

# CURVE WARNING SOLUTIONS



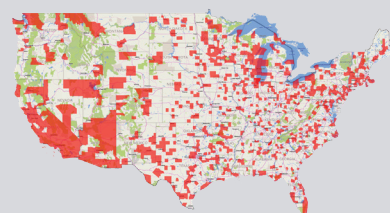




As an industry-leading innovator, TAPCO manufactures, services and distributes a wide portfolio of traffic and parking safety solutions designed to increase safe travels for all. Since 1956, we have set the standard for delivering reliable, cutting-edge traffic safety enhancements. From our world-renowned line of LED-enhanced BlinkerSign® solutions to our pedestrian crossing products and early detection warning systems, safety is at the heart of all TAPCO innovations.

### Generations of Expertise

Working alongside traffic professionals for more than 60 years gives our team an exclusive perspective on the past, present and future needs of the traffic and parking safety industry.



### A Nationwide Reach

With successful solution installations throughout all 50 states, we understand the safety concerns communities face across the nation.

### Innovative, Smart City Technology

Our mission is to continue to lead the industry with an innovative, customer-focused approach that evolves with the technological demands of our customers.



### Award-Winning Mindset

At TAPCO, we take pride in establishing and maintaining our innovative culture.

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## The Highway Curve Problem

Highway curves are few and far between, yet they account for 25 percent of all highway fatalities in the United States. Considered one of the most dangerous highway segments drivers encounter, highway curves produce an average crash rate three times that of other highway segments — leaving traffic professionals responsible for mitigating the contributing factors.

## Common Horizontal Curve Crash Factors

### Roadway Departure



Seventy-five percent of highway curve-related fatal crashes include a single vehicle departing the road and striking fixed objects or overturning. Keeping vehicles on the road is critical to minimizing fatal crashes, especially in instances when poor road conditions are present.

### In-Curve Speeding



Reducing vehicle speeds from posted speeds to in-curve advisory speeds is necessary for drivers to carefully navigate the length of the curve.

### Driver Awareness



Immediate curve recognition is essential for drivers – particularly those unfamiliar with the approaching trajectory – to anticipate a change of direction and not veer off the road.



# SYSTEM OVERVIEW

## CURVE WARNING SOLUTION

Reduce horizontal curve crashes by 58% with the TAPCO Dynamic Curve Warning System\*. Uniquely engineered to fit the contours of any dangerous curve, the system is proven to increase driver awareness, reduce speeds and keep drivers on the road.

Maximizing safety of a curve and reducing roadway departures is crucial in a variety of applications:

- Two-lane rural highway curves
- High-speed, multi-lane expressway curves
- Obstructed view highway curves
- Highway off- and on-ramps with tight radii

### PROVEN RESULTS

System technology recommended by FHWA for 30% reduction in vehicles exceeding curve advisory speeds more than 15 mph†

### SYSTEM FLEXIBILITY

Solar power capability allows for installation in any environment

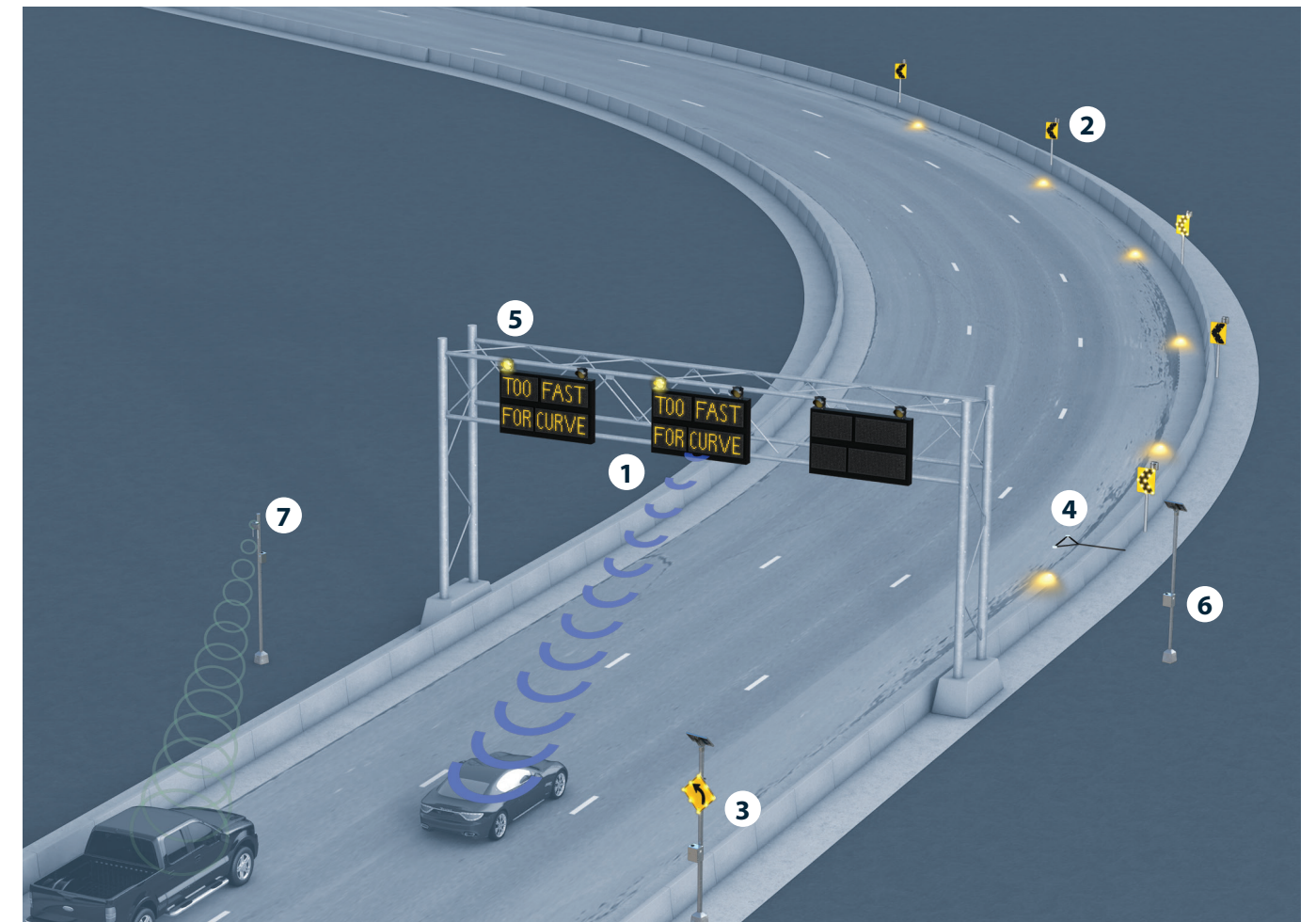
Multiple activation methods available:  
 Vehicle-activated  
 Dusk 'Til Dawn  
 24/7 alert



# SYSTEM OVERVIEW

## CURVE WARNING SOLUTION

- 1 ACTIVATION SENSORS**  
System activation is triggered by radar sensors based on predetermined criteria: presence, speed or speed with vehicle classification.
- 2 WARNING ALERTS**  
Command drivers' attention with Standard BlinkerChevron™ or Ruggedized BlinkerChevron™ warning alerts to communicate the change in direction.
- 3 ADVANCED WARNING ALERTS**  
Placed in advance of a curve, a BlinkerSign® or BlinkerBeacon™ notifies drivers of the curve ahead.
- 4 WEATHER SENSOR**  
Embed a sensor in the pavement to detect when conditions are unfavorable and the predetermined speed thresholds need to be adjusted.



- 5 MESSAGE BOARDS**  
Installed above the roadway, message boards warn drivers they are traveling too fast for the curve ahead.
- 6 BLINKLINK®**  
Remotely monitor system status and collect data, including activation and speed trends.
- 7 CONNECTED VEHICLE INTERFACE (CVI)**  
Integrate with connected vehicle infrastructure to send in-vehicle alerts to connected autonomous vehicles, notifying them of the curve ahead.



# SYSTEM ACTIVATIONS

## RADAR

Radar sensors are mounted ahead of a curve to detect approaching vehicles and trigger systems based on predetermined customizable criteria, alerting drivers of the danger ahead. These application-specific criteria prevent the system from becoming “white noise,” thereby increasing compliance and safety.



### VEHICLE PRESENCE

Triggers activation when vehicles are approaching the curve



### SPEED

Triggers activation when a vehicle approaching the curve exceeds predetermined speed threshold



### SPEED WITH VEHICLE CLASSIFICATION

Triggers activation when vehicles approaching the curve are exceeding the predetermined speed for their vehicles' classification



# SYSTEM ACTIVATIONS

## SCHEDULED

Dynamic Curve Warning Systems can be configured to flash based on preference, allowing you to customize the system to fit your community's needs.



### 24/7 OPERATION

The 24/7 flashing BlinkerChevron™ is always operating, making it a cost-effective first step to improve safety on interstates and at highly-trafficked curves

### DUSK 'TIL DAWN OPERATION

Using ambient light sensors, BlinkerChevron™ flashes during nighttime hours to enhance awareness

### TIME CLOCK

The programmability of the time clock provides traffic engineers with the ability to schedule system activation during specific timeframes



# WIRELESS COMMUNICATION

## BLINKERBEAM®

BlinkerBeam® wireless radios communicate system activation to all TAPCO warning alerts.

Placed at the detection location, a transmitter radio sends wireless signals upon system activation to receiver radios inside the control cabinet of each warning alert, triggering the alert to flash.



**BLINKERBEAM® WIRELESS RADIO**

Easy-to-read, backlit LCD display

Intuitive joystick for in-field control

Menu-driven diagnostics for quick setup and configuration

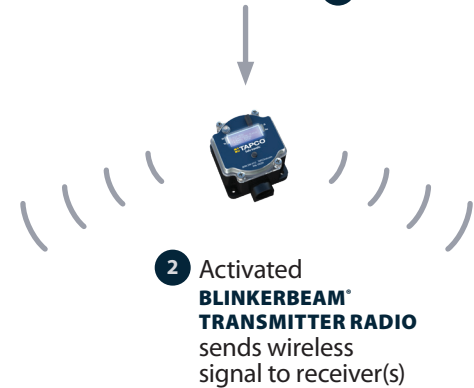
Three selectable power levels, up to one-watt, to increase signal distance

Range of up to 900 feet; works with multiple antenna options to extend distance

Utilizes 900 MHz frequency-hopping spread spectrum for reliable operation



**1 SYSTEM DETECTION**



**2 Activated BLINKERBEAM® TRANSMITTER RADIO sends wireless signal to receiver(s)**

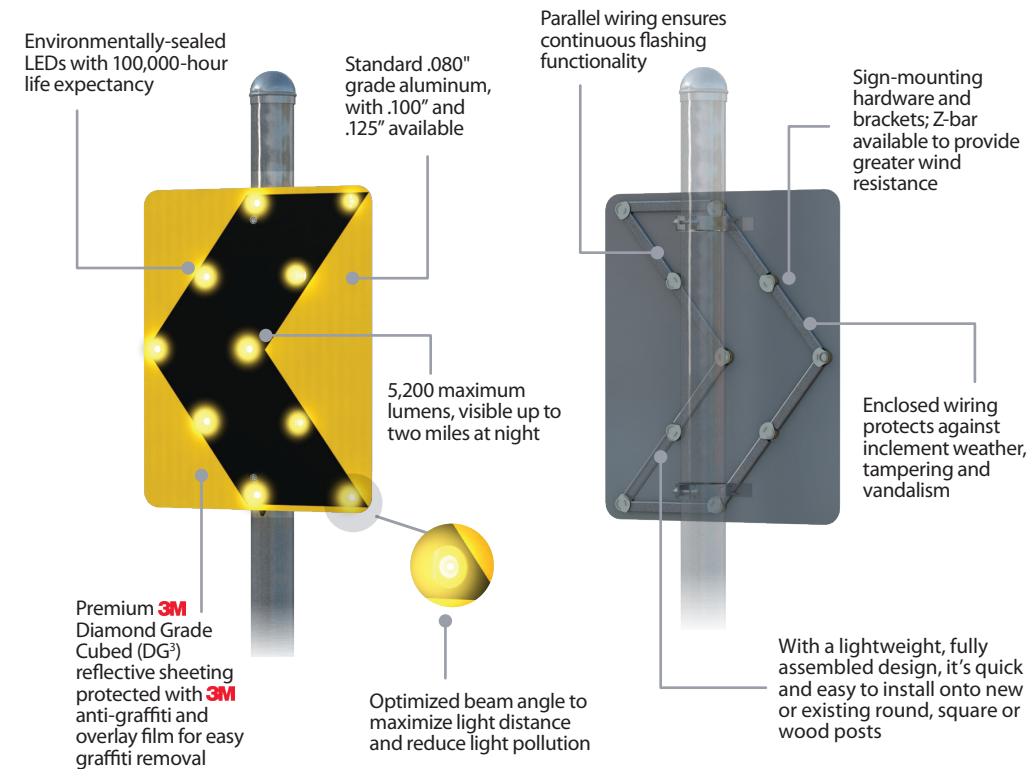


**3 BLINKERBEAM® RECEIVER RADIO(S) activate LED-enhanced warning alerts**

# LED-ENHANCED WARNING ALERTS

## BLINKERCHEVRON™ FLASHING LED SIGNS

BlinkerChevron™ Flashing LED signs are engineered to increase driver awareness day and night, safely guiding drivers through the length of the curve.



### MUTCD-COMPLIANT

Each BlinkerChevron™ is MUTCD-compliant and flashes in accordance with MUTCD section 2A.07

### HIGH QUALITY, MADE IN THE USA

Manufactured in Brown Deer, Wisconsin, each BlinkerChevron™ is engineered to withstand the harshest environmental conditions

### VARIABLE DIMMING

LEDs automatically dim based on ambient light, maintaining optimal LED output and extending system autonomy

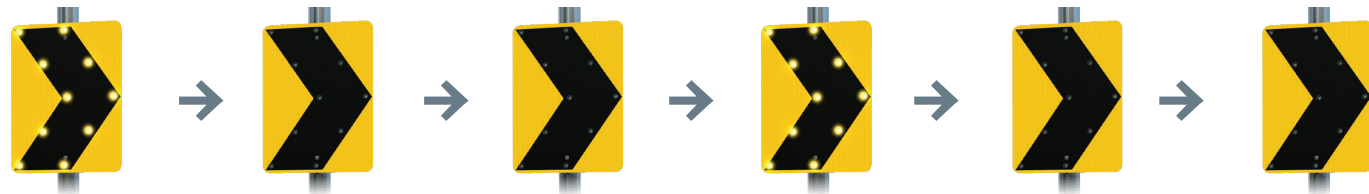




# SYSTEM CONFIGURATION

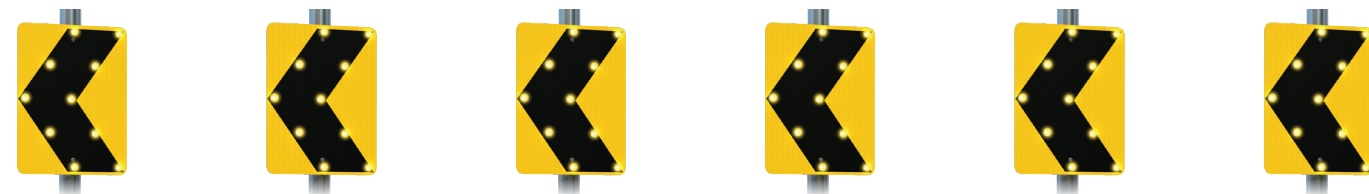
## FLASH PATTERN & ARRANGEMENT

### FLASH PATTERN



#### SEQUENTIAL

Delivers a pull-through effect, guiding the driver through the length of the curve. Best used for long, extensive curves.



#### SIMULTANEOUS

Flashes all chevrons in unison once the system is activated. Best used for quick, sharp curves.

### ARRANGEMENT



#### SINGLE-SIDED

Installed on roads where drivers travel in only one direction, such as interstates and highways.



#### DOUBLE-SIDED

Installed on roads where drivers travel in both directions, such as two-lane rural roads.

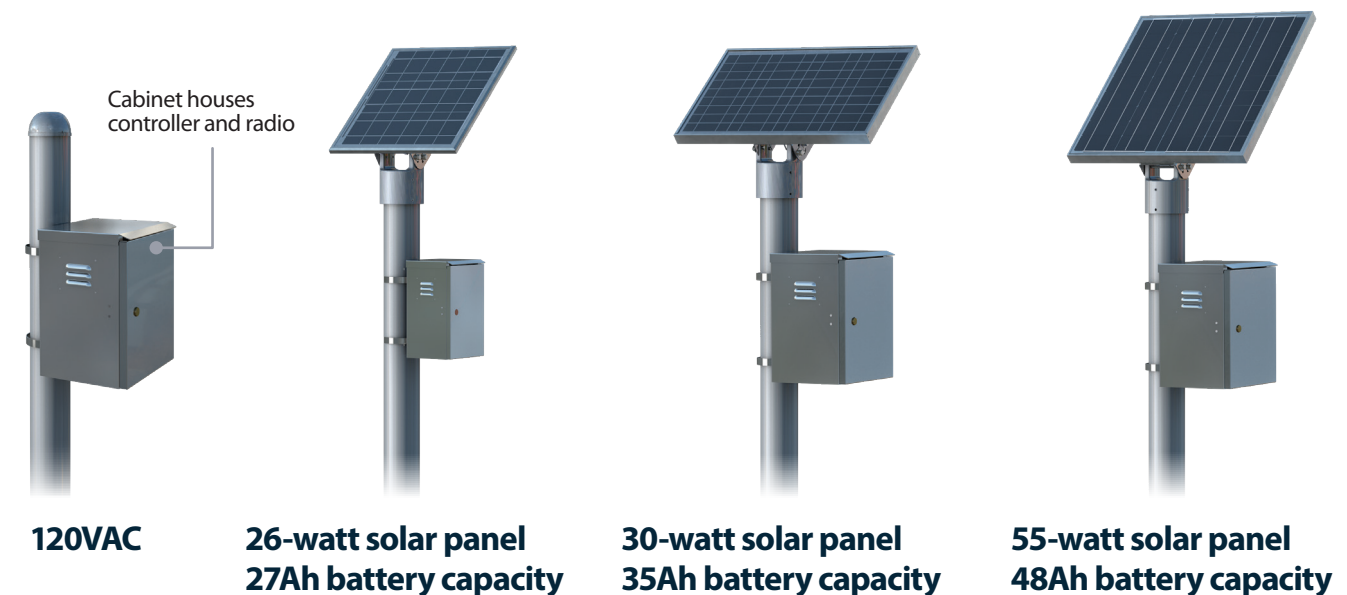
# POWER AND CONTROL OPTIONS

## FLEX POWER

Flex Power options provide flexible system configuration for multiple applications and power requirements while allowing easy access to control cabinets. Any TAPCO system can be designed to fit your power or environmental need.

### POPULAR POWER PACKAGES

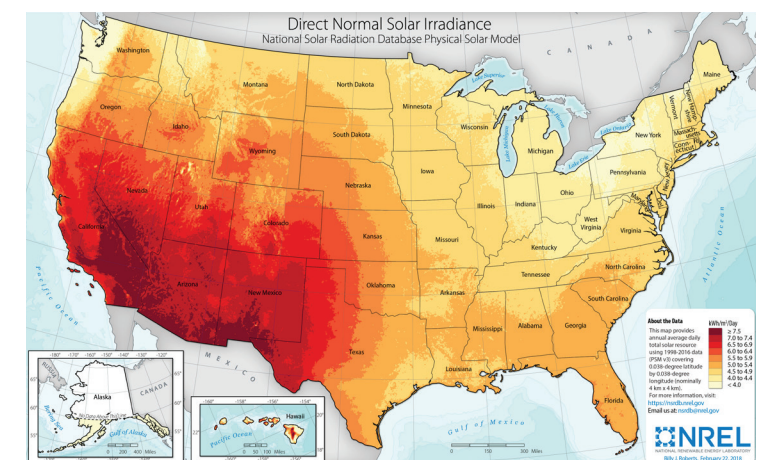
TAPCO offers many solar and AC power packages to choose from, including streetlight power. Some of the most popular are shown below, with other options available upon request.



### SOLAR REQUIREMENTS

Critical solar factors such as direct normal irradiance and global horizontal irradiance vary depending on system location. To ensure the right power configuration, we conduct solar calculations to optimize system power.

Call us today for a free solar consultation: **(800) 236-0112**





# POWER AND CONTROL OPTIONS

## 13W TOP-OF-POLE SELF-CONTAINED SOLAR CABINET

Uniquely designed using durable polycarbonate, TAPCO's new 13-Watt Top-Of-Pole Self-Contained Solar Cabinet is a lightweight option that can power Dynamic Curve Warning System.



### AUTONOMY CAPABILITIES

Up to 28Ah of battery power delivers autonomy up to 30 days

### COMPATIBLE

Supports BlinkerSign®, BlinkerChevron™ and BlinkerBeacon™ warning alerts without reducing LED and system performance

### COMPACT DESIGN

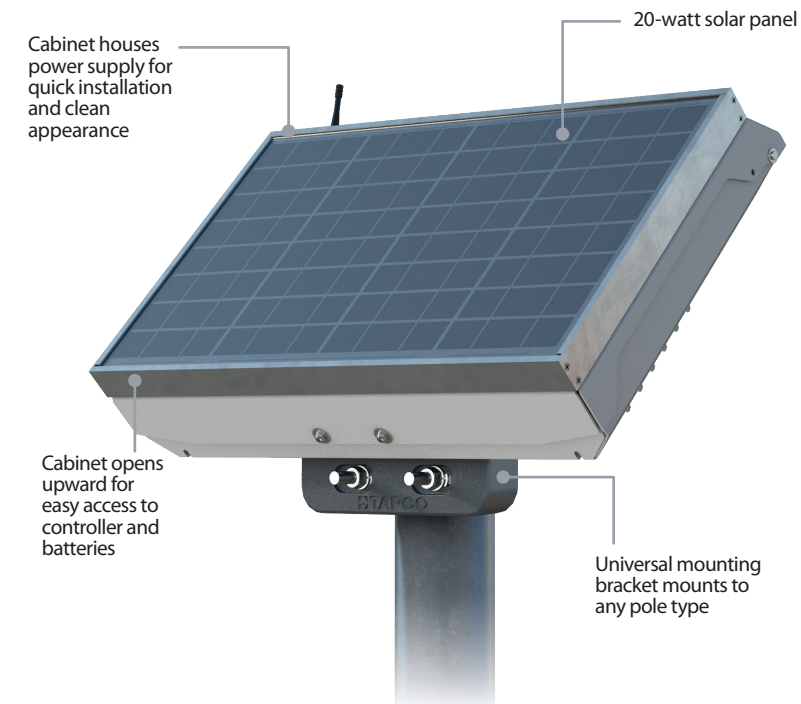
Weighs one-third as much as traditional cabinets for one-person installation



# POWER AND CONTROL OPTIONS

## 20W TOP-OF-POLE SELF-CONTAINED SOLAR CABINET

TAPCO's 20-Watt Top-Of-Pole Self-Contained Solar Cabinet provides power for Dynamic Curve Warning System in a discreet, powder-coated aluminum housing.



### INCREASED AUTONOMY

44Ah battery supports double-sided warning alerts or regions with limited insulation

### EASE OF ACCESS

Cabinet door opens for easy access and serviceability

### EASY TO INSTALL

Easily attaches onto new or existing posts and poles





# ENHANCEMENTS

## RUGGEDIZED BLINKERSIGN®

Extreme weather events can inflict severe damage on standard traffic signs. Reinforced with two additional layers of material, the Ruggedized BlinkerSign® is engineered to take on heavy winds, plowed or blowing snow, impacts and falling debris.

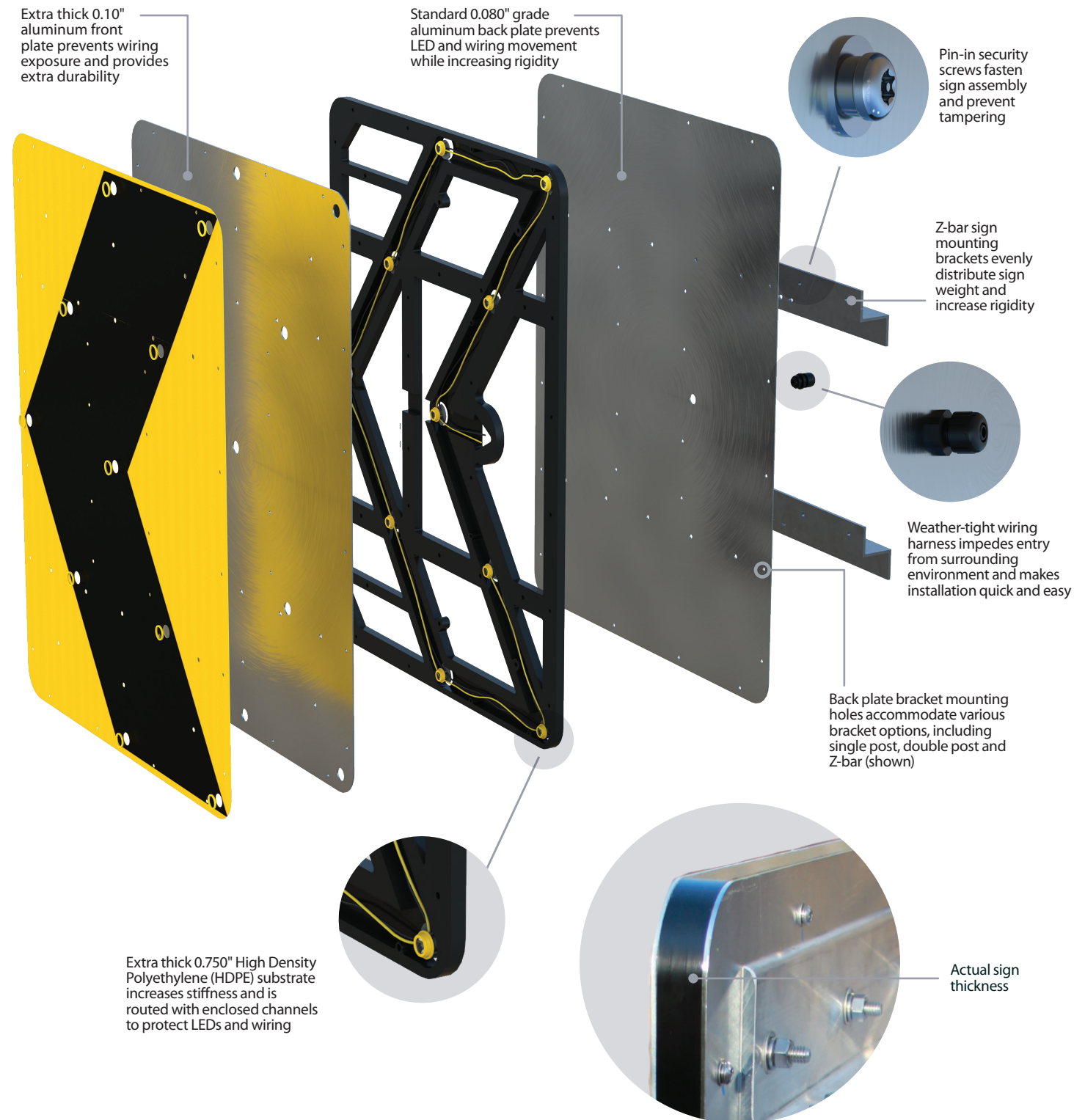
The legend on a Ruggedized BlinkerSign® can be customized to fit the application and is recommended in harsher environments such as:

- Coastal regions
- Hurricane-impacted regions
- High-speed curves
- Mountain passes
- Valley roads



# ENHANCEMENTS

## RUGGEDIZED BLINKERSIGN®





# ENHANCEMENTS

## ROAD WEATHER SENSOR & ADVANCE WARNING ALERTS



### ROAD WEATHER INFORMATION SENSOR (RWIS)

Precipitation sensor triggers system activation and adjusts speed threshold when unfavorable weather conditions are present based on predetermined specifications.



### ADVANCE CURVE WARNING ALERTS

Warn drivers of approaching changes in road trajectory. The advance curve warning alert can be programmed to flash at preferred times or be activated by approaching vehicles using a multitude of detection methods (see page 6-7).

# ENHANCEMENTS

## MESSAGE BOARDS

Similar to advance curve warning alerts, curve warning message boards can be programmed to flash at preferred times or activated by approaching vehicles. Ideal for multi-lane expressways, curve warning message boards utilize radar detection to identify vehicle speeds in each lane.



### BLANK OUT SIGNS

Display simple warning messages, clearly visible to drivers when they are traveling too fast for the curve.



### DYNAMIC MESSAGE BOARDS

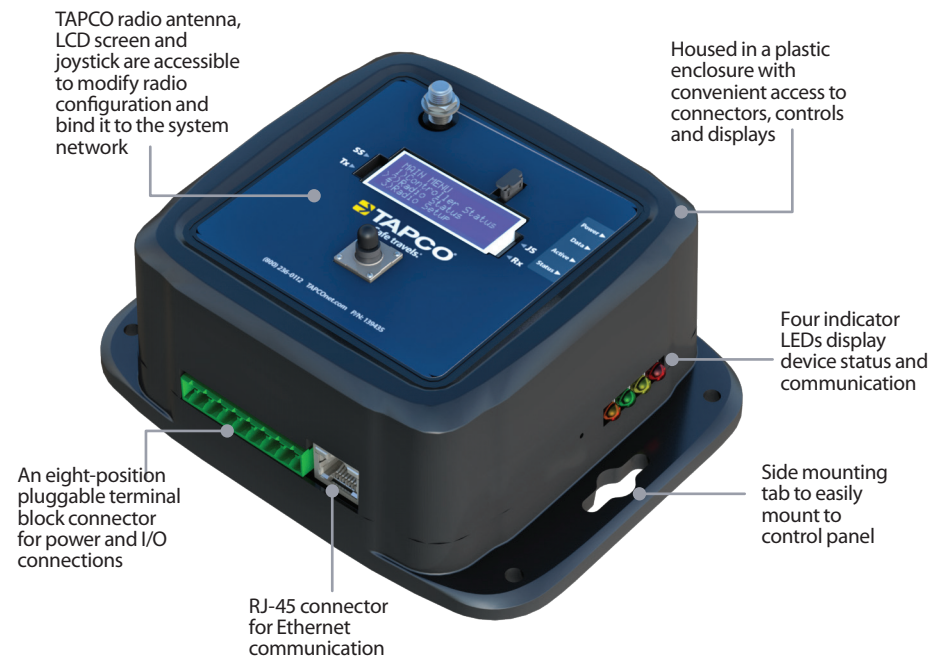
Provide en-route information that adjusts to a warning when drivers are traveling too fast for the curve.



# ENHANCEMENTS

## CONNECTED VEHICLE INTERFACE

Add another layer of safety to your curve warning solution with the Connected Vehicle Interface (CVI), an Ethernet interface for TAPCO Dynamic Curve Warning Systems to communicate information to connected vehicle infrastructure, such as typical Road Side Units (RSU).



### IN-VEHICLE ALERTS

Upon system activation, connected vehicles receive notifications through dashboard displays and other onboard devices

### NETWORK AGNOSTIC

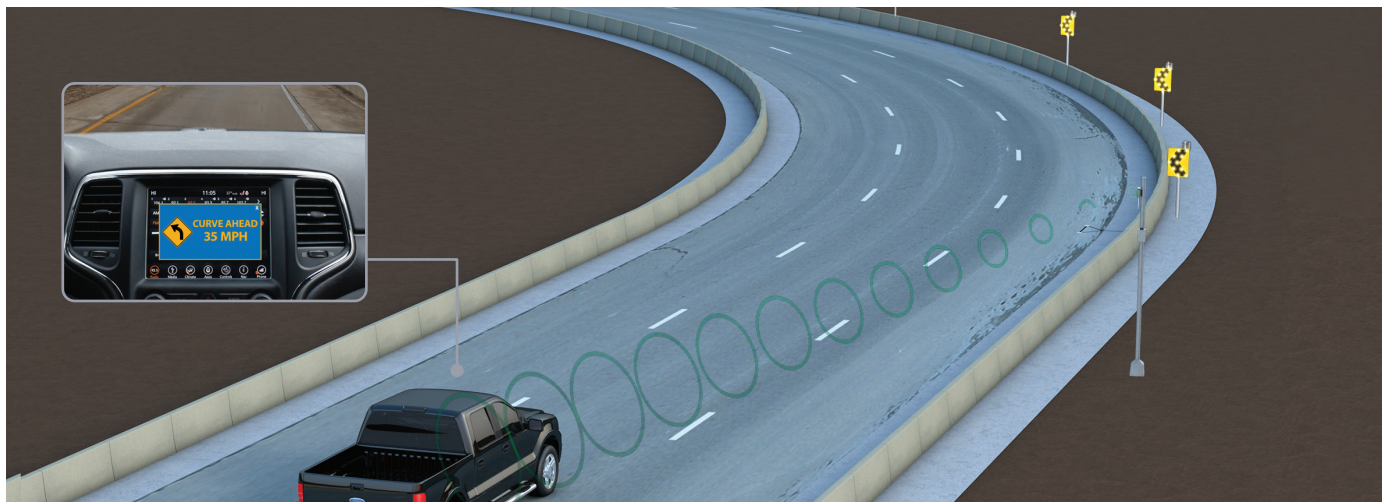
Transmits data via Dedicated Short-Range Communication (DSRC) or cellular RSUs

### ATMS INTEGRATION

Connects with Advanced Traffic Management Systems to provide traffic managers with actionable system data

### MODULAR

Can be added to existing or new TAPCO Dynamic Curve Warning Systems



# SMART CITY SOFTWARE

## BLINKLINK® POWERED BY TAPCO

### INTELLIGENT WARNING SYSTEM MONITORING FOR SMART CITY INFRASTRUCTURE

BlinkLink®, powered by TAPCO, is an easy-to-use, cloud-based software application for agencies to remotely manage and monitor their Intelligent Warning Systems.

Securely connected through reliable cellular networks, BlinkLink® collects real-time data and sends voice, email and SMS notifications to predetermined recipients.

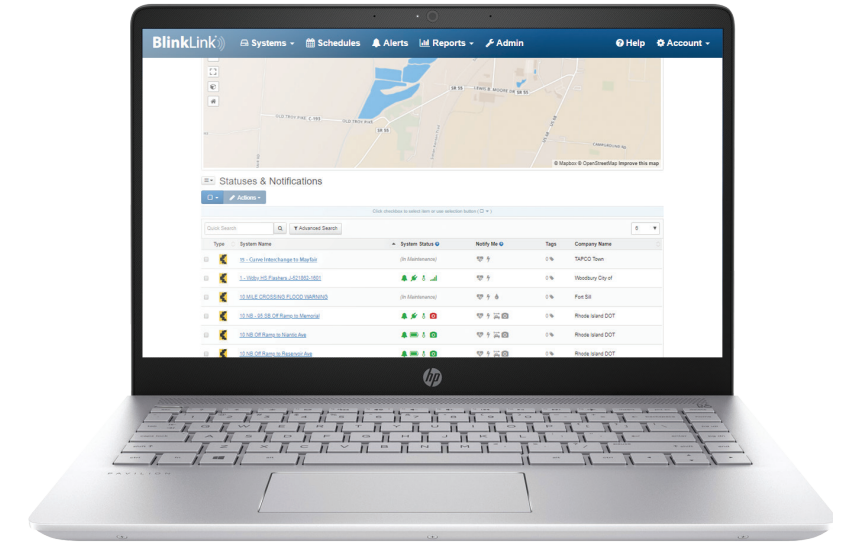
Access on any web-enabled device

Easily program and view the status of every system

Analyze system activation trends and gain insight about problem areas

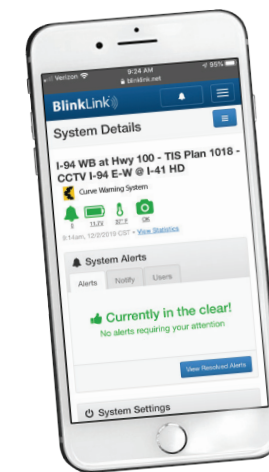
Keep your whole team informed through activation notifications

Generate custom activation reports

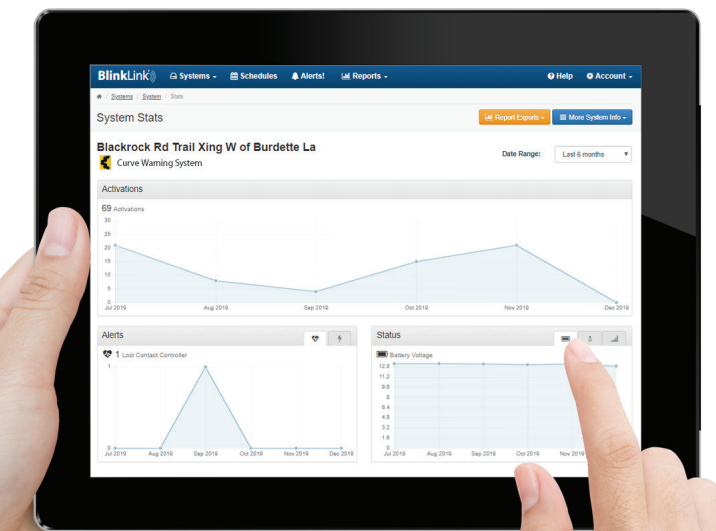


Collect real-time data, including activation trends

Provides officials with actionable insight by collecting system activation, vehicle classification and speed data



Remotely manage and monitor every IWS system





# PREVENTATIVE MAINTENANCE SERVICE CONTRACTS

Preventative Maintenance Service Contracts provide customers nationwide with the peace of mind that their curve warning solutions will perform optimally with the highest system uptime. From routine maintenance to complex diagnostic support, every contract is customized based on your labor and budgetary needs.

## POPULAR SERVICE CONTRACTS INCLUDE:

- On-site or virtual training of equipment and software
- Scheduled system maintenance
- System surveillance and monitoring
- Extended warranty coverage
- Emergency services, such as knockdown repairs and replacement part delivery
- Dedicated diagnostic support

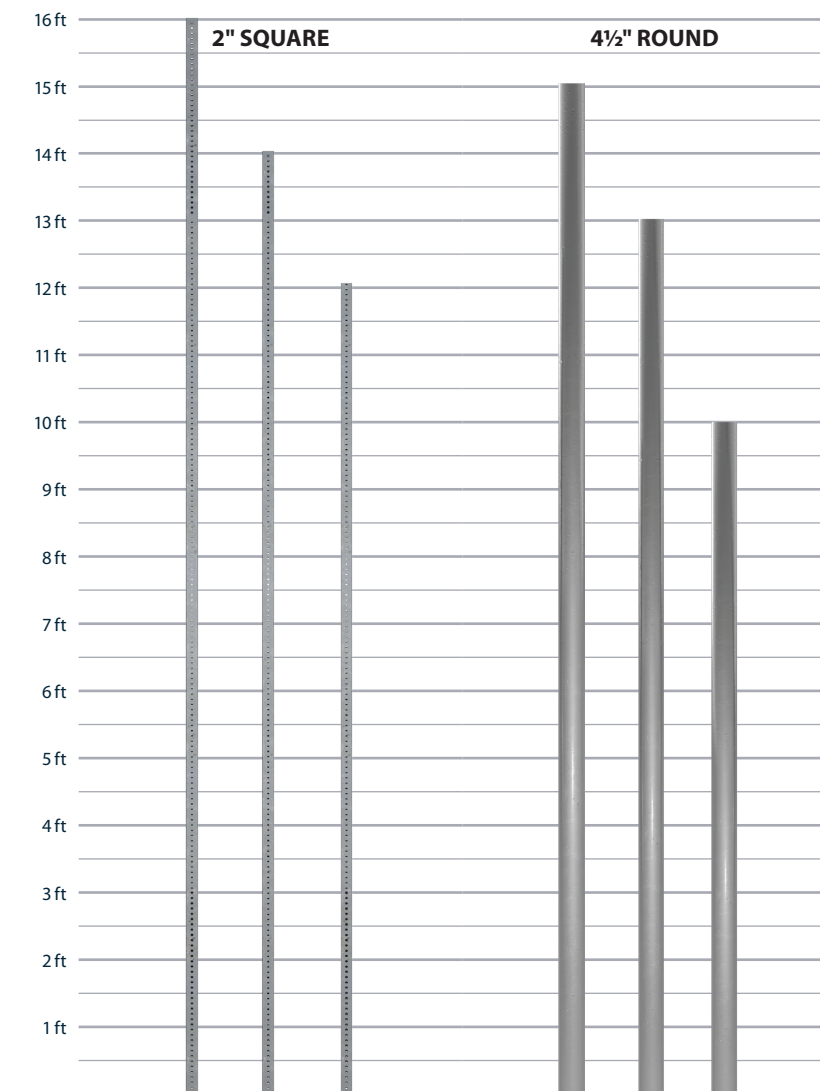
Want to learn more? Call us today to customize your contract: **(800) 236-0112**



# COMMON POLE KITS POLES & BREAKAWAY ANCHORS

## COMMON POLE KITS

Pole configuration plays a crucial role in the design of your Dynamic Curve Warning System. Below are some of our most popular options.



### 2" x 2" Square Post Kits

- Accommodates warning alerts only
- Includes: post height of choice, sleeve and assembly hardware
- Sign brackets and anchor sold separately

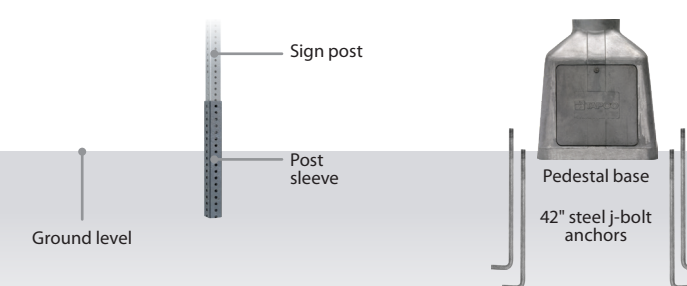
HEIGHT	PART NUMBER
12 ft	114401K
14 ft	138313
16 ft	138314



### 4 1/2" OD Round Pole Kits

- Accommodates warning alerts and sensors
- Includes: pole height of choice, pedestal base, 42" steel j-bolt anchors and assembly hardware
- 18" steel j-bolt anchors available
- Sign brackets sold separately

HEIGHT	PART NUMBER
10 ft	107889
13 ft	101919
15 ft	101920



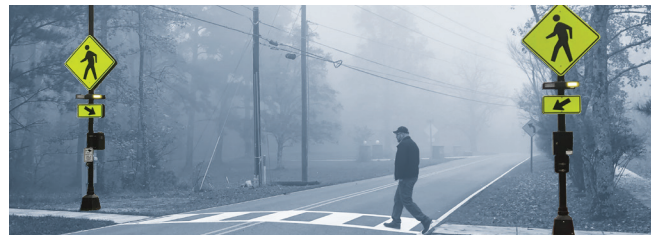
Additional poles, anchors and mounting options are available depending on weight loads, including 2 3/8", 2 7/8" and wood posts.



# TAPCO SOLUTIONS

## INTELLIGENT WARNING SYSTEMS

TAPCO designs comprehensive traffic solutions that improve mobility and safety for all road users.



**PEDESTRIAN CROSSWALK**



**WRONG-WAY ALERT**



**SPEED AWARENESS**



**SCHOOL ZONE WARNING**



**OVERHEIGHT WARNING**



**INTERSECTION CONFLICT WARNING**



**HIGH WATER WARNING**



**EMERGENCY VEHICLE WARNING**



**TAPCO**  
Safe travels.

(800) 236-0112

TAPCOnet.com

### SAVE TIME AND MONEY WITH OMNIA PARTNERS AND TAPCO

Did you know we offer an exclusive discount through our competitively solicited OMNIA Partners contract? Participating government and non-profit agencies that purchase direct from the contract receive the lowest available price and free shipping on our entire product portfolio.