

Technology Solutions for Grade Crossing Safety Prioritization

Elizabeth Lun, PE

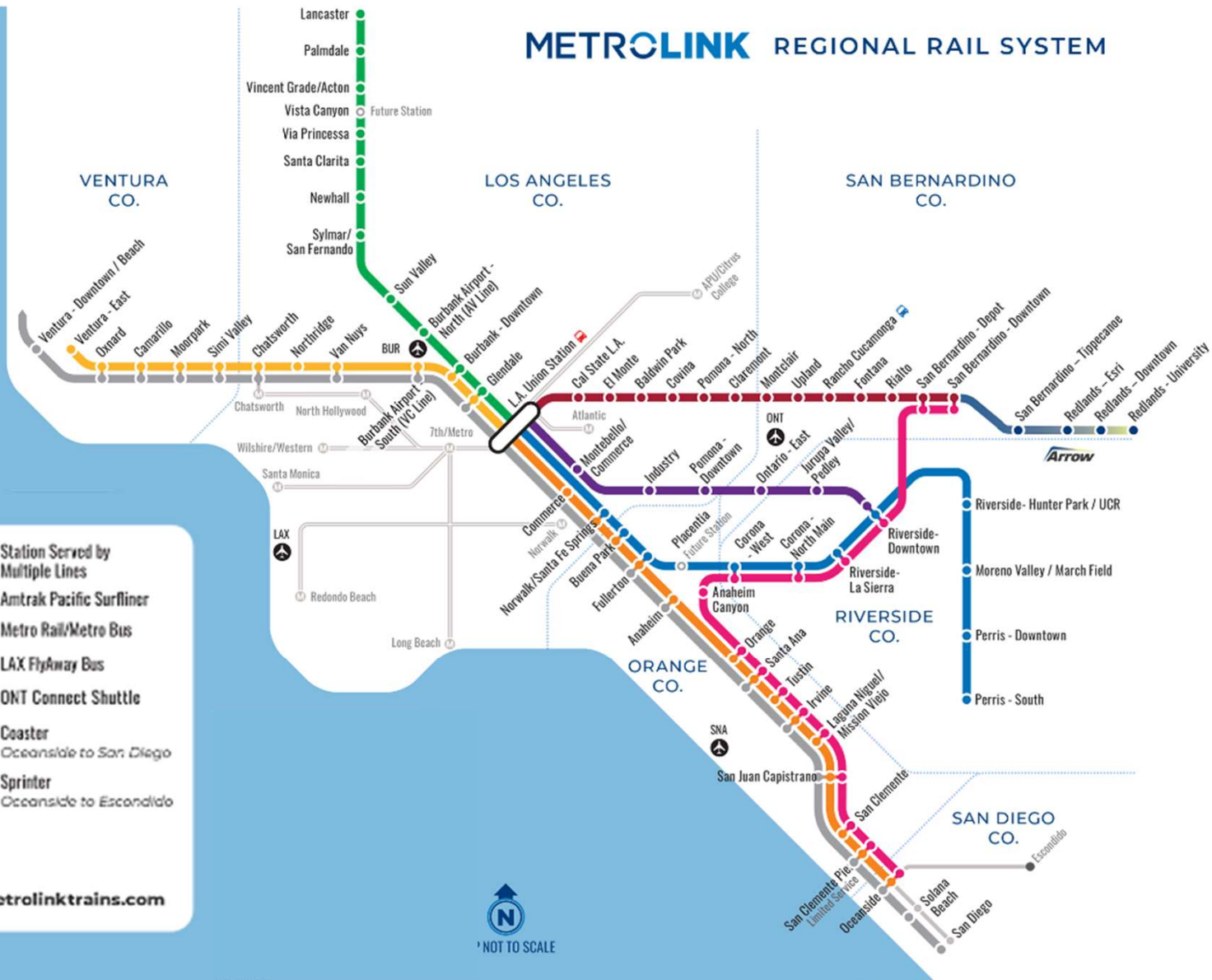
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Danielle Peña, PE, TE

 **RAILPROS**

August 2024

Southern California Regional Rail System



Safety Approach

In order to increase safety and decrease incidents, Metrolink implements changes based on the

Three E's of Safety

EDUCATION

Increasing awareness which leads to increased safety.



ENFORCEMENT

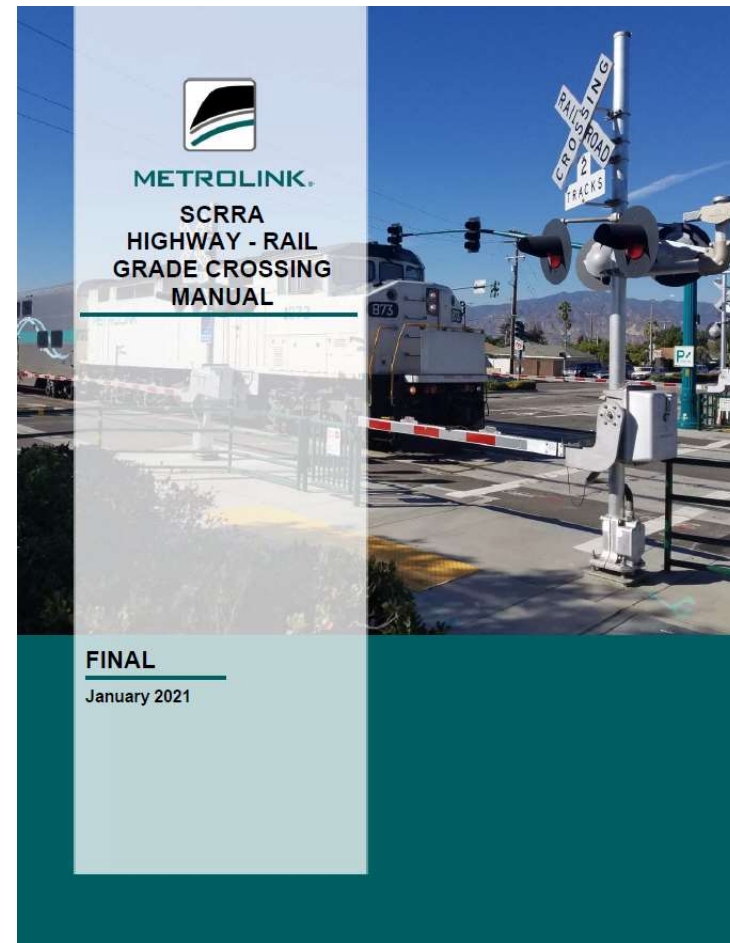
Aggressively enforcing rail safety laws through directed enforcement with law enforcement partners.



ENGINEERING

Researching and developing new and effective ways of keeping grade crossings safe, lessening the chance of a tragic incident.



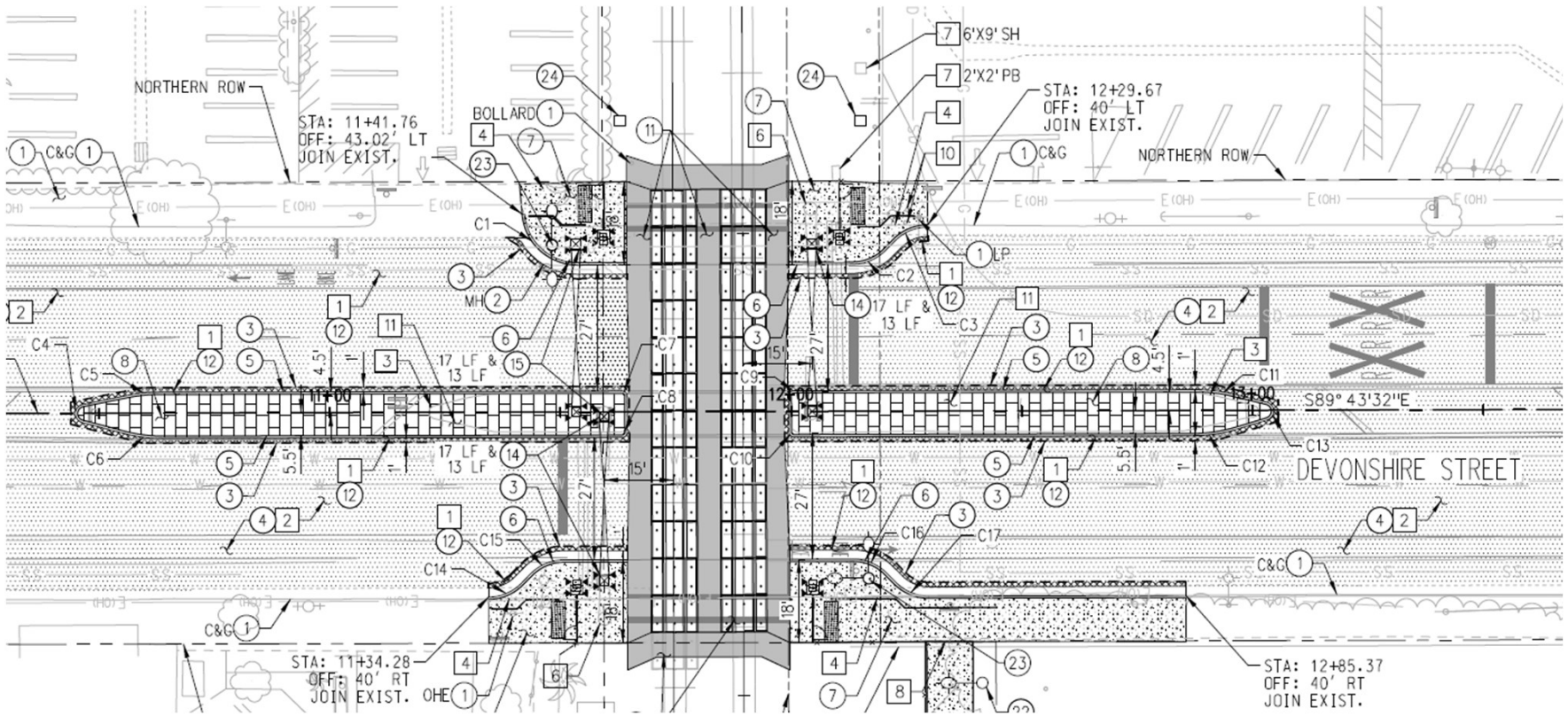


<https://metrolinktrains.com/about/agency/engineering--construction/>

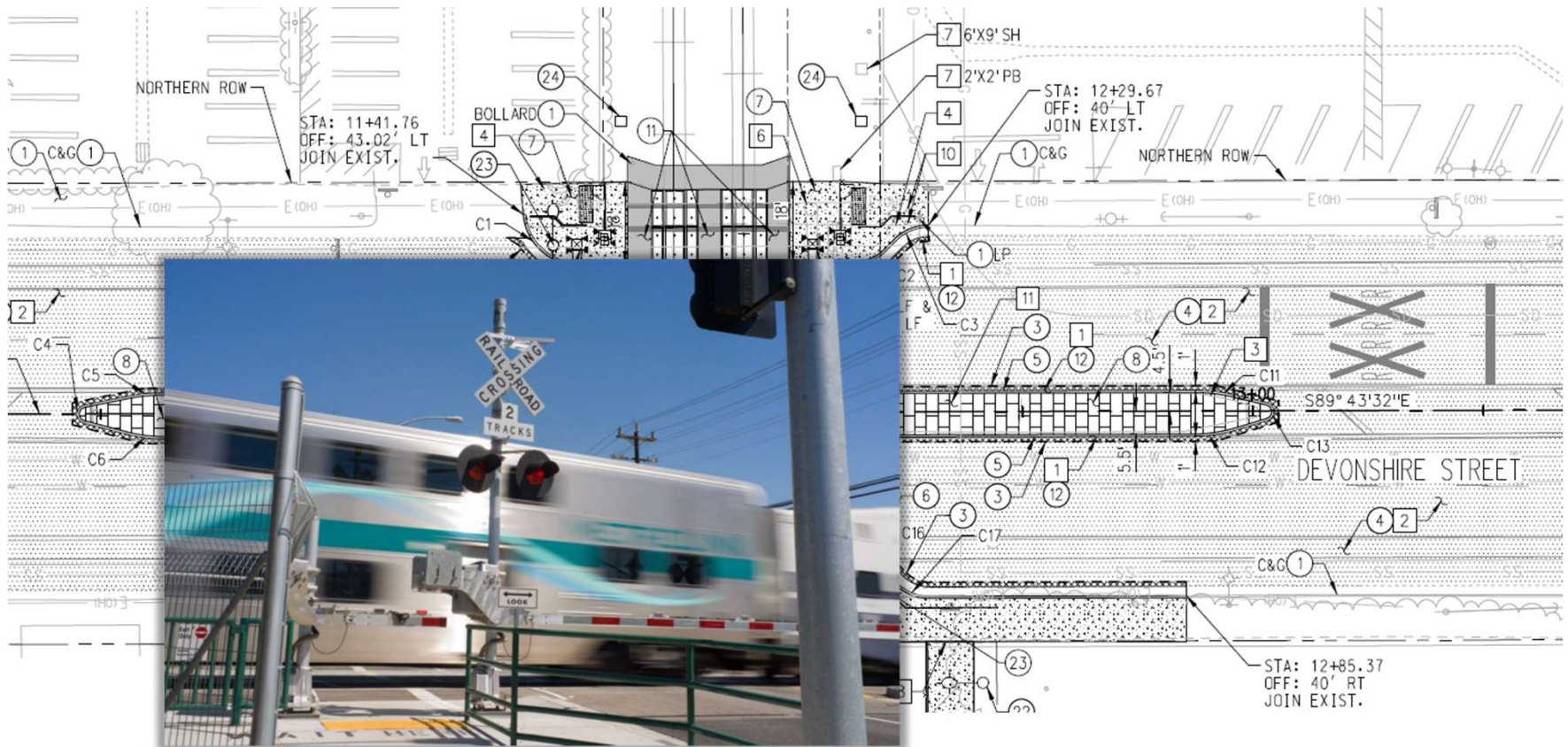
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At-Grade Crossing Improvements



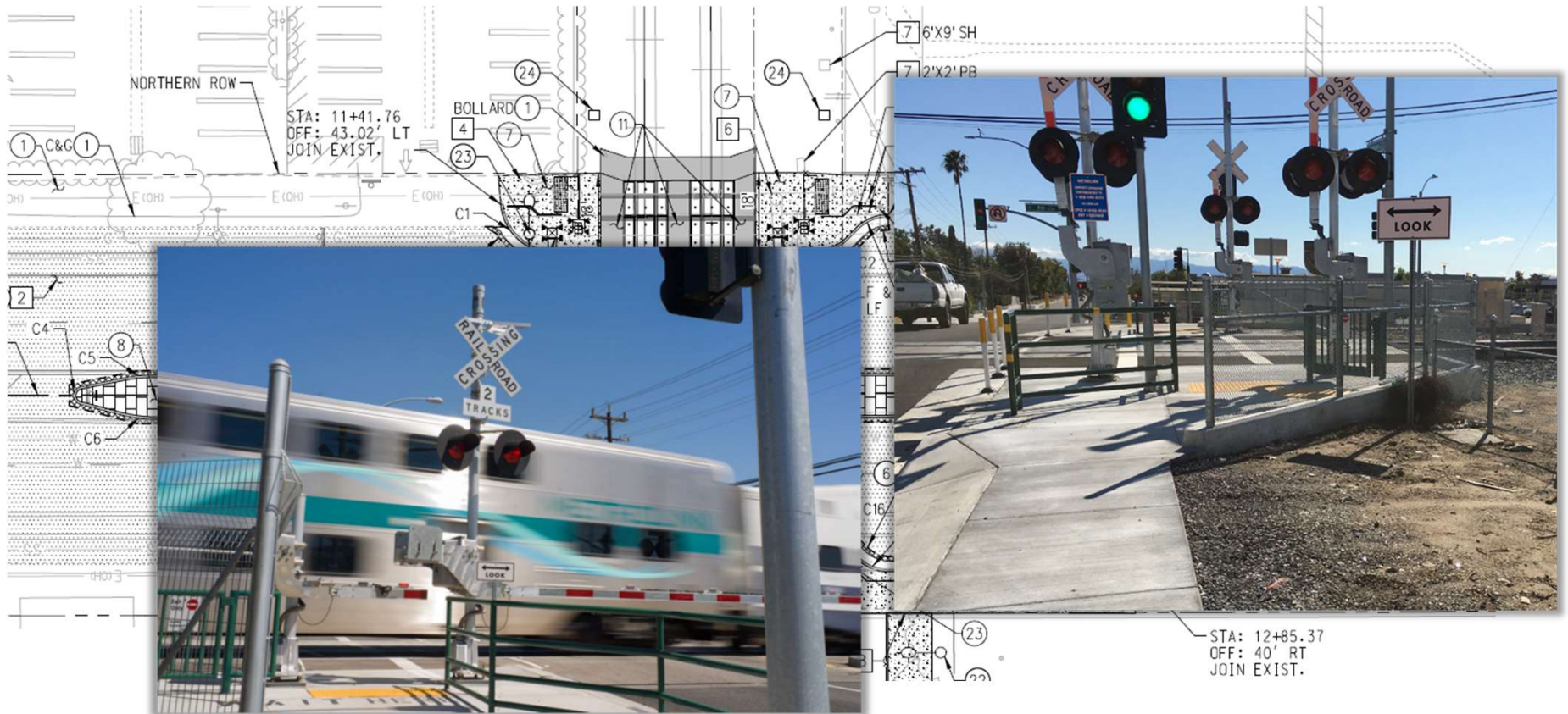
At-Grade Crossing Improvements



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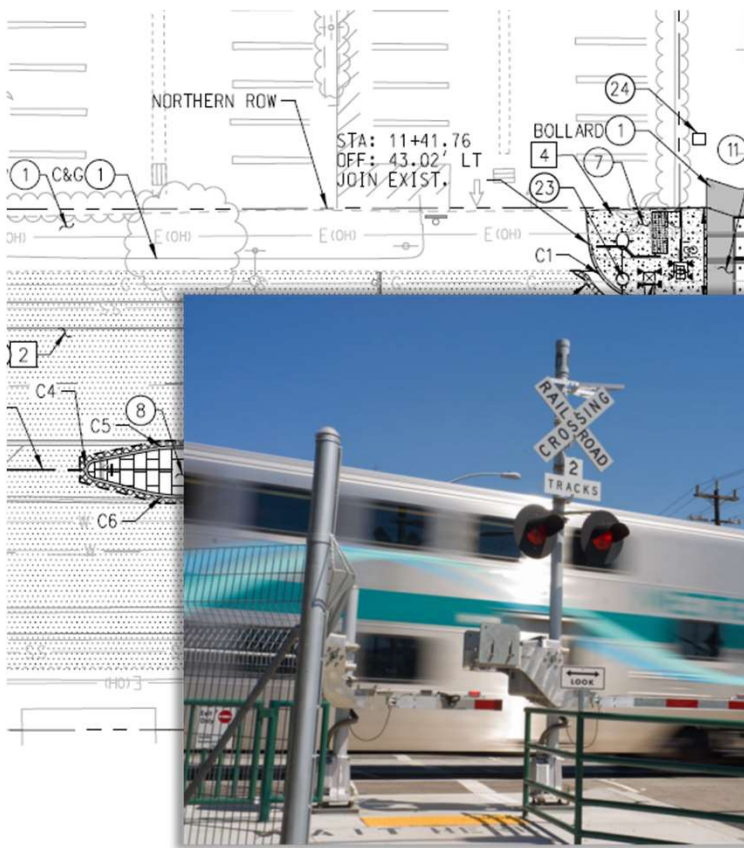
At-Grade Crossing Improvements



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At-Grade Crossing Improvements



STA: 11+41.76
OFF: 40' RT
JOIN EXIST.

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At-Grade Crossing Improvements



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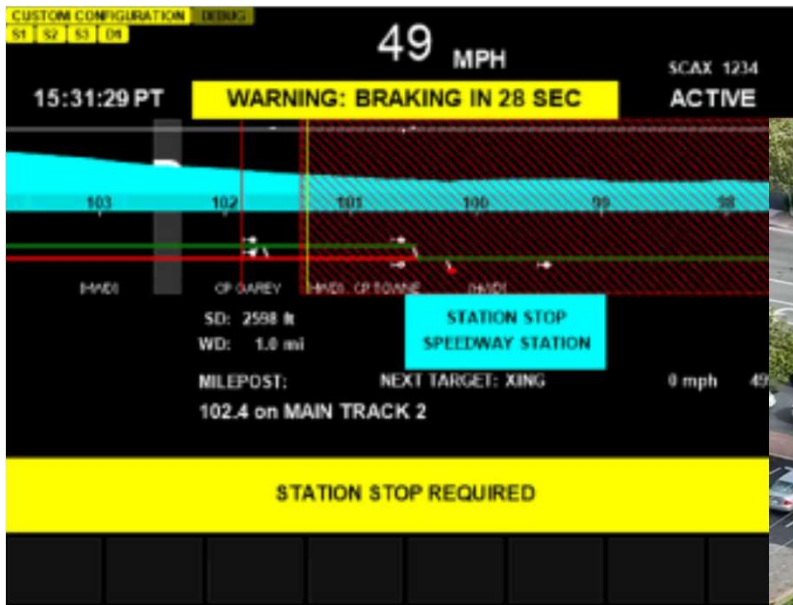


STATION: 40' RT
OFF: 40' RT
JOIN EXIST.

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Leveraging Existing PTC Infrastructure

- Wireless Crossing Nearside Station Stop (WCNSSS)



Del Obispo, San Juan Capistrano, Ca

Wireless Crossing Nearside Station Stop (WCNSS)

Normal:



With WCNSS:



Signage

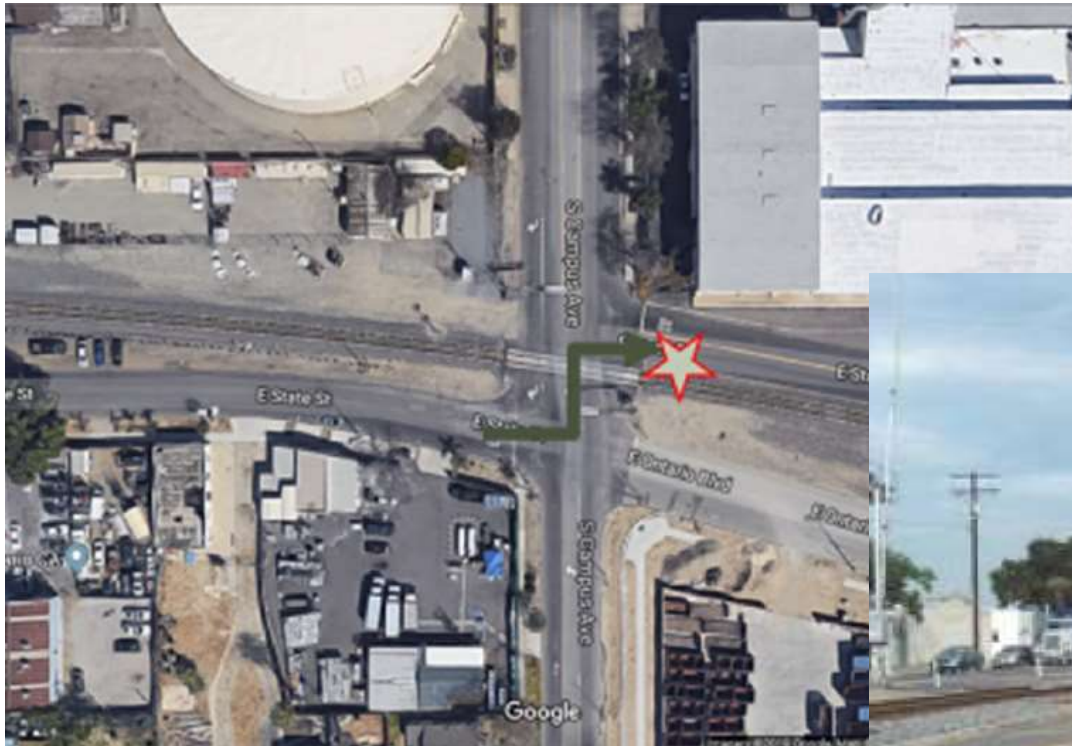


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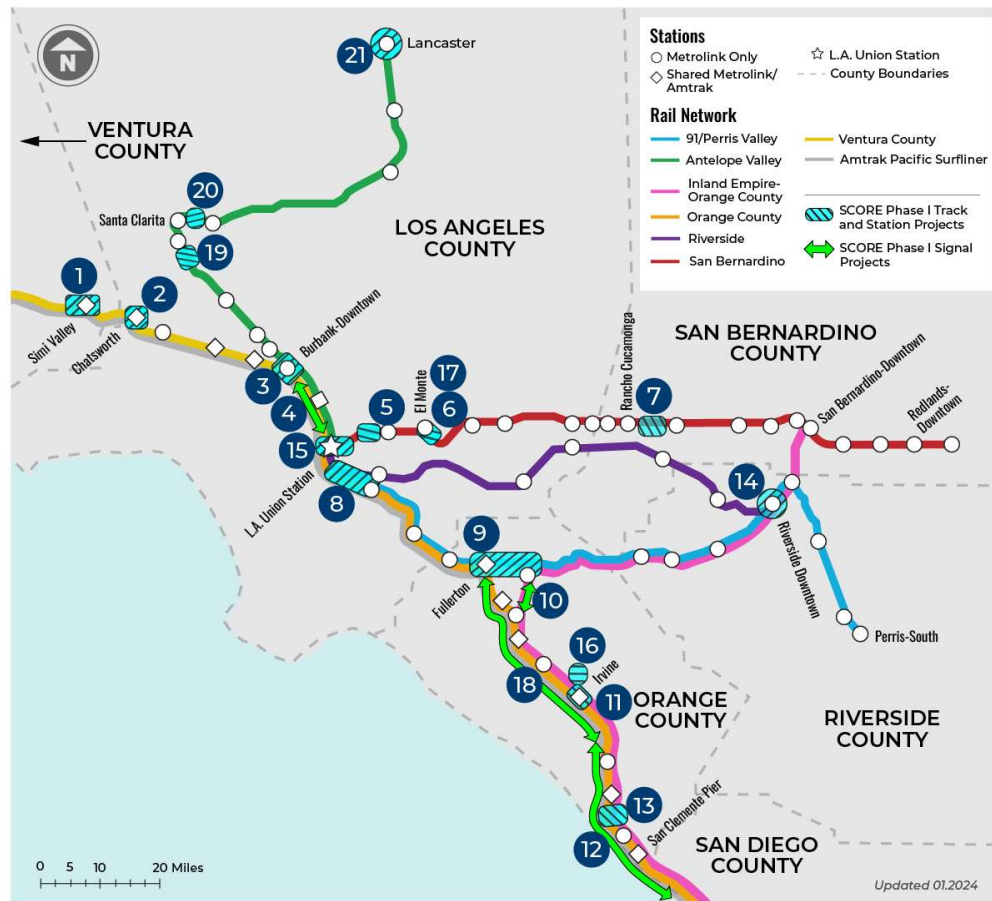
Campus Ave



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Capital Improvement Projects



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SCORE

SCORE PHASE 1 PROJECTS

- 1 Simi Valley Double Track
- 2 Chatsworth Station Improvements
- 3 Burbank Junction Speed Improvements
- 4 Signal Improvements (Burbank-L.A.)
- 5 Marengo Siding Extension
- 6 El Monte Siding Extension
- 7 Rancho Cucamonga Siding Extension
- 8 Hobart to Commerce Capacity Improvements
- 9 Fullerton Interlocker (incl. Atwood-Esperanza 3rd Track)
- 10 Signal Improvements (Atwood-Orange)
- 11 Irvine Station Improvements
- 12 Signal Improvements (Avery-Songs)
- 13 Serra Siding Extension
- 14 Riverside - Downtown Station Improvements
- 15 Link Union Station
- 16 Orange County Maintenance Facility
- 17 Tyler Ave and Cogswell Rd Grade Crossing Improvements
- 18 Signal Improvements (La Palma-Avery)
- 19 Balboa Double Track Extension
- 20 Canyon Siding Extension
- 21 Lancaster Terminal Improvements

**Note: Link US Phase A includes Metrolink's LAUS RYRM Project*

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ENGINEERING RECOMMENDATIONS



Standardization Diagnostic Preparation

A worksheet that combines engineering elements from the Safety Team regarding past incidents and issues



Inter-Departmental Coordination

SCRRA's engineering team and safety teams work together to identify possible engineering solutions within the project limits

Crossing Safety Prioritization Program



Crossing Evaluation System with Data-driven Database can be leveraged to: identify, evaluate, and prioritize crossing improvements; and for funding and grant applications

Field Assessments performed at each location for priority crossings



Stakeholder Engagement Program, engages stakeholders, develop solutions, and cooperate on proposed nearer vs long term improvements



Crossing Closures and Grade Separations

Evaluate any opportunities to close or grade separate crossings per SCRRA Board Resolution 98-21 and 91-3



Funding Coordination

to be used to complete Project Study Reports (PSR's) and grant applications

Proper Implementation of Standards



Applied on site specific-issues of the actual crossing; including but not limited to location, needs, incident histories, daily traffic and surroundings



Engineering Standards should be regarded as a toolbox while evaluating each crossing on an individual bases as to which tools need to be applied.

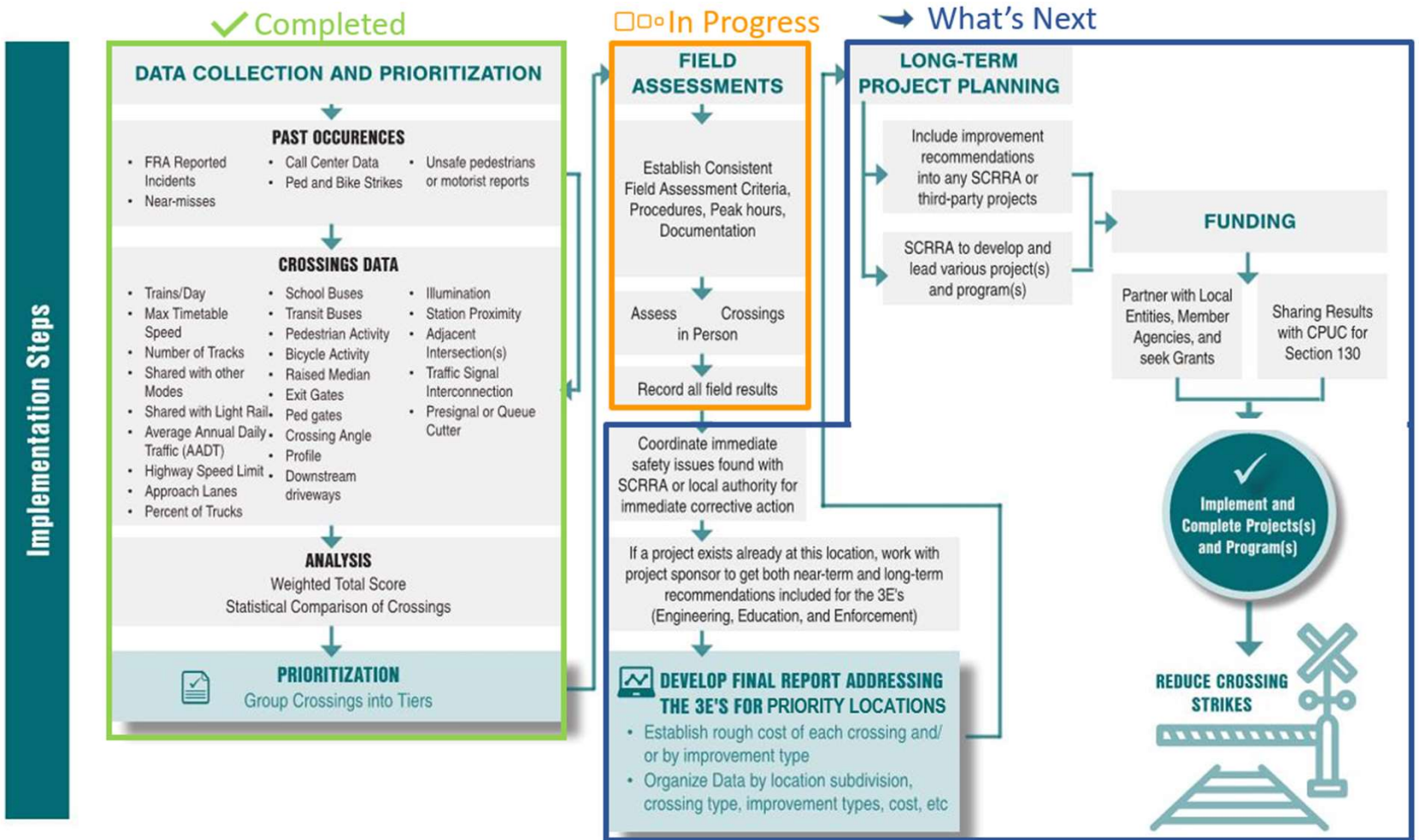
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Grade Crossing Safety Prioritization Tool

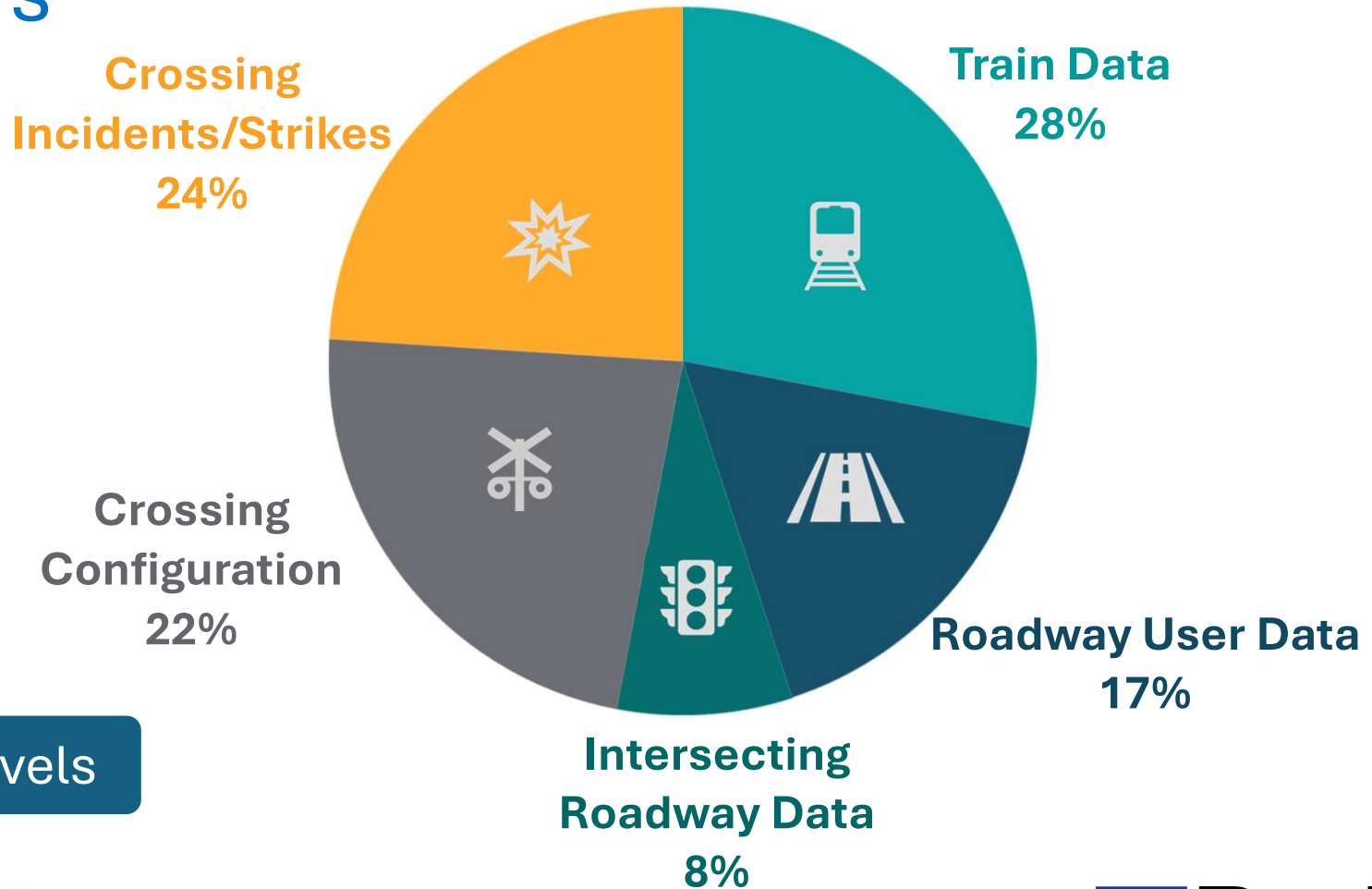
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Vision



32 Factors



3 Priority Levels

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32 Factors

- Train Data
- Crossing Incident/Strikes
- Crossing Configuration
- Roadway User Data
- Intersecting Roadway Data

Scoring Criteria
Trains/Day
Excessive Number of Trains Factor
of Tracks
Average Daily Traffic (ADT)
Max Timetable Speed
Shared Crossing with other Modes on Separate Tracks?
Shared Crossing with Light Rail?
Intersecting Roadway within 300ft?
of Vehicle on Tracks (last 5 yrs)
of Unsafe Motorists (last 5 yrs)
of Unsafe Pedestrians (last 5 yrs)
of Ped Strikes (last 5 yrs)
of Bike Strikes (last 5 yrs)
of Vehicle Strikes (last 5 yrs)
of Approach Lanes
Raised Median
Pedestrian Activity
Bicycle Activity
% of Trucks
Transit Buses
Exit Gates?
Ped gates?
Crossing Angle/high = closest to 90 degrees
Profile
Downstream Driveway within 100ft?
Illumination within 50ft from nearest rail?
Proximity to Station Within 500ft?
Train Horn Eliminated?
Traffic Signal Interconnection?
Pre-signals or Queue-Cutter
Highway Speed Limit (MPH)
School Buses



METROLINK CROSSING SAFETY PRIORITIZATION

Summary Dashboard

DASHBOARD NAVIGATION

SUMMARY

DETAILED

EQUITY ATLAS

FIELD ASSESSMENTS

FRA ACCIDENT AND INVENTORY REPORT

FILTERS

SUBDIVISION

All

CITY

All

2021 REHAB RATING

All

SAFETY PRIORITY

All

MILEPOST

0.47 537.13

CROSSING TYPE

All

COUNTY

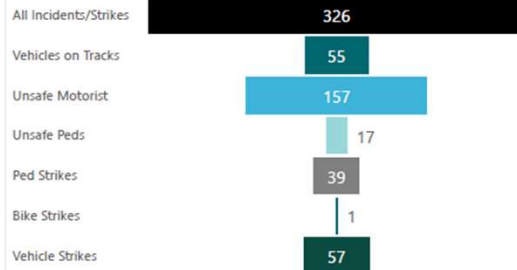
All

EXISTING VS. FUTURE CONFIG

All

CLEAR ALL FILTERS

CROSSING INCIDENTS/STRIKES



SAFETY DATA

13
of Priority 1 Xings

19
of Priority 2 Xings

330
of Priority 3 Xings

2021 REHAB DATA

1
of "1" Rehab Rating

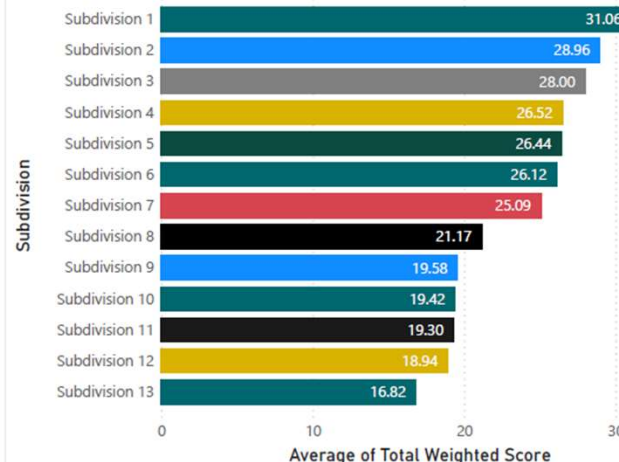
10
of "1" Rehab Rating

99
of "3" Rehab Rating

113
of "4" Rehab Rating

12
of "5" Rehab Rating

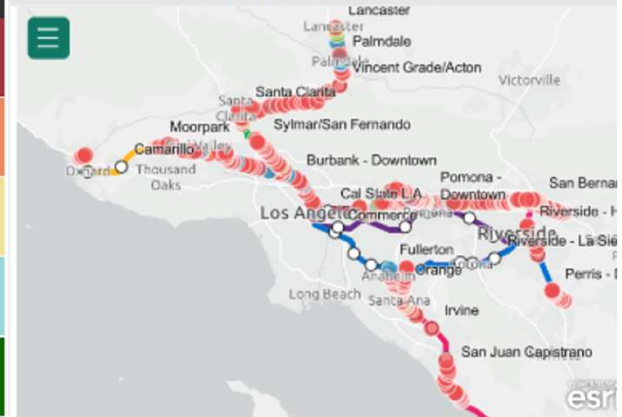
AVERAGE WEIGHTED SAFETY SCORE BY SUBD.



LEGEND

Key Type	Description
Safety Ranking	Lower number is highest priority for safety improvements
Safety Priority	1 is highest priority for safety improvements (3 is least priority)
Rehab Rating	1 is highest priority (5 is best condition)

CROSSINGS MAP (SAFETY PRIORITY)



SUMMARY CROSSINGS LIST

DOT #	Crossing Name	Safety Ranking	Safety Priority	2021 Rehab Rating
00000A	Location 1	1	Priority 1	0
00000A	Location 2	1	Priority 1	3
00000A	Location 3	3	Priority 1	3
00000A	Location 4	4	Priority 1	3
00000A	Location 5	5	Priority 1	3
00000A	Location 6	6	Priority 1	4
00000A	Location 7	7	Priority 1	3
00000A	Location 8	8	Priority 1	4
00000A	Location 9	9	Priority 1	3
00000A	Location 10	10	Priority 1	3
00000A	Location 11	11	Priority 1	4
00000A	Location 12	12	Priority 1	3
00000A	Location 13	13	Priority 1	0
00000A	Location 14	14	Priority 2	2
00000A	Location 15	15	Priority 2	3
00000A	Location 16	16	Priority 2	4
00000A	Location 17	17	Priority 2	4
00000A	Location 18	18	Priority 2	4
00000A	Location 19	19	Priority 2	4
00000A	Location 20	20	Priority 2	0
00000A	Location 21	21	Priority 2	3
00000A	Location 22	22	Priority 2	4
00000A	Location 23	23	Priority 2	3

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METROLINK CROSSING SAFETY PRIORITIZATION

Detailed Table

DASHBOARD NAVIGATION

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FIELD ASSESSMENTS

FRA ACCIDENT AND
INVENTORY REPORT

FILTERS

SUBDIVISION

All

MILEPOST

0.47 537.13



SAFETY PRIORITY

All

2021 REHAB RATING

All

CITY

All

COUNTY

All

CROSSING TYPE

All

EXISTING V. FUTURE CONFIG

All

CLEAR ALL FILTERS

DETAILED CROSSINGS LIST

DOT #	Crossing Name	# of Unsafe Pedestrians (last 5 yrs)	# of Ped Strikes (last 5 yrs)	# of Bike Strikes (last 5 yrs)	# of Vehicle Strikes (last 5 yrs)	All Incidents/ Strikes	Weighted Score	Safety Ranking	Safety Priority	2021 Rehab Rating	2021 Rehab Rating Label
00000A	Location 1	0	0	0	0	2	45.10	1	Priority 1	0	
00000A	Location 2	0	0	0	0	2	45.10	1	Priority 1	3	Fair
00000A	Location 3	0	1	0	3	7	42.93	3	Priority 1	3	Fair
00000A	Location 4	0	0	0	0	4	42.78	4	Priority 1	3	Fair
00000A	Location 5	1	0	0	1	4	42.69	5	Priority 1	3	Fair
00000A	Location 6	1	1	0	2	8	42.58	6	Priority 1	4	Good
00000A	Location 7	0	0	0	2	10	41.99	7	Priority 1	3	Fair
00000A	Location 8	0	1	0	2	9	41.92	8	Priority 1	4	Good
00000A	Location 9	0	0	0	1	3	41.78	9	Priority 1	3	Fair
00000A	Location 10	0	0	0	1	4	41.77	10	Priority 1	3	Fair
00000A	Location 11	0	0	0	1	4	40.86	11	Priority 1	4	Good
00000A	Location 12	0	0	0	0	1	40.35	12	Priority 1	3	Fair
00000A	Location 13	0	0	0	0	0	40.30	13	Priority 1	0	
00000A	Location 14	0	0	0	1	3	39.36	14	Priority 2	2	Improvement Needed
00000A	Location 15	0	3	0	2	6	39.30	15	Priority 2	3	Fair
00000A	Location 16	0	2	0	1	6	39.12	16	Priority 2	4	Good
00000A	Location 17	0	0	0	2	8	38.89	17	Priority 2	4	Good
00000A	Location 18	1	0	0	0	2	38.71	18	Priority 2	4	Good
00000A	Location 19	0	0	0	2	3	38.51	19	Priority 2	4	Good
00000A	Location 20	0	0	0	0	0	38.06	20	Priority 2	0	
00000A	Location 21	0	0	0	1	2	37.86	21	Priority 2	3	Fair
00000A	Location 22	0	0	0	1	8	37.03	22	Priority 2	4	Good
00000A	Location 23	0	0	0	0	1	36.69	23	Priority 2	3	Fair

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METROLINK CROSSING SAFETY PRIORITIZATION

Detailed Table

DASHBOARD NAVIGATION

[SUMMARY](#)[DETAILED](#)[EQUITY ATLAS](#)[FIELD ASSESSMENTS](#)[FRA ACCIDENT AND INVENTORY REPORT](#)

FILTERS

SUBDIVISION

All

MILEPOST

0.47 537.13



SAFETY PRIORITY

All

2021 REHAB RATING

All

CITY

All

COUNTY

All

CROSSING TYPE

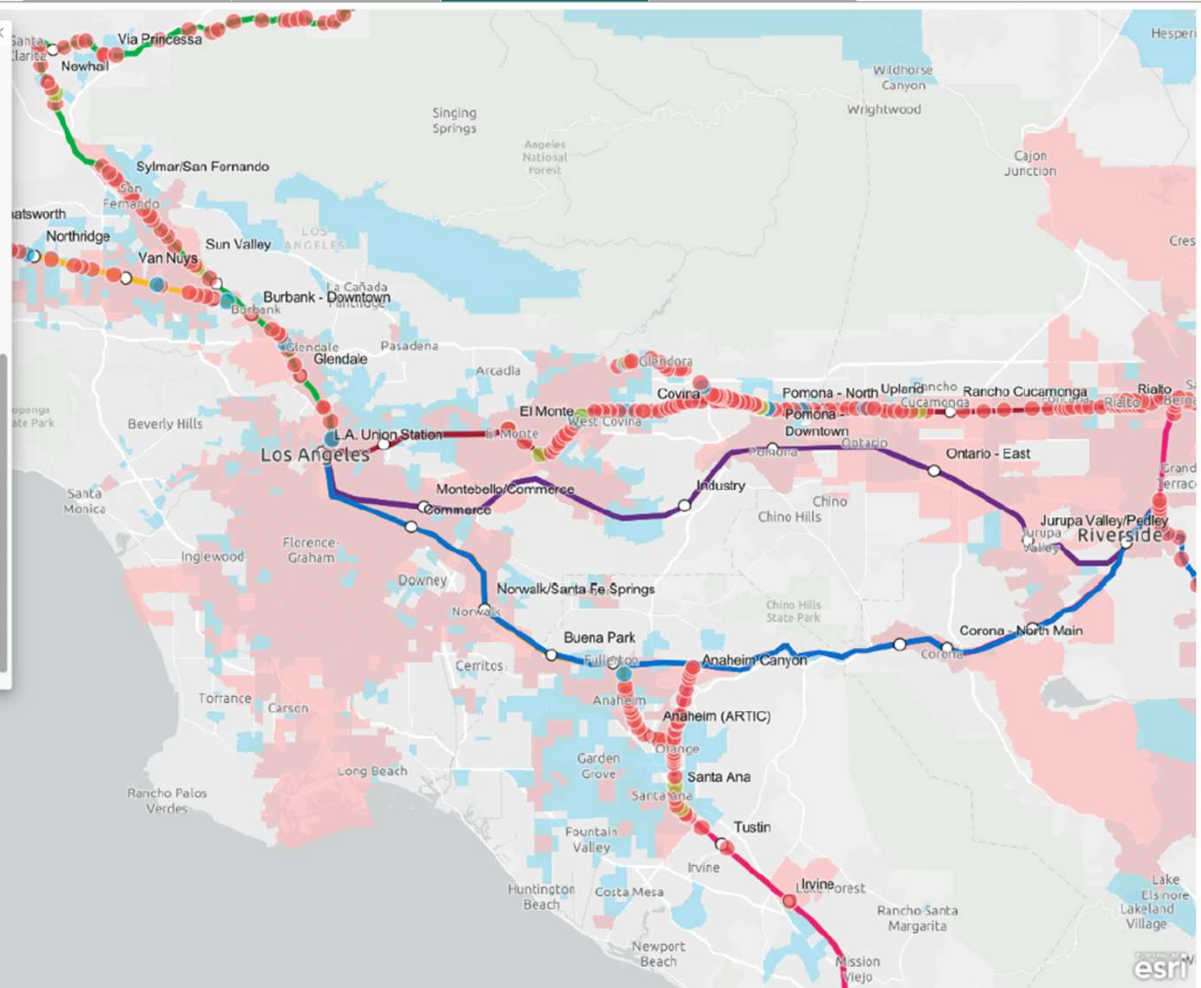
All

EXISTING V. FUTURE CONFIG

All

CLEAR ALL FILTERS

- Layers
- > MEA - Homeownership Rate
 - > MEA - Formerly Redlined ...
 - > MEA - Limited English-spe...
 - > MEA - Median Household ...
 - > MEA - Population Below 2...
 - > MEA - Population with a D...
 - > MEA - Rent Burden
 - > MEA - Seniors
 - > MEA - Zero-Vehicle House...
 - > MEA - Composite
 - > MEA - Youth
 - > MEA - CalEnviroScreen 3.0...
 - > MEA - Communities of Co...
 - > MEA - Areas of Persistent ...
 - > MEA - SB 535 Disadvantag...
 - > MEA - SB 535 Disadvantag...
 - > MEA - AB 1550 Low-Inco...
 - > MEA - AB 1550 Low-Inco...



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METROLINK CROSSING SAFETY PRIORITIZATION

Detailed Table

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FRA ACCIDENT AND
INVENTORY REPORT

DOT # - CROSSING NAME

- ☐ 00000 - Location 1
- ☐ 00000 - Location 2
- ☐ 00000 - Location 3
- ☐ 00000 - Location 4
- ☐ 00000 - Location 5
- ☒ 00000 - Location 6
- ☐ 00000 - Location 7
- ☐ 00000 - Location 8
- ☐ 00000 - Location 9
- ☐ 700000 - Location 10

CROSSING NAME

Location Name

CITY

City Name

COUNTY

County Name

SUBDIVISION

Subdivision name

MILEPOST (MP)

xx.xx

DOT

00000

CPUC

CPUC number

SAFETY PRIORITY

Priority 1

2021 REHAB RATING

3

FIELD ASSESSMENT RECOMMENDATIONS - 3 Es

Long Term

Near Term

Engineering

Near/Long Term

Completed?

Consider improving pedestrian approaches at N side of crossing	Long Term	No
Consider installing a WB pre-signal to prevent on-track queuing during normal operation	Long Term	No
Install 24" RR limit lines for EB and WB approaches per CA-MUTCD	Near Term	No
Install Do Not Stop on Tracks (R8-8) signs in center median area for WB thru traffic	Near Term	No
Install EB RxR pavement markings next to W10-1 sign per CA-MUTCD	Near Term	No
Install Stop Here on Red (R10-6) sign at right turn limit line downstream of crossing as crosswalk is located around the corner from the limit line	Near Term	No
Remove arrow pavement markings at WB limit line	Near Term	No
Resurface asphalt roadway approaches	Long Term	No
Revise traffic signal timing to reduce WB red interval	Near Term	No
Trim tree branches in EB direction to avoid blocking visibility of RR flashers and traffic signal	Near Term	No

Education

Near/Long Term

Completed?

Publish a public service message through social media and/or buses about crossing safety.	Near Term	No
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Enforcement

Near/Long Term

Completed?

Ask if local law officials can perform targeted enforcement campaigns to encourage pedestrians and cyclists to use designated pathways.	Near Term	No
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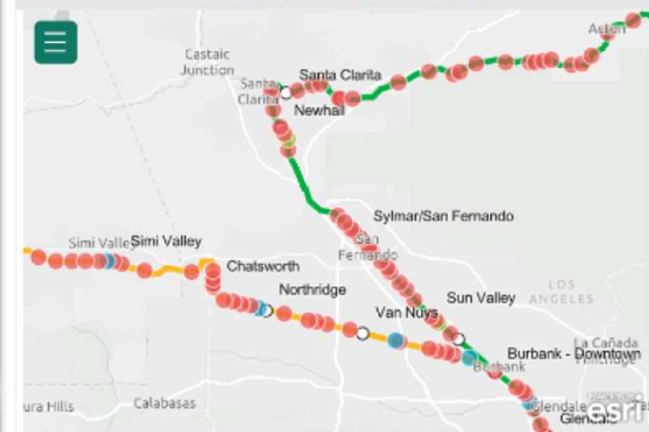
FIELD ASSESSMENT REPORT

CLICK ON THE ICON LINK BELOW TO ACCESS THE FULL REPORT



CROSSING LOCATION MAP

CROSSINGS MAP (SAFETY PRIORITY)



Implementation

✓ Completed

Data Collection and Prioritization (Past Occurrences, Crossing Data, Analysis, Prioritization)

□□ In Progress

Field Assessments (Priority 1 complete; Priority 2 Next)



What's Next

Implement Near-Term and Long-Term Recommendations from Field Assessments:

- Local Coordination and Share Results with State PUC, FRA, etc.
- Incorporate into existing projects
- Project Planning & Funding

For more information



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We'd also like to thank our consultant team RailPros, Inc., whom was instrumental in creating this vision and developing the tool in partnership with SCRRRA.

