

California High-Speed Rail Authority

Burbank to Los Angeles *Project Section*

Draft Project Environmental Impact Report/Environmental Impact Statement

Appendix 3.18-A: RIMS II Modeling Details

May 2020



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: February 20, 2019
TO: Jaime Guzman, Rail Delivery Partner
FROM: Jon Hecht, ICF
SUBJECT: Appendix 3.18-A RIMS II Modeling Details

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.

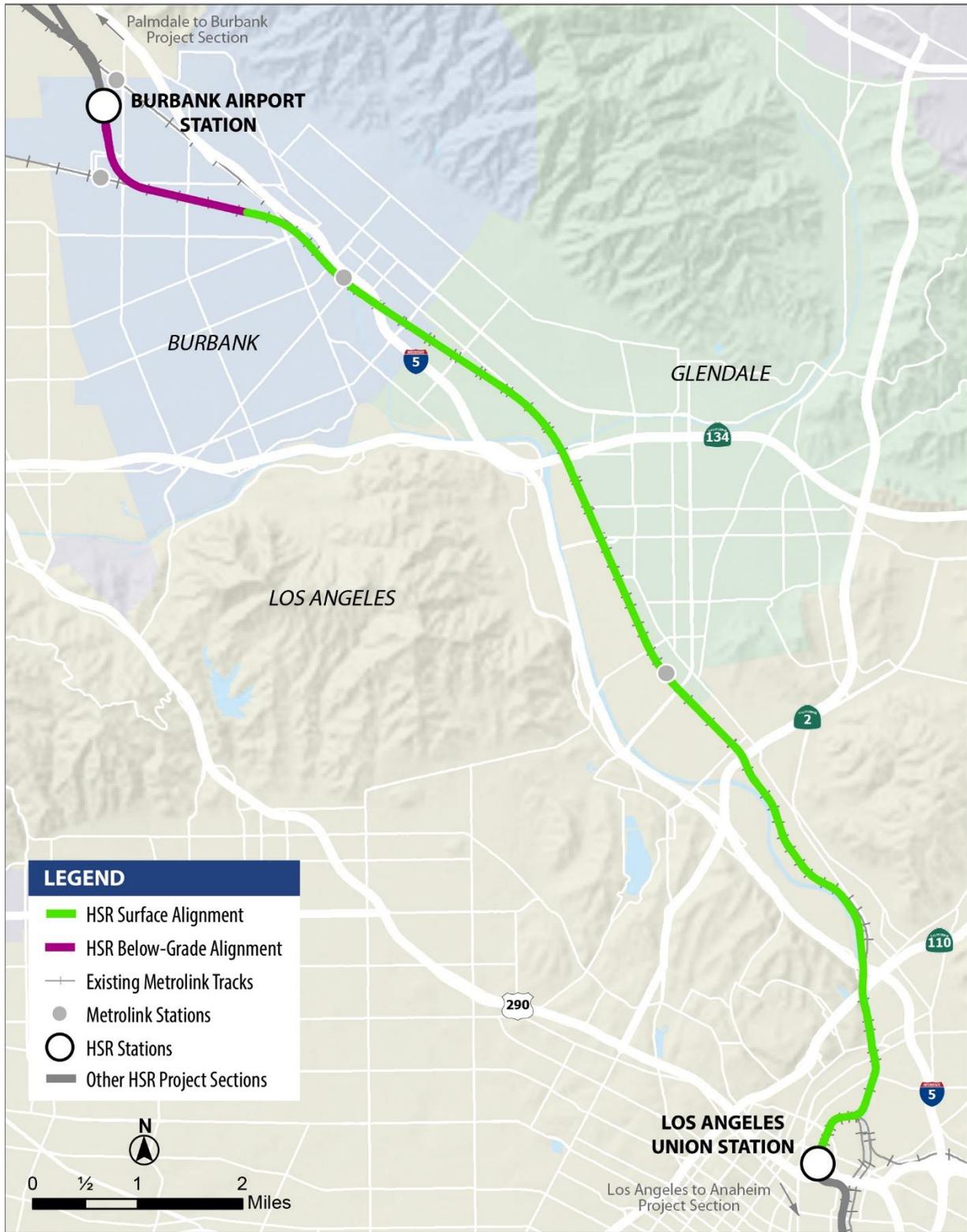
High-Speed Rail Project Alternative Description

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 6-year construction period that allocates the percentage of construction expenditures across each year as follows: 8 percent, 17 percent, 25 percent, 25 percent, 17 percent, and 8 percent (Authority and FRA 2017b).

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.

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	\$133
30	Support facilities: yards, shops, and administration buildings	\$0
40	Sitework, right-of-way, land, and existing improvements ¹	\$1,213
50	Communications and signaling	\$51
60	Electric traction	\$65
90	Unallocated contingency	\$127
Total:		\$2,875

Source: Authority and FRA, 2018

¹ According to the *Burbank to Los Angeles Project Section Preliminary Engineering for Project Definition Record Set Capital Cost Estimate Report* (Authority and FRA 2018), 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 2017c). 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 a variety of cost categories (Table 2). In the memorandum, O&M costs are presented 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 listed in Table 2 were mapped to cost categories that are included in the RIMS II model. This mapping enables estimates of the direct, indirect, and induced employment impacts from O&M based on the RIMS II multipliers. The mapping of O&M cost categories to RIMS II categories is shown in Table 2.

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.

Table 2. Mapping of Operations and Maintenance Cost Categories to Regional Input-Output Modeling System Categories

Cost Category	RIMS II Category
Train operations	Transit and ground passenger transportation
Dispatching	Transit and ground passenger transportation
Maintenance of equipment	Transit and ground passenger transportation
Maintenance of infrastructure	Transit and ground passenger transportation
Station and train cleaning	Other services
Commercial	General merchandise
General and administrative	Administrative and support services
Insurance	Insurance carriers and related activities
Unallocated contingency	Transit and ground passenger transportation

RIMS II = Regional Input-Output Modeling System

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 for the affected counties (Los Angeles and Orange). As noted in the Regional Growth section of the *Environmental Methodology Guidelines*, Version 5.09 (Authority 2017), the percentage employment gains for Los Angeles and Orange counties are 4.8 percent and 0.0 percent, respectively.

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 multicounty impact area (the indirect resource study area [RSA]) for the project section (Los Angeles and Orange counties).

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 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 multicounty 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 multicounty impact area (the indirect RSA) for the project section (Los Angeles and Orange counties).

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 6 years, with anticipated completion in fall 2026. Construction of the HSR Build Alternative is estimated to create 28,000¹ direct, indirect, and induced job years in the two-county indirect RSA.² Of the total created annual job years, 11,300 would be direct and 16,700 would be indirect and induced. The largest job growth is expected in the construction industry, with 13,500 new construction-related job years. The next most heavily affected industry would be the retail trade sector, which is estimated to grow by 3,000 job years. Table 3 presents the employment impacts for each year of construction. During the peak period of construction (2022 and 2023), the HSR Build Alternative would support an estimated 2,900 direct and 4,200 indirect and induced jobs per year, for a total of 7,000 jobs per year.

Table 3 Employment Impacts During Construction (in annual job years)

Employment	2020	2021	2022	2023	2024	2025	Total
Direct	900	2,000	2,900	2,900	2,000	900	11,300
Indirect and induced	1,400	2,900	4,200	4,200	2,900	1,400	16,700
Total	2,300	4,800	7,000	7,000	4,800	2,300	28,000

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, 2016.

The final year of the construction period, 2026, is not included in the table because the construction schedule for the High-Speed Rail Build Alternative projects that construction would be completed in 2025.

¹ Employment impacts are rounded up to the nearest 100 jobs, and totals may not sum correctly due to rounding.

² An “annual job year” is equivalent to one person fully employed for 1 year.

Long-Term Employment Growth Impacts from Operations and Maintenance

O&M of the HSR Build Alternative would result in a projected 900 direct jobs working for HSR and 300 indirect and induced jobs at businesses supported by local expenditures by the HSR project and staff, for a total of 1,100 new jobs in the RSA by 2040 (Table 4).

Table 4. Direct, Indirect, and Induced Jobs by 2040 from Operations and Maintenance¹

County	Direct	Indirect and Induced	Total
Los Angeles County	600	300	800
Orange County	300	100	300
RSA	900	300	1,100

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

¹ Employment impacts are rounded up to the nearest 100 jobs, and totals may not sum correctly because of rounding.

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 each county, the anticipated increase in jobs associated with improved mobility and accessibility is 5,400 jobs in the RSA by 2040.

References

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