,012	518,413	104,535

Total Attendance by Downtown Residents/Workers	3,542,000
Total Attendance at Downtown Attractions	26,470,000
Gross Up Factor	110%
Adjusted Attendance	29,117,000
Attendance net DTLA residents/workers	25,575,000
Overnight Visitors, net convention	1,539,000
LOS	3.2
DTLA Capture	75%
DTLA Outings - Overnight visitors	3,693,000
Assumed day visitors (incl. tourists from other parts of LA)	21,881,000
Drivetime pop -90 to 120 min drive	18,186,000
Trips per year drive time resident (excl. tourists)	1.20

Sources for event attendance by downtown residents and workers: Downtown LA 2013 Demographic Survey. AECOM incorporated assumptions for the share of events that constitute primary outings.
Sources for Downtown attractions attendance: LA Live, StaplesCenter.com, MusicCenter.org, The Museum Directory, ArtWalk LA, FIDM.com, AECOM .

Figure 21: Visitor Spending Profile

Domestic Overnight Visitor Spending

		Downtown 2014 $	%
Rental Car	$	127	9%
Gasoline/Parking/Taxi/Other Transportation	$	120	8%
Lodging	$	348	23%
F&B Eating Out	$	293	20%
F&B Eating In (Groceries)	$	70	5%
Admission/Entertainment	$	179	12%
Shopping/Gifts/Souvenirs	$	260	17%
Amenities (Spa, grooming, health club, etc.)	$	49	3%
Other	$	48	3%
Average Spending Per Travel Party	$	1,495	100%

Domestic Overnight Party Size and Length of Stay (LA County with at least one visit to DTLA)

Average Party Size		2.73
Average Length of Stay		3.1
Average Spending Per Domestic Ovenright Visitor (2014 $)	$	547
Average Spending per Visitor Per Night	$	177

Typical day	9am - 10pm
Spending hours per day	13 hours

Spending per night			Spending per hour	
Rental Car	$	15	$	1.15
Gasoline/Parking/Taxi/Other Transportation	$	14	$	1.09
Lodging	$	41	$	3.17
F&B Eating Out	$	35	$	2.66
F&B Eating In (Groceries)	$	8	$	0.64
Admission/Entertainment	$	21	$	1.63
Shopping/Gifts/Souvenirs	$	31	$	2.36
Amenities (Spa, grooming, health club, etc.)	$	6	$	0.45
Other	$	6	$	0.43
Average Spending Per Person	$	177	$	13.59

Source: LA Tourism and Convention Bureau 2014.

Figure 22: Extended Visitor LOS Scenarios: New Spending in Downtown Los Angeles (2014$)

		Low	Medium	High
Scenario - Capture rate for extended LOS		**0.5%**	**1.0%**	**1.5%**
Captured visitors who extend LOS		128,000	256,000	384,000
Additional LOS (hours)	**2.0**			
New Spending	Visitor Spend (per Hour)	Low	Medium	High
Room Revenues (annual)	n/a			
Food & Beverage	$ 3.30	$844,000	$1,689,000	$2,533,000
Parking	$0.26	$67,000	$134,000	$201,000
Entertainment	$ 1.63	$417,000	$834,000	$1,251,000
Retail / Other	$ 3.25	$830,000	$1,661,000	$2,491,000
Total New DOWNTOWN Visitor Spending	$8.44	$2,159,000	$4,317,000	$6,476,000

Source: AECOM

Figure 23: Estimated City Revenues from Induced Length of Stay by Downtown Visitors

	Sales & Parking Tax	
	Annual Spending	Collections @ 1.0% Sales Tax* 14.0% Parking Tax
2016-2020	-	-
2021-2025	$2,226,000	$28,000
2026-2030	$4,451,000	$55,000
2031-2035	$4,451,000	$55,000
2036-2040	$4,451,000	$55,000
2041-2045	$4,451,000	$55,000
Cumulative		$1,243,000

Note: Sales tax revenues only include the portion of the sales tax that accrue to the region of study. Values rounded. Hotel, Sales, and Parking Taxes do not accrue to the U.S.

Figure 24: Estimated Revenues from Induced Length of Stay to County and State

	Sales Tax		
	Rate	Annual at Build-out	Cumulative
County	1.5%	$63,000	$1,412,000
State	6.5%	$272,000	$6,118,000

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 2014, the greater Downtown Los Angeles office market consisted of approximately 690 buildings, with 68.6 million square feet of total rentable building area (RBA), average vacancy of 12.8%, and an average rent (full-service gross or FSG) of nearly $33 per square foot (SF), as reported by CoStar, a leading provider of commercial real estate data in the United States. The greater Downtown Los Angeles office market constituted 14% of occupied space in Los Angeles County office market. Since 2010, approximately 2.5 million square feet of inventory has been added to the greater Downtown Office Market.

A **Baseline** scenario forecast of Downtown office construction requirements was developed for the next 30 years (*study period*: 2016 to 2045), based on historical five-year averages and adjusted for current economic conditions and typical real estate cycles. The demand for office supply in the greater Downtown Los Angeles office market was developed by examining long-term employment projections for industries that lease office space in Los Angeles County and an estimate for those industries to locate in the Downtown area. Under the Baseline, total new office development over the study period is expected to total 14.2 million square feet in Downtown Los Angeles.

A second development scenario, **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 Streetcar scenario, total new office development over the study period is expected to total 15.1 million square feet in Downtown Los Angeles.

The office development attributed to the Streetcar is the difference in the amount of constructed office and supportive space between the Baseline and Streetcar scenarios. This value, approximately 784,000 square feet of office, combined with 31,000 SF of supportive services, serves as the basis for estimating the number of additional new Downtown office employees, associated food and beverage (F&B) and retail 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, local developer interviews, and the research team's in-house Cost Consulting team. Using an average vacancy rate of 12.0% and an average employment density of 200 square feet per employee, the office development induces approximately 4,000 new office-related employees, due to the difference between the Baseline and Streetcar development scenarios.

Using 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 $17.3 million annually by 2045. This supports 51,000 square feet of new retail and restaurant space, and approximately 150 new jobs.

Additionally, each new office employee is estimated to support demand for 1.5 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 5,800 new hotel room nights annually by the end of the study period, with associated spending of $2 million annually in Downtown Los Angeles.

Using these estimates, 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 was estimated. The Streetcar is projected to create:

- 4,200 new jobs by 2045
- 835,000 new square feet of development
    - 784,000 new square feet of office development
    - 51,000 square feet of supportive services
- $18.5 million in retail, food and beverage, and other spending annually
- Demand for 5,800 annual room nights with $900,000 in annual room revenues
- $1.25 million in annual city tax revenues by 2045

Figure 25: Summary Impact: Induced Office

Time Period	Construction Cost (cum.)	Gross SF (cum.)	Office Jobs (perm.)	F&B Spending (annual)	Retail Spending (annual)	Other Spending (annual)	Room Nights (annual)	Room Revenues (annual)
2016-2020	$30,575,000	103,000	500	$1,051,414	$1,134,232	$45,565	697	$ 108,808
2021-2025	$103,975,000	341,000	1,650	$3,460,904	$3,733,513	$149,985	2,295	$ 358,160
2026-2030	$158,795,000	506,000	2,480	$5,213,261	$5,623,899	$225,926	3,457	$ 539,506
2031-2035	$217,807,500	677,000	3,315	$6,965,618	$7,514,286	$301,868	4,619	$ 720,853
2036-2040	$245,796,250	759,000	3,735	$7,841,796	$8,459,479	$339,839	5,200	$ 811,526
2041-2045	$271,903,750	835,000	4,150	$8,717,974	$9,404,672	$377,809	5,781	$ 902,200
Annual/Perm. Impacts by End Year	n/a	n/a	4,150	$8,717,974	$9,404,672	$377,809	5,781	$ 902,200
Cumulative Impacts by End Year	$271,903,750	835,000						

Note: Values are an average annual snapshot for each year in the five-year period. For example, in 2021, the Streetcar is anticipated to support 1,650 jobs in 341,000 cumulative square feet of new office space, with 2,300 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, the research team estimated the direct, indirect and induced, and total economic impacts to the City, County, State, and U.S. resulting from construction of the new office and related supportive space. These impact estimates are presented below.

With an estimated cost of $272 million, construction of new office (and supportive retail and food and beverage space) is estimated to have a total cumulative city impact of $462 million in total economic output on the City. Construction is projected to support direct employment of approximately 1,710 jobs[4] with associated labor income of $132 million. Indirect and induced employment is expected to yield an additional 1,180 jobs[5] with $72 million in employee compensation within the City. In sum, construction of new office, above baseline growth expectations, will support 2,890 jobs[6] with $204 million in cumulative labor income during the 30-year development period. Additional impacts to the County, State, and U.S. are shown below.

[4] A construction job is equivalent to one job for one year
[5] *ibid.*
[6] *ibid.*

Figure 26: One-time Economic Impact of Construction: Induced Office & Related Development

Construction Budget			$271,900,000
Economic Impact	Jobs	Labor Income	Output
City	Jobs	Labor Income	Output
Direct	1,710	$132,500,000	$271,900,000
Indirect & Induced	1,180	$71,500,000	$190,000,000
Total	2,890	$204,000,000	$461,900,000
County			
Direct	1,710	$132,500,000	$271,900,000
Indirect & Induced	1,280	$76,300,000	$197,400,000
Total	2,990	$208,800,000	$469,300,000
State			
Direct	1,740	$133,500,000	$271,900,000
Indirect & Induced	1,770	$108,100,000	$295,800,000
Total	3,510	$241,500,000	$567,700,000
U.S.			
Direct	1,840	$126,600,000	$271,900,000
Indirect & Induced	2,810	$158,500,000	$483,400,000
Total	4,650	$285,100,000	$755,300,000

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Values in 2014$. Impacts in larger jurisdictions are inclusive of smaller jurisdictions. At the national level, estimates of labor income are modeled based on national averages for worker compensation. This yields somewhat smaller total values for labor income compared to State of California, the County, and the City, where average worker compensation is substantially higher than the national average.

As quantified above in Figure 25, 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. With total annual labor income of $379 million (Figure 27) and direct spending of $19.6 million (from Figure 25, summarized in Figure 27) in Downtown Los Angeles annually by 2045, new office workers and business visitors create total regional output of $226 million to the City. In addition to 4,200 new office jobs, they are expected to support the creation of 1,510 additional jobs in the City of Los Angeles by the conclusion of the study period, with recurring annual employee compensation of $81 million. Additional impacts to the County, State, and US are summarized below.

Figure 27: Recurring Economic Impact: Office Worker & Business Visitor Spending Impacts

(Resulting from the additional 4,200 office jobs in the Streetcar scenario)

Office Jobs			4,200
Average Labor Income			$90,200
Total Labor Income			$378,888,000
New Downtown Spending			$19,600,000
Downtown	Jobs	Labor Income	Output
Retail/Ancillary Impacts of Office Worker Spending Downtown	180	$5,300,000	$12,400,000
Economic Impacts of Office Worker Spending on Larger Regions	Jobs	Labor Income	Output
City	1,510	$80,900,000	$225,700,000
County	1,700	$89,400,000	$243,900,000
State	2,150	$118,800,000	$335,500,000
U.S.	3,320	$169,800,000	$519,300,000

Recurring annual impact at project build-out, assumed to be 2045. All values in current 2014$.

The tables below provide additional computational detail regarding the analysis.

- Figure 28 shows the 30-year projection of potential new office to downtown Los Angeles
- Figure 29 shows the Baseline vs. Streetcar projections of new office development to Downtown over the 30-year study period, resulting in a 5.5% difference over the Baseline estimate. Projection factors are estimates based on historical trends, the literature review, and interviews conducted for this study effort.
- Figure 30 shows the induced office employment associated with the incremental difference between the Baseline and Streetcar scenarios. An office density of 200 square feet per employee was utilized.
- Figure 31 summarizes office worker spending by expenditure category. Figure 32 shows the total new spending associated with the incremental growth in office development.
- Figure 33 shows the estimated new ancillary development (retail and food & beverage) that is likely to be supported by new office worker spending.
- Figure 34 shows the estimated new hotel room night demand from the incremental growth in office development. Figure 35 translates new hotel room night demand into additional local spending on F&B, parking, entertainment, and retail purchases.
- Figure 36 summarizes the impacts of incremental growth in office development on jobs, development square footage, construction spending, and other spending impacts.
- Figure 37 shows the tax revenue impacts to the City of Los Angeles from incremental growth in office development. Figure 38 shows the tax revenue impacts to other regions.

Figure 28: Office Supply, Downtown Los Angeles

Year	Assumption	2013	2018	2023	2028	2033	2038	2043	2048
Total Employment in Los Angeles County [1]		4,118,000	4,426,000	4,756,000	5,111,000	5,492,000	5,902,000	6,343,000	6,816,000
% Private Jobs @ [2]	85%	3,500,000	3,762,000	4,043,000	4,344,000	4,668,000	5,017,000	5,392,000	5,794,000
Change			262,000	281,000	301,000	324,000	349,000	375,000	402,000
% Office Jobs @ [3]	20%		52,400	56,200	60,200	64,800	69,800	75,000	80,400
Demand @ [4]	200 SF/Job		10,480,000	11,240,000	12,040,000	12,960,000	13,960,000	15,000,000	16,080,000
Downtown Capture @ [5]									
16.0%			1,677,000	1,798,000	1,926,000	2,074,000	2,234,000	2,400,000	2,573,000
17.5%			1,834,000	1,967,000	2,107,000	2,268,000	2,443,000	2,625,000	2,814,000
19.0%			1,991,000	2,136,000	2,288,000	2,462,000	2,652,000	2,850,000	3,055,000
Study Area Capture of Downtown @ [6]	70%								
Low			1,174,000	1,259,000	1,348,000	1,452,000	1,564,000	1,680,000	1,801,000
Mid			1,284,000	1,377,000	1,475,000	1,588,000	1,710,000	1,838,000	1,970,000
High			1,394,000	1,495,000	1,602,000	1,723,000	1,856,000	1,995,000	2,139,000
Study Area w/ Equilibrium Vacancy @ [7]	12%								
Low			1,334,000	1,431,000	1,532,000	1,650,000	1,777,000	1,909,000	2,047,000
Mid			1,459,000	1,565,000	1,676,000	1,805,000	1,943,000	2,089,000	2,239,000
High			1,584,000	1,699,000	1,820,000	1,958,000	2,109,000	2,267,000	2,431,000

[1] EDD employment projection 2010 - 2020, adjusted for current employment and extended through 2035 (CAGR 1.45%)

[2] EDD historic share of private jobs (10-Year average)

[3] Office development as share of total commercial development (5-year average) as reported by CoStar

[4] JLL estimate for average commercial space required per new office job

[5] AECOM estimate (low, mid, high); Low esimtate based on historic capture of Los Angeles County office development as reported by CoStar

[6] AECOM estimate based on historic capture of Downtown office development as reported by CoStar

[7] AECOM estimate based on historic equilibrium vacancy as reported by CoStar

Source: Costar, AECOM

Figure 29: Office Development Scenarios - Baseline & With Streetcar

Construction Need/Year with 12.0% Equilibrium Vacancy	430,000
Average Gain in Occupied Space per 5-year period	2,150,000

Time Period	Base Factor	Factor with Streetcar	Difference	Base Case Office Construction (SF)	Office Construction with Streetcar (SF)	Difference (SF)
2016-2020	0.75	0.80	6.0%	1,612,500	1,709,000	97,000
2021-2025	1.15	1.25	9.0%	2,472,500	2,696,000	224,000
2026-2030	1.20	1.27	6.0%	2,580,000	2,735,000	155,000
2031-2035	1.25	1.33	6.0%	2,687,500	2,849,000	161,000
2036-2040	1.20	1.24	3.0%	2,580,000	2,656,000	76,000
2041-2045	1.10	1.13	3.0%	2,365,000	2,436,000	71,000
Total 2016-2045	0.95	1.00	5.2%	14,297,500	15,081,000	784,000
Average Annual Construction over period:				476,583	503,000	26,000

Total induced SF due to Streetcar 5.5%

Time Period	New Construction	Rehab	New Build (SF)	Rehab (SF)	Total Construction Value	Cumulative Construction Value
2016-2020	60%	40%	58,000	39,000	$29,025,000	$29,025,000
2021-2025	65%	35%	145,000	78,000	$69,875,000	$98,900,000
2026-2030	75%	25%	116,000	39,000	$52,245,000	$151,145,000
2031-2035	80%	20%	129,000	32,000	$56,438,000	$207,583,000
2036-2040	80%	20%	61,000	15,000	$26,714,000	$234,296,000
2041-2045	80%	20%	57,000	14,000	$24,833,000	$259,129,000
Total 2016-2045			566,000	217,000	$259,129,000	$259,129,000
Dev Cost PSF @	$400	$150				

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

Figure 30: Office - Induced Employment based on new occupied space

Square Feet/Emp. 200

	Change in Occupied Office (SF)			New (Induced) Office Employment	
	Base Case Δ (SF)	With Streetcar Δ (SF)	Difference (SF)	Employment	Cumulative Employment
2016-2020	1,613,000	1,709,000	97,000	480	480
2021-2025	2,473,000	2,696,000	224,000	1,100	1,580
2026-2030	2,580,000	2,735,000	155,000	800	2,380
2031-2035	2,688,000	2,849,000	161,000	800	3,180
2036-2040	2,580,000	2,656,000	76,000	400	3,580
2041-2045	2,365,000	2,436,000	71,000	400	3,980
Total 2016-2045	14,298,000	15,081,000	784,000	3,980	3,980
Annual Average	572,000	603,000	31,000		

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

Figure 31: Office Worker Spending

Spending Category	Weekly (Avg.)	Capture in Study Area	Adjusted	2011$	Annual 2014$	Rounded
Fast-Food/Deli Eateries	$ 16.85	95%	$ 16.01	$ 835.23	$ 871	$ 870
Full-Service Restaurants	$ 19.03	90%	$ 17.13	$ 893.64	$ 932	$ 930
General Retail	$ 72.41	40%	$ 28.96	$ 1,511.27	$ 1,576	$ 1,580
Grocery	$ 18.68	25%	$ 4.67	$ 243.67	$ 254	$ 250
Personal Services/Entertainment	$ 38.24	35%	$ 13.38	$ 698.34	$ 728	$ 730
Total	$ 165.21		$ 80.15	$ 4,182.16	$ 4,361	$ 4,360

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

Figure 32: Average Annual Spending by New Downtown Office Workers

	F&B	Retail	Total Spending
2016-2020	$984,000	$1,109,000	$2,093,000
2021-2025	$3,239,000	$3,650,000	$6,889,000
2026-2030	$4,879,000	$5,498,000	$10,377,000
2031-2035	$6,519,000	$7,346,000	$13,865,000
2036-2040	$7,339,000	$8,270,000	$15,609,000
2041-2045	$8,159,000	$9,194,000	$17,353,000
Total Annual by End Year	$8,159,000	$9,194,000	$17,353,000

Note: Values rounded to nearest 1000.

Figure 33: Office-Induced Supportive Services: Square Footage, Construction Cost, Jobs

	F&B SF	Retail SF	Total SF (Rounded)	Total SF Cumulative	Construction Cost (period)	Construction Cost (cum.)	Jobs (period)	Jobs (cumulative)
2016-2020	2,460	3,696	6,200	6,200	$1,550,000	$1,550,000	21	21
2021-2025	5,638	8,470	14,100	20,300	$3,525,000	$5,075,000	47	68
2026-2030	4,100	6,160	10,300	30,600	$2,575,000	$7,650,000	34	102
2031-2035	4,100	6,160	10,300	40,900	$2,575,000	$10,225,000	34	136
2036-2040	2,050	3,080	5,100	46,000	$1,275,000	$11,500,000	17	153
2041-2045	2,050	3,080	5,100	51,100	$1,275,000	$12,775,000	17	170
Total 2016-2045	20,398	30,646	51,000	51,000	$12,775,000	$12,775,000	170	170

Sales PSF $400 $300 Dev Cost PSF @ $250 300 SF/Emp

Source: ICSC, RS Means, AECOM

Figure 34: Office Generated Hotel Rooms

	2013
Los Angeles Market Segmentation	
Leisure	78%
Business	22%
LA County Hotel Market	
Number of Hotel Rooms Sold	27,188,900
% Rooms Business	5,981,558
LA County Employment	4,118,000
Occupied Business Room Nights/Employee	1.5

Source: Los Angeles Convention and Visitors Bureau, AECOM

Figure 35: Office-Generated Hotel Business

	Room Nights	Cumulative Room Nights	Room Revenues	F&B	Parking	Entertainment	Retail	Other	Total Annual Spending
Spending per room night			$156	$97	$9	$21	$36	$65	
2016-2020	697	697	$109,000	$67,000	$6,000	$14,000	$25,000	$46,000	$268,000
2021-2025	1,598	2,295	$358,000	$222,000	$20,000	$48,000	$84,000	$150,000	$882,000
2026-2030	1,162	3,457	$540,000	$334,000	$31,000	$72,000	$126,000	$226,000	$1,328,000
2031-2035	1,162	4,619	$721,000	$447,000	$41,000	$96,000	$168,000	$302,000	$1,775,000
2036-2040	581	5,200	$812,000	$503,000	$46,000	$108,000	$190,000	$340,000	$1,998,000
2041-2045	581	5,781	$902,000	$559,000	$51,000	$120,000	$211,000	$378,000	$2,221,000
Total Annual by End Year	5,781	5,781	$902,000	$559,000	$51,000	$120,000	$211,000	$378,000	$2,221,000

Source: Los Angeles Convention and Visitors Bureau, AECOM

Figure 36: Summary Impact on Downtown Los Angeles: Induced Office

Time Period	Construction Cost (cum.)	Gross SF (cum.)	Office Jobs (perm.)	F&B Spending (annual)	Retail Spending (annual)	Other Spending (annual)	Room Nights (annual)	Room Revenues (annual)
2016-2020	$30,575,000	103,000	500	$1,051,414	$1,134,232	$45,565	697	$ 108,808
2021-2025	$103,975,000	341,000	1,650	$3,460,904	$3,733,513	$149,985	2,295	$ 358,160
2026-2030	$158,795,000	506,000	2,480	$5,213,261	$5,623,899	$225,926	3,457	$ 539,506
2031-2035	$217,807,500	677,000	3,315	$6,965,618	$7,514,286	$301,868	4,619	$ 720,853
2036-2040	$245,796,250	759,000	3,735	$7,841,796	$8,459,479	$339,839	5,200	$ 811,526
2041-2045	$271,903,750	835,000	4,150	$8,717,974	$9,404,672	$377,809	5,781	$ 902,200
Annual/Perm. Impacts by End Year	n/a	n/a	4,150	$8,717,974	$9,404,672	$377,809	5,781	$ 902,200
Cumulative Impacts by End Year	$271,903,750	835,000						

Note: For display purposes, this table duplicates Figure 25. Values are an average annual snapshot for each year in the five-year period. For example, in 2021, the Streetcar is anticipated to support 1,650 jobs in 341,000 cumulative square feet of new office space, with 2,300 new hotel room nights demanded during the year. Gross square footage includes office and supportive retail and food and beverage space.

Figure 37: Estimated Tax Revenues from Induced Office Development to City of Los Angeles

	Property Tax		Sales Tax		Hotel Tax	
	23% of 1% Property Tax		1% of Sales Value		14% of Hotel Revenues	
	Construction Value	Annual Collections @ 0.23%	Annual Retail Sales	Annual Collections @ 1.0%	Annual Hotel Revenues	Annual Collections @ 14.0%
2016-2020	$30,575,000	$71,000	$2,200,000	$22,000	$107,000	$15,000
2021-2025	$103,975,000	$240,000	$7,300,000	$73,000	$357,000	$50,000
2026-2030	$158,795,000	$367,000	$11,100,000	$111,000	$543,000	$76,000
2031-2035	$217,808,000	$503,000	$14,800,000	$148,000	$721,000	$101,000
2036-2040	$245,796,000	$568,000	$16,600,000	$166,000	$814,000	$114,000
2041-2045	$271,904,000	$628,000	$18,500,000	$185,000	$900,000	$126,000
Cumulative		$11,878,000		$3,525,000		$2,410,000

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. City capture rate of annual property tax revenues is based on assessed value as reported by Los Angeles County Assessor and apportionment factors for property tax to City of Los Angeles as reported by the LA County Auditor Controller (assessed value was modified to account for welfare and homeowner property tax exemptions: taxable value = 94.2% of assessed value). Sales tax revenues only include the portion of the sales tax that accrue to the City of Los Angeles. Hotel tax rate is based on current City of LA TOT rate (2014).

Figure 38: Estimated Tax Revenues from Induced Office Development to Other Regions

	Property Tax			Sales Tax		
	Allocation of 1% Tax	Annual at Build-out	Cumulative	Rate	Annual at Build-out	Cumulative
LAUSD/ LACC	21%	$576,000	$10,900,000	n/a	n/a	n/a
County	21%	$582,000	$11,018,000	1.5%	$278,000	$5,288,000
State	0%	$0	$0	6.5%	$1,203,000	$22,913,000
U.S.	0%	$0	$0	0%	$0	$0

LAUSD: Los Angeles Unified School District. LACC: Los Angeles City College. Source: Property Tax Allocation – LA County Auditor Controller (Percent shown is the allocation of the 1% property tax levied against assessed value; assessed value was modified to account for welfare and homeowner property tax exemptions – taxable value = 95.5% of assessed value; Sales Tax: California Board of Equalization.

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 a 15-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 larger Downtown Los Angeles residential market[7] and in the Downtown study area were examined from the period 1999 to 2014 to calculate long-term construction requirements in five-year increments. In July 2014, the larger Downtown Los Angeles residential market comprised approximately 31,200 units, with a residential population of 53,320 (Figure 42), an additional 3,700 to 4,600 units under construction (Figure 45), and a pipeline (permitted and planned/proposed units) of approximately 13,800 units (Figure 45).[8] Approximately 22,500 of these units are non-single room occupancy units. The larger Downtown Los Angeles housing market constitutes approximately two percent (2.2%) of housing units in the City of Los Angeles, and less than one percent (0.9%) of housing units in Los Angeles County. The net annual development of new residential space has totaled 1,290 units per year from 1999 to 2014, and has averaged 610 units per year between 2010 and 2014 (Figure 43). When SRO units are excluded, the net annual change between 2010 and 2014 has averaged 930 units per year, with a compound annual growth rate of 4.6%.

A **Baseline** scenario forecast of Downtown residential construction requirements was developed for the 30-year study period (2016 to 2045), based on recent historical averages, then adjusted for current economic conditions and typical real estate cycles. Under the Baseline scenario, total new residential development over the study period is expected to total 34,800 residential units in Downtown Los Angeles (Figure 47).

A second development scenario, **Streetcar**, was prepared in a similar manner, forecasting residential construction after introducing Streetcar improvements to Downtown Los Angeles. This forecast was informed by the existing development pipeline, literature review, interviews, and the team's expertise and experience in analyzing urban transit impacts on real estate development. Under the Streetcar scenario, total new residential development over the study period is expected to total 39,300 units in Downtown Los Angeles (Figure 47).

The incremental residential development impact of the Streetcar is the difference in amount of constructed residential space between the **Baseline** and **Streetcar** scenarios. This value, approximately 4,500 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 determined using multiple sources, including RS Means, local developer interviews, and the research team's Cost Consultancy group. Using an average vacancy rate of 5% (as reported by DCBID) and an average household size of 1.7 persons per unit (calculated based on current population and unit counts), the Streetcar is projected to induce an additional 7,400 incremental new residents above expected Baseline growth in Downtown Los Angeles (Figure 39).

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 75,000 square feet of ancillary service space, with new spending on food and beverage and retail and convenience goods expected to reach $26 million annually by 2045. This will support 250 permanent new jobs (Figure 39).

The Streetcar is projected to create:

[7] The larger Downtown Los Angeles residential market is generally defined as the area between the 101 Freeway on the north and east, the 110 Freeway on the west, and Interstate 10 on the south.
[8] Source: Downtown Center Business Improvement District (Supply), Urban One (Pipeline)

- 250 direct new jobs Downtown by 2045
- 4,500 residential units and 75,000 new square feet of ancillary development
- $5.1 million in retail and food and beverage, and other spending annually

Figure 39: Incremental Impact on Downtown Los Angeles: Residential & Ancillary Development

	Cumulative over Study Period				Annual by Period		
	Residential Units	Ancillary Development (SF)	Total Construction Cost	Jobs	Retail Spending	F&B Spending	Total
2016-2020	1,300	20,800	$376 million	70	$700,000	$700,000	$1,400,000
2020-2025	2,500	41,600	$752 million	140	$1,500,000	$1,400,000	$2,800,000
2026-2030	3,300	54,600	$987 million	180	$1,900,000	$1,800,000	$3,700,000
2031-2035	4,000	65,500	$1,183 billion	220	$2,300,000	$2,200,000	$4,500,000
2036-2040	4,300	71,800	$1,298 billion	240	$2,500,000	$2,400,000	$4,900,000
2041-2045	4,500	75,000	$1,356 billion	250	$2,600,000	$2,500,000	$5,100,000
Total	4,500	75,000	$1,356 billion	250	$2,600,000	$2,500,000	$5,100,000
Construction Value	$1.337 billion	$18 million	$1.356 billion				

Note: This table shows the incremental residential development attributed to the Streetcar; in other words, the difference between the Streetcar and Baseline residential scenarios. Spending projections are an average annual snapshot for each year in the five-year period. Ancillary Development includes supportive retail and food and beverage space.

Using these estimates, the research team estimated the direct, indirect and induced, and total economic impact of incremental residential and ancillary development in Downtown Los Angeles on jobs, spending, taxes, and economic output to the City, County, State, and U.S. Economic impacts were estimated for both the construction impacts and the ongoing annual operating impacts from new resident spending and household income effects. The results are presented below.

With an estimated construction cost of $1.4 billion, incremental residential and ancillary service space development is estimated to have a total cumulative impact of $2.3 billion to the City of Los Angeles (Figure 40). The construction of new housing is projected to support direct employment of approximately 7,000 direct construction jobs[9] across the City of Los Angeles with associated wages of $531 million (Figure 40). Indirect and induced employment is expected to yield an additional 6,260 jobs[10] with $360 million in employee compensation within the City of Los Angeles. In sum, construction of new housing, above baseline growth expectations in Downtown Los Angeles, is estimated to support 13,260 jobs[11] with $892 million in cumulative labor income during the 30-year development period (Figure 40).

[9] A construction job is equivalent to one job for one year
[10] *ibid.*
[11] *ibid.*

Figure 40: One-time Economic Impact of Construction: Residential & Ancillary Development

Construction Budget			$1,355,600,000
Economic Impacts	Jobs	Labor Income	Output
City			
Direct	7,000	$531,300,000	$1,355,600,000
Indirect & Induced	6,260	$360,400,000	$952,300,000
Total	13,260	$891,600,000	$2,307,900,000
County			
Direct	7,000	$531,300,000	$1,355,600,000
Indirect & Induced	6,650	$377,200,000	$967,100,000
Total	13,650	$908,400,000	$2,322,700,000
State			
Direct	7,120	$538,700,000	$1,355,600,000
Indirect & Induced	9,300	$549,000,000	$1,505,000,000
Total	16,420	$1,087,700,000	$2,860,600,000
U.S.			
Direct	7,240	$492,400,000	$1,355,600,000
Indirect & Induced	14,080	$773,900,000	$2,354,300,000
Total	21,320	$1,266,300,000	$3,709,900,000

Source: AECOM, Implan Group LLC IMPLAN System (data and software). Employment figures rounded to nearest 10; output and labor income rounded to nearest 100,000. Impacts in larger jurisdictions are inclusive of smaller jurisdictions. At the national level, estimates of labor income are modeled based on national averages for worker compensation. This yields somewhat smaller total values for labor income compared to State of California, the County, and the City, where average worker compensation is substantially higher than the national average.

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. Median household income of new Downtown residents is estimated to be nearly $100,000 (DCBID), which is significantly higher than the comparable household income in Los Angeles County. With total estimated annual household income of $447 million, new residents will create a total regional output of $405 million annually (Figure 41). In addition to 250 direct new jobs in Downtown Los Angeles in supportive service sectors such as retail, they are expected to support the creation of 2,650 new jobs across the City of Los Angeles by the conclusion of the study period, with recurring annual labor income of $144 million.

Figure 41: Recurring Economic Impact: Resident Spending Impacts

New Households			4,530
Estimated Household Income			$98,700
New Spending Downtown			$25,640,000
Aggregate Household Income			$447,111,000
Downtown	Jobs	Labor Income	Output
Induced by Resident Spending	250	$7,000,000	$16,200,000
Economic Impacts	Jobs	Labor Income	Output
City	2,650	$143,500,000	$405,000,000
County	2,760	$146,500,000	$404,500,000
State	3,380	$188,500,000	$538,000,000
U.S.	4,980	$257,000,000	$792,300,000

Recurring annual impact at project build-out, assumed to be 2045. All values in current 2014$. Employment figures rounded to nearest 10; output and labor income rounded to nearest 100,000. City, County, State, and U.S. impacts are the result of household spending; they reflect indirect and induced effects. Source: for Median Income –Downtown Los Angeles Demographic Survey (2013), other calculations are from AECOM

The tables below provide additional computational detail regarding the analysis.

- Figure 42 and Figure 43 show the residential population and number of housing units in Downtown Los Angeles, the City and County from 1999 to 2014.
- Figure 44 shows distribution of Downtown housing units by neighborhood.
- Figure 45 shows the current pipeline of Downtown housing units.
- Figure 46 provides the Baseline vs. Streetcar projections of new residential development to Downtown over the 30-year study period, resulting in a 13% difference over the Baseline estimate. Projection factors are estimates based on historical trends, pipeline of new development, the literature review, and interviews conducted for this study effort.
- Figure 47 calculates the construction value of the incremental housing units above Baseline projections.
- Figure 48 shows the residential population growth associated with the incremental housing development.
- Figure 49 and Figure 50 provide the estimate of downtown retail square footage induced by new Downtown residents' household spending, with Figure 51 showing the estimated sales of those retail establishments.
- Figure 52 calculates the construction value of the incremental retail square footage.
- Figure 53 summarizes the impacts of incremental growth in residential development on downtown population, jobs, development square footage, construction spending, and other spending impacts.
- Figure 54 shows the tax revenue impacts to the City of Los Angeles from incremental growth in office development. Figure 55 shows the tax revenue impacts to other regions.

Figure 42: Residential Population & Housing Supply, Downtown Los Angeles 2014

Existing Housing (2014)	Affordable Units	Market Rate Rental Units	Market Rate Condos	Market Rate Total Units	Total
Existing as of December 31, 1998	8,370	2,430	830	3,260	11,630
Constructed since Adaptive Reuse Ordinance					19,560
Subtotal: Existing Units					31,180
Subtotal: Under Development	40	6,120	160	6,280	6,320
Total					37,500
Population (2014)					53,320

Source: DCBID - Downtown Los Angeles Housing Information. The Downtown Los Angeles housing market comprises the area generally bordered by the 101 Freeway on the north, the 110 Freeway on the west, Interstate 10 on the south, and I-5 on the east.

Figure 43: Residential Population & Housing Supply, 1999-2014

				1999-2014		2010-2014	
Housing Units	1999	2010	2014	CAGR	Annual Change	CAGR	Annual Change
Downtown	11,630	28,740	31,180	6.8%	1,300	2.1%	610
SRO		*9,990*	*8,700*			*-3.4%*	*-1,290*
Non-SRO		*18,750*	*22,480*			*4.6%*	*930*
City	1,334,680	1,417,310	1,432,550	0.5%	6,530	0.3%	3,810
County	3,258,680	3,431,590	3,474,150	0.4%	14,370	0.3%	10,640
Housing Unit Ratio					Capture Ratio		Capture Ratio
Downtown: City	0.9%	2.0%	2.2%		20%		16%
Downtown: County	0.4%	0.8%	0.9%		9.1%		5.7%
Household Population						CAGR	Annual Change
Downtown		49,150	53,320			2.1%	1,040
City		3,704,410	3,811,600			0.7%	26,800
County		9,643,310	9,860,390			0.6%	54,270
Residents per Unit							
Downtown		1.7	1.7				
City		2.6	2.7				
County		2.8	2.8				

CAGR = Compound Annual Growth Rate. Unit counts and population rounded to nearest 10.
Source: Figure 42, DCBID - Downtown Los Angeles Housing Information, CA Department of Finance E-1 and E-5 Reports, AECOM.

Figure 44: Distribution of Units by Neighborhood

District	Condo	Apartment	Total	% of Total
Arts	692	779	1,471	7%
Bunker Hill*	**530**	**1,679**	**2,209**	**10%**
City East	0	401	401	2%
City West	425	3,221	3,646	16%
Chinatown	0	1,954	1,954	9%
Civic Center*	**0**	**0**	**0**	**0%**
Fashion	280	204	484	2%
Financial*	**250**	**875**	**1,125**	**5%**
Historic*	**1,073**	**4,297**	**5,370**	**24%**
Jewelry*	**0**	**0**	**0**	**0%**
Little Tokyo	821	644	1,465	7%
South Park*	**1,773**	**2,580**	**4,353**	**19%**
Union Station	0	0	0	0%
Warehouse	0	0	0	0%
Total	5,844	16,634	22,478	100%
Units in Downtown Study Area*	**3,626**	**9,431**	**13,057**	**58%**
Percent in Downtown Study Area	62%	57%	58%	

Note: Rows highlighted in **bold text** fall within the Downtown Study Area for purposes of this analysis
Source: DCBID - Downtown Los Angeles Housing Information, AECOM

Figure 45: Pipeline of Residential Units within Downtown Study Area

	Units	Units
Under Construction	3,730	4,558
Permitted	5,680	0
Planned/Proposed	8,090	1,765
Total	22,510	6,323
% Adaptive Re-use	5%	n/a
Source	Urban One	DCBID

Sources: DCBID; Urban One Development Group prepared a comprehensive list of approximately 120 properties for this study that were completed, under construction, or permitted, planned, or proposed for Downtown Los Angeles via LA Curbed, LA Downtown News, LA Times, Mack Urban Development Pipeline, and others, as of July 2014

Figure 46: Residential Development Scenarios - Baseline & With Streetcar

Average Construction of Non-SRO Downtown Units (annual)						930
Percent of Downtown Units Projected for Downtown Study Area						75%
Average Annual Construction in Downtown Study Area						700
Average Construction Required per 5-year Period						3,500
Time Period	Baseline Factor	Streetcar Factor	Difference	Baseline Projection	Streetcar Projection	Difference (units)
2016-2020	3.000	3.360	12%	10,490	11,740	1,260
2020-2025	2.000	2.360	18%	6,990	8,250	1,260
2026-2030	1.500	1.725	15%	5,240	6,030	790
2031-2035	1.250	1.438	15%	4,370	5,020	660
2036-2040	1.100	1.210	10%	3,840	4,230	380
2041-2045	1.100	1.155	5%	3,840	4,040	190
Total	1.658	1.875	13%	34,780	39,310	4,530
			Average Annual Construction:	1,160	1,310	150
			Five-Year Average:	5,800	6,550	760
			Induced over Baseline:		13%	

Source: Figure 43, Figure 44, Figure 45. AECOM. Project team determined Baseline and Streetcar Projection Factors (adjustment to average construction required per 5-year period for each scenario) using available data regarding the number of units currently under construction, planned and proposed in Downtown, combined with literature review, developer interviews, and consultant's judgment. Values of units rounded to nearest 10.

Figure 47: Residential Construction Cost

	Construction Cost per Unit	Unit Distribution		
New	$300,000	95%		
Renovation	$200,000	5%		
Blended Cost per Unit	**$294,800**			
	Residential Units – by Period	Residential Units - Cumulative	Construction Value – by Period	Construction Value - Cumulative
2016-2020	1,260	1,260	$370,900,000	$370,900,000
2020-2025	1,260	2,520	$370,900,000	$741,800,000
2026-2030	790	3,300	$231,800,000	$973,700,000
2031-2035	660	3,960	$193,200,000	$1,166,800,000
2036-2040	380	4,340	$113,300,000	$1,280,200,000
2041-2045	190	4,530	$56,700,000	$1,336,800,000
Total	4,530	4,530	$1,336,800,000	$1,336,800,000

Source: Unit distribution estimated using data from Figure 44 and developer interviews. Cost per unit determined using combination of sources, including RS Means, AECOM Cost Consulting group, and developer interviews. Values rounded.

Figure 48: New Residents

Residents per Unit		1.7
Occupancy		95%
	Population – by Period	Population - Cumulative
2016-2020	2,040	2,040
2020-2025	2,040	4,090
2026-2030	1,280	5,370
2031-2035	1,060	6,430
2036-2040	620	7,050
2041-2045	310	7,370
Total	7,370	7,370

Source: Figure 43, Figure 47. Values rounded to nearest 10, totals may not match due to rounding.

Figure 49: Retail Space Demand from Residential Spending

City Population (2012)		3,854,260		
Type of Retailer	Taxable Transactions 2012 ($000)	Average Sales Per Capita	Sales PSF	SF per Capita
Apparel stores	$2,884,984	$749	$300	2.5
General merchandise stores	$2,759,578	$716	$300	2.4
Drug Stores	$413,937	$107	$500	0.2
Food stores	$2,322,695	$603	$540	1.1
Eating and drinking places	$6,564,652	$1,703	$400	4.3
Home furnishings and appliances	$1,676,926	$435	$300	1.4
Building materials	$1,942,915	$504	$300	1.7
Motor vehicle dealerships	$13,049,641	$1,309		
Motor vehicle parts	$1,429,751	$143	$300	0.48
Service stations	$5,090,496	$1,321		
Other retail stores	$3,716,658	$964	$300	3.21
Retail Stores Totals	$41,852,233	$8,554		17.29
Residential Inducement of Ancillary Services				SF per Capita
Retail				**5.9**
Apparel stores				2.5
Other retail stores				3.2
Drug Stores				0.2
F&B				**4.3**
Eating and drinking places				4.3

Drug store sales estimated at 15% of General Merchandise in LA County. Sources: CA DOF (Population 2012), CA Board of Equalization (Taxable Transactions), Dollars & Cents of Retail 2008 & AECOM (Sales per Square Foot).

Figure 50: Induced Development of Ancillary Service Space due to New Residential Spending

SF per Capita		5.9	4.3			
SF per Employee					300	
	Population – Cumulative	Induced Retail (SF)	Induced F&B (SF)	Total Induced (SF)	Jobs - Cumulative	Jobs – by Period
2016-2020	2,040	12,100	8,700	20,800	70	70
2020-2025	4,090	24,200	17,400	41,600	140	70
2026-2030	5,370	31,800	22,800	54,600	180	40
2031-2035	6,430	38,100	27,400	65,500	220	40
2036-2040	7,050	41,800	30,000	71,800	240	20
2041-2045	7,370	43,600	31,400	75,000	250	10
Total	7,370	43,600	31,400	75,000	250	250

Source: Figure 48, Figure 49. Retail and F&B square foot per employee estimate per generally accepted industry standards. Values rounded.

Figure 51: Induced Sales Downtown due to New Residential Spending

Sales per SF	$300	$400	
	Retail Sales	F&B Sales	Total Sales
2016-2020	$3,600,000	$3,500,000	$7,100,000
2020-2025	$7,300,000	$7,000,000	$14,200,000
2026-2030	$9,500,000	$9,100,000	$18,700,000
2031-2035	$11,400,000	$11,000,000	$22,400,000
2036-2040	$12,500,000	$12,000,000	$24,600,000
2041-2045	$13,100,000	$12,500,000	$25,600,000
Annual by 2045	$13,100,000	$12,500,000	$25,600,000

Source: Figure 50. Sales per SF based on Dollars and Cents 2006 and conservative estimates of general industry standards

Figure 52: Construction Value of Ancillary Residential Development

Construction Cost PSF		$250
	Ancillary Development - Cumulative (SF)	Construction Value - Cumulative
2016-2020	20,800	$5,200,000
2020-2025	41,600	$10,400,000
2026-2030	54,600	$13,700,000
2031-2035	65,500	$16,400,000
2036-2040	71,800	$18,000,000
2041-2045	75,000	$18,800,000
Total	75,000	$18,800,000

Source: Figure 50. Cost per unit determined using combination of sources, including RS Means, AECOM Cost Consulting group, and developer interviews. Values rounded.

Figure 53: Summary Impact on Downtown Los Angeles: Induced Residential

	Residential Units	Residential Population	Ancillary Sales	Ancillary SF	Ancillary Jobs	Construction Value*
2016-2020	1,260	2,040	$7,100,000	20,800	70	$376,100,000
2020-2025	2,520	4,090	$14,200,000	41,600	140	$752,200,000
2026-2030	3,300	5,370	$18,700,000	54,600	180	$987,300,000
2031-2035	3,960	6,430	$22,400,000	65,500	220	$1,183,200,000
2036-2040	4,340	7,050	$24,600,000	71,800	240	$1,298,100,000
2041-2045	4,530	7,370	$25,600,000	75,000	250	$1,355,600,000
Total (by 2045)	4,530	7,370	$25,600,000	75,000	250	$1,355,600,000

Construction Value is the combined total of Residential and ancillary development. All values are cumulative.
Source: Figure 46, Figure 47, Figure 48, Figure 50, Figure 51, Figure 52

Figure 54: New City Revenues, Property & Sales Tax

	Property Tax		Sales Tax	
Tax Rate	23% of 1% Property Tax		1% of Sales Value	
	Taxable Value (Cumulative)	Annual Property Tax Collection 0.23%	Annual Retail/F&B Spending	Annual Sales Tax Collections 1.0%
2016-2020	$188,060,000	$434,000	$7,114,000	$71,000
2021-2025	$564,181,000	$1,303,000	$14,228,000	$142,000
2026-2030	$869,778,000	$2,008,000	$18,674,000	$187,000
2031-2035	$1,085,264,000	$2,506,000	$22,379,000	$224,000
2036-2040	$1,240,675,000	$2,865,000	$24,553,000	$246,000
2041-2045	$1,326,869,000	$3,064,000	$25,640,000	$256,000
Cumulative		$60,896,000		$5,629,000

Source: Figure 47, Figure 50, Figure 53, Property Tax Allocation – LA County Auditor Controller (assessed value was modified to account for welfare and homeowner property tax exemptions – taxable value = 94.2% of assessed value); Sales Tax – California Board of Equalization.

Figure 55: Property & Sales Tax Revenue from Induced Residential Development to Other Regions

	Property Tax			Sales Tax		
	Allocation of 1% Tax	Annual at Build-out	Cumulative	Rate	Annual at Build-out	Cumulative
LAUSD/ LACC	21%	$2,811,000	$55,883,000	n/a	n/a	n/a
County	21%	$2,842,000	$56,488,000	1.5%	$385,000	$8,444,000
State	0%	$0	$0	6.5%	$1,667,000	$36,591,000
U.S.	0%	$0	$0	0%	$0	$0

LAUSD: Los Angeles Unified School District. LACC: Los Angeles City College. Source: Property Tax Allocation – LA County Auditor Controller (Percent shown is the allocation of the 1% property tax levied against assessed value; assessed value was modified to account for welfare and homeowner property tax exemptions – taxable value = 95.5% of assessed value; Sales Tax: California Board of Equalization.

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INTERVIEWS

The research team conducted interviews with the following individuals and institutions in July 2014:

- Rob Kane, Lincoln Property Group
- Paul Keller, Mack Urban
- Jason Deibler, ACE Hotel
- Homer Williams, Marriott Hotels
- K.C. Yasmer, Forest City
- Rocky Rockefeller, Rockefeller Partners
- Karin Liljegren, Omgivning
- Bud Omven, Los Angeles Convention Center
- Brad Gessner, Los Angeles Convention Center
- Patrick Spillane, IDS Real Estate

The following individuals and institutions were interviewed during first iteration of this study (2011):

- Jeff Blosser, Portland Convention and Visitors Bureau (Portland, OR)
- Steve Hayes, Tampa Bay and Company (Tampa, FL)
- Raymond Ha, Fred's Mexican Restaurant (San Diego)
- Carola Ross, AEG/LA Live
- Barbara Kirklighter, Los Angeles Tourism and Convention Board / Los Angeles Convention and Visitors Bureau
- Franciscus Loukrezis, Los Angeles Tourism and Convention Board / Los Angeles Convention and Visitors Bureau
- Dennis Allen, Urban One
- JR Riddle, Urban One
- Jim Atkins, Merlone Geier Partners
- David Gray, David Gray Architects
- Rocky Rockefeller, Rockefeller Partners

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