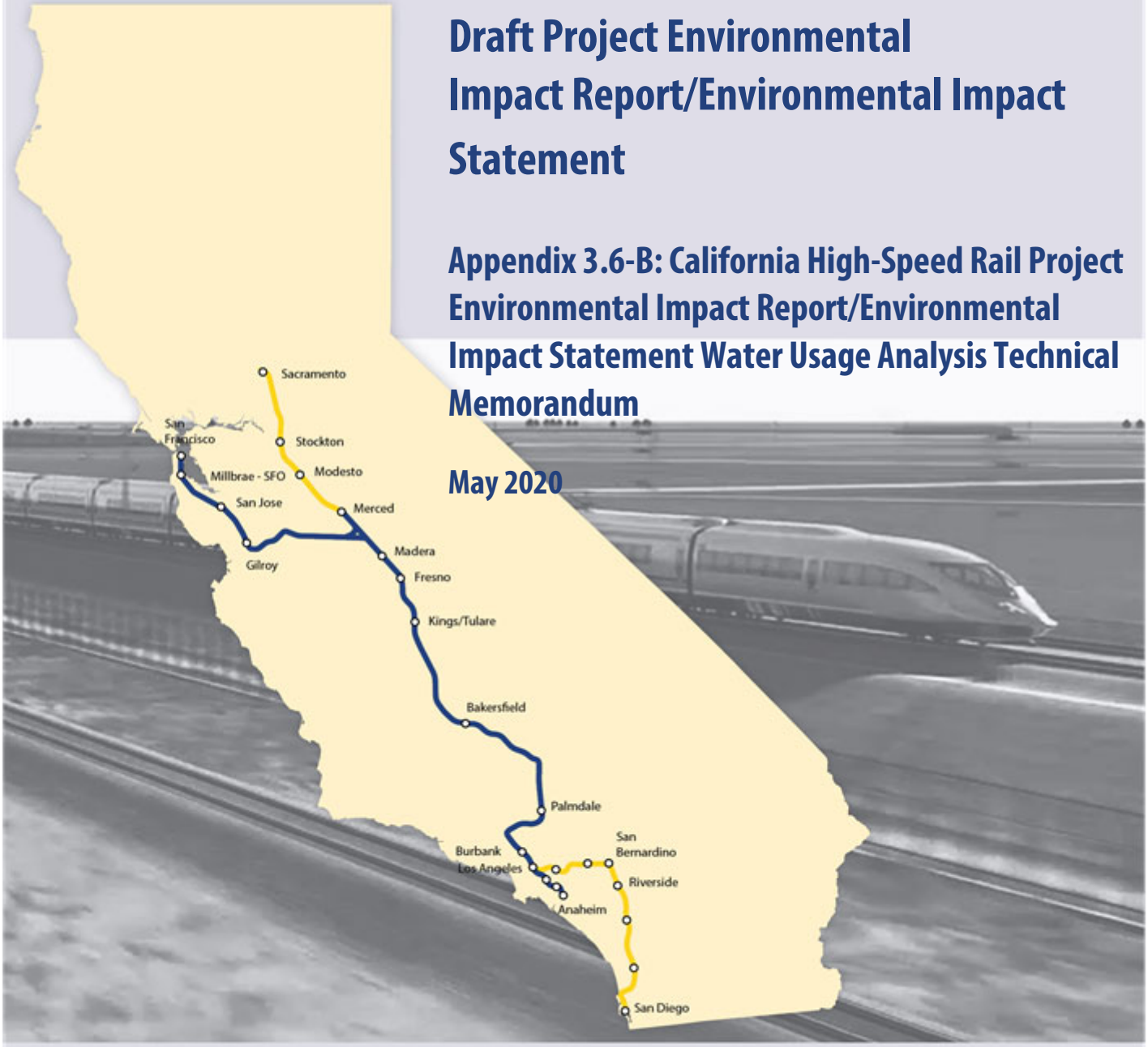
California High-Speed Rail Authority

Burbank to Los Angeles Project Section

Draft Project Environmental Impact Report/Environmental Impact Statement

Appendix 3.6-B: California High-Speed Rail Project Environmental Impact Report/Environmental Impact Statement Water Usage Analysis Technical Memorandum

May 2020



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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CALIFORNIA High-Speed Rail Authority

Memorandum

DATE: February 20, 2020

TO: Andrew Bayne

FROM: Jayna Harris

CC: Nicole West

SUBJECT: California High-Speed Rail Project Environmental Impact Report/Environmental Impact Statement Water Usage Analysis Technical Memorandum

EXECUTIVE SUMMARY

This technical memorandum presents an analysis and evaluation of anticipated water usage requirements for both the construction and operation of the Build Alternative for the Burbank to Los Angeles Project Section of the California High-Speed Rail (HSR) System. This technical memorandum also identifies current water usage at the proposed HSR Build Alternative stations, as well as likely water supply sources to meet the anticipated HSR water demand for this project section.

The Burbank to Los Angeles Project Section of the California HSR System is approximately 14 miles long, crossing the cities of Burbank, Glendale, and Los Angeles. Relevant sections of pertinent HSR reports, including the *Operations and Maintenance Cost Model Documentation: 2016 BUSINESS PLAN* (California High-Speed Rail Authority [Authority] 2016a) and *the Summary of Requirements for Maintenance Facilities* (Authority 2016b) were reviewed to identify all facilities that would have significant water demand requirements. Based on this review, facilities that would require significant water demand include the proposed stations at Burbank Airport and Los Angeles Union Station (LAUS).

Water usage factors and estimated usage rates were identified for the HSR Build Alternative as summarized in the attached tables (all tables provided in Attachment A) and as detailed below. These water usage factors were used to estimate the future water demand for the HSR Build Alternative for construction activities, as well as operation and maintenance at final build-out. Existing water usage was also evaluated for the HSR Build Alternative project footprint, including the stations. The existing water usage estimates were then compared with the future estimated demand. This comparison indicates that construction of the Burbank to Los Angeles Project Section of the HSR system would result in a net decrease in annual water usage for the area impacted by the construction of the track and associated facilities compared to existing conditions when annualized over a five-year construction period. Operation and maintenance of the HSR Build Alternative at final build out would result in a net increase of water usage over existing water usage in the project footprint of approximately 30 percent of the current water usage. Water usage would increase within the HSR Build Alternative project footprint based on water usage factors obtained from the Palmdale Water District's 2016 Water System Master Plan (WSMP), and the Los Angeles Department of Water and Power's (LADWP) Urban Water Management Plan (UWMP). This increase in water usage is primarily due to operation of the stations. Operation of the Burbank Airport Station would result in water use by passengers and employees, as well as for landscaping. Water usage at the existing LAUS would increase based on wastewater generation rates obtained from the Sanitation Districts of Los Angeles County (District No. 19). The increase in water usage at LAUS is due to the additional passengers and employees that will use the station during operation of the HSR Build Alternative.

BACKGROUND

The Authority, a state governing board formed in 1996, has responsibility for planning, designing, constructing, and operating the HSR system. When completed, the HSR project would provide intercity HSR service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego.

The California HSR System is divided into nine project sections. The Burbank to Los Angeles Project Section, shown on Figure 1 (Attachment B), would connect to the Palmdale to Burbank Project Section to the north and the Los Angeles to Anaheim Project Section to the south. The Burbank to Los Angeles Project Section of the California HSR System is approximately 14 miles long, crossing the cities of Burbank, Glendale, and Los Angeles.

Major features of the Burbank to Los Angeles Project Section include the track and associated right-of-way, and stations.

METHODOLOGY

This analysis consisted of the following steps:

1. Review of existing relevant information, reports, and documents to identify project features and activities that would require significant water usage during both the construction and operation of the HSR Build Alternative.
2. Identification of the expected land requirements for the HSR Build Alternative, as well as staffing requirements for operating and maintaining each feature, during both construction and operation at full build-out.
3. Development of water demand estimates for both construction and long-term operation of the HSR Build Alternative. The water demand estimate for construction is annualized over a five-year period and the annual water usage estimate is based on full build-out in 2040.
4. Determination of existing water usage at the sites where the HSR system would be constructed and operated. Parcel land use information was identified, and then specific water usage rates developed from recent data were applied. Water use demands were also approximated based on the estimated population and per capita demands. Results from these two approaches were then compared.
5. Identification of available existing water supply and additional water supply sources, if needed, to provide the required water to each section feature during both construction and long-term operation. A more detailed description of the approach for each step is provided below.

Identification of Project Features with Significant Water Usage

Relevant project documents were reviewed to identify all project facilities that would have significant water demand requirements. Based on this review, construction of the HSR Build Alternative (14 miles in length, including tunnels) would require significant water usage; however, water usage would be temporary and would cease after construction is completed. The HSR stations would also require significant construction and operational water usage.

The Burbank to Los Angeles Project Section would be served by two stations, the Burbank Airport Station and LAUS, located in Burbank and Los Angeles, respectively (Figures 2 and 3).

The Burbank Airport Station would have both underground and above-ground facilities that would span approximately 51.2 acres. Station facilities would include train boarding platforms; a station building that would house ticketing areas, passenger waiting areas, restrooms, and related facilities; pick-up/drop-off facilities for private autos; a transit center for buses and shuttles; and surface parking areas. Underground portions of the station would be beneath Cohasset Street, along which runs the boundary between the City of Los Angeles to the north and the City of Burbank to the south. There would be two HSR tracks at the Burbank Airport Station.

The proposed HSR station at LAUS would include up to four HSR tracks and two 870-foot platforms (with the possibility of extending to 1,000 feet). These elements, as well as changes related to the passenger concourse and Los Angeles County Metropolitan Transportation Authority (Metro) Gold Line, are addressed within Metro's Link Union Station (Link US)[1] Project Environmental Impact Report, on which the Authority is a responsible agency under CEQA, and the forthcoming EIS..

Estimating Future Water Demand Requirements

Operational Water Demand Methodology

This section describes the relevant information and assumptions used to estimate the future water demand for the HSR Build Alternative. Water demand estimates were developed for both construction activities and operation and maintenance at final build-out. Data tables summarizing key facility information and water demand estimates are included at the end of this technical memorandum.The process followed in estimating water demand for the operation of each facility is summarized below:

- Identify facilities requiring water usage
- Determine water usage factors for each facility, including:
  - Size/footprint of buildings and overall site areas
  - Passenger/employee use for each facility
  - Facility functions and operation and maintenance requirements
- Determine appropriate water usage factors
- Apply factors and estimate total water demand

Operational water usage factors were identified for the different facilities by obtaining information from similar facilities. The different water usage factors were compared, and the most appropriate annual water usage rate was selected as described below. The water usage factors and estimated future water demand for each facility are summarized in Table 1.

Water is anticipated to be used at the tunnels, portals, and stations. Water will be required at tunnels and portal sites during operations for tunnel cleaning, fire and life safety, domestic needs, and general maintenance operations. The number, size, and end use of the facilities have not been fully established at this time. It is assumed that, at a minimum, restrooms and wash areas will be included as part of the portal infrastructure. Water needs will be updated as the operation plans of the tunnel facilities are updated.

Table 1 includes the estimated operational water usage for the Burbank Airport Station and LAUS. Operational water usage estimates for the Burbank Airport Station were based on engineer estimates. The method that yielded the most conservative results was chosen. This entailed applying 5 gallons per passenger per day use factors to the estimated number of passengers, and 0.03 gallon per square foot of landscaping per day use factors. As shown in Table 1, the estimated daily passenger for horizon year 2040 for the Burbank Airport Station is 25,670 passengers, and the total landscaping area is 603,474 square feet.

Operational water usage estimates for LAUS were also based on engineer estimates, which entailed applying 5 gallons per passenger per day use factors to the estimated number of passengers, plus 30 gallons per employee. As shown in Table 1, the estimated daily number of passengers for horizon year 2040 for LAUS is 29,200 passengers, and the estimated number of employees is 120 (Authority 2017a).

Metro's Link Union Station (Link US) Final EIR estimates that an operational water usage at LAUS would be 453 acre-feet/year by the year 2040. Refer to the Link US Final EIR[2] for additional details. This EIR/EIS utilizes a different methodology to calculate the operational water usage by the HSR Build Alternative at LAUS by the year 2040 for the HSR Build Alternative. As shown in Table 1, the

[1] Link US will "transform LAUS from a 'stub-end,' or dead-end station, to a 'run-through' station by extending tracks south over the US-101 freeway. Additionally, Link US includes the development of a new passenger concourse with a wide array of retail amenities to further enhance the passenger experience at LAUS." More information is available at www.metro.net/projects/link-us.

[2] https://www.metro.net/projects/link-us/final-eir/

methodology used is based on gallons of water per passenger per day, and gallons of water per square foot of landscaping.

Construction Water Demand Methodology

The process for estimating the water demand related to construction of the HSR Build Alternative is summarized below:

- Identify the construction footprint for the HSR Build Alternative
- Identify the different construction components associated with construction of the HSR Build Alternative:
  - Manufacturing of concrete
  - Earthwork and soil conditioning
  - Dust suppression
  - Landscaping and irrigation
  - Tunnel excavation

Water usage estimates were developed for construction of the HSR Build Alternative based on engineer estimates. This is discussed in more detail below in the "Water Supply to Serve Construction" section. The total estimated construction water usage was annualized over a five-year period unless otherwise noted. This information is summarized in Table 2.

Estimating Existing Water Usage

Land areas that would be impacted by the Burbank to Los Angeles Project Section were identified for the HSR Build Alternative project footprint, and the existing water usage was estimated for those areas.

Existing Water Demand Methodology

The proposed Burbank Airport Station and LAUS sites are currently supplied with treated municipal water from Burbank Water and Power and the LADWP, respectively. The proposed HSR Build Alternative is located within areas covered by the Burbank UWMP, the City of Glendale Water and Power UWMP, and the LADWP UWMP, which do not contain land use water usage factors. In the absence of water demand factors from these districts, two alternate methods were considered when determining the existing water demand within the HSR Build Alternative project footprint, and a third method was used to estimate existing water demand at LAUS.

Palmdale Water District Water Use Factors

Given that the Burbank, Glendale, and Los Angeles UWMPs do not contain land use-based water usage factors and that the two station sites are located in a similar climate as Palmdale, water usage factors from the Palmdale UWMP were applied to estimate existing water usage for the HSR Build Alternative. The HSR Build Alternative tends to experience annual precipitation higher than that of Palmdale (i.e., Palmdale receives 7.4 inches of annual precipitation compared to Burbank with 17.35 inches and Los Angeles with 18.67 inches [U.S. Climate Data 2017a, 2017b, 2017c]). Therefore, utilizing these factors for the HSR Build Alternative would provide conservative water usage estimates.

To estimate the existing water usage for the HSR Build Alternative, the permanent impact footprint was overlain on parcel data to identify affected existing land use classifications. Water usage factors from the Palmdale Water District's 2016 WSMP were applied to each affected land use classification to estimate current water usage for the area within the HSR Build Alternative footprint. The Palmdale Water District's 2016 WSMP provides land use-based water demand factors for low-density residential, medium-density residential, high-density residential, commercial, industrial, public, nonrecreational open space, and unknown uses. For the purpose of conservatively estimating existing water usage, the medium-density residential factor of 3,310 gallons per day per acre (3.7 acre-feet per acre per year), was selected to apply to residential land uses. No water usage factors were available for "Community Facilities," "Open Space and Recreation," "Railroads," and "Transportation, Communications, and

Utilities" land uses in the WSMP. For "Institutional," "Community Facilities" and "Open Space and Recreation" land uses, the "Public" water use factor of 2,500 gallons per day per acre (2.80 acre-feet per acre per year) was applied, and for "Railroads" and Transportation, Communications, and Utilities" land uses, the "Unknown" water use factor of 330 gallons per day per acre (0.37 acre-foot per acre per year) was applied.

Los Angeles Per Capita Water Usage Rate

For planning purposes, the LADWP generally forecasts demand based on population trends and average per capita factors, and does not maintain any standard unit demand factors for specific types of land uses. Water use demands can be approximated based on the estimated population and per capita demands (City of Los Angeles 2006).

To estimate the existing water usage for the area within the HSR Build Alternative project footprint, estimates for resident and employee displacements resulting from the HSR Build Alternative were multiplied by an estimated per capita water usage rate. Displacement data were gathered from the *Burbank to Los Angeles Project Section Draft Community Impact Assessment Volume I: CIA Report (*Authority 2019). The estimated per capita water usage rate was developed utilizing information from the LADWP UWMP. The estimated LADWP service area population for 2015 was divided by the estimated water use in acre-feet to develop a per capita water usage rate. Estimated water use in acre-feet was developed from a 24-year average (1991–2014) (LADWP 2015). The per capita water usage rate was then multiplied by the total displaced population in the Burbank to Los Angeles Project Section.

Los Angeles Wastewater Generation Rate

LAUS is an existing station, and its facilities would be used by the passengers and employees associated with operation of the HSR Build Alternative. Therefore, it is important to assess existing water use at the station to determine if the facility can accommodate the projected water use. To estimate existing water use at LAUS, wastewater generation estimates from District No. 19 of the Sanitation Districts of Los Angeles County were used. Wastewater generation is given as gallons per day per each 1,000 square feet of particular land use classes. The "service shop" generation rate was used for LAUS, while the "light manufacturing" generation rate was applied to the rail yard. These rates were multiplied by the square footage of each land use class to find total wastewater generation per day. Because wastewater is about 50 percent of total water use, wastewater generation was then divided by 0.50 to obtain a daily water use value. The square footage estimate for LAUS was found from the Union Station Fact Sheet (Union Station LA 2016), and square footage for the rail yard was estimated using Google Earth.

Existing Water Usage Analysis

Using the methodologies described above, the existing water usage within the area of the HSR Build Alternative footprint was calculated.

Palmdale Water District Water Use Factors

The predominant existing land uses for the HSR Build Alternative are Unknown (approximately 57 percent), and Industrial (approximately 85 percent).

Table 3 shows the water usage factors applied to the HSR Build Alternative project footprint, broken out by city. Total acreage impacted by the HSR Build Alternative project footprint in the Burbank to Los Angeles Project Section would be approximately 344 acres. When applying the water usage factors from the Palmdale UWMP, the total existing annual water usage rate for this area was calculated to be 251.83 acre-feet per year. Of the three study area cities, Burbank is the largest existing consumer of water, with approximately 148 acre-feet/year (about 59 percent of the total existing water use for the project footprint). Burbank is followed by Los Angeles, with 79 acre-feet/year (31 percent of the total), and Glendale, with 25 acre-feet/year (10 percent of the total).

Los Angeles Per Capita Water Usage Rate

The total average water use from 1991 to 2014 in the LADWP service area was 611,332 acre-feet per year (LADWP 2015a). Population for the LADWP service area in 2015 was 3,987,622 people (LADWP

2015b). Using the total average water use and total population in the LADWP service area, the total water usage rate was calculated to be 0.15 acre-foot per person.

Residents and employees displaced by the Burbank to Los Angeles Project Section would total 34 and 1,747, respectfully. Existing water usage in the project section was calculated by multiplying 0.15 acre-foot per person per year by 1,781 people. When using this information from the LADWP UWMP, the total annual water usage rate for this area was calculated to be 267.15 acre-feet per year.

Table 4 shows the per capita water usage factors applied to the number of residents and employees displaced along the entire HSR Build Alternative, broken out by city. Using the per capita methodology, Burbank is still the largest existing consumer of water of the three cities, with 192.45 acre-feet/year (about 72 percent of the total water use for the project vicinity). Burbank is again followed by Los Angeles, with 54.30 acre-feet/year (20 percent of the total), and Glendale, with 20.40 acre-feet/year (8 percent of the total).

Los Angeles Wastewater Generation Rate

Land uses for LAUS include service shop, which represents Union Station (approximately 22 percent of the total area), and light manufacturing, which represents the rail yard (approximately 78 percent of the total area).

Table 5 shows the wastewater generation rates applied to the LAUS land use areas. The total area of LAUS is approximately 748,000 square feet, or 17.17 acres. When applying the wastewater generation rates to this area, total daily wastewater generation is 30,775 gallons/day, which means water use is 61,550 gallons/day, or 68.94 acre-feet/year.

Comparison of Existing Water Usage to Estimated Future Demand

Water Use During Operation

This section compares the estimated existing water usage within the area of the HSR Build Alternative project footprint to the estimated future water demand during operations and maintenance of the proposed HSR facilities.

Total existing water usage rates within the area of the HSR Build Alternative project footprint range from 251.83 acre-feet/year to 267.15 acre-feet/year among the methods considered (Palmdale UWMP water usage factors vs. LADWP UWMP per capita usage). For the purpose of conservatively estimating existing water usage, the smaller Palmdale UWMP usage rate of 251.83 acre-feet/year was used. Existing water usage at LAUS is 68.94 acre-feet/year.

Future water demand requirements are associated mainly with the station sites. As stated above under Estimating Future Water Demand Requirements, water is anticipated to be used at the tunnel and portal sites. However, the estimated water needs for the tunnel and portal sites have not been fully established and will be updated as operation plans for the tunnel facilities are updated.

Estimated future demand for the Burbank Airport Station is 164.8 acre-feet/year, and estimated future demand for LAUS is 167.6 acre-feet/year. Total future demand would total 332.4 acre-feet/year. Operation and maintenance of the HSR Build Alternative at final build out would result in a net increase of water usage over existing water usage in the project footprint of approximately 30 percent of the current water usage. Specifically, water demand in the project footprint is expected to increase with the HSR Build Alternative (i.e., 332.4 acre-feet/year for the HSR Build Alternative compared to the existing water usage rate of 251.83 acre-feet/year using the Palmdale UWMP water usage factors).

Water Use During Construction

Engineers estimated the amount of water needed to construct the HSR Build Alternative. The amount of water estimated to be used during construction included estimates for concrete work, earthwork, dust control, irrigation for reseeded areas, and tunnel construction and excavation for the HSR Build Alternative (Table 2).

Water use for construction of the HSR alignment is related to concrete work, earthwork, dust control, irrigation, and tunneling. HSR Build Alternative construction water usage is summarized in Table 4.

Total water needed to construct the HSR alignment is 616.44 acre-feet, or 123.99 acre-feet/year over the five-year construction period. Total water needed to construct the Burbank Airport Station is 525 acre-feet, or 105 acre-feet/year**.**

Engineers for the Burbank to Los Angeles Project Section estimate that there would be no construction water use for LAUS. Thus, the total water needed to construct the HSR Build Alternative is 1,141,45 acre-feet, or 228.29 acre-feet/year.

Construction of the Burbank to Los Angeles Project Section would result in a net decrease in annual water usage for the area impacted by construction of the HSR Build Alternative compared to existing usage when annualized over a five-year period. This would be due to the change from industrial and other land uses with more water-intensive activities to less water-intensive construction activities. Specifically, it is estimated that the water usage during construction of the HSR Build Alternative would be approximately 91 percent (228.29 acre-feet/year needed for construction usage, compared to 251.83 acre-feet/year for current existing usage) of the existing water demand on an annual basis for the project footprint. In other words, the current annual water usage for locations displaced by the project is greater than the water usage needs for project-related construction in the same area. It is important to note that construction water demand is not a continuous flow demand by the supplier, and water usage is often sporadic and a function of particular construction activities occurring at the time. Water for construction of the HSR Build Alternative could be supplied from existing surface or groundwater supply systems.

Water Supply Sources

Water Supply Sources for Construction of the Burbank to Los Angeles Project Section

Water supply during construction would be supplied by the municipal water supply agencies within the cities of Burbank, Glendale, and Los Angeles (i.e. Burbank Water and Power, Glendale Water and Power, and the Los Angeles Department of Water and Power).

Water Supply Sources for Operation of the Burbank to Los Angeles Project Section Facilities

This section describes water supply sources for each of the proposed HSR facilities.

Burbank Water and Power would supply water connection for the tunnel.

The Burbank Airport Station and LAUS sites are currently served by their respective municipal water supply agencies. It is anticipated that both stations will connect to the existing municipal systems. Water supply assessments are required (Senate Bills 221 and 610) for developments of more than 500 homes (which is equivalent to 250 acre-feet/year). Because the stations are expected to require less than 250 acre-feet/year, water supply assessments would not be needed for these facilities, and no other special actions to secure water from the local agencies would be necessary.

CONCLUSIONS

The construction phase of the Burbank to Los Angeles Project Section would result in a net decrease in annual water usage of approximately 9 percent of the existing water usage for the area within the project footprint. This information is summarized in Table 6.

However, operation and maintenance of the HSR system at final build-out would result in a net increase in water usage within the project footprint of approximately 30 percent of the current water usage.

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Attachments: A: Tables 1–8

B: Figures 1–6

ATTACHMENT A

TABLES

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Table 1 Water Demand Summary

Facility	Daily Use	Method	Use Factor	Estimated Daily Volume (gpd)	Annual Water usage (ac-ft/yr)
Burbank Airport Station	25,670 passengers 603,474 square feet	Gallons per passenger per day Gallons per square foot of landscaping	5 gpd/passenger 0.03125 gallons per square foot	147,209	164.8
Los Angeles Union Station	29,200 passengers 120 employees	Fresno to Bakersfield Project Section Station Methodology	5 gallons/passenger 30 gallons/employee	149,600	167.6

ac-ft/yr = acre-feet per year
gpd = gallons per day

Table 2 Construction Water Usage Summary—High-Speed Rail Build Alternative[1]

Facility	Item	Total Volume (MG)	Total Volume (acre-feet)	Annualized Water Usage (ac-ft/yr)
Alignment				
Burbank to Los Angeles Project Section Alignment	Concrete Work	13.37	41.06	8.21
	Earthwork (Fill)	114.33	351.00	70.20
	Dust Control	62.60	192.18	38.44
	Irrigation	4.54	13.93	2.79
	Tunneling	5.95	18.27	3.65
	Total	**200.79**	**616.44**	**123.29**[2]
Stations				
Burbank Station	Concrete Work	--	--	--
	Earthwork (Fill)	--	--	--
	Dust Control	--	--	--
	Irrigation	--	--	--
	Tunneling	--	--	--
	Total	**171.00**	**525.00**	**105.00**[2,3]
Total		**371.79**	**1,141.44**	**228.29**

[1] Link US will "transform LAUS from a 'stub-end,' or dead-end station, to a 'run-through' station by extending tracks south over the US-101 freeway. The project will also add a new loop track that will provide improved operational flexibility for rail service. Additionally, Link US includes the development of a new passenger concourse with a wide array of retail amenities to further enhance the passenger experience at LAUS." More information is available at www.metro.net/projects/link-us.

[2] Annualized water usage is for a five-year construction period.

[3] Taken from *Public Utilities and Energy for Palmdale to Burbank Project Section* (California High Speed Rail Authority, October 2017)

ac-ft/yr = acre-feet per year
LAUS = Los Angeles Union Station
MG = million gallons
TBM = tunnel boring machine
US = U.S. Route

Table 3 Palmdale Water District Method: Existing Water Usage

Existing Land Use Category	Permanent Impacts (ac)	Percentage	Water Usage Factors (gpd/ac)[1]	Water Usage Factors (ac-ft/ac)[1]	Annual Water Usage (ac-ft/year/ac)	Annual Water Usage (ac-ft/year)
City of Burbank						
Commercial	6.96	4.5%	1,260.00	0.0039	1.41	9.82
Industrial	69.33	44.82%	1,070.00	0.0033	1.20	83.09
Residential[2]	1.61	1.04%	3,310.00	0.0102	3.71	5.96
Public[3]	12.05	7.79%	2,500.00	0.0077	2.80	33.76
Unknown[4]	42.33	27.37%	330.00	0.0010	0.37	15.65
Vacant Land	22.39	14.48%	0	0	0.00	0.00
Total (ac)	**154.67**	**100.00%**	**--**	**--**	**--**	**148.27**
City of Glendale						
Commercial	1.43	2.57%	1,260.00	0.0039	1.41	2.01
Industrial	3.06	5.52%	1,070.00	0.0033	1.20	3.67
Residential[2]	0.06	0.12%	3,310.00	0.0102	3.71	0.24
Public[3]	0.04	0.08%	2,500.00	0.0077	2.80	0.12
Unknown[4]	50.76	91.50%	330.00	0.0010	0.37	18.76
Vacant Land	0.12	0.22%	0	0	0.00	0.00
Total (ac)	**55.48**	**100.00%**	**--**	**--**	**--**	**24.81**
City of Los Angeles						
Commercial	13.54	10.15%	1,260.00	0.0039	1.41	19.11
Industrial	12.91	9.68%	1,070.00	0.0033	1.20	15.47
Residential[2]	0.05	0.04%	3,310.00	0.0102	3.71	0.20
Public[3]	2.36	1.77%	2,500.00	0.0077	2.80	6.60
Unknown[4]	101.09	75.79%	330.00	0.0010	0.37	37.37
Vacant Land	3.43	2.57%	0	0	0.00	0.00
Total (ac)	**133.38**	**100.00%**	**--**	**--**	**--**	**78.76**

Existing Land Use Category	Permanent Impacts (ac)	Percentage	Water Usage Factors (gpd/ac)[1]	Water Usage Factors (ac-ft/ac)[1]	Annual Water Usage (ac-ft/year/ac)	Annual Water Usage (ac-ft/year)
High-Speed Rail Build Alternative						
Commercial	21.92	6.38%	1,260.00	0.0039	1.41	30.94
Industrial	85.30	24.83%	1,070.00	0.0033	1.20	102.23
Residential[2]	1.73	0.50%	3,310.00	0.0102	3.71	6.40
Public[3]	14.46	4.21%	2,500.00	0.0077	2.80	40.48
Unknown[4]	194.19	56.53%	330.00	0.0010	0.37	71.78
Vacant Land	25.94	7.55%	0	0	0.00	0.00
Total (ac)	**343.53**	**100%**	**--**	**--**	**--**	**251.83**

[1] Water usage factors were taken from the Palmdale Water District's 2016 Water System Master Plan (December 2016).
[2] The medium-density factor of 3,310 gpd/acre (3.7 ac-ft/ac), which is a smaller water usage factor than high-density residential, was selected to apply to residential (see Existing Water Demand Methodology section for details).
[3] Includes Community Facilities and Open Space and Recreation land uses.
[4] Includes Railroads and Transportation, Communications, and Utilities land uses.

ac = acre(s)
ac-ft = acre-feet
ac-ft/ac = acre-feet per acre
gpd = gallons per day

Table 4 Los Angeles Per Capita Method: Existing Water Usage

City	Total Displaced Residents	Total Displaced Employees	Total Displaced Persons	Total Per Capita Water Use[1] (ac-ft per person per year)	Total Existing Water Use (ac-ft/year)
Burbank	19	1,264	1,283	0.15	192.45
Glendale	0	136	136		20.40
Los Angeles	15	347	362		54.30
Total	**34**	**1,747**	**1,781**		**267.15**

[1] Estimated per capita water usage rate was developed utilizing information from the Los Angeles Department of Water and Power Urban Water Management Plan.
ac-ft = acre-feet

Table 5 Los Angeles Wastewater Generation Method: Existing Water Usage at Los Angeles Union Station

LAUS Component	Square footage	Wastewater generation (gal/day per 1,000 sf)[1]	Water flow (gal/day per 1000 sf)[2]	Water use (gal/day)	Water use (ac-ft/yr)
Union Station	161,000[3]	100	200	32200	36.07
Rail Yard	587,000[4]	25	50	29350	32.88
				Total	**68.94**

[1] Uses wastewater generation estimates from *Los Angeles County Sanitation District No. 19 Service Charge Report for Fiscal Year 2015-16*. For the Union Station generation rate, "service shop" generation rate was used. For the rail yard generation rate, "light manufacturing" was used.
[2] Wastewater generation is assumed to be 50% of water use. Water flow was calculated by doubling wastewater generation rates.
[3] Square footage obtained from the Los Angeles County Metropolitan Transportation Authority (2018).
[4] Square footage estimated from Google Earth.
ac-ft/yr = acre-feet per year
sf = square feet

Table 6 Project Footprint Water Usage Summary

Facility Type	Annual Water Usage (acre-feet)
Existing Water Usage—Palmdale Water Use Factors Assumption	
HSR Build Alternative	**251.83**
Existing Water Usage—Los Angeles Per Capita Water Usage Rate Assumption	
HSR Build Alternative	**267.15**
Minimum Use Total	**251.83**
Construction Water Usage[1]	
HSR Build Alternative	123.29
Burbank Airport Station	105.00
Maximum Use Total	**228.29**
Total Change	**-23.54**
Estimated Water Usage—2040 at 100 Percent Build-Out	
Burbank Airport Station	164.80
Los Angeles Union Station	167.60
Maximum Use Total	**332.40**
Total Change	**+80.57**

[1] Construction water usage is annualized for a five-year construction period, except as noted otherwise.
HSR = High-Speed Rail

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ATTACHMENT B

FIGURES

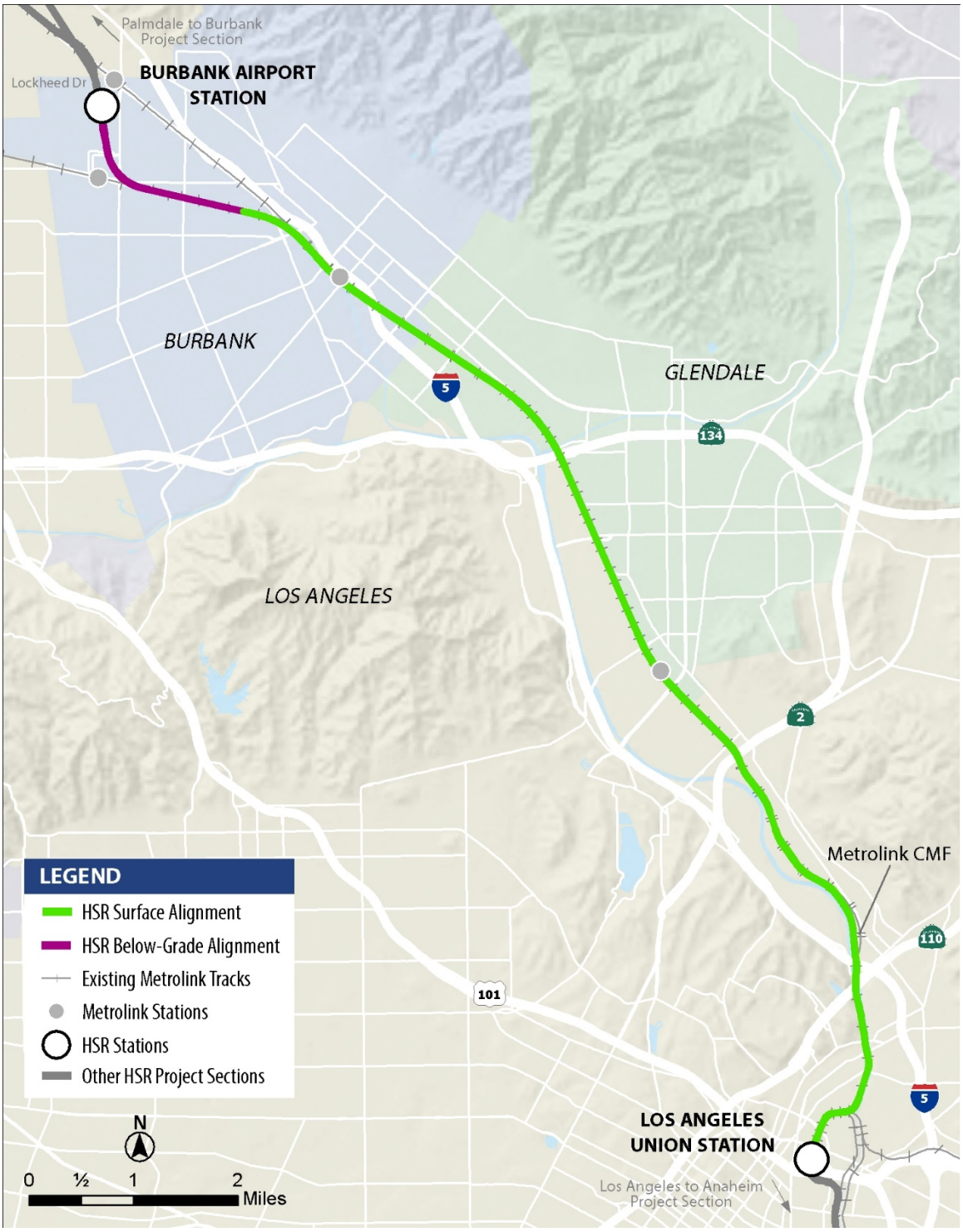

Figure 1 Burbank to Los Angeles Project Section

Figure 2 Burbank to Los Angeles Project Section—Burbank Airport Station

Figure 3 Burbank to Los Angeles Project Section—Los Angeles Union Station