California High-Speed Rail Authority

Burbank to Los Angeles Project Section

Final Environmental Impact Report/ Environmental Impact Statement

Appendix 3.18-A: RIMS II Modeling Details

September 2021

CALIFORNIA High-Speed Rail Authority

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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Memorandum

DATE: December 7, 2020

TO: Andrew Bayne, Rail Delivery Partner

FROM: Jon Hecht, ICF

SUBJECT: Appendix 3.18-A RIMS II Modeling Details, revised December 2020

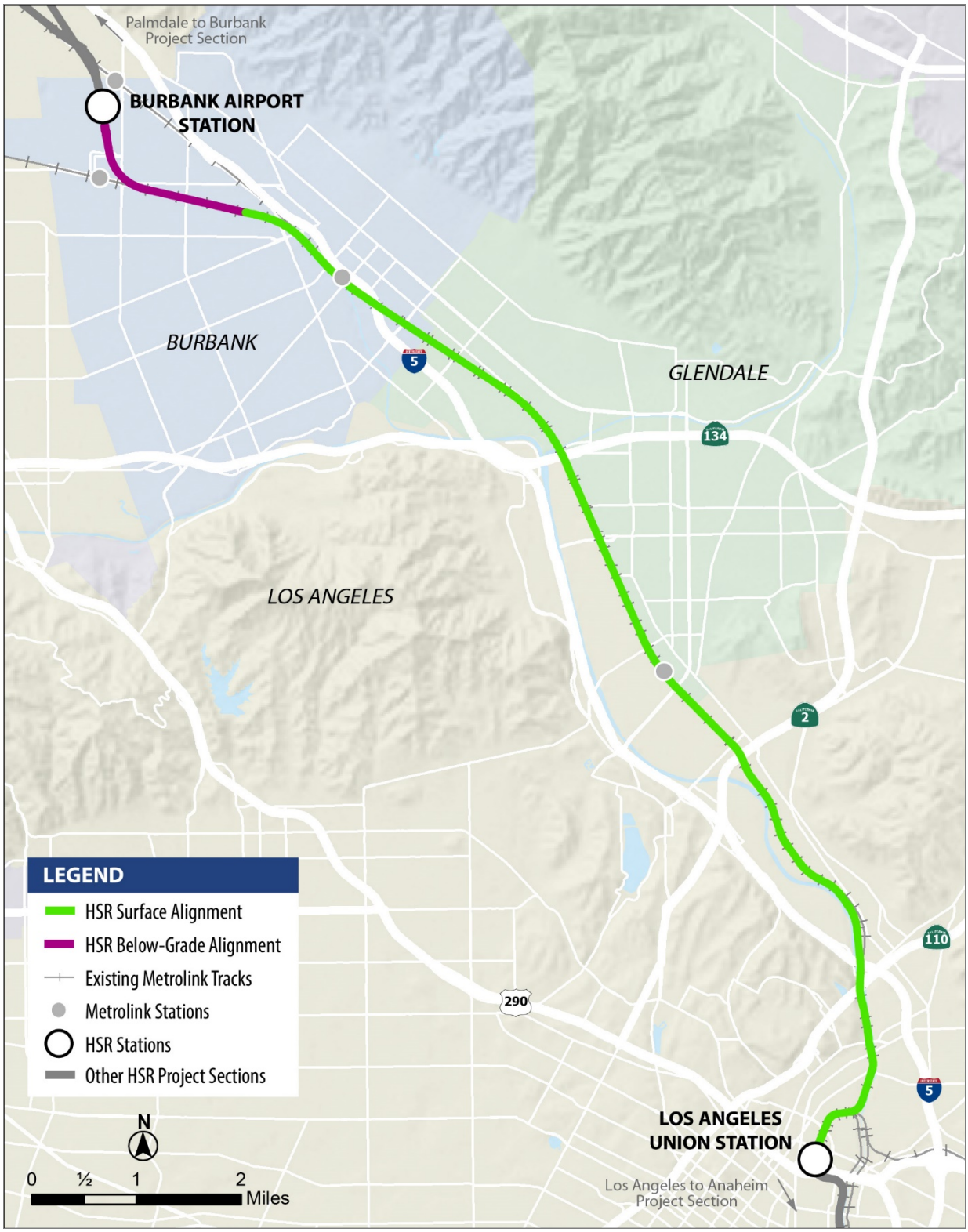
This memorandum provides a summary of the impact analysis conducted for estimation of the employment growth impacts anticipated for the Burbank to Los Angeles Project Section (project section) of the California High-Speed Rail (HSR) System. This memorandum describes the assumptions and methods used to estimate short-term and long-term employment growth impacts, and presents the analysis results. This memorandum has been updated to be consistent with the 2020–2028 construction period now assumed for this project section. The engineering refinements incorporated into the HSR Build Alternative following the circulation of the Draft EIR/EIS did not result in substantial changes to the project cost estimate; as such, no further revisions as a result of those refinements were made. However, the cost estimate used herein has been updated for consistency with the most recent estimate. The long-term employment impacts from operations and maintenance spending have also been updated.

High-Speed Rail Project Alternative Description

The HSR Build Alternative proposes new and upgraded track, maintenance facilities, grade separations, drainage improvements, communications towers, security fencing, passenger train stations, and other necessary facilities to introduce HSR service into the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Corridor from near Hollywood Burbank Airport to Los Angeles Union Station (LAUS). In portions of the alignment, new and upgraded tracks would allow other passenger trains to share tracks with the HSR system. HSR stations would be located near Hollywood Burbank Airport and at LAUS. The alignment would be entirely grade-separated at crossings, meaning that roads, railroads, and other transport facilities would be located at different heights so the HSR system would not interrupt or interface with other modes of transport, including vehicle, bicycle, and pedestrian.

For most of the project section, the HSR alignment would be within the existing railroad right-of-way, which is typically 70 to 100 feet wide. The HSR alignment includes northbound and southbound electrified tracks for high-speed trains. The right-of-way would be fenced to prohibit pedestrian and public or unauthorized vehicle access.

The Burbank to Los Angeles Project Section includes a combination of at-grade, below-grade, and retained-fill track, depending on corridor and design constraints (Figure 1). The at-grade and retained-fill portions of the alignment would be designed with structural flexibility to accommodate shared operations with other passenger rail operators. Throughout most of the project section (between Alameda Avenue and State Route [SR] 110), two new electrified tracks would be placed along the west side of the existing railroad right-of-way and would be useable for HSR and other passenger rail operators. The existing non-electrified tracks would be realigned closer to the east side of the existing right-of-way, for a total of four tracks; these realigned, non-electrified tracks would be usable for freight and other passenger rail operators, but not for HSR.



Source: Authority and FRA, 2018
Draft alignments, elements not to scale

Figure 1 Burbank to Los Angeles Project Section

Throughout most of the Burbank to Los Angeles Project Section, the electrified track centerline and the non-electrified track centerline would have a minimum separation of 23.5 feet, and the northbound and southbound electrified tracks would have a separation of 16.5 feet, following the California High-Speed Rail Authority's (Authority) *Technical Memorandum 1.1.21 Typical Cross Sections for 15% Design* (Authority 2013). However, in several areas of the corridor, the right-of-way is less than 100 feet wide, a threshold that constrains the design. As a result, reduced track separations were used in these constrained areas in order to stay within the existing right-of-way to the greatest extent possible and thus minimize property impacts. The reduced separations between the electrified and non-electrified track centerlines would be a minimum of 16.5 feet, and between the two electrified track centerlines would be 15 feet.

Overview of Impact Evaluation

Analysis of employment growth resulting from the HSR Build Alternative requires estimates of impacts stemming from three primary sources: (1) the initial construction phase; (2) the operations and maintenance (O&M) phase on an ongoing, annual basis; and (3) the potential economic growth effects associated with improvements to accessibility. The approach for estimating employment impacts from construction in the short term and O&M activities in the long term involved applying the Bureau of Economic Analysis' Regional Input-Output Modeling System (RIMS II) to costs associated with construction and O&M activities. This approach is in line with industry-standard practices for economic impact analysis and will ensure that HSR section-specific analyses will be acceptable and consistent across different project sections.

Assumptions, Inputs, and Adjustments/Modifications

This section presents a description of the key assumptions and inputs used to estimate employment growth impacts resulting from the HSR Build Alternative in the short term from construction and in the long term from O&M, and as a result of increased accessibility.

Assumptions, Inputs, and Adjustments/Modifications for the Short-Term Employment Growth Impacts from Construction

The primary input for the estimate of short-term employment impacts from construction was the total estimated construction costs for the project section listed in the *Burbank to Los Angeles Project Section Preliminary Engineering for Project Definition Record Set Capital Cost Estimate Report* (Authority and FRA 2018). Table 1 shows the construction costs (in 2018) for the Burbank to Los Angeles Project Section. As instructed by the *Regional Growth Environmental Methodology Guidelines,* Version 5.09 (Authority 2017), the breakdown excluded the cost categories that do not require significant amounts of new local direct jobs, such as those related to right-of-way acquisition and construction costs expended outside of the local region.

Other assumptions relevant to estimating the short-term impacts from construction include the use of a constant dollar base year and the adjustment of the RIMS II multipliers to correspond with the constant dollar base year. In addition, to be consistent across HSR project sections, employment impacts were expressed as person-years of employment. Lastly, employment impacts were estimated for each year of construction based on a 9-year construction period that allocates the percentage of construction expenditures across each year as follows: 8.5 percent, 17.9 percent, 18.9 percent, 18 percent, 18.5 percent, 11.1 percent, 6.5 percent, 0.4 percent, and 0.1 percent (emission percentages may not add due to rounding). The expenditure estimates were assigned consistent with the CO_2e emissions that are modeled for the project.

Because the RIMS II multipliers were estimated using 2007 dollars, a key modification made was that construction cost estimates were deflated to 2007 dollars using the Consumer Price Index, produced and maintained by the U.S. Department of Labor's Bureau of Labor Statistics. The multiplier used to deflate costs to 2007 dollars (from 2018 dollars as shown in Table 1) was 0.826.

Table 1. Standard Construction Cost Categories for Burbank to Los Angeles Based on the Distribution of Phase 1 Costs (Millions of 2018$)

Standard Cost Categories		Burbank to Los Angeles Cost (in millions)
10	Track structures and track	$1,286
20	Stations, terminals, and intermodal	$134
30	Support facilities: yards, shops, and administration buildings	$57
40	Sitework, right-of-way, land, and existing improvements[1]	$1,516
50	Communications and signaling	$51
60	Electric traction	$65
80	Professional Services	$318
90	Unallocated contingency	$127
Total:		**$3,554**

Source: Authority, 2020

[1] According to the *Burbank to Los Angeles Project Section Preliminary Engineering for Project Definition Record Set Capital Cost Estimate Report* (Authority 2020), purchase or lease of real estate is 20% of cost category 40. Thus, 20% of cost category 40 (or $303 million) was subtracted from the Burbank to Los Angeles Project Section total.

Assumptions, Inputs, and Modifications for the Long-Term Employment Growth Impacts from Operations and Maintenance

The primary input to estimate long-term employment growth impacts from O&M is the total estimated O&M costs for the project section as presented in a February 6, 2017, memorandum (Authority and FRA 2017b). The memorandum summarizes the assumptions used to estimate full HSR O&M costs that are published in the 2016 Business Plan. The memorandum estimates O&M costs based on the rail transportation RIMS II sector for 2029 and 2040. In order to estimate annual employment growth impacts, a linear growth rate was assumed for the interim years between 2029 and 2040.

To estimate the O&M employment growth impacts, the O&M cost categories were mapped to the rail transportation RIMS II sector. This mapping enables estimates of the direct, indirect, and induced employment impacts from O&M based on the RIMS II multipliers.

Similar to the estimation of short-term impacts from construction, other assumptions relevant to estimating the long-term impacts from O&M include the use of a constant dollar base year and the adjustment of the RIMS II multipliers to correspond with the constant dollar base year. In addition, to be consistent across project sections, employment impacts are expressed as person-years of employment.

Assumptions, Inputs, and Modifications/Adjustments for Estimating Long-Term Employment Growth Impacts from Increased Accessibility

The key inputs for the analysis of long-term employment impacts related to increased accessibility are the 102,000 assumed added permanent jobs and the allocation of these jobs across California counties.

Other key inputs are the average accessibility increase score and percentage of employment gain Los Angeles County. As noted in the Regional Growth section of the *Environmental Methodology Guidelines*, Version 5.09 (Authority 2017), the percentage employment gains for Los Angeles County is 4.8 percent.

Methods for Estimating Employment Impacts

This section presents a description of the methods used to estimate employment growth impacts resulting from the HSR Build Alternative in the short term from construction and in the long term from O&M, and as a result of increased accessibility.

Methods for Estimating Short-Term Employment Growth Impacts from Construction

The short-term impacts on employment growth in the region from construction include impacts from direct spending and impacts resulting from indirect and multiplier effects. These impacts were estimated for future years based on the RIMS II Final Demand employment multipliers, with the multipliers customized for the regional growth impact area (the resource study area [RSA]) for the project section (Los Angeles County).

Customized RIMS II multipliers are used to estimate the direct, indirect, and induced estimates for annual job-years for construction of the project section. Employment growth driven by demand for construction workers for each year of construction was estimated according to the construction schedule. The identified peak year for direct employment impacts was compared to the forecast construction sector employment in the region. This comparison was used to determine if the demand for construction workers is likely to be met by the regional construction sector workforce forecast. Qualitative assessment of the likelihood of construction workers moving into the region for employment opportunities was performed to determine the potential for substantial effects on public services and utilities. In terms of the need for temporary construction workers in various locations, it should be noted that the location of the workers will vary. Workers involved in construction of the track would keep moving along the corridor, while workers involved in construction of the stations would be in the same general area for nearly the entire duration of the multiyear construction period.

Methods for Estimating Long-Term Employment Growth Impacts from Operations and Maintenance

The long-term impacts on employment growth in the region from ongoing O&M include impacts from direct jobs during operation for HSR staff and impacts resulting from indirect and multiplier effects. These impacts were estimated for future years based on the RIMS II Final Demand employment multipliers, with the multipliers customized for the regional growth impact area (the RSA) for the project section (Los Angeles County). The Final Demand employment multiplier for the rail transportation industry in Los Angeles County was 6.0668, using costs in 2007 dollars. RIMS II uses 2007 U.S. Benchmark Input-Output data. As such, the same multiplier (0.826) was used to deflate operations and maintenance costs to 2007 dollars (from 2018 dollars) as was described in the short-term employment growth impacts from construction analysis.

Methods for Estimating Long-Term Employment Growth Impacts from Increased Accessibility

The Authority developed a methodology to estimate regional growth impacts associated with the improved accessibility provided by the HSR system. The methodology utilized a range of impact “factors” found in the literature, including elasticities of employment with respect to accessibility and employment ratios based on corridor length. The analysis produced a range of estimates of the possible long-term employment increases. To estimate the long-term employment growth impacts from increased accessibility from the project section, the approach, methods, and assumptions provided by the Authority in the Regional Growth section of the Environmental Methodology Guidelines were used.

Results for Employment Impacts

This section presents the results for the employment growth impacts estimated for the HSR Build Alternative in the short term from construction and in the long term from O&M, and as a result of increased accessibility.

Short-Term Employment Growth Impacts from Construction

Construction activities are anticipated to begin in 2020 and would continue within the RSA for 9 years, with anticipated completion in fall 2028. Construction of the HSR Build Alternative is estimated to create 25,060[1] direct, indirect, and induced job-years in the RSA.[2] Of the total created annual job-years, 12,560 would be direct and 12,510 would be indirect and induced. Table 2 presents the employment impacts for each year of construction. During the peak period of construction (2022), the HSR Build Alternative would support an estimated 2,380 direct and 2,370 indirect and induced jobs per year, for a total of 4,740 jobs per year.

Table 2 Employment Impacts During Construction (in job-years)

Employment	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
Direct	1,080	2,250	2,380	2,260	2,330	1,400	820	50	20	12,560
Indirect and induced	1,070	2,240	2,370	2,250	2,320	1,390	820	50	20	12,510
Total	**2,150**	**4,490**	**4,740**	**4,510**	**4,650**	**2,790**	**1,640**	**100**	**40**	**25,060**

Sources: Results from RIMS II multiplier analysis using data from the following sources: construction spending estimates for the Burbank to Los Angeles Project Section; Bureau of Economic Analysis, 2015.

Long-Term Employment Growth Impacts from Operations and Maintenance

O&M of the HSR Build Alternative would result in a projected 90 direct jobs working for HSR and 140 indirect and induced jobs at businesses supported by local expenditures by the HSR project and staff, for a total of 230 new jobs in the RSA by 2040 (Table 3).

Table 3. Direct, Indirect, and Induced Jobs by 2040 from Operations and Maintenance

County	Direct	Indirect and Induced	Total
Los Angeles County	90	140	**230**

Sources: Authority and FRA, 2016, 2018b; Bureau of Economic Analysis, 2015.

Employment Impacts from Long-term Increased Mobility and Accessibility

Job growth resulting from increased mobility and accessibility in the region would occur in a wide variety of industries, providing jobs to workers with different skill sets (Authority 2007). Given that the region has unemployed workers in the construction, manufacturing, wholesale trade, transportation, professional and technical services, and real estate sectors, the regional workforce has a variety of skills and would be able to fill many of the jobs created by the HSR Build Alternative. Based on the statewide employment gains and projected distribution to Los Angeles County, the anticipated increase in jobs associated with improved mobility and accessibility is anywhere from 4,900 to 5,880 jobs in the RSA by 2040 (the midpoint of this range is 5,390 jobs).

In addition to the direct accessibility-related jobs, the indirect impact of the economic stimulus from these additional jobs would consequentially spur the creation of further jobs. The anticipated increase in jobs was calculated by applying an employment multiplier (6.067 for Los Angeles County) to the RIMS II output to establish the county-specific employment increases. The anticipated increase in jobs as a result of the improved mobility and accessibility ranges from 3,020 to 3,620 new jobs within the RSA (the midpoint of this range is 3,320 jobs).

[1] Employment impacts are rounded up to the nearest 10 jobs, and totals may not sum correctly due to rounding.

[2] An annual job-year is equivalent to one job held by one person over 1 year's duration. This metric can account for both full-time and part-time jobs.

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