



Visual Supplement for LightGuard Systems® In-Roadway Warning LightGuard (IRWL) Asphalt Installations



**When the Pedestrian Crossing Isn't Clearly Visible
The LightGuard Smart Crosswalk™ System Is...**

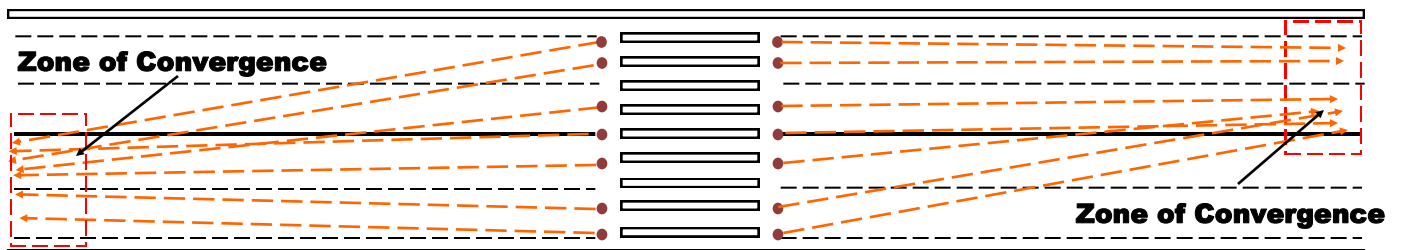
Copyright© 2016 LightGuard Systems, Inc. All Rights Reserved

2292 Airport Blvd. Santa Rosa, CA 95403 | Ph (707) 542-4547 | Fax (707) 525-6333

Step 1 Determine placement and site angles of in-roadway warning signals to intersect at optimum driver viewing zone as specified by Signal Alignment Diagram (See Section 3.7.1). Signal assemblies can be manually aimed, but laser site method is optimal.



Below is a typical mid-block crosswalk with 7 in-pavement signal lights on each side. The "Zone of Convergence" is the area in the traffic lanes where the signal light lenses are aimed towards approaching motorist. The signal lights will merge at the eye level of the approaching driver. This "Zone" is typically located 200 - 400 feet from the crosswalk zone (See Installation Manual Section 3.7)



Step 2

Perform saw cuts using pavement cutting device in accordance with predetermined layout to facilitate hook-ups through bottom of base plate to terminal connection points. Cuts to be $\frac{3}{8}$ to $\frac{1}{2}$ inch width in accordance with the CA Standard Plan ES-5A, or local standards, with a depth of 2 – 2½ inches for direct burial of wire. (See Installation Manual Sections 3.5.1 and 3.5.2)



Step 3

Provide depression cut-out for base plates approximately $1\frac{3}{8}$ inch (+/- 1/8 inch) inch deep on concrete or asphalt. Depression cut-out should only be slightly larger than base plate. Depression cut-outs should be level, or even, to conform to the existing approach grade of the roadway.

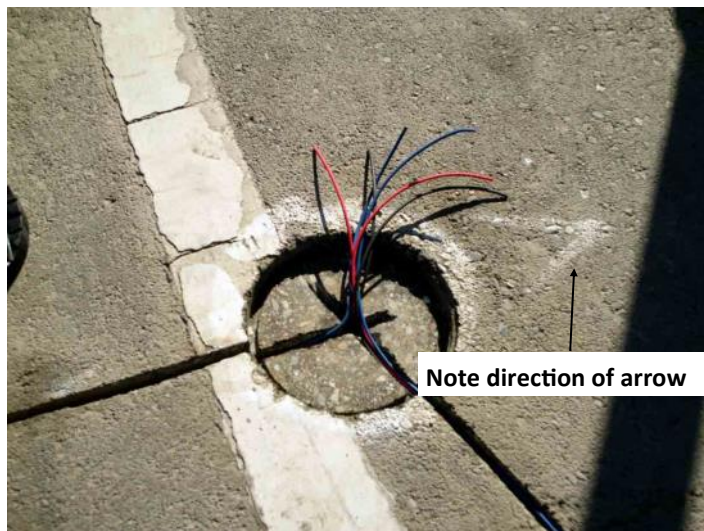
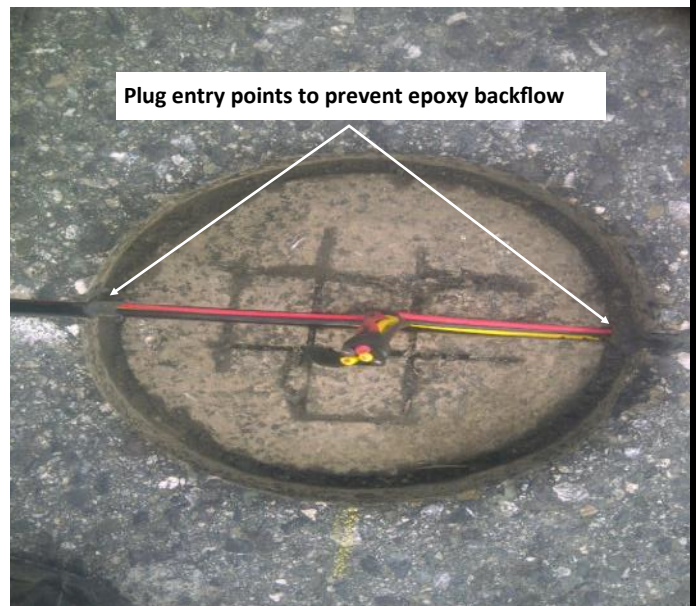
Step 4

If required, dig out for traffic electric hand hole boxes and install boxes for wiring access points at predetermined locations in accordance with the CA Standard Plan ES-5E, or local standards.



Step 5

Install all necessary wire to predetermined connection points and lay in cleared roadway cuts. (See Installation Manual Section 3.6). Place material on top of the wires into the saw cut at the core drill entrance area to hold down the wires & simultaneously plug (see picture to right) the core drill area to prevent flow of epoxy back into the saw cut.



Bored hole depression has been completely cleared of debris and is ready for mixed epoxy pour.

Step 6

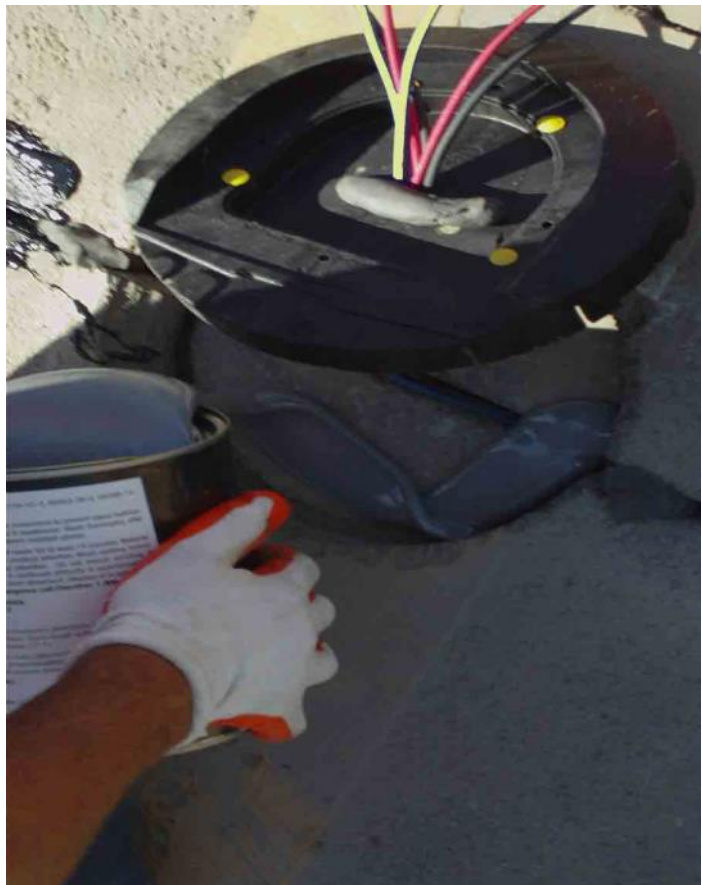
Check for proper site distance angles and level depth of base plate (See Installation Manual Sections 3.7, 3.5 and 3.2.4). Mark alignment on roadway for base plate focus direction. Top of base plate (circumferential edge as is shown in the Installation Manual, section 3.5.1) should be flush or slightly below (less than .10 inch) roadway surface AND free from excess adhesive (See Installation Manual Section 3.5).



Step 7

Mix only enough 2-part epoxy (BONDO 7084) for 2 to 3 base plates, since Epoxy working life is approximately 10 minutes. Surfaces should be cleaned of dirt or debris, and dry before applying adhesive. Ensure that wires are vertical in the center of the depression cut. Pour epoxy into depression cut (approximately $\frac{1}{4}$ " depth). Pull wire through center hole in base plate. Minimize the amount of epoxy that flows into the base plate. Secure base plates to roadway surface by pressing the base plate into the epoxy in the depression cut.

Ensure that epoxy flows around the outside diameter of the base plate and slightly around the wires emerging from the center hole of the base plate, but DOES NOT flow into the base plate. Ensure that epoxy fills outside diameter of base plate up to grade level. Ensure that the base plate is aligned with the mark made in step 6 (See Installation Manual Section 3.5) and is aimed correctly both horizontally and vertically toward the zone of convergence *prior to epoxy curing*. Allow minimum of 30 minutes of epoxy cure time prior to moving wires for connecting pigtail gel plugs (Sec. 3.6).

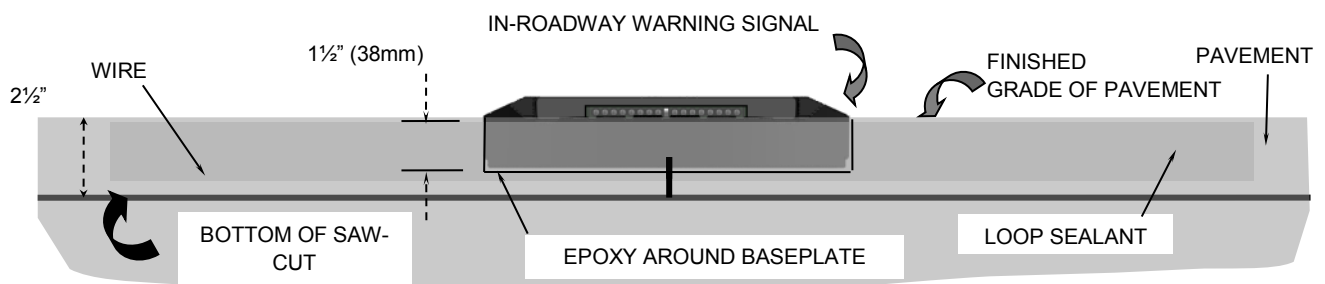


Step 8

Allow minimum of 1 hour cure time (above 70°F & 2 hours if colder temperatures), and be certain that the bondo is fully cured before opening traffic lanes to vehicles travelling over recently epoxied base plates. Signal heads can be secured to base plates as soon as epoxy has sufficiently hardened. **NOTE:** *Temperature is critical.*

Step 9

Secure in-roadway warning signal to base plates using socket head cap screws using Allen Wrench or equivalent (See Installation Manual Section 3.4). Socket head cap screws are to be coated with anti-seize compound for maintenance purposes to ensure that screws can be removed after exposure to the environment & additionally contain an embedded nylon thread-lock bead to prevent the screws from backing out while exposed to the roadway environment.



IRWL SIGNAL AND BASE PLATE INSTALLATION GUIDELINES

NOTE: *Correct Placement of Bases is CRITICAL to System Performance*

Step 1 - Determine placement and site angles of in-roadway warning signals to intersect at optimum driver viewing zone as specified by Signal Alignment Diagram (See Section 3.7.1). Signal assemblies can be manually aimed, but laser site method is optimal.

Step 2 - Perform saw cuts using pavement cutting device in accordance with predetermined layout to facilitate hook-ups through bottom of base plate to terminal connection points. Cuts to be $\frac{3}{8}$ to $\frac{1}{2}$ inch width in accordance with the CA Standard Plan ES-5A, or local standards, with a depth of 2 – 2½ inches for direct burial of wire. (See Installation Manual Sections 3.5.1 and 3.5.2)

Step 3 - Provide depression cut-out for base plates approximately $1\frac{3}{8}$ inch (+/- 1/8 inch) inch deep on concrete or asphalt. Depression cut-out should only be slightly larger than base plate. Depression cut-outs should be level, or even, to conform to the existing approach grade of the roadway.

Step 4 - If required, dig out for traffic electric hand hole boxes and install boxes for wiring access points at predetermined locations in accordance with the CA Standard Plan ES-5E, or local standards.

Step 5 - Install all necessary wire to predetermined connection points and lay in cleared roadway cuts. (See Installation Manual Section 3.6). Place material on top of the wires into the saw cut at the core drill entrance area to hold down the wires & simultaneously plug the core drill area to prevent flow of epoxy back into the saw cut.

Step 6 - Check for proper site distance angles and level depth of base plate (See Installation Manual Sections 3.7, 3.5 and 3.2.4). Mark alignment on roadway for base plate focus direction. Top of base plate (circumferential edge shown in section 3.5.1) should be flush or slightly below (less than .10 inch) roadway surface AND free from excess adhesive (See Installation Manual Section 3.5).

Step 7 - Mix only enough 2-part epoxy (BONDO 7084) for 2 to 3 base plates, since Epoxy working life is approximately 10 minutes. Surfaces should be cleaned of dirt or debris, and dry before applying adhesive. Ensure that wires are vertical in the center of the depression cut. Pour epoxy into depression cut (approximately $\frac{1}{4}$ " depth). Pull wire through center hole in base plate. Minimize the amount of epoxy that flows into the base plate. Secure base plates to roadway surface by pressing the base plate into the epoxy in the depression cut.

Ensure that epoxy flows around the outside diameter of the base plate and slightly around the wires emerging from the center hole of the base plate, but DOES NOT flow into the base plate. Ensure that epoxy fills outside diameter of base plate up to grade level. Ensure that the base plate is aligned with the mark made in step 6 above; (See Installation Manual Section 3.5) and is aimed correctly both horizontally and vertically toward the zone of convergence *prior to epoxy curing*. Allow minimum of 30 minutes of epoxy cure time prior to moving wires for connecting pigtail gel plugs (Sec. 3.6 of the Installation Manual).

Step 8 - Allow minimum of 1 hour cure time (above 70°F & 2 hours if colder temperatures), be certain that the bondo is fully cured before opening traffic lanes to vehicles travelling over recently epoxied base plates. Signal heads can be secured to base plates as soon as epoxy has sufficiently hardened. **NOTE: Temperature is critical.**

Step 9 - Secure in-roadway warning signal to base plates using socket head cap screws using Allen Wrench or equivalent (See Installation Manual Section 3.4). Socket head cap screws are to be coated with anti-seize compound for maintenance purposes to ensure that screws can be removed after exposure to the environment & additionally contain an embedded nylon thread-lock bead to prevent the screws from backing out while exposed to the roadway environment.