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LOS ANGELES UNION STATION RUN-THROUGH TRACKS

UNION STATION TERMINAL IMPROVEMENTS

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ABSTRACT

The Los Angeles Union Station (LAUS) Passenger Terminal, the last of the great American Railroad Stations of the twentieth century, was built in 1939 before the development of airports and highways. Access to LAUS is provided by a set of lead tracks, with the trains pulling into the terminal and then reversing the direction of travel after unloading and loading of passengers. Over the years, LAUS has evolved to a multi-modal transportation center. Metrolink, the regional commuter rail system for the greater Los Angeles area, started operation in 1992. Passengers arriving at the terminal will

transfer to other trains, shuttles, busways connecting to Los Angeles, Pasadena and surrounding counties. With the existing configuration at LAUS, the trains are subject to delays at the station platforms or access connecting back to the main lines.

Continuing growth to 2025 is forecast for the regional and inter-city passenger rail in the metropolitan Los Angeles area. The proposed Run-through Tracks will improve the operational efficiencies, capabilities and scheduling reliability, pedestrian access, platforms and baggage Car operation for the existing “ stub-end “ condition. The project will extend 4 tracks south of Union Station over the 101 freeway, and then transition to 2 tracks before connecting to the BNSF main line located along the west side of the Los Angeles River.

This paper will address the Union Station Terminal improvements, the solutions to elevate the existing platforms, the addition of 2 new platforms, reconstruction of passenger tunnel ramp access and the service/baggage handling road. A pedestrian flow study of the Main Passenger Tunnel was completed to determine that the Level of Service is adequate for pedestrian movement within the Union Station facility.

Key Words: run-through tracks, platforms, pedestrian flow

HISTORY OF PLATFORM CONFIGURATION

Built in 1939, there were 8 original passenger platforms with 17 tracks. Full length butterfly canopies were supported by single columns at the center of the platforms.

Starting from the north and side of the platform, the concrete ramps extend downward to connect the main passenger tunnel.

In 1987, the south end of the Union Station property, approximately 50 feet wide, was dedicated to allow the construction of the 3-lane El Monte Busway and carpool lane along the 101 freeway. The south retaining wall was re-constructed by Caltrans (California Department of Transportation).

In 1991, the cut and cover Metro Rail subway station was constructed diagonally across all the tracks, and directly below the main passenger tunnel. Platforms 1 through 6 remained in operation. However, Platforms 7 and 8 were suspended from service/operation. The connection at the main passenger tunnel entrance leading to the double ramps was blocked off for any public access.

In 1995, the MTA Gateway Center, which includes the Bus Plaza and a 4,000 cars parking garage was constructed along the Union Station property along the eastern border. To provide the passenger connection from the Bus Plaza and the MTA Gateway Center, the main passenger tunnel was extended further to the east to provide the vital passenger link and access to the Platforms and the Metro Rail subway station.

In 2003, Platform No. 1, Track 1 and Track 2 were re-constructed to serve as the Pasadena Gold Line Station that extends to Chinatown and to the north to the city of Pasadena. The north ramp connecting the main passenger tunnel was demolished to make room for elevator and stairs to travel up to the platform. The new construction at the

passenger tunnel elevation is approximately 106 feet long and 30 feet wide. Ticket Vending Machines, electrical room and elevator machine room are located at this level.

At the south ramp, only a short segment of the existing ramp connecting to a control room remained. The remaining passenger ramp was demolished.

In 2004, Metro awarded the design build contract of Metro Gold Line Extension, which is a 6 miles extension from Union Station Platform 1 to East Los Angeles. Bridge abutment is constructed at the southern end of Track 1 to provide the foundation for the bridge over the 101 freeway.

FUNCTIONAL NEEDS

As the multi-modal transportation center, the following issues are essential

- Efficient track capacity and configuration to handle the passenger trains movement
- Sufficient platform capacity to handle the loading and unloading of train passengers, especially during peak hours in the morning or afternoon
- Acceptable Level of Service for the pedestrian traffic in the main passenger tunnel connecting the platforms, and providing the access to the Red Line Subway and the Gateway Center Bus Plaza
- Sufficient capacity at the ramps connecting the main passenger tunnel and the platforms for loading and unloading
- Easy access for the disabled passengers

- Ancillary activities for the train operations (baggage Car access to the platforms, maintenance service etc.)

EXISTING PLATFORM CONFIGURATION

Platforms No. 2 through 6 provides Amtrak and Metrolink passenger train connection service via Tracks 3 through 12. At the south end of the platforms, passenger can travel from one end of the platform to another through south access road sidewalk.

PROPOSED TRACK MODIFICATIONS

The proposed track modifications involves the extension of bi-directional running track from the existing stub-end yard configuration of tracks at LAUS to provide “ run-through” capabilities for the four stub-ended stations tracks (Track 3,4,5 and 6) at LAUS. The extension would involve construction of a railroad bridge span over the El Monte Busway and US 101. The elevated rail structure would continue west then east from US 101 to the vicinity of the BNSF West Bank Yard, where the tracks will descend to grade and reconnect to the existing BNSF mainline tracks along the west bank of Los Angeles River. To obtain the necessary vertical clearance between the run-through tracks and US 101, the westernmost platforms 2 and 3 and their associated platform tracks (Tracks 3, 4, 5 and 6) would be raised approximately 5 feet above the existing grade. New tracks 13, 14, 15 and 16 will be added to service Platform 7 and 8.

PATFORM 2 AND 3

Proposed Modifications

- The existing ramps that connect the main passenger tunnel to the platform 2 and 3 will be extended to the raised platform. The slope of the extension will be improved from the existing (1 vertical to 8 horizontal) to conform to the American with Disabilities Act requirement (1 vertical 12 horizontal).
- The existing stair starting from the south side of the main passenger tunnel will be extended to the raised platform.
- New stairs will be constructed from the north side of the main passenger tunnel to connect to the northern platform level to provide maximum access and passenger circulation
- New stairs will also be constructed from the southern ends of the platform to descend to the new basement area under the platform area, and also connect to South Service Road
- The butterfly canopy and supporting columns at Platform 2 and 3 will be raised approximately by 5 feet. The butterfly canopy will be dis-assembled, inspected and strengthened as necessary to meet the current seismic codes. After the new platforms are constructed, the canopy will be erected. New canopies, matching the existing architectural features, will be constructed over the extended ramps and platform areas.

PLATFORM 4, 5 AND 6

Existing Configuration

- The existing ramp connecting the passenger tunnel to the southern platform area has been modified in the 1990's to conform to the ADA requirement. The original

ramps with 1 vertical to 8 horizontal were modified to 1 vertical to 12 horizontal slopes. Stairs also serves as an alternative access connecting the passenger tunnel to the southern platform area.

- The existing ramps connecting the passenger tunnel to the northern platform area will remain.

Proposed Modifications

- The southern ends of the platform will be connected to the 14 feet wide Upper Baggage Car Collector Road. Bordering the Baggage Car Collector Road is a new stair that will connect to the Lower Baggage Car Collector Road, which is also 14 feet wide.
- A new retaining wall will be constructed separating the Baggage Car Collector Road at the platform elevation, and the Baggage Car Ramp at the lower elevation.

PLATFORM 7 AND 8

Existing Configuration

- During 1991, the cut and cover Metro Rail subway station was constructed diagonally across all the tracks, and directly below the main passenger tunnel. However, Platforms 7 and 8 were suspended from service/operation.
- The platforms were demolished to provide room for the Mail Truck Facility and Parking area.
- The connection at the main passenger tunnel entrance leading to the double ramps was blocked off for any public access.

Proposed Modifications

- The Mail Truck Facility will be relocated off-site, located a few miles to the south.
- New platforms and ramps will be constructed to connect to the main passenger tunnel, and the other platforms and the South Service Road.
- New canopies, matching the existing architectural features of Platforms 2 through 5, will be constructed over the ramps and platform areas.

PROPOSED SOUTH SERVICE ROAD MODIFICATION

In order to provide for the vehicular, baggage Car circulation and emergency passenger exiting access, the south service road will be depressed under the elevated run-through track structure and the Metro Goldline Eastside Extension LRT elevated structure.

The depressed service road vertical clearance to the bottom of the run-through structure will be 15 feet. The roadway width will be 40 feet wide to accommodate a 6 feet wide pedestrian walkway, an 8 feet baggage Car lane, two 12 feet vehicular lane, and a 2 feet wide curb. The 6 feet wide pedestrian walkway will connect to the new ramp extending up to the platform 2 and 3. This alternative will provide the connection from the South Service Road to the new basement area below Platforms 2 and 3. Both the passengers and the baggage Car can easily access between the Platforms and the South Service Road.

PASSENGER TUNNEL PEDESTRAIN FLOW ANALYSIS

Purpose

The number of passengers that could be expected to use the main passenger tunnel of the Angeles Union Station during the construction phase (Year 2010) and for the year 2025. The analysis is required to determine if the main passenger tunnel will be adequate to handle the volume of traffic that that is expected during these 2 periods. The Level of Service (LOS) criteria is taken from the Highway Capacity Manual 2000 edition.

LOS	Operating Characteristics	Pedestrian Space (sq.ft./person)	Flow Rate (Persons/min/ft)
A	Movement in desired paths without alteration in response to others. Speeds freely selected and conflicts unlikely.	More than 60	Less than 5
B	Same as above. At this level, pedestrians begin to be aware of others and response to their presence when selecting a pace.	40 to 60	5 to 7
C	Enough space for normal walking speeds and bypassing others. Reverse direction or crossing movements can cause minor conflicts.	24 to 40	7 to 10
D	Individual walking speed and ability to pass other restricted. High probability of conflict when crossing or traveling in reverse flow. Provides reasonably fluid flow, but friction and interaction likely.	15 to 24	10 to 15
E	Walking speed restricted. Space is not sufficient for passing slower pedestrians. Cross or reverse flow movements difficult. Volumes approach the limit of walkway capacity with stoppages an interruptions to flow	8 to 15	15 to 23
F	Walking speed severely restricted. Frequent unavoidable contact with other pedestrians. Cross and reverse flow movements virtually impossible. Flow is sporadic and unstable. Space characteristic of queued pedestrians rather moving streams.	Less than 8	Varies

Passenger Data

Projections of the passenger volumes arriving from Amtrak and Metrolink trains are assumed during the construction phase (Year 2010) and for Year 2025. The Metrolink

passenger counts assumptions are based on the passenger volumes contained in the Daily Weekday Ridership Projections provided by Metrolink (Revised 10/17/2000) when the analysis and study was completed. The Amtrak passenger counts assumptions was provided by Amtrak based on the California Passenger Rail System 20 Year Improvement Plan dated March 2001.

The Level of Service (LOS) criteria is based on the pedestrian space and flow rates, and the description of the operating characteristics that are contained in the Highway Capacity Manual 2000.

Assumptions

- The main passenger tunnel is approximately 28 feet wide and 400 feet long.
- 50% of Metrolink passenger counts from the daily ridership would travel during the morning rush hour between 0600 and 0859.
- 90% of Metrolink passenger counts from the daily ridership would travel during the morning rush hours between 0600 and 0859, and the afternoon rush hour between 1500-1759.
- For Amtrak Surfliner trains originating from San Diego at the southern end and traveling to Santa Barbara/San Luis Obispo at the northern end, it is assumed that 40% of the passengers will either entrain or detrain at LAUS, while the rest of the passengers will continue through LAUS to other stations. To consider that motorized vehicles are used to transport senior citizens and baggage from the main terminal to the platforms, a factor of 1.5 for the passenger counts is used for occupying extra space, thus affecting the tunnel passenger capacity.

- A duration of 2 minutes is used to account for the time necessary for a passenger to detrain, exit the platform through either the ramp or stair, connect to the passenger tunnel, and travel to the eastern end to the Bus Plaza, or to western end to Metro subway / other connections.
- A duration of 2 minutes is also used to account for passengers proceeding from the station is departing trains.

Train and Passenger Forecast

Year 2010 (Construction Phase)

During the morning rush hour period from 0600 to 0859, a total of 69 revenue trains is assumed in the forecast, with an estimated of 14,385 daily passengers to detrain or entrain at LAUS.

The analysis shows that pedestrian LOS rating will be D or better for the morning rush hour period. A LOS rating of E would be considered the highest practical rating without affecting a smooth pedestrian flow . In addition, when the pedestrian reaches the passenger tunnel via the platform ramps/stairs, they will travel in both directions to the east and west to the Metro Subway stations platforms located below the passenger tunnel. Consequently, it is clear that the tunnel will have sufficient operating capacity and acceptable LOS.

Year 2025

During the morning rush hour period from 0600 to 0859, a total 84 revenue trains is assumed in the forecast, with an estimated of 22,627 daily passengers to detrain or entrain at LAUS.

PASSENGER TUNNEL – SUMMARY

The pedestrian flow analysis demonstrates that the passenger tunnel will accommodate the passenger movement within the Union Station facility during the construction phase in Year 2010, and for the future in the Year 2025. For the passenger forecast in Year 2050, there are 2 short periods about one minute duration where the LOS rating is E. A LOS rating of E would be considered the highest practical rating without affecting a smooth pedestrian flow. Due to the layout of the passenger tunnel, which extends 400 feet in the east west direction, the pedestrians reaching the passenger tunnel from the platform ramps/stairs have the choice to travel either to the east or to the west to arrive at the other connections or destinations. Consequently, it is clear that the tunnel will have sufficient operating capacity and acceptable LOS to handle the pedestrian flow in the future.