ROADWAY SAFETY INITIATIVES
in the San Antonio District
Safety: Mission ZERO

24/7
365
Working Everyday to Enhance Safety

- SolaRight Internally Illuminated Recessed Pavement Markers
- LaneLight Enhanced In-Pavement LED Pavement Markers
- Alert-Brands PostAlert System
- Dallas/Ft. Worth Lite & Barricade Solar Advanced Warning System (SAWS)
- Horizon Signal Technologies Driveway Assistance Device (DAD) System
Benefits of IIRPMs:

- Recessed in Pavement (low maintenance)
- 10+ Year Lifetime (longer than RPMs)
- Up to ½ Mile of Visibility (5x further than RPMs)
- Solar Powered (great for areas w/no power)
- TxDOT SAT Requested Test Trial at 2 Locations
# SolaRight Internally Illuminated Recessed Pavement Markers

<table>
<thead>
<tr>
<th>Urban Location</th>
<th>Site Description</th>
<th>Applicable Crashes (3 Yrs)</th>
<th>Area/Maintenance Office Input</th>
<th>Proposed Mitigation Pending</th>
<th>Upcoming Projects</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-410 Frontage Rd &amp; UPRR</td>
<td>Non-Continuous Frontage Rd @ Trader's Village</td>
<td>9</td>
<td>Great location for this product; we spend significant dollars on guardrail repair all year long; however, the product will be short-lived with new M&amp;O job coming.</td>
<td>Additional signage, transverse rumble strips, larger dead-end board</td>
<td>Mill &amp; Overlay (0521-05-145)</td>
<td>Great site; however, recently let Mill &amp; Overlay Project will include improvements such as new pavement, markings/markers, signs, etc.; timing of demo is an issue.</td>
</tr>
<tr>
<td>SL 1604 Frontage Rd &amp; UPRR</td>
<td>Non-Continuous Frontage Rd @ Green Mountain &amp; Nacogdoches</td>
<td>1</td>
<td>Good location, but not as much of an issue from a safety, data, or maintenance standpoint.</td>
<td>N/A</td>
<td>None</td>
<td>With no improvements recently recommended at this location, it would be a good before/after test location; however, with a low ADT and limited crashes, should be a no-go.</td>
</tr>
<tr>
<td>SL 1604 Frontage Rd &amp; UPRR</td>
<td>Non-Continuous Frontage Rd @ Nacogdoches &amp; Lookout Rd</td>
<td>2</td>
<td>Good location, but not as much of an issue from a safety, data, or maintenance standpoint.</td>
<td>N/A</td>
<td>None</td>
<td>With no improvements recently recommended at this location, it would be a good before/after test location; however, with a low ADT and limited crashes, should be a no-go.</td>
</tr>
<tr>
<td>US 281 &amp; Basse Rd</td>
<td>NB Exit Ramp to Clover-Leaf @ Basse Rd</td>
<td>5</td>
<td>This would be a great location since we recently overlaid the ramp last year (2017) and that barrier gets hit a lot.</td>
<td>N/A</td>
<td>Converting to a Diamond</td>
<td>This location is ideal; however, there needs to be some discussion on the timeline of the interchange reconfiguration; also, we need to discuss coordination with Alamo Heights/Olmos Park/COSA.</td>
</tr>
<tr>
<td>I-10 &amp; Ramsgate Turnaround</td>
<td>WB/EB Turnaround Near USAA</td>
<td>43</td>
<td>This location gets hit all of the time; we are constantly having to replace signs, repair guardrail, replace delineation; and there was a recent project that also repaired the concrete from crashes.</td>
<td>N/A</td>
<td>None</td>
<td>After seeing that 33 of the 43 crashes that occurred at this location were in the dark, we feel that this is the right spot for the demo; we possibly need to coordinate with USAA.</td>
</tr>
</tbody>
</table>
SolaRight Internally Illuminated Recessed Pavement Markers

- Location #1 (I-10 & Ramsgate Turnaround)
Internally Illuminated Raised Pavement Markers (RPMs)
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Internally Illuminated Raised Pavement Markers (RPMs)
SolaRight Internally Illuminated Recessed Pavement Markers

- IIRPMs Installed
  - “After” study by TTI underway
  - Incremental solutions being designed/implemented (i.e., signing, striping, flashing beacon, illumination, OSB, etc.)
Location #2 (Y-Intersection at Loop 1604 & SH 151)
Internally Illuminated Raised Pavement Markers (RPMs)
Internally Illuminated Raised Pavement Markers (RPMs)
Internally Illuminated Raised Pavement Markers (RPMs)
SolaRight Internally Illuminated Recessed Pavement Markers

- **IIRPMs Installed**
  - “After” study by TTI underway
  - Other solutions being designed/implemented (i.e., signing, striping, illumination, etc.)
LaneLight Enhanced In-Pavement LED Pavement Markers

- **Benefits:**
  - Recessed in Pavement (low maintenance)
  - Hardwired w/Signal (synchronized)
  - Ultra Bright (3.5 million candela / m² output)
  - Guides Driver (distracted driver focused)
  - TxDOT ELP Utilized on DDI
LaneLight Enhanced In-Pavement LED Pavement Markers

- **Loop 1604 & SH 16 Diverging Left Turn Interchange**
  - First Non-Standard Interchange in TxDOT SAT District
  - Set to Open in Spring 2019
LaneLight Enhanced In-Pavement LED Pavement Markers

Special Thanks to Eduardo Perales from TxDOT El Paso
Alert-Brands PostAlert System

- Rural roadway safety is an ongoing concern
- Curves are typically the greatest risk locations on low-volume roadways
- Maintenance crews spend a lot of time replacing signs in the line of fire
- The PostAlert System provides enhanced sign visibility
**Alert-Brands PostAlert System**

- **Benefits:**
  - Visual Enhancement (daytime/nighttime)
  - Low Cost ($<50/unit)
  - Easy to Install (5 min)
  - Durable HDPE (Heavy Duty Poly-Ethylene)
  - Temperature Resistant (-40 to 190 degree)
Alert-Brands PostAlert System

- Installed at 4 locations within the TxDOT SAT District
- Safety evaluation by TTI currently underway
Alert-Brands PostAlert System

- According to maintenance personnel, the test location chevron signs are typically replaced once per month.
- PostAlerts have not been replaced since installed (May 2018).
TxDOT SAT District is implementing Smart Work Zones on 10+ projects along interstate highways

Standard Features Include:
- Temporary Speed Monitoring Systems
- End of Queue Systems
- Temporary Incident Detection & Surveillance Systems

Non-Standard Feature:
- Trucks Entering Roadway (Actuated) Warning Systems
Dallas/Ft. Worth Lite & Barricade developed the Solar Advanced Warning System (SAWS)

TxDOT SAT District requested a test location
DFW Lite & Barricade Solar Advanced Warning System (SAWS)

- Test Location: I-10 HOV Lanes Project in northwest San Antonio
DFW Lite & Barricade Solar Advanced Warning System (SAWS)

- Majority of construction in center of mainlanes
- 60 MPH construction zone speed limit in place
DFW Lite & Barricade Solar Advanced Warning System (SAWS)
San Antonio Roadway Safety Initiatives

DFW Lite & Barricade Solar Advanced Warning System (SAWS)

POSTED SPEED LIMIT

RADAR ONLY
WHEN FLASHING
WHEN FLASHING

Date: 07/18/2018 Project: SAWS TEST PROJECT PROJECT #: 0072-07-041
Comments:
TEST PROJECT
10 MOV LANE CONSTRUCTION

October 16, 2018
DFW Lite & Barricade Solar Advanced Warning System (SAWS)
DFW Lite & Barricade Solar Advanced Warning System (SAWS)

- TTI studying the effect of the SAWS
  - Daytime versus nighttime effect
  - Traffic lane shift rate
  - Break lights measured
  - Speed measurements
- Positive feedback from construction personnel
- Any enhancement is a potentially life-saving improvement
- Double SAWS units will be tested next week
Horizon Signal Driveway Assistance Device (DAD) System

- Solution has long been needed to provide better options for traffic control within one-lane, two-way work zones.
- Technology has provided portable traffic signals to control entry points to one-lane, two-way work zone sites, but that leaves intermediate driveways to be controlled by workers.
- Worker safety associated with flagging is a major concern.
Horizon Signal Driveway Assistance Device (DAD) System

- TxDOT SAT District Project:
  - US 83 Rehab in Uvalde, TX
- Project Letting: Nov 2018
- Project Length: 8 Miles
- Residential Driveways: 40+
- Issue: Pavement design calls for lime treating the existing material, which requires a long cure time
- Potential Solution: Temporary Pavement (not preferred)
- Driveway Assistance Devices (DADs) will save TxDOT upwards of $3M in construction cost and remove flaggers from the line of fire of traffic
Horizon Signal Driveway Assistance Device (DAD) System

- Original TxDOT/TTI Ideas

Stop

Proceed Right
Horizon Signal Driveway Assistance Device (DAD) System

- Other State Ideas

- Michigan

- North Carolina

- Iowa & Massachusetts
Horizon Signal Driveway Assistance Device (DAD) System

- Other State Ideas

Oregon

Vermont

Virginia
Horizon Signal Driveway Assistance Device (DAD) System

- **TxDOT Current Design**
  - Driveway traffic stops on red
  - Driveway traffic is permitted to travel one-way in the direction of the flashing yellow arrow
  - Up to nine (9) DADs will be interconnected with a portable traffic signal at either end of the project
Horizon Signal Driveway Assistance Device (DAD) System
## Horizon Signal Driveway Assistance Device (DAD) System

### US 83 Southbound

#### Top Driveway Assistance Device Signal Locations

<table>
<thead>
<tr>
<th>Directory No.</th>
<th>Begin Station</th>
<th>End Station</th>
<th>Driveway Assistance Device</th>
<th>Top Phase/Stage</th>
<th>Phase Duration Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>108-01</td>
<td>175504782</td>
<td>175504760</td>
<td></td>
<td>Phase 1 Step 1</td>
<td>3</td>
</tr>
<tr>
<td>108-02</td>
<td>175504738</td>
<td>175504716</td>
<td></td>
<td>Phase 1 Step 2</td>
<td>3</td>
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<tr>
<td>108-03</td>
<td>175504694</td>
<td>175504672</td>
<td></td>
<td>Phase 1 Step 3</td>
<td>3</td>
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<tr>
<td>108-04</td>
<td>175504650</td>
<td>175504628</td>
<td></td>
<td>Phase 1 Step 4</td>
<td>3</td>
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<tr>
<td>108-05</td>
<td>175504606</td>
<td>175504584</td>
<td></td>
<td>Phase 1 Step 5</td>
<td>3</td>
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<tr>
<td>108-06</td>
<td>175504562</td>
<td>175504540</td>
<td></td>
<td>Phase 1 Step 6</td>
<td>2</td>
</tr>
<tr>
<td>108-07</td>
<td>175504518</td>
<td>175504496</td>
<td></td>
<td>Phase 1 Step 7</td>
<td>2</td>
</tr>
<tr>
<td>108-08</td>
<td>175504474</td>
<td>175504452</td>
<td></td>
<td>Phase 1 Step 8</td>
<td>2</td>
</tr>
</tbody>
</table>

- **Phase Duration Months:**
  - Phase 1 Step 1: 3
  - Phase 1 Step 2: 3
  - Phase 1 Step 3: 3
  - Phase 1 Step 4: 3
  - Phase 1 Step 5: 3
  - Phase 1 Step 6: 2
  - Phase 1 Step 7: 2
  - Phase 1 Step 8: 2
Horizon Signal Driveway Assistance Device (DAD) System

- US 83 Current Project Status:
  - CSJ: 0037-01-042 (Nov 2018)
  - Special Specification 6343 Approved on 10/02/2018
  - Bid-Code Processed:
    6343-6001 “Driveway Assistance Device System” (Per Month)

- Laredo District Utilizing SS on Four (4) CSJs w/Similar TCP
Recognition of Team Effort

- **TTI Support:** Steve Venglar, PE
- **US 83 PM:** Eric Hernandez, PE
- **TxDOT SAT Traffic Team:**
  - Dale Picha, PE, PTOE
  - Matt Sneed, PE, PTOE
  - Ben Worsham, PE, PTOE
  - Eduardo “Lalo” Villalon, PE
  - John Gianotti, PE
  - Robert Garcia
  - Mike Jaeger
  - Susan Atkins
  - Jeanne Tarrants
  - Robert Steigleder
  - John Obadal
  - Jesus Farias
  - Roger Garcia
  - Velinda Viesca-Garza
  - Mark Perez
  - Ron Gutierrez
  - Wilfred Buck
  - Richard Martinez
  - Craig Williams
  - Daniel Cardenas