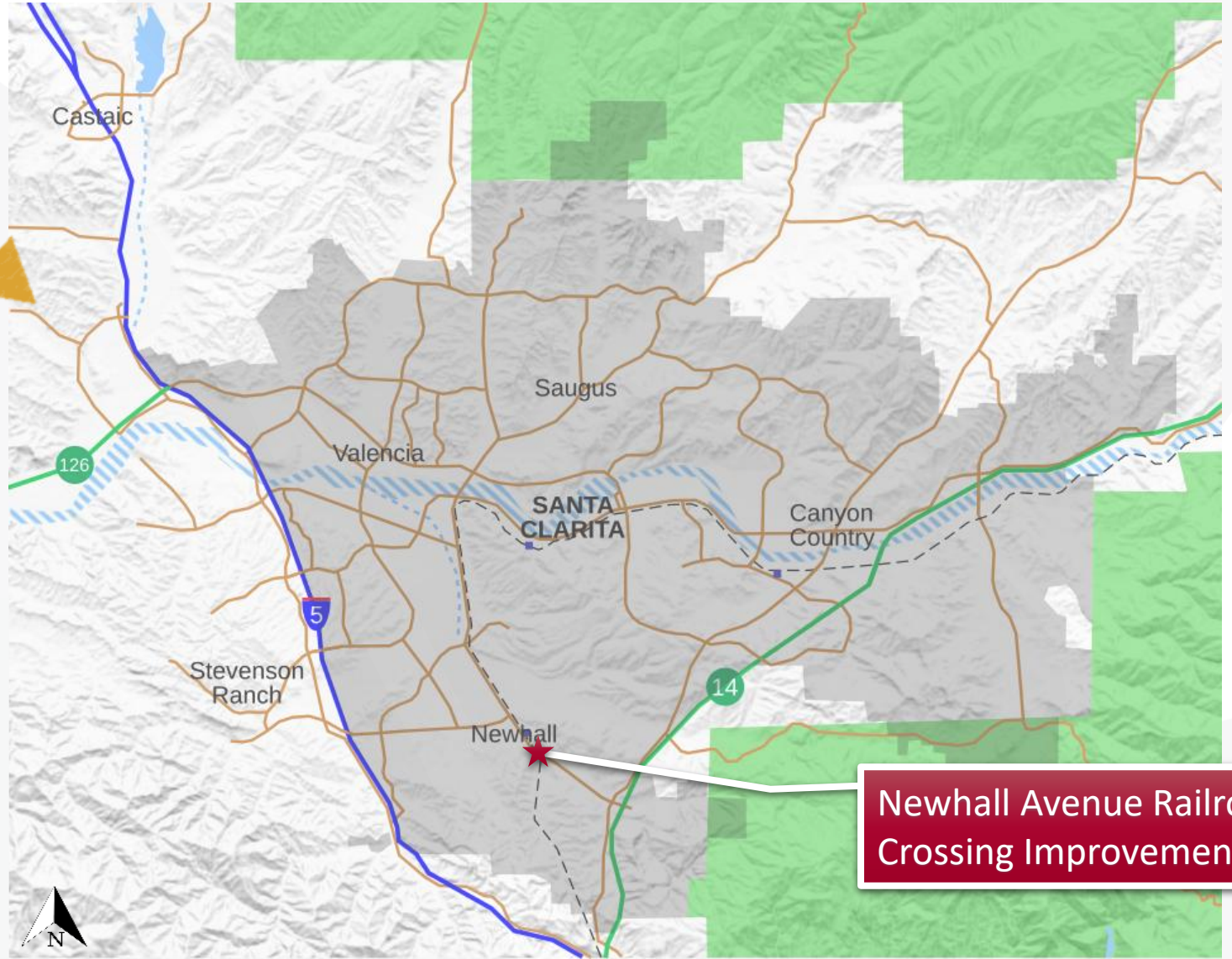
2026 ITE Western District Annual Meeting

Harnessing AI for Traffic Safety: Near-Miss Analysis for Newhall Avenue Railroad Crossing Improvement

Kimley»Horn

Project Location

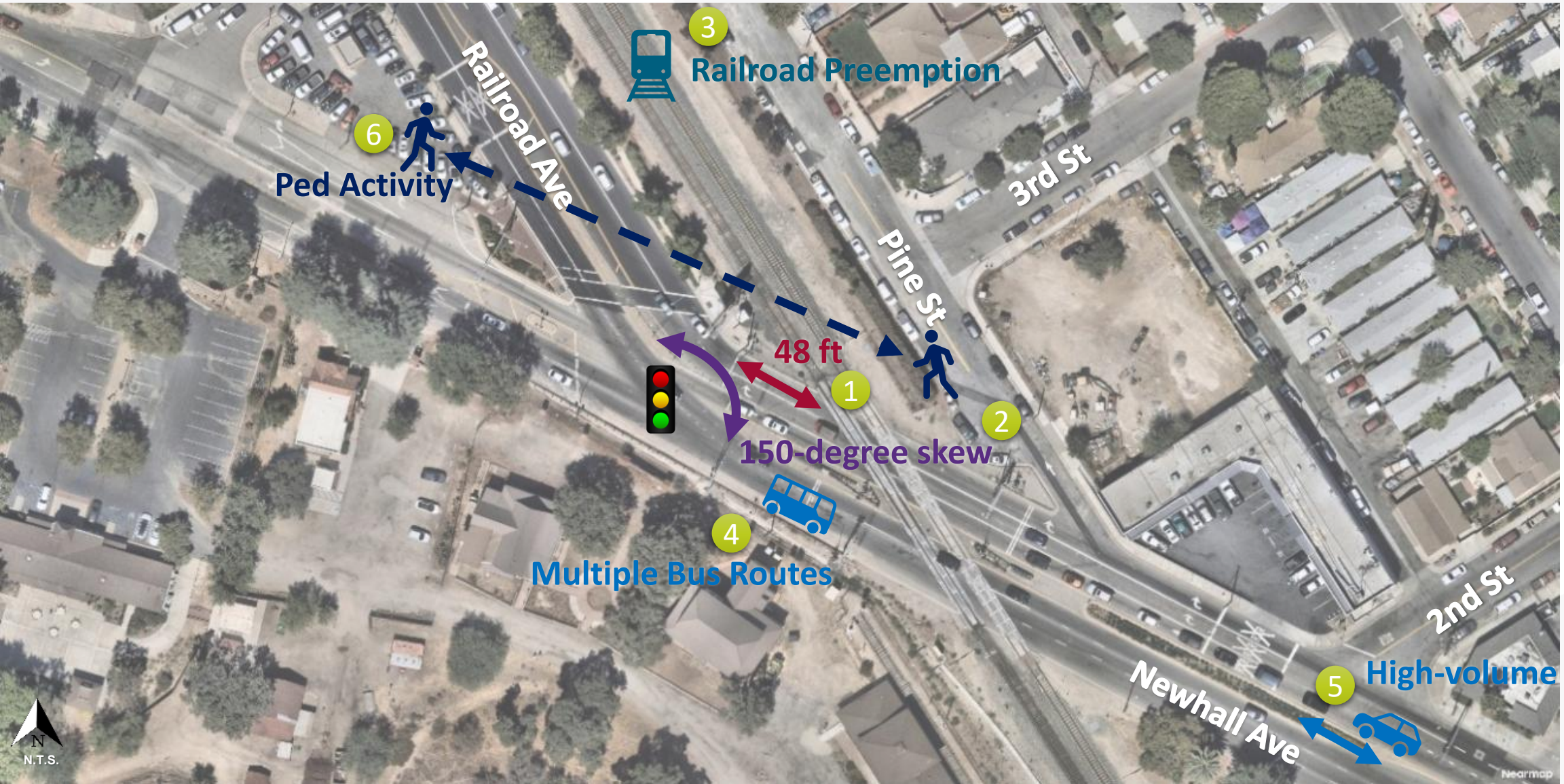


- Interstate 5
- California State Routes (14 and 126)
- Major surface streets
- Metrolink rail line
- Metrolink station (blue boxes)
- Santa Clarita city limit
- Permanent bodies of water
- Intermittent bodies of water (Santa Clara River and tributaries)
- Angeles National Forest

Project Location

Newhall Avenue Railroad Crossing Improvements Project

Study Area


3
Railroad Preemption
6
Ped Activity
Railroad Ave
3rd St
Pine St
48 ft
1
2
150-degree skew
4
Multiple Bus Routes
2nd St
Newhall Ave
5
High-volume Arterial
N
N.T.S.

Existing Conditions

Westbound Approach of Newhall Avenue At-Grade Crossing

Westbound Queue along Newhall Avenue

Eastbound Queue Spillback at Newhall Avenue Railroad Crossing

Southbound/eastbound truck comes to a full stop in advance of railroad tracks after turning left from Railroad Avenue onto Newhall Avenue

Existing Conditions

Southbound/eastbound Santa Clarita transit bus swinging wide to the rightmost lane, leaving room for two lanes of vehicles to travel through the intersection

Eastbound school bus stopping in the rightmost eastbound lane, leaving room for two lanes of vehicles to travel through the intersection

Westbound bus comes to a full stop in advance of railroad tracks along Newhall Avenue

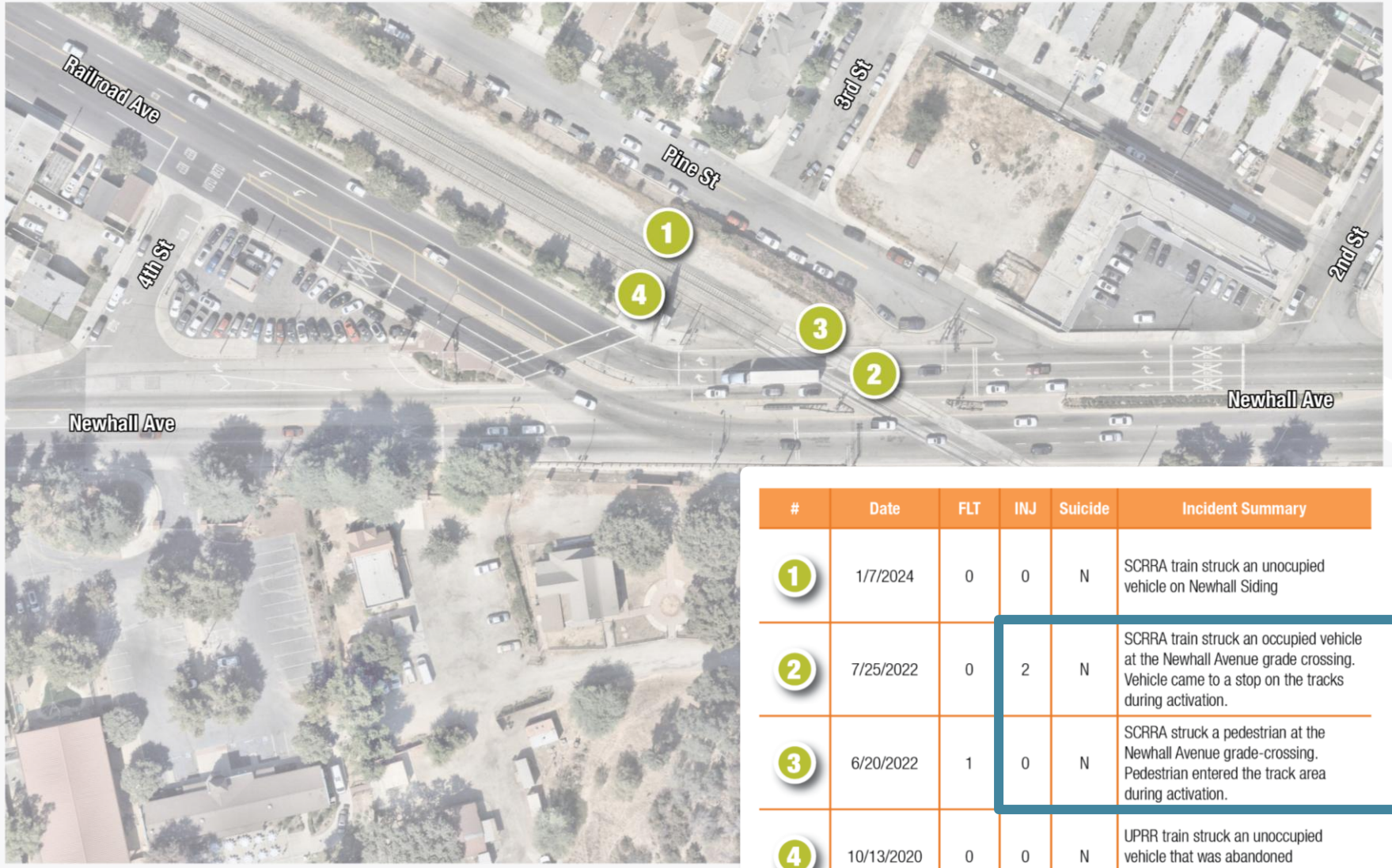
Existing Conditions

Pedestrian using the median island as refuge while waiting to cross Railroad Avenue outside of pedestrian phase

Pedestrian crossing Railroad Avenue at 4th Street

Pedestrian on scooter navigates around closed train barriers traveling westbound on the north side of Newhall Avenue

Railroad Crossing Incident Summary



#	Date	FLT	INJ	Suicide	Incident Summary
1	1/7/2024	0	0	N	SCRRA train struck an unocupied vehicle on Newhall Siding
2	7/25/2022	0	2	N	SCRRA train struck an occupied vehicle at the Newhall Avenue grade crossing. Vehicle came to a stop on the tracks during activation.
3	6/20/2022	1	0	N	SCRRA struck a pedestrian at the Newhall Avenue grade-crossing. Pedestrian entered the track area during activation.
4	10/13/2020	0	0	N	UPRR train struck an unoccupied vehicle that was abandoned on the tracks.

Yr 2020 to 2024

- 4 incidents
- 2 injuries
- 1 fatality

Candidate location for Section 130 funds to eliminate hazards and enhance safety, based on:

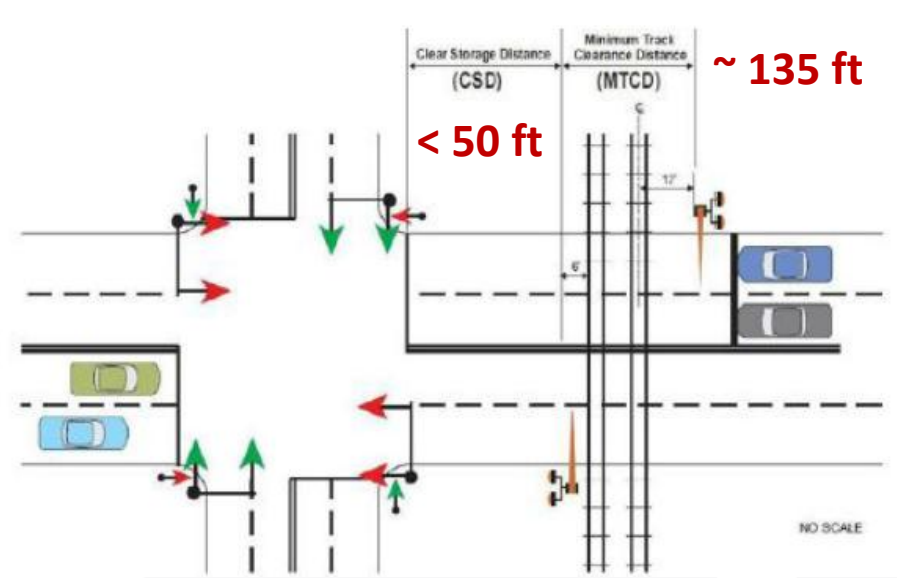
- Incident history
- Train and vehicle volumes
- Geometric configuration

Approach

Traffic Study

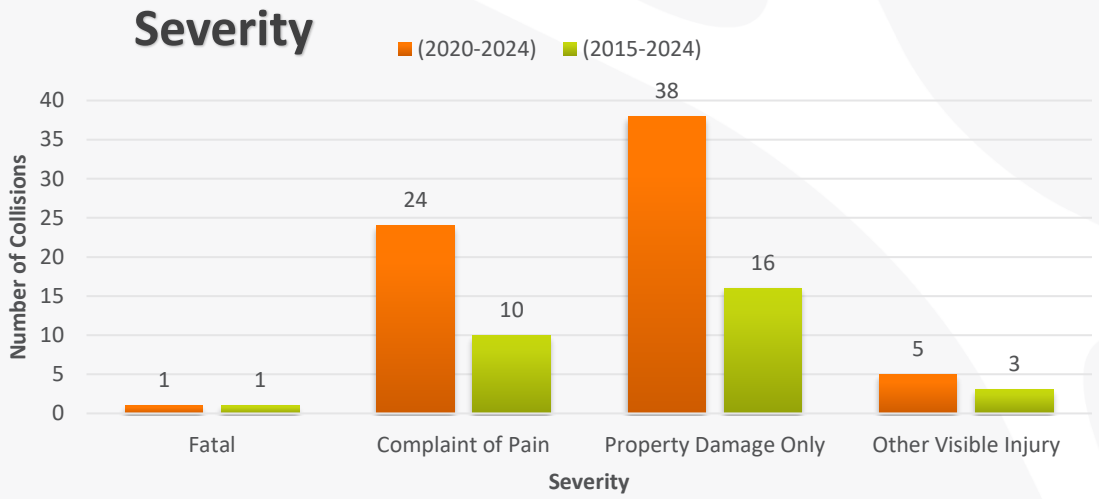
- Vehicles/Bike/Ped Counts
- Collision/LOS/Queue Analysis
- Railroad Signal Preemption

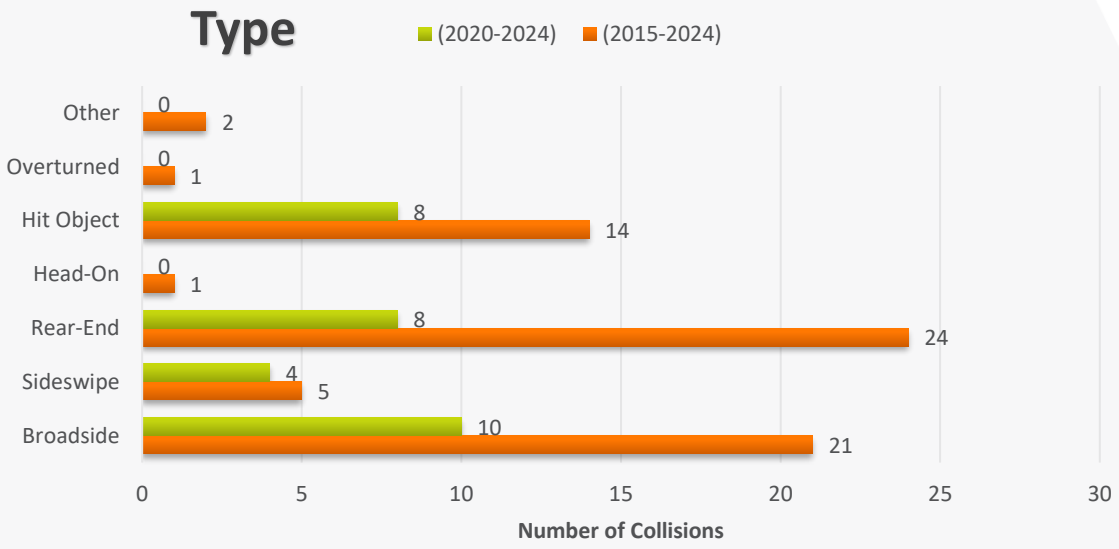
Civil/Signal/Signing/Striping Design



Clear Storage Distance	Application	Key Operational Characteristics
Less than 50–75 ft[a]	Relocated Stop Line with or without Pre-signal	• Relocate stop line to upstream of tracks • At the upper end of distance range, consider providing a pre-signal • Intersection signal timing plan should clear the CSD as well as the MTCD
50–75 ft to 200–250 ft[a]	Pre-signal	• Pre-Signal operates continuously in coordination with downstream traffic signal; should include green offset • Timing plan provides queue clearance time sufficient to clear the MTCD but vehicles may remain in CSD
200–250 ft to 450–500 ft[a]	Hybrid Pre-signal/ Queue-Cutter	• Hybrid pre-signal operates continuously in coordination with downstream traffic signal; should include green offset • Timing plan provides queue clearance time sufficient to clear the MTCD but vehicles may remain in CSD • Hybrid pre-signal should have queue detection to extend the duration of the red interval until an adequate downstream gap exists • Queue-cutter signal generally operates independently of downstream traffic control signal for queue prevention on crossing in off-peak periods to reduce unnecessary signal cycling

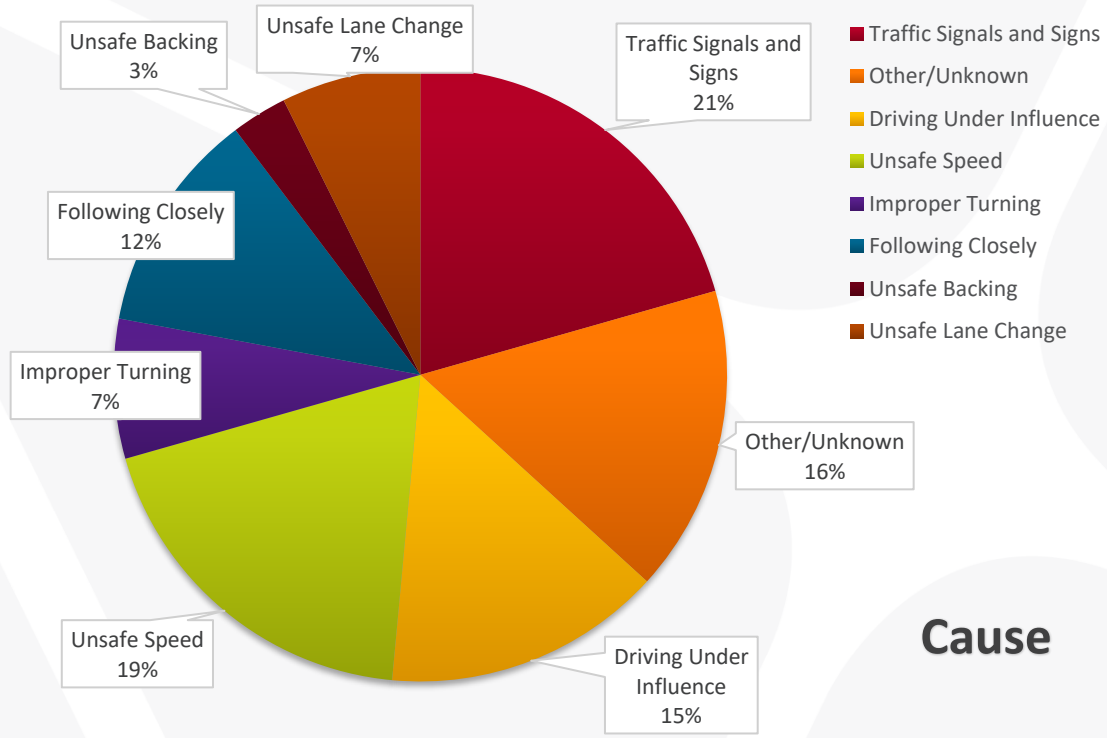
Intersection Traditional Safety Evaluation





Railroad Ave/ Newhall Ave Intersection

- 68 crashes in 10 years; 30 in 5 years
- 1 fatality
- 35% Rear-end crashes
- 31% Broadside crashes
- 21% Signal/sign related crashes



Cause

Traditional Safety Evaluation

Crash history shows what happened.

Not what ALMOST happened.

AI-Based Safety Analytics

Seven consecutive days of:

- 24-hour video collection
- Automated object tracking
- Conflict identification
- Vehicle trajectory analysis
- Key Metric
  - Post Encroachment Time (PET)
    - Time between one road user leaving a conflict point and another reaching the same point
    - PET ≤ 1.5 seconds = Critical Near-Miss *(Industry Standard)*

TRANSOFT SOLUTIONS

VERALYTIX PULSE

Advanced AI technology that proactively detects dangerous road interactions, enabling prediction, diagnosis, and informed decision support.

AI detection → trajectories → PET

Near-Miss Analysis

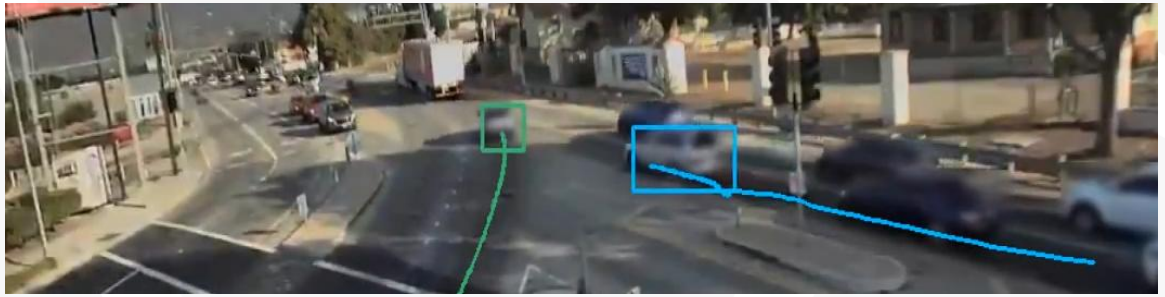
- Leverage data to identify potential collisions
- Aggregate trends over a larger time period
- Catch near miss instances at all hours of the day

Southbound vehicle runs a red light at the end of green, nearly missing an eastbound vehicle

Eastbound Newhall Avenue queues back up to the study intersection, with a westbound vehicle nearly missing a southbound vehicle queued in the intersection

Westbound vehicle runs a red light at the end of green after southbound traffic has started moving

Southbound cyclist runs a red light, nearly missing eastbound and westbound through vehicles



Southbound vehicle runs a red light at the end of green cycle.

Near-Miss Analysis

Southbound vehicle runs a red light at the green cycle

Southbound vehicle runs a red light at the end of green cycle

Southbound vehicle runs a red light at the green cycle

Southbound vehicle runs a red light after westbound traffic has started moving

Near-Miss Analysis

Near-Miss Analysis Take-Aways

- The safety issue was not random, and not an isolated violation problem.
- The conflicts showed a repeatable behavioral and recurring operational pattern.
- These observations occurred throughout the study period across multiple days.
- Queueing was creating safety risk—not just delay.

Why this was valuable?

Traditional crash review:

No crash → No police report

AI review:

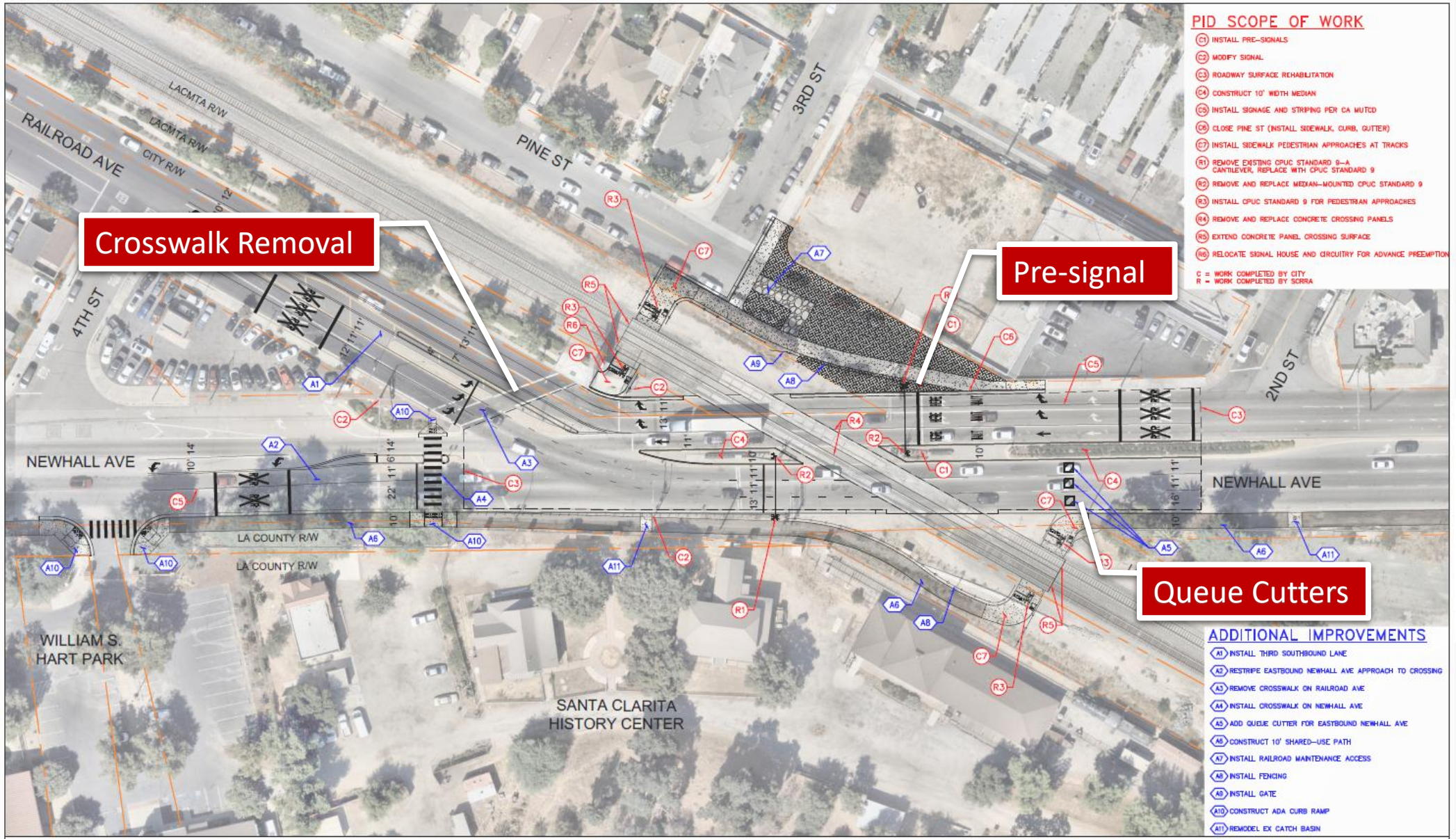
Large amount of data → Conflict identified → Severity quantified

Recurring Factors

1. Queue Spillback
   - Vehicles trapped in or near the intersection
2. Railroad Preemption
   - Limited storage and constrained recovery after train events.
3. Skewed Geometry
   - Unusual driver expectations and visibility challenges
4. Signal Visibility
   - Southbound driver compliance concerns associated with the approach geometry

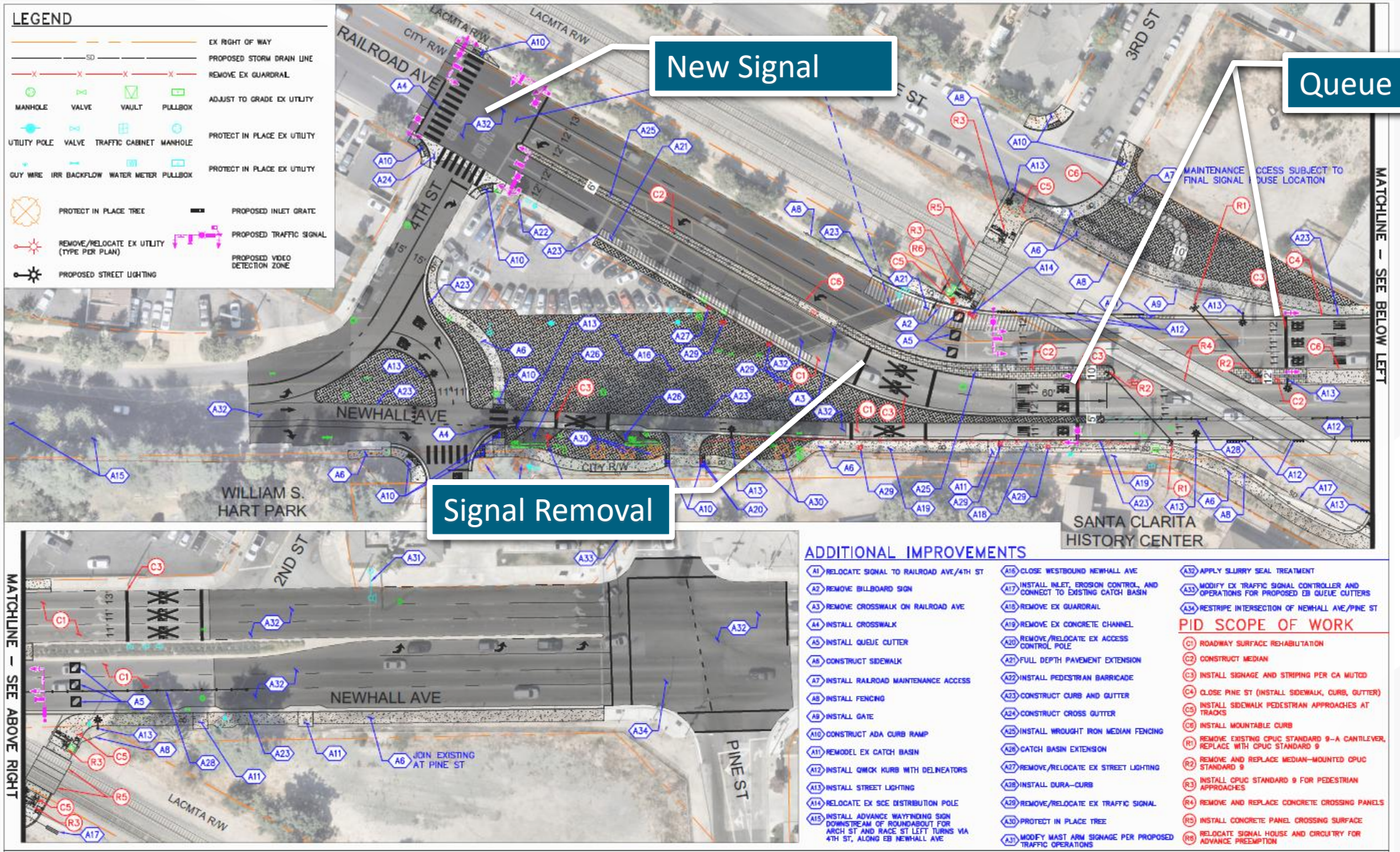
Project Recommendations

Conventional



Project Recommendations

AI-Derived Conflict Data



Kimley»Horn

Expect More. Experience Better.

Crashes are the lagging indicator of safety. Near-misses are the leading indicator. AI allows us to measure those risks and provide quantifiable data to support our engineering recommendations.

Thank You!