City and County Engineers Association

Signal Synchronization and Safety Adaptive: Enhancing Traffic Safety on PCH

Luncheon Presentation – March 5, 2026

Kimley»Horn

Team Introduction

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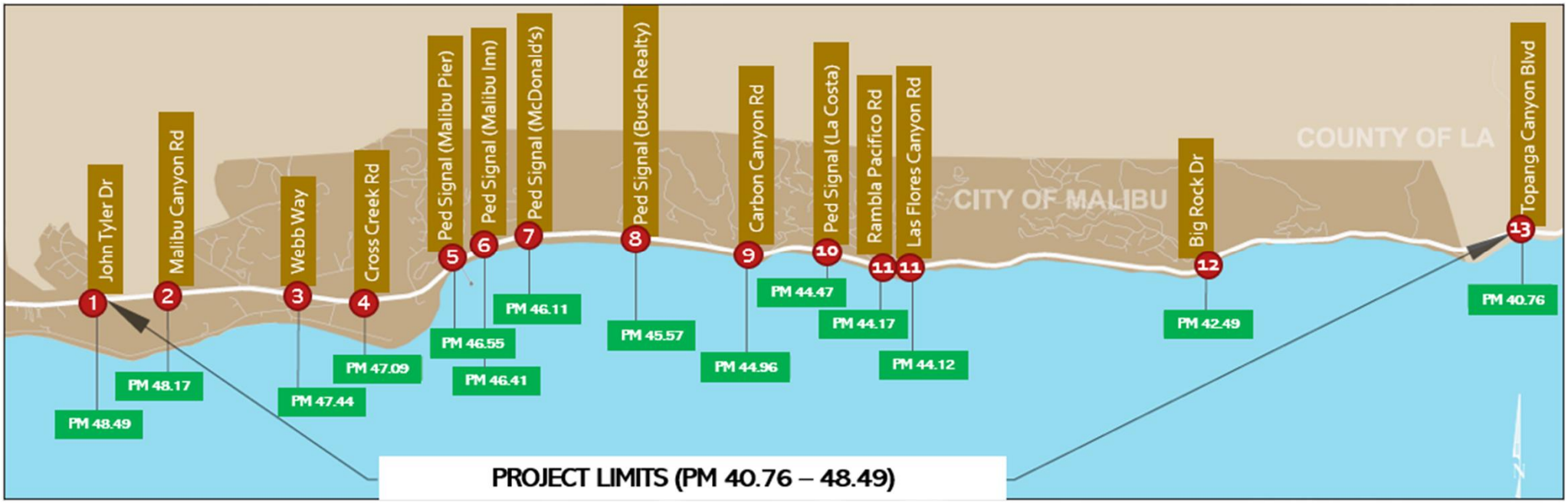
Malibu: What You Think You Know

Malibu: The Reality

SAFETY ADAPTIVE SIGNAL SYSTEM:
Enhancing Traffic Safety on PCH

PROJECT OVERVIEW

- SR-1/PCH from John Tyler Dr to Topanga Canyon Blvd
- Approximately 8 miles with 13 signalized intersections



SAFETY ADAPTIVE SIGNAL SYSTEM:
Enhancing Traffic Safety on PCH

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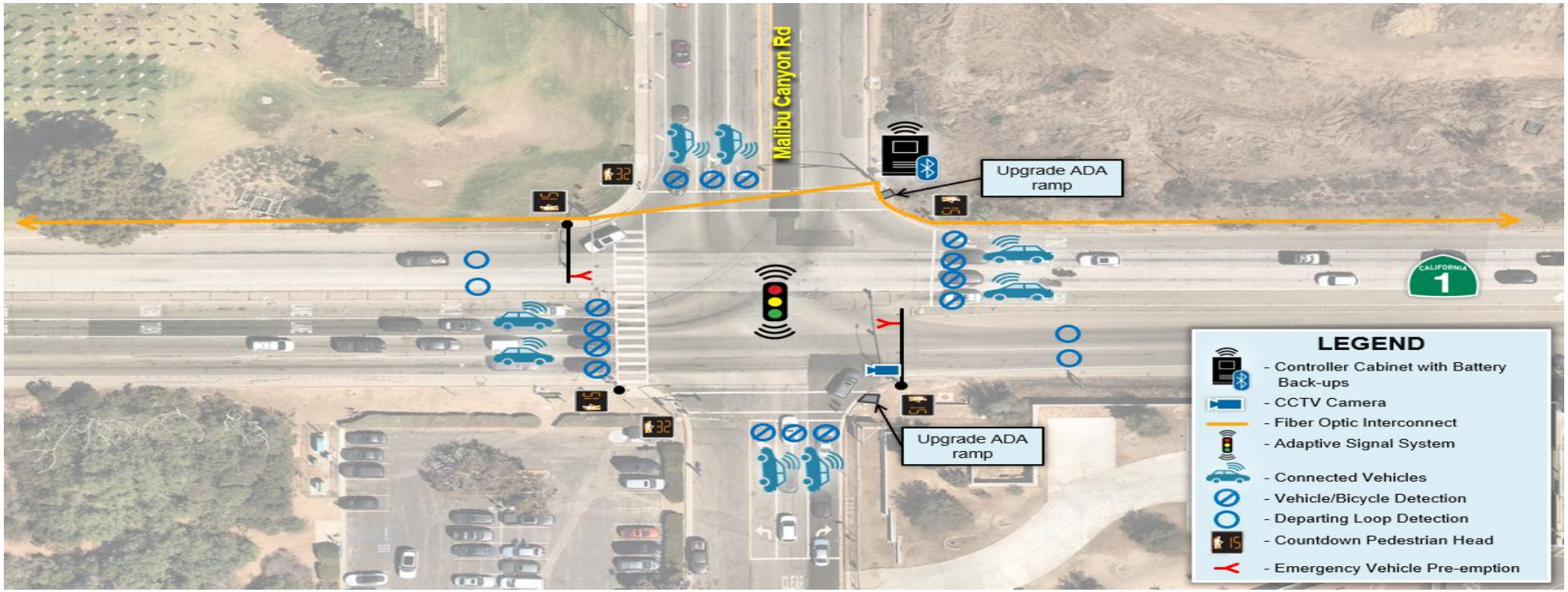
PROJECT OVERVIEW – INTERSECTION ENHANCEMENTS

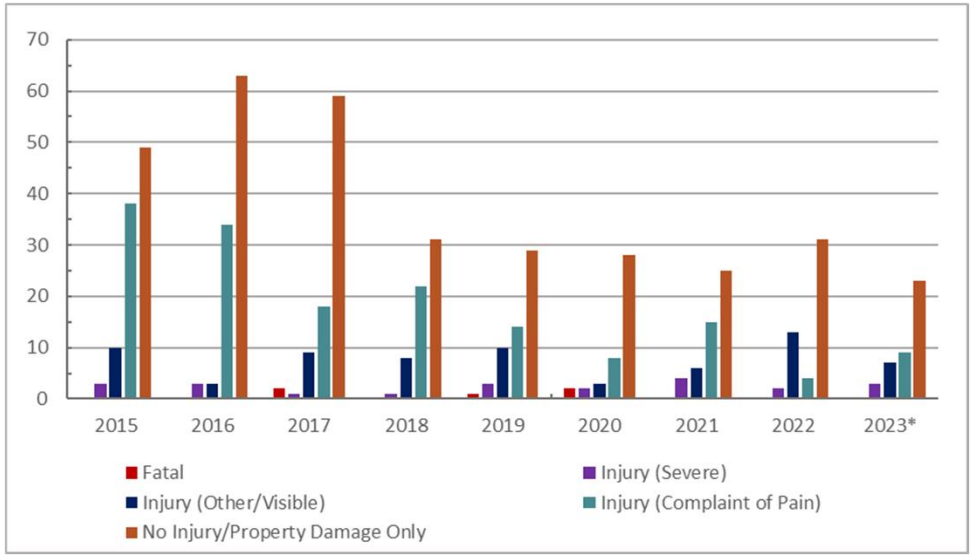


PROJECT OVERVIEW – INTERSECTION ENHANCEMENTS

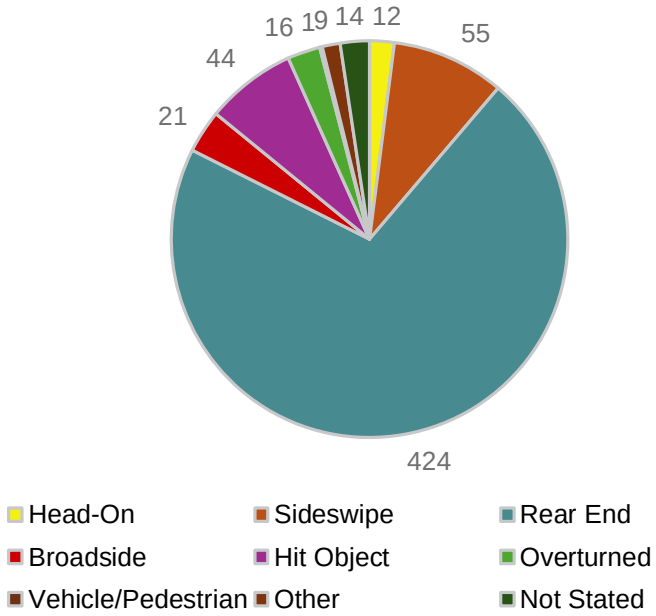
THE CITY OF MALIBU – SAFETY ASSESSMENT

PCH Speed-Related Collisions by Year	
Year	Number of Collisions
2015	100
2016	103
2017	89
2018	62
2019	57
2020	43
2021	50
2022	50
2023*	42
Total	596

PCH 2015-2023 Speed-Related Collisions by Type



PCH 2015-2023 Speed-Related Collisions by Cause



Source: SWITRS
*2023 data is provisional

SAFETY ADAPTIVE SIGNAL SYSTEM:
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THE CITY OF MALIBU – SAFETY ASSESSMENT

SAFETY ADAPTIVE APPROACH

What factors contribute to an unsafe corridor?

1. Driver behavior:
    1. Distracted drivers
    2. Impaired drivers
2. Corridor characteristics:
    1. Conditions that facilitate excessive speeding – wide roadways, high speed limits, light traffic, sparsely spaced intersections, good signal timing
    2. Visibility – most pedestrian fatalities occur at night
    3. Proximity to high-volume pedestrian areas (e.g. schools, malls, venues, etc.)

SAFETY ADAPTIVE APPROACH

How much does excessive speeding contribute to an unsafe corridor?

(Source: Portland.gov - Top Contributing Factors to Traffic Deaths).

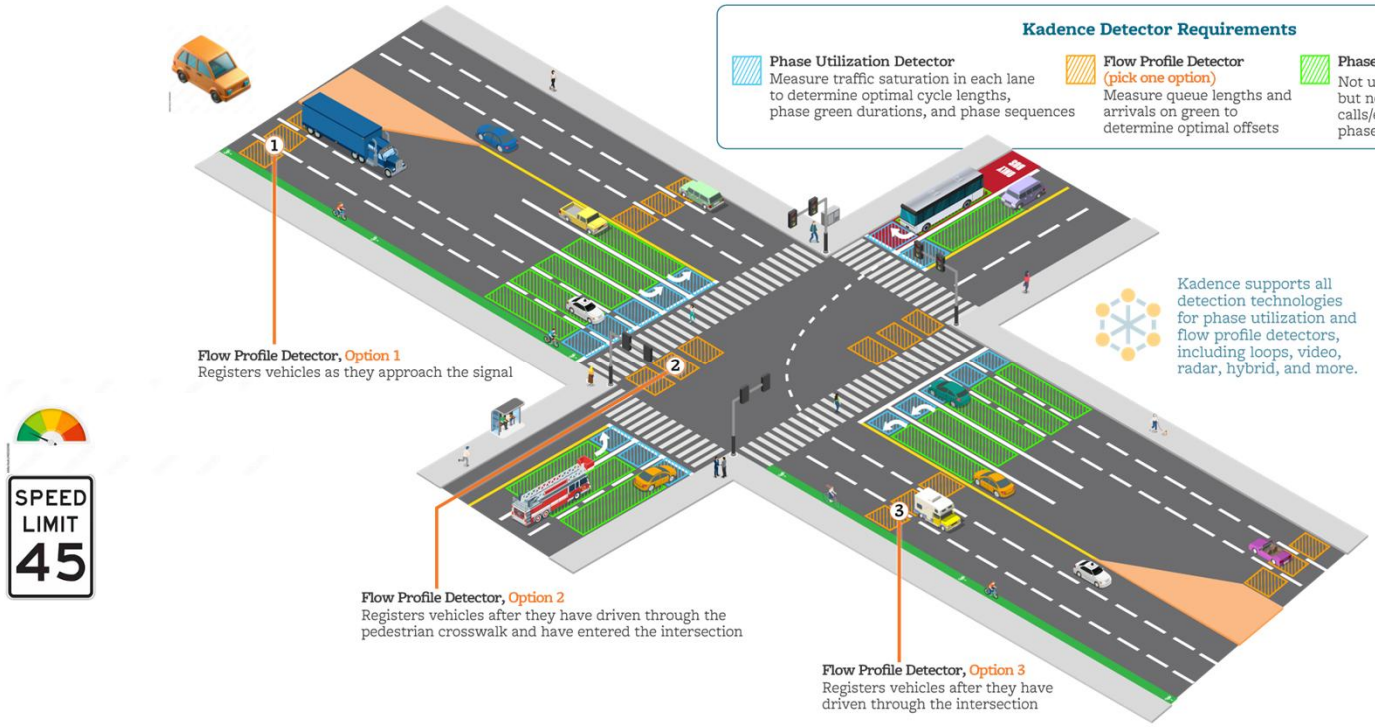
SAFETY ADAPTIVE APPROACH

What is *"Safety Adaptive"*?

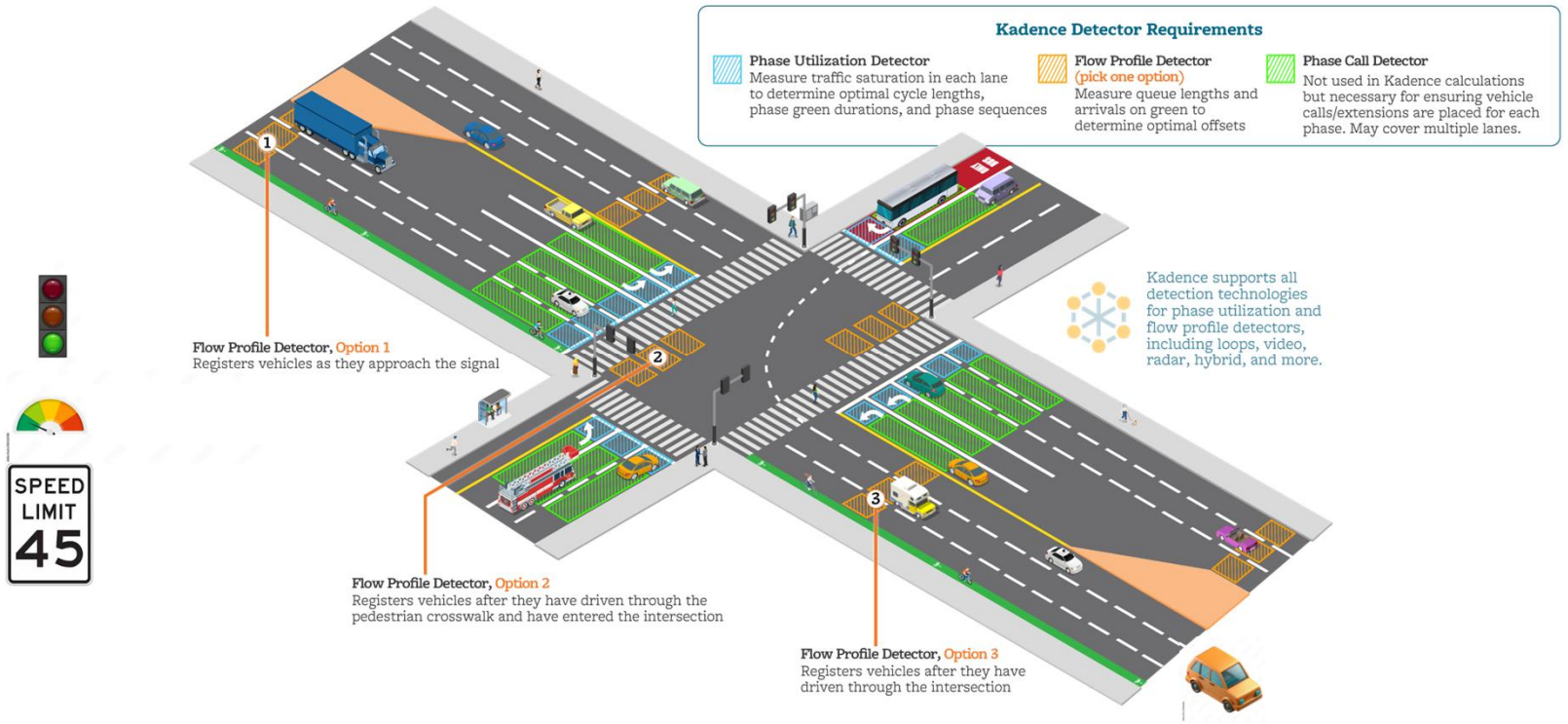
Technology designed to take real-time vehicle speeds as an input and, when unsafe driving conditions (i.e. motorists speeding) are detected, adjust the signal timings to stop motorists at more red lights until the unsafe condition is no longer detected.

This allows you to effectively have a "dynamic speed bump" on major roadways that only activates when you need it.

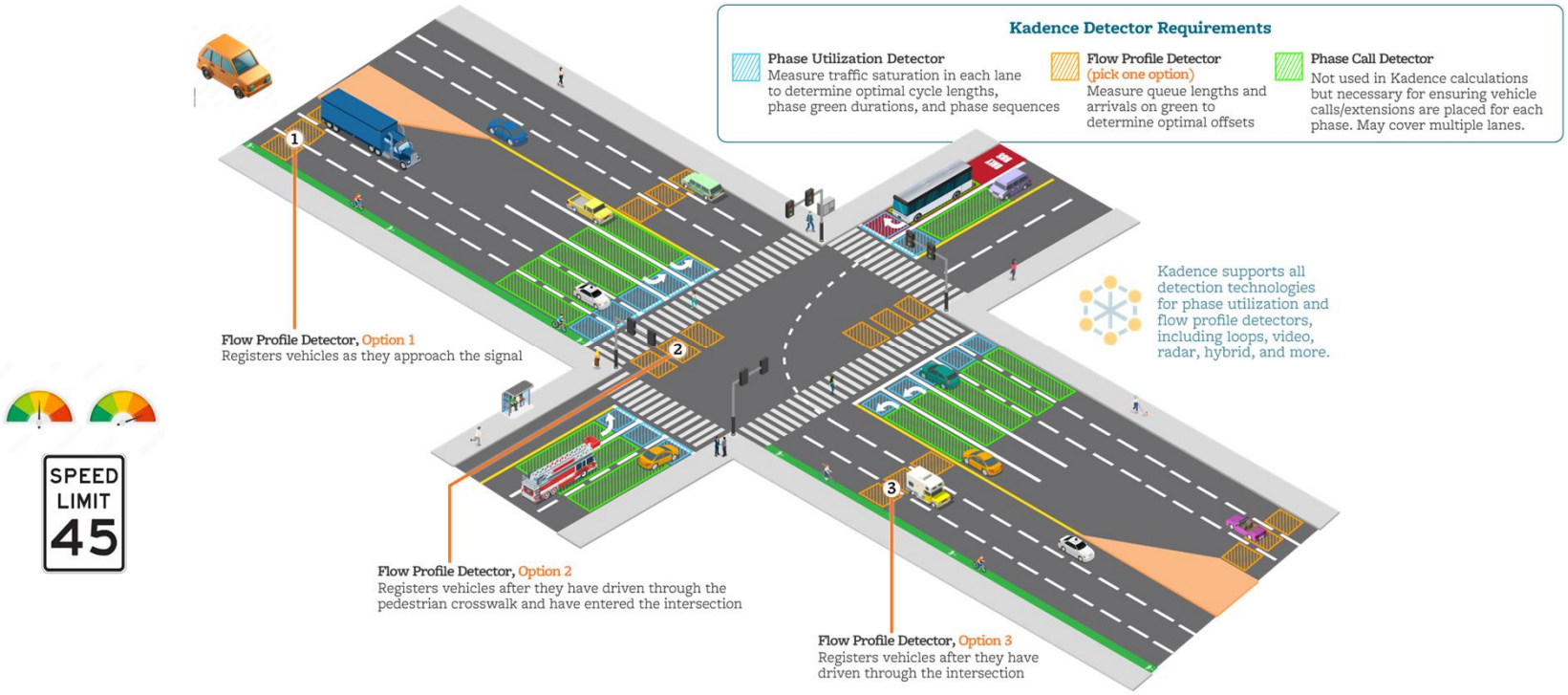
TRADITIONAL ADAPTIVE APPROACH



TRADITIONAL ADAPTIVE APPROACH



SAFETY ADAPTIVE APPROACH



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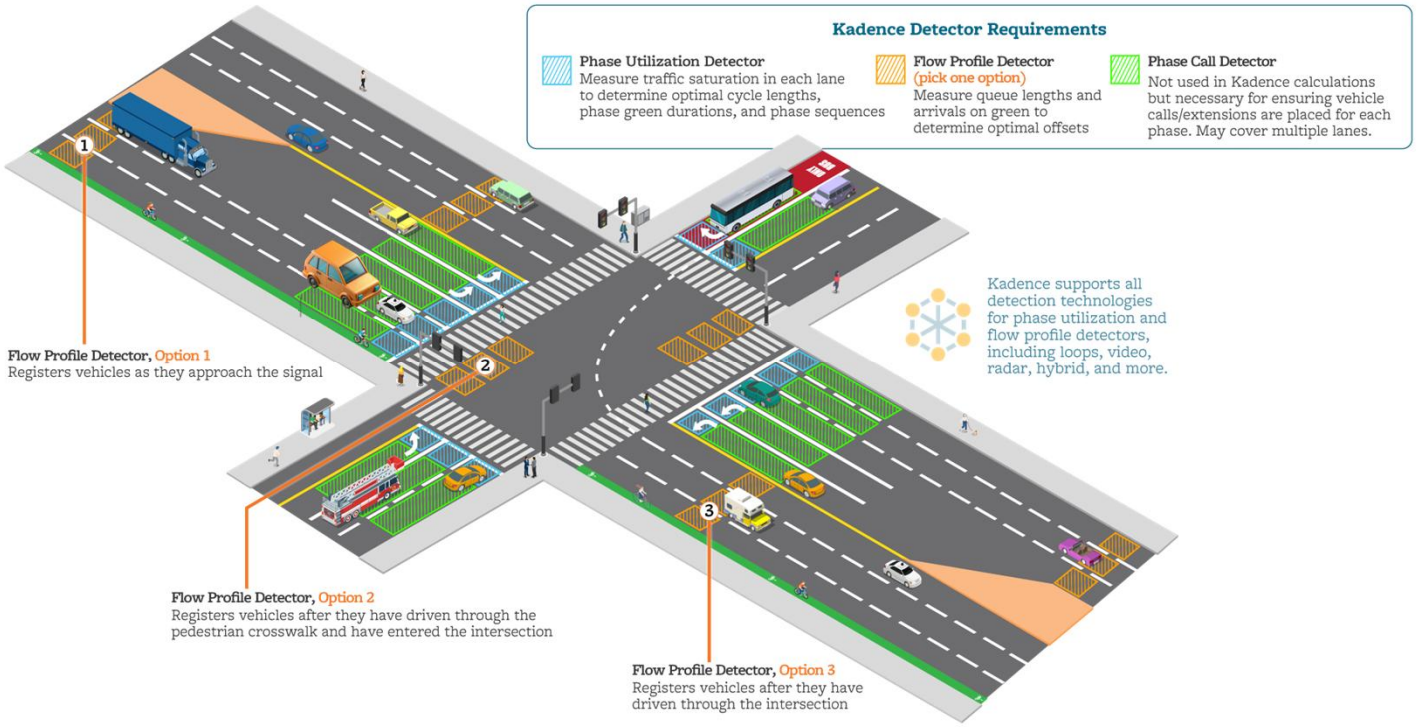
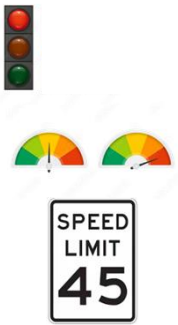
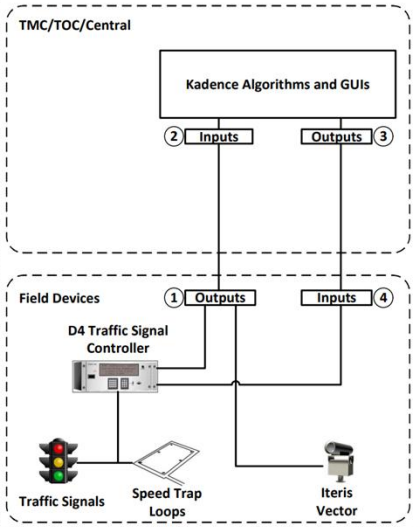




SAFETY ADAPTIVE SIGNAL SYSTEM:
Enhancing Traffic Safety on PCH

Kadence Safety Adaptive Process Flow

Malibu PCH



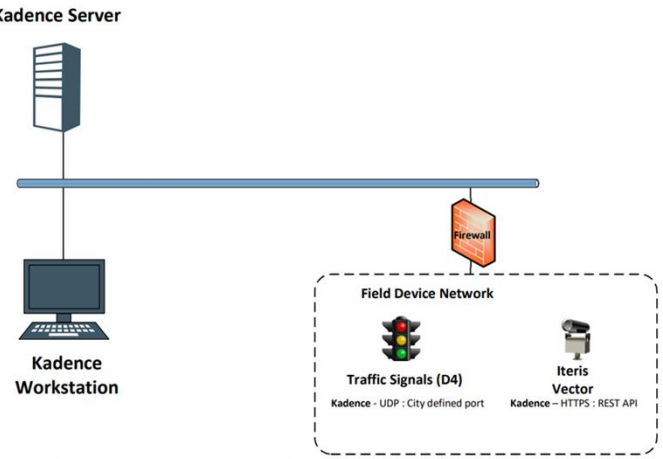
Process Steps

1. D4 traffic signal controller sends second-by-second detector and phasing info + minute-by-minute binned vehicle speeds from speed trap loops to Kadence. Iteris Vector Camera sends minute-by-minute binned vehicle speeds to Kadence.
2. Kadence receives the phasing and detector data from field devices and the safety adaptive algorithm processes data to determine appropriate timing and safety optimizations.
3. Kadence safety adaptive algorithm generates timing plan optimizations designed to either improve traffic flow or, if unsafe speeding is detected, increase the occurrence of red lights. These optimizations are typically generated every 3 cycles (e.g. ~4-6 minutes).
4. Kadence sends the new optimized timing to the traffic signal controller and initiates a central command to make the controller run this plan.
1. The process repeats starting again at step 1.

Prepared by:
Kimley»Horn
Aug 2025

Kadence Safety Adaptive Network Diagram

Caltrans Network



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PCH SAFETY - WHAT'S NEXT?

AUTOMATED SPEED ENFORECEMENT CAMERAS

QUICK BUILD ROUNDABOUTS

SAFETY ADAPTIVE SIGNAL SYSTEM:
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LAS FLORES INTERSECTION SAFETY IMPROVEMENTS

THANK YOU,

QUESTIONS?