

PROPOSED RESOLUTION

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

RAIL SAFETY DIVISION
RAIL TRANSIT SAFETY BRANCH

Resolution ST-243
November 4, 2021

RESOLUTION

RESOLUTION ST-243 GRANTING THE LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY A VARIANCE FROM GENERAL ORDER 95 FOR THE MINIMUM OVERHEAD CONDUCTOR RAIL CLEARANCE IN A 170-FOOT PORTION OF THE REGIONAL CONNECTOR TRANSIT CORRIDOR PROJECT

SUMMARY

This resolution approves the Los Angeles County Metropolitan Transportation Authority's request for a variance from General Order 95 to allow a reduced minimum clearance from 14 feet to 13 feet 9 inches between the running rails and Overhead Conductor Rail in a 170-foot portion of the Regional Connector Transit Corridor Project.

BACKGROUND

The Los Angeles County Metropolitan Transportation Authority (LACMTA or Metro) rail operations consist of the Metro Rail A, B, C, D, E, and L Lines. LACMTA rail system carries approximately 344,000 passengers per weekday, with annual ridership of approximately 108 million in 2018.

The Regional Connector Transit Corridor (RCTC) Project is a below-grade, 1.9-mile, dual-track light rail system that will extend the existing A Line (formerly Blue Line) from the 7th/Metro Station, to the existing L Line (formerly Gold Line) in the Little Tokyo area of Los Angeles. The 7th/Metro Station is the current northern terminus of the A Line. The new RCTC link will allow passengers to

travel from Azusa to Long Beach and from East Los Angeles to Santa Monica without transferring lines. The RCTC will contain three new subway stations: Little Tokyo/Arts District at 1st St/Central, Historic Broadway at 2nd St/Broadway, and Grand Ave Arts/Bunker Hill at 2nd St/Hope. The Little Tokyo/Arts District Station was originally an at-grade station on the L Line but will be demolished and relocated below grade at 1st St/Central for the RCTC. In the Little Tokyo area near 1st St/Alameda, the RCTC will transition to the L Line at two different portals: one will connect to the northbound branch of the L Line while the other will connect to the eastbound branch of the L Line. The RCTC will serve Little Tokyo, the Arts District, Civic Center, The Historic Core, Broadway, Grand Ave, Bunker Hill, Flower Street, and the Financial District.

The RCTC alignment is entirely below grade in a tunnel and thus is an “Exclusive” alignment classification as described in General Order (GO) 143-B, Section 9.04(a).

GO 95, Rule 37, Table 1 establishes the basic minimum allowable vertical clearance of wires above railroads. Rule 74.4E states, “A reduction of the clearances given in Table 1 to a minimum of 14 feet for trolley contact conductors is permitted for subways, tunnels or bridges, and for 0-750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classification 9.04-a. and 9.04-b. (1) contained in General Order No. 143-A.” GO 95 Figure 74-1 illustrates Rule 74.4E. Trolley contact conductors carry the electric power which the LRV pantograph must touch during operations to power the vehicle.

GO 95 Rule 77.4B states, “A reduction of the clearances given in Table 1 to a clearance of not less than 14 feet above the rails is permitted for trolley span wires under bridges, in tunnels, or in subways, and for 0-750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classification 9.04-a. and 9.04-b.(1), contained in General Order No. 143-A.” Trolley span wires support the typical overhead catenary wire. In this case the OCR insulated brackets and support rod, which holds the contact wire, fulfills that function.

By letter dated May 12, 2021, LACMTA requested to deviate from the 14-foot minimum clearance requirements of GO 95, Rule 74.4E, Figure 74-1, and Rule 77.4B to allow a minimum clearance of 13 feet 9 inches between the running rails and Overhead Conductor Rail (OCR) in the first 170 feet of track in RCTC that connects to the A Line. Beyond the 170-foot portion, the RCTC OCR is compliant with the 14-foot minimum clearance requirement. The request is for both Tracks 1 and 2 in the 170-foot portion.

The OCR is a continuous aluminum rail supported by insulated brackets affixed to the tunnel soffit or walls, that holds the copper contact wire under zero tension. The OCR remains electrically isolated from the ceiling supports by insulators and an insulated support rod. The pantograph of a light rail vehicle (LRV) contacts the contact wire of the OCR to receive electrical power.

LACMTA's request letter explained that the minimum RCTC OCR clearance will be 13 feet 9 inches because that is the current OCR clearance at the tail end of A Line's 7th/Metro Station, which the RCTC will connect to. In the early 1990s when the A Line was constructed, an Overhead Catenary System (OCS) in the 7th/Metro tunnel was installed at a minimum clearance of 13 feet 8 inches with the clearance at the end of the tail track at 13 feet 9 inches, which was compliant with CPUC GO requirements at the time. During the 2019 New Blue Improvement Project, the OCS was replaced with OCR in the 7th/Metro tunnel, but since the tunnel structure was not modified, the OCR maintained the existing lower clearances. RTSB Staff researched the versions of GO 95 and GO 143 that were applicable in 1990 and verified that the new OCR clearances remained compliant with CPUC GO requirements during the original construction year. In addition, Metro personnel and OCS/OCR Subject Matter Experts accepted the lower clearances, performed functionality tests with an LRV on the OCR, and addressed the resulting minor discrepancies prior to reopening A Line for revenue service. Therefore, RTSB staff determined that the OCR system at a reduced clearance was acceptable.

The total distance of RCTC that contains OCR with a clearance of less than 14 feet is 170 feet. At the interface between RCTC and the A Line there is an OCR overlap, where two OCR segments overlap each other. In the first 80 feet north

of the overlap, the OCR clearance will remain 13 feet 9 inches. Beyond that, the distance in which the clearance will transition from 13 feet 9 inches to 14 feet is 90 feet, beginning from stationing 6+29 to stationing 7+19 on Track 1, and beginning from stationing 6+25 to stationing 7+15 on Track 2. According to LACMTA, the transition to a 14-foot OCR clearance starts at the 80-foot mark and cannot start sooner because it is not advisable to start raising the OCR clearance immediately approaching or departing the OCR overlap. LACMTA's request letter also explained that the transition is necessary since the OCR gradient needs to change gradually, which helps prevent damage and reduce wear and tear of the OCR and the LRV pantograph. In total, the distance of non-compliant OCR is the sum of 80 feet and 90 feet, or 170 feet.

LACMTA maintains that the OCR minimum clearance of 13 feet 9 inches would not negatively impact the safety of the public, passengers, or employees. The portion of RCTC that requires a variance is in an underground tunnel with exclusive right-of-way, as is the entire project, and there is little exposure to patron or employees, who are not expected to be in the tunnel except in an emergency evacuation event. In that case, the OCR would be beyond the reach of passengers who are using the emergency walkway. Therefore, the potential consequence of someone contacting the OCR will be nonexistent.

According to LACMTA's request letter, the alternative options to make the RCTC compliant would require reconstruction and grinding of the A Line ceiling and/or changes to the track alignment profile in the A Line and RCTC. However, track construction is complete in this area of the project.

In addition to their request letter, LACMTA Staff informed RTSB Staff via email on April 20, 2021, that the maximum allowable gradient of the OCR is 0.3%, rounded from 0.28%, and the OCR meets the 3-inch vertical clearance requirement between the OCR and its supporting structure. The 3-inch clearance is required by American Railway Engineering and Maintenance-of-Way Association (AREMA) Chapter 33 Part 2 Table 33-2-2, Metro Rail Design Criteria (MRDC) Section 9.18.8.D.9.d, and CPUC GO 95, Rule 37, Table 1, Case 9.

DISCUSSION

The OCR Gradient Profile drawing, Track Alignment Plan and Profile drawing, Wiring Layout Plan drawing, and other supporting documents were reviewed by RTSB staff. The drawings are consistent with LACMTA's description of the OCR clearance, including the length of the OCR clearance transition, the total length of the non-compliant OCR, and the location of the non-compliant OCR.

LACMTA has asserted in their request letter that the reduced OCR clearances in the 170-foot portion of the RCTC will not negatively impact the safety of the public, passengers, or employees. Staff concurs with LACMTA's assessment and recommends that the LACMTA request be granted based on the following:

1. The OCR clearance lower than 14 feet in the 7th/Metro Station tunnel of the A Line met GO 95 requirements at the time of its construction. Rebuilding the 7th/Metro Station is not part of the RCTC Project scope and budget. The gradual OCR clearance transition from 13 feet 9 inches to 14 feet is necessary for system reliability and maintainability. Having an abrupt OCR clearance change from 14 feet to 13 feet 9 inches at the interface between the RCTC Project and the A Line, would not provide continuous contact between the pantograph and contact wire. There needs to be a certain range of contact forces between the pantograph and OCR so the pantograph can collect current and power the LRV. As LACMTA's request letter also stated, the gradual transition helps prevent damage and reduces wear of the OCR and pantograph. More wire wear would require more maintenance, which would possibly lead to service disruptions.
2. The percent grade of the OCR is appropriate for the planned operating speed. The cab signal maximum enforced speed for both tracks is 55mph in the area where the RCTC approaches the A Line. The Engineer of Record (EOR) for the project set a 0.6% maximum OCR gradient for track speeds above 46mph, which aligns with the requirement in AREMA Table 4-1 "Maximum Wire Gradient versus Line Speed" to have a 0.6% maximum gradient for speeds between 45-55mph. The gradient of the non-compliant OCR portion would at most be 0.28%, which would comply with the EOR requirement and AREMA Table 4-1.

3. Electrical hazard will be mitigated in several ways. The OCR will be electrically isolated from the ceiling supports by insulators and an insulated support rod. Insulating supports for power rail conductors are required by NFPA 130 (2014), which the RCTC is required to follow, to “provide safety isolation from the contact rail” per Section 6.3.4.2(1). Additionally, the three inches of electrical clearance between the OCR and supporting structure, which is required by AREMA, MRDC, and CPUC GO 95, will reduce the potential for undesired grounding. Further, in the cases that people or employees must evacuate the LRV in the tunnel where the non-compliant OCR is, the OCR will physically remain out of reach, which prevents inadvertent contact with the live power rail per NFPA 130 (2014) Section 6.3.4.2(2).
4. The alternative options to maintain the required 14-foot clearance would require reconstruction and grinding of the A Line 7th/Metro Station tunnel ceiling and/or changes to the track alignment profile in the A Line and RCTC, which would not be practicable for several reasons. The A Line, including the 7th/Metro station and tunnel, is currently operational and track construction at the connection point between A Line and RCTC is already complete. In effect, the tunnel and or track reconstruction would cause heavy disruption to A Line operation and the RCTC construction. As previously discussed, the safety risk presented by the low OCR is minimized by a combination of methods, so the reconstruction to achieve a 14-foot OCR clearance would make minimal difference to the safety risk factor.

NOTICE

On October 1, 2021, this Resolution was published on the Commission’s Daily Calendar.

COMMENTS

The draft resolution of the Rail Safety Division in this matter was mailed in accordance with Section 311 of the Public Utilities Code and Rule 14.2(d)(1) of the Commission's Rules of Practice and Procedure.

_____ comments were received.

FINDINGS

Findings and explanations here

1. By letter dated May 12, 2021, LACMTA requested to deviate from the 14-foot minimum clearance requirements of GO 95, Rule 74.4E, Figure 74-1, and Rule 77.4B to allow a minimum clearance of 13 feet 9 inches between the running rails and Overhead Conductor Rail (OCR) in the first 170 feet of track in RCTC that connects to the A Line at 7th/Metro Station.
2. The RCTC project, including the portion of the line that requires a variance, is underground and in an "Exclusive" alignment classification per General Order 143-B.
3. The minimum RCTC OCR clearance will be 13 feet 9 inches because that is the current OCR clearance at the tail end of A Line's 7th/Metro Station, which the RCTC will connect to. The OCR clearance lower than 14 feet in the 7th/Metro Station tunnel of the A Line met GO 95 requirements at the time of its construction.
4. The gradual OCR clearance transition from 13-feet-9-inches to 14-feet is necessary for maintainability and system reliability.
5. The percent grade of the OCR complies with the EOR requirement and AREMA Table 4-1.
6. Electrical hazard is mitigated by the following: the OCR will be insulated from ceiling supports per NFPA 130 (2014); the OCR will have 3 inches of electrical clearance from the surface of the supporting structure per

AREMA, MRDC, and CPUC GO 95; in cases that people or employees must evacuate the LRV in the tunnel where the non-compliant OCR is, the OCR will physically remain out of reach, which complies with NFPA 130 (2014).

7. The alternative options to make the RCTC compliant would require reconstruction and grinding of the A Line 7th/Metro Station tunnel ceiling and/or changes to the track alignment profile in the A Line and RCTC, which is not practicable since the heavy disruption caused by the reconstruction would make minimal difference to the safety risk.
8. RTSB staff and LACMTA agree that the proposed minimum OCR clearance of 13 feet 9 inches will not adversely affect employee, public, or passenger safety.
9. The LACMTA request and this Resolution were sent to the Electric Safety and Reliability Branch for review and concurrence. No concerns or objections were identified.

THEREFORE, IT IS ORDERED THAT:

1. The Los Angeles County Metropolitan Transportation Authority is granted authority to deviate from the requirements of General Order 95 Rule 74.4E, Figure 74-1, and Rule 77.4B, and have a minimum Overhead Contact Rail clearance of 13 feet 9 inches instead of the required 14-foot clearance for the 170-foot portion of the Regional Connector Transit Corridor Project as described in this Resolution.

2. This resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed, and adopted by the Commission at its regularly scheduled meeting held on November 4, 2021. The following Commissioners voting favorably thereon:

RACHEL PETERSON
Executive Director