IMSA Journal, July/August 2011 - Cover Story

Pedestrian Crossings: All over the Map
by Joe Wise, Solar Traffic Controls

About this cover...UK-built Mini Cooper crossing London Bridge in Lake Havasu City, Arizona. Built in 1831, the bridge was dismantled, reconstructed, and rededicated in 1971 in Arizona, USA.
Photo courtesy Terry Brown, Lake Havasu City, AZ.

Pedestrian Crossings: All over the Map
By Joe Wise, Solar Traffic Controls

The need for pedestrian crossings, especially mid-block crossings, is a fact of life for all Department of Transportation agencies from the state to the municipal level. With increasing efficiencies for LED traffic safety devices there is an ample array of choices for addressing pedestrian crossing solutions. In most parts of the world, many can be solar powered.

In general, three basic approaches cover most applications. The first is a simple crosswalk system with either sensors or buttons at the crossing point and radio activated flashers in advance of the crosswalk. We'll refer to this as a Type 1 crossing system for this discussion.

The second is to have the warning devices immediately at the crosswalk, with or without advance flashers, which we refer to as a Type 2 crossing. Thirdly, there are systems which employ In Roadway Lighting (IRWL) to outline the crosswalk with lamp assemblies in the pavement, and for this discussion we refer to as a Type 3 solution. Many of these IRWL systems can be equipped with flashing beacons and/or flashing signs at or in advance of the crossing. All these basic system types can be customized easily to adapt to specific project needs.

Multiple vendors, both domestic and foreign, offer equipment or packages of equipment to meet the basic systems outlined above. However, if your project will employ solar power, the three basics of solar should be provided to any potential vendor: Location, Load, and Duty Cycle.

Location, Load, Duty Cycle
Location defines the solar radiation resources for the general area in which the equipment will be deployed. Two systems, identical in every way and deployed in solar-varied areas such as Salt Lake and Phoenix, should have different-sized solar arrays and batteries to accomplish the same task.

Load defines total power drawn by each piece of equipment in the system, in each mode. Consider the power draw from a radio in standby mode versus one transmitting.

Duty Cycle - this parameter considers the average daily time each load draws power which can vary with time of day, time of year or day of the week.

Sizing Report
A responsible vendor will offer a sizing report to support any design offered and should be included as part of any product offering. A full explanation can be found at our Site Map: go to Customer Service & Support/Wireless Traffic Control Solutions: A Primer.

Agencies should be warned: some manufacturers are now employing one-size-fits-all approaches in which optical output is determined by battery voltage first rather than ambient light thus dropping their optical outputs at times to sub-par values which could expose agencies to undue liability. Generally these vendors do not ask for any data nor do they provide a sizing report for the project. One way to avoid this issue is to ask for the optical output from the devices to be used to ensure you are making an apples-to-apples comparison.

Type 1 Systems

A Type 1 system will employ a means of activating the warning devices at the crossing point. Typically these will be vandal-resistant push buttons yet in many cases can be pedestrian detectors of some kind, such as microwave, PIR, a combination of the two or a pedestrian detection mat.

The poles can be equipped with a solar power package since the power draw is so low in the standby mode. The advance warning devices can be flashing beacons, RRFB assemblies and/or LED enhanced signs. Figure 1 shows a CAD drawing of a typical four pole system and the layout around a crosswalk. Note that all radio communications are one way.

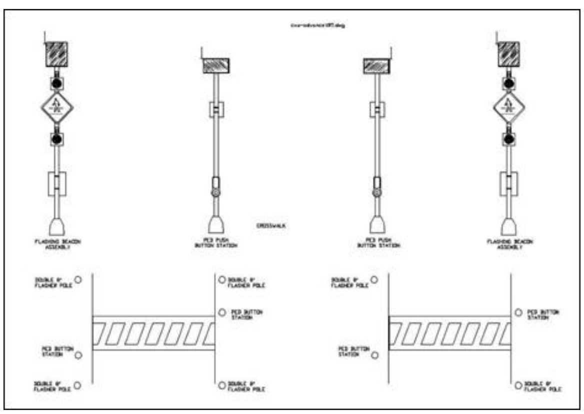


Figure 1

Examples of this type of application can be found in Arlington County, Virginia and in Pateros, Washington. While the system in Arlington County is in an urban setting, the availability of power was too costly due to remediation costs of installing the infrastructure. The system in Pateros was along a state highway where access to power was questionable.

In Arlington County, the system is composed of three solar-powered points, two being sensor stations and the third a dual 12-inch, flashing beacon system in advance of the crossing. The sensor stations are located on either side of the crosswalk on the curbs and use Smartwalk 1400 pedestrian sensors as the activation device. The flasher system was linked to both sensor stations using a digitally-coded receiver. Once the signal is received, the flasher begins operation for the programmed run-time. The unit uses two 12-inch, amber DC LED lamps configured for wig-wag operation. Photo 1 shows the sensor station for sensor-activated crosswalk flasher.

Arlington County, VA sensor station

In Pateros, the need was for a pedestrian-activated beacon on a two-lane state highway where a park and a few residences were located across the highway from the main section of town. The activation device is a Polara Bulldog pedestrian button. The advance flasher units consist of a single 12-inch amber DC LED to warn oncoming traffic of pedestrian activity. Photo 2 shows the southbound view of the Pateros system.

Pateros, WA southbound view of system

Type 2 Systems

These consist of a minimum of two poles located immediately at the crosswalk, each with a button or detector to activate the system. Note: the radio communications in these systems is two-way. It is also possible to place a time switch in one of the units and operate the unit both as a time of day flasher and a pedestrian-activated flasher.

Figure 2 shows three possible layouts for this type system. Layout A is a typical two pole. Layout B is a four pole (master and three slaves). Layout C is 2 two-pole systems configured for a crossing with a protected pedestrian island. Other configurations are possible as well.

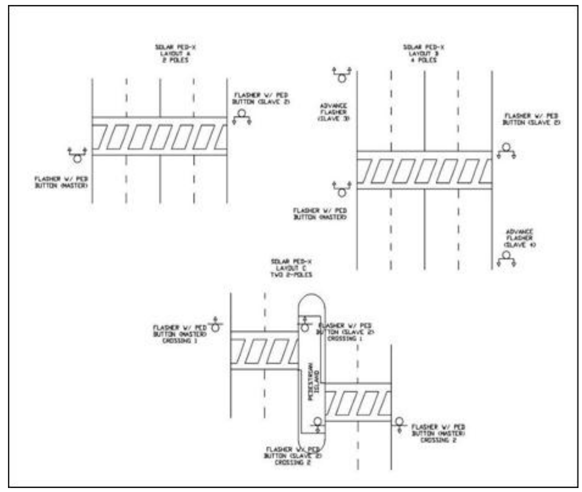


Figure 2

The cover photo of this issue is an example of a Type 2 system. Located in Lake Havasu City, Arizona, this system provides pedestrian safety for tourists on the London Bridge. Lake Havasu City has installed multiple units around town for mid-block crossings.

London Bridge spans Lake Havasu in AZ

A second example of Type 2 equipment is a split crossing with a protected pedestrian island in the middle. Flagstaff, Arizona, had a need for a mid-block crossing from a residential area along a busy street to Northern Arizona University. Since traffic volume is higher in each direction with the time of day and there was a median, a protected pedestrian crossing was created to allow pedestrians to complete the crossing as two shorter individual crossings rather than one long crossing. Photo 4 on the next page is an example.

Type 2 system, Flagstaff, AZ

Type 3 Systems

The acceptance and use of In-Roadway Lighting (IRWL) systems has increased greatly in the last few years. Some of the original products in this category were modified runway lighting fixtures. Most products available now are specifically geared for this market application. The biggest improvement in this solution over the last few years has been conversion to all LED lamp sources. Formerly the lamps were 40-50W incandescent. The use of LED lamps in these systems makes them prime candidates for solar power.

Product offerings include both single and dual directional output fixtures. One key consideration is a typical system layout around an intersection using dual window fixtures on a two lane street. These systems can be equipped with a variety of enhancements such as flashing beacons and/or LED signs both at the crossing and in advance. Two examples of this can be found in the Phoenix metropolitan area. See Figure 3.

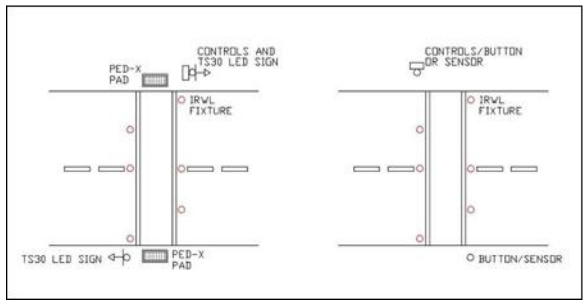


Figure 3

The first example is a system in Carefree. This desert town has few traffic signals; minimal street lighting and an unhurried pace. For years, residents shunned any kind of signaling device beyond a static sign. In 2010, the city installed an IRWL system equipped with single 8-inch amber beacons at the crossing. The system provides pedestrian safety between a condominium area to the town center. See Photo 5 on the next page for a close-up of the pedestrian button station.

Close-up of pedestrian button in AZ

The street has four through lanes of travel, a left turn and a 9-foot wide median. STC provided 12 - TS400 series fixtures for the project along with poles, flashing beacons, pedestrian button stations and a solar power package to run the entire system. As the roadway is slightly curved, a mix of TS420 and TS450 lamps (www.xwalk.com) were used to provide good light-spread to oncoming motorists. Each type of lamp features a bi-directional output with different lenses allowing for a mix of narrow/wide beam and wide/wide beam optical outputs.

Another example of this pedestrian crossing solution is a project completed for the Salt River Pima Maricopa Indian Community near Scottsdale. This project was installed between the tribal center's main parking lot and the new tribal center. The project consisted of six TS500 (www.xwalk.com) lamp assemblies at the crossing and radio activated flashers in advance of the crossing.

Summary

These examples of crossing systems illustrate many of the applications which can be done affordably to enhance pedestrian safety with current technology. Furthermore, they are energy efficient, can be solar powered and highlight the benefits of solar technology: no trenching, no boring, "green" and with reduced costs both initially and over the operating life of the systems. Solar-powered traffic controls are the answer when power is too difficult to obtain; when it takes too long to run it to a site or where there are too many obstacles in the ground. If you can't bore under the road or across the road or dig up paving stones: solar is a viable solution.

When a traffic control project is defined correctly, i.e., all the equipment in the load and each component's duty cycle identified, solar power clearly offers a cost-effective and feasible alternative: almost a set-it-and-forget-it type product.

Celebrating our 10th year designing and manufacturing solar-powered traffic control systems. STC has fielded projects worldwide and includes equipment in Afghanistan, Australia, Canada, Japan, Kosovo, Croatia, Bermuda, and the Bahamas and throughout the United States. For more information on STC's products and services, please stay on our Website.

References

Type 1 systems at STC Website click on Applications/Ped-X "Wireless" Crosswalks Pateros, WA photos/sale compliments of Jim Fauconnier, McCain Traffic NW office.

Arlington County, VA photo/sale courtesy Randy Dominick, Traffic Systems and Technology, Manassas, VA; Arlington sensors from MS SEDCO, www.mssedco.com

Type 2 systems on STC Website click on Applications/Ped-X "Wireless" Crosswalks; Flagstaff project equipment furnished to Brown Wholesale, Phoenix, AZ
Polara buttons from Polara Engineering www.polaraengineering.com

Type 3 Systems on STC Website click on Applications/Area & In-Roadway Lighting
IRWL fixtures by Traffic Safety Corporation www.xwalk.com

Carefree project sale/installation by Rural Electric, Mesa, AZ
Salt River Tribal project sale/installation by AJP Electric, Phoenix, AZ

Figure 1

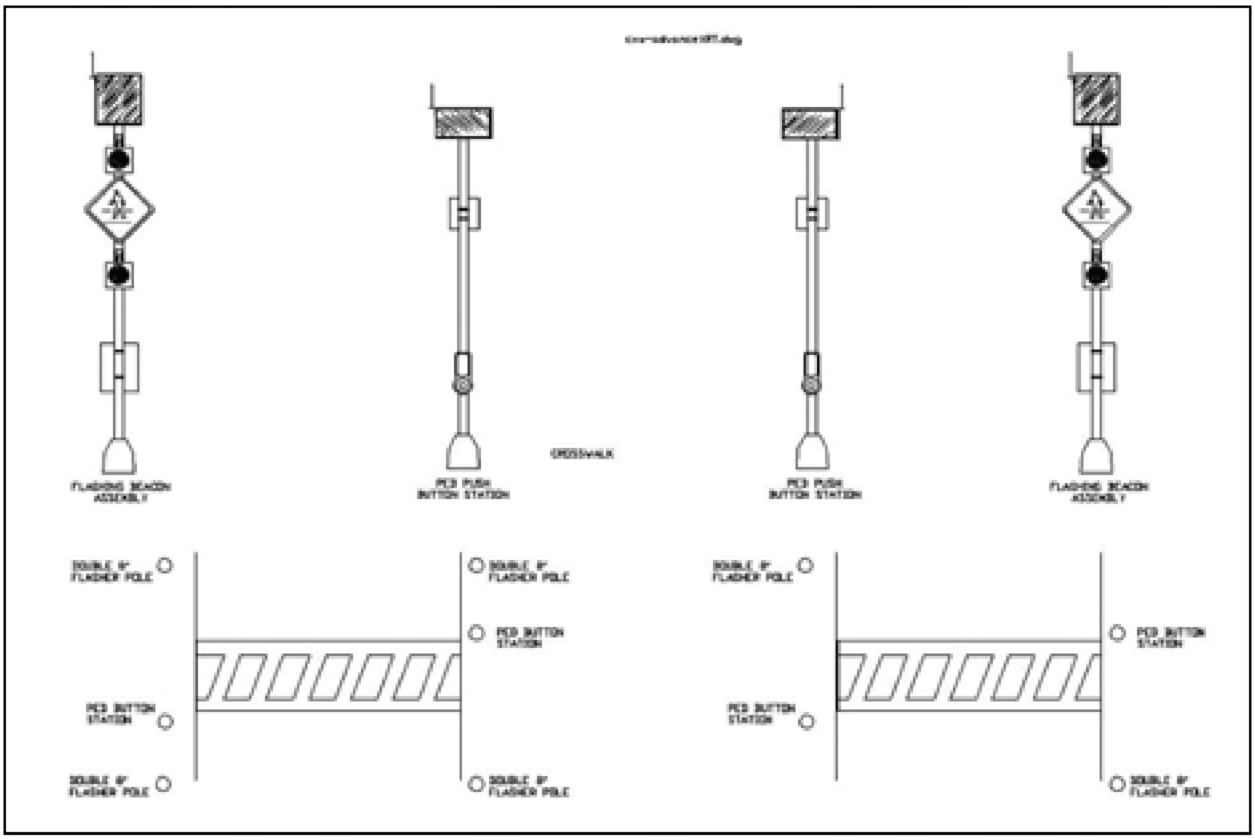

FLASHING BEACON ASSEMBLY
PED PUSH BUTTON STATION
CROSSWALK
PED PUSH BUTTON STATION
FLASHING BEACON ASSEMBLY
DOUBLE 8" FLASHER POLE
DOUBLE 8" FLASHER POLE
PED BUTTON STATION
PED BUTTON STATION
DOUBLE 8" FLASHER POLE
DOUBLE 8" FLASHER POLE
DOUBLE 8" FLASHER POLE
DOUBLE 8" FLASHER POLE
PED BUTTON STATION
PED BUTTON STATION
DOUBLE 8" FLASHER POLE
DOUBLE 8" FLASHER POLE

Figure 2

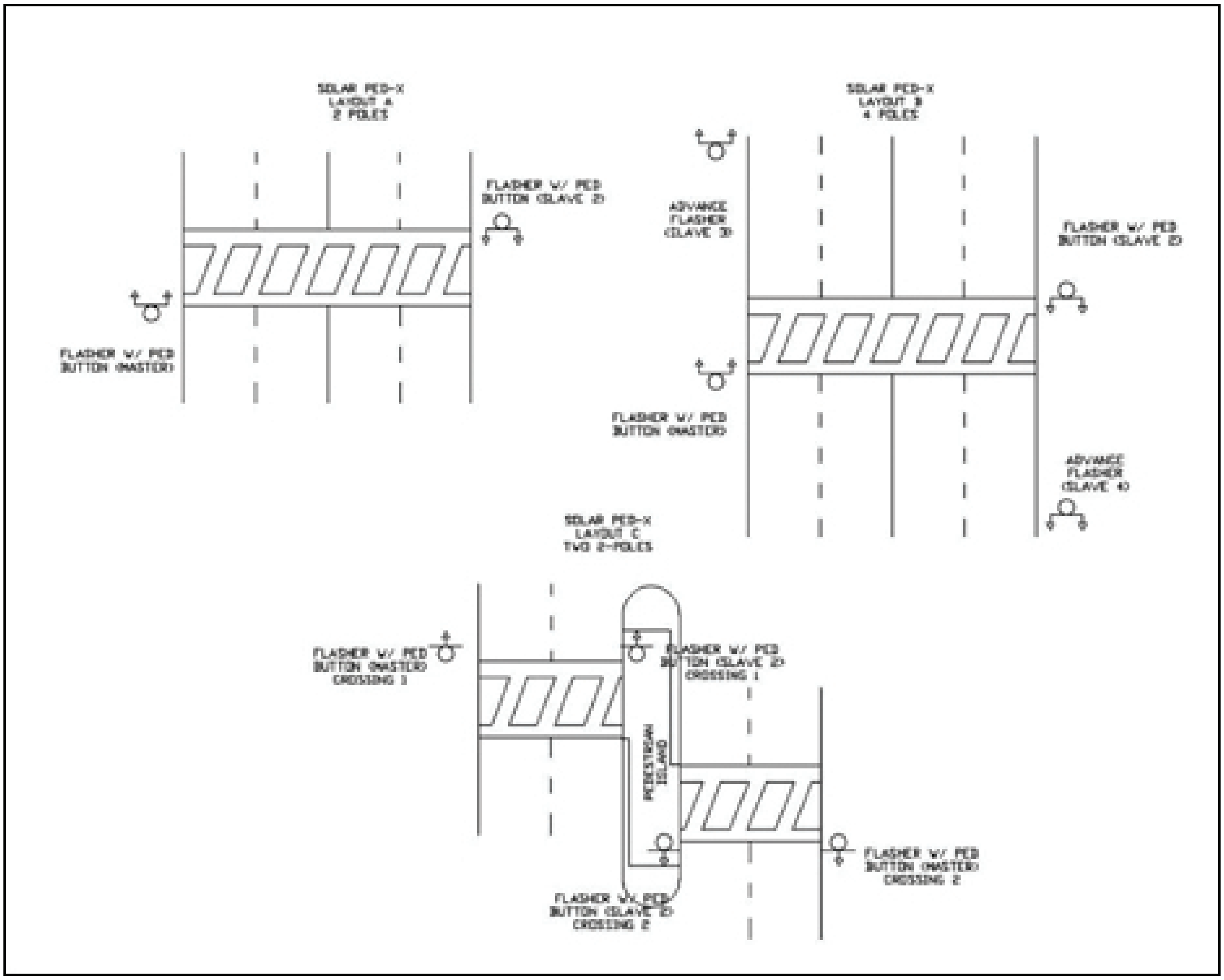
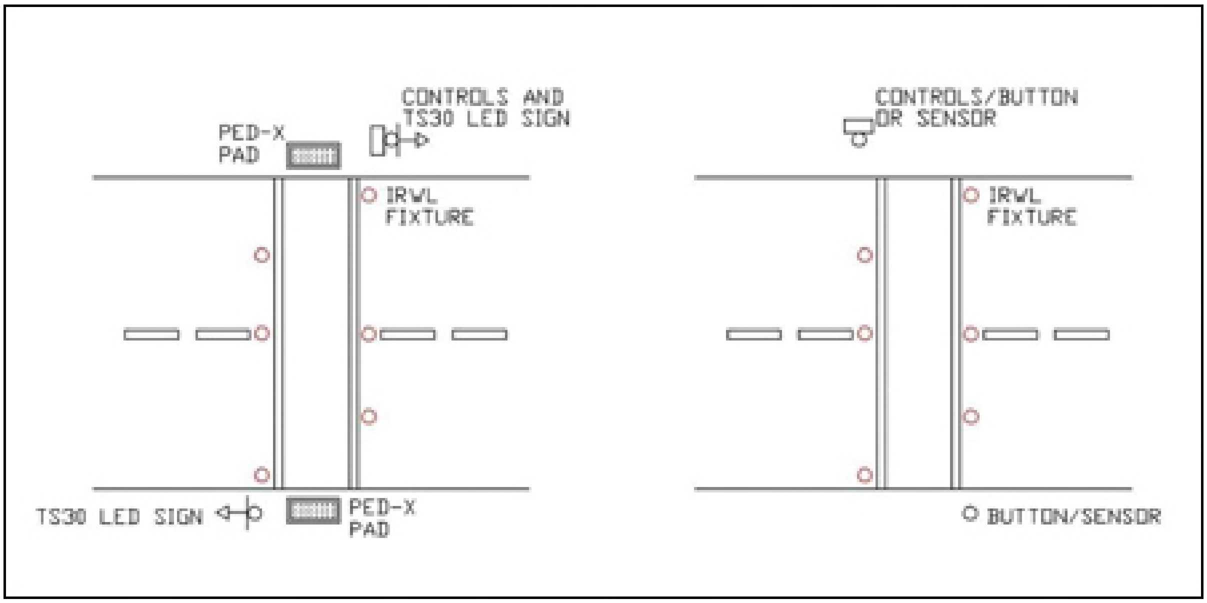

SOLAR PED-X
LAYOUT A
2 POLES
FLASHER W/ PED BUTTON (SLAVE 2)
FLASHER W/ PED BUTTON (MASTER)
SOLAR PED-X
LAYOUT B
4 POLES
ADVANCE FLASHER (SLAVE 3)
FLASHER W/ PED BUTTON (SLAVE 2)
FLASHER W/ PED BUTTON (MASTER)
ADVANCE FLASHER (SLAVE 4)
SOLAR PED-X
LAYOUT C
TWO 2-POLES
FLASHER W/ PED BUTTON (MASTER) CROSSING 1
FLASHER W/ PED BUTTON (SLAVE 2) CROSSING 1
PEDESTRIAN ISLAND
FLASHER W/ PED BUTTON (MASTER) CROSSING 2
FLASHER W/ PED BUTTON (SLAVE 2) CROSSING 2

Figure 3


CONTROLS AND
TS30 LED SIGN
PED-X
PAD
IRWL
FIXTURE
TS30 LED SIGN
PED-X
PAD
CONTROLS/BUTTON
OR SENSOR
IRWL
FIXTURE
BUTTON/SENSOR