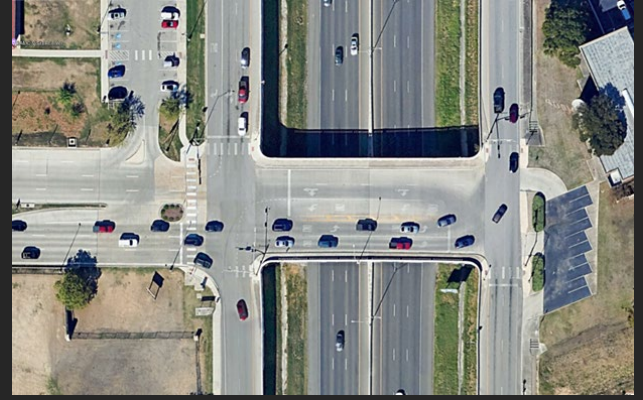






Enhancing Access and Operational Efficiency Through Dynamic Signing and Signal Optimization in San Antonio Area

Marc Jacobson, P.E., PTOE – City Of San Antonio

Justin Clark, P.E., PTOE – Pape-Dawson Engineers, LLC

September 25, 2025

TexITE Fall Meeting – El Paso – Session 2B

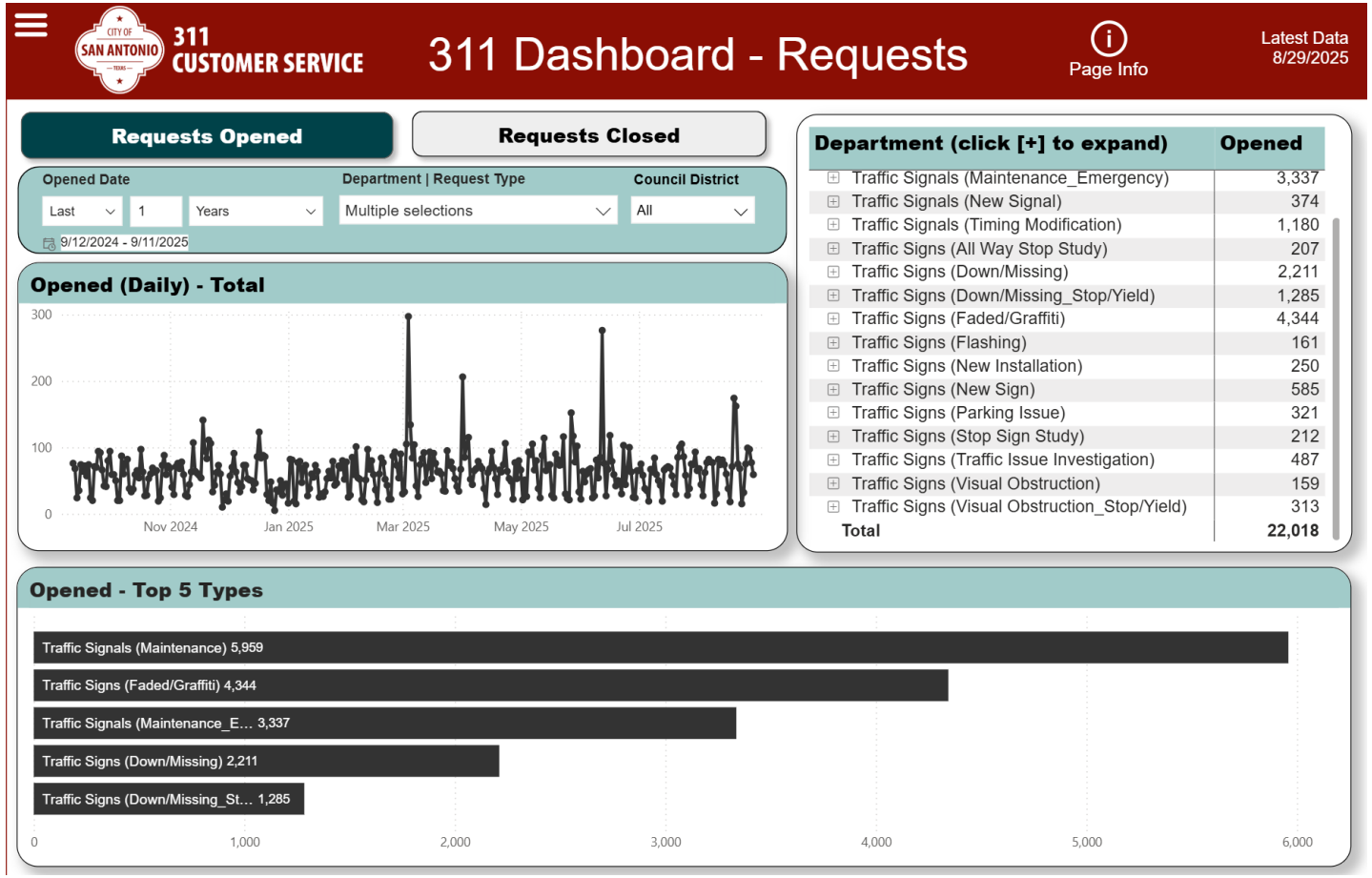
CITY OF SAN ANTONIO TEXAS

PAPE–DAWSON

Public Complaint

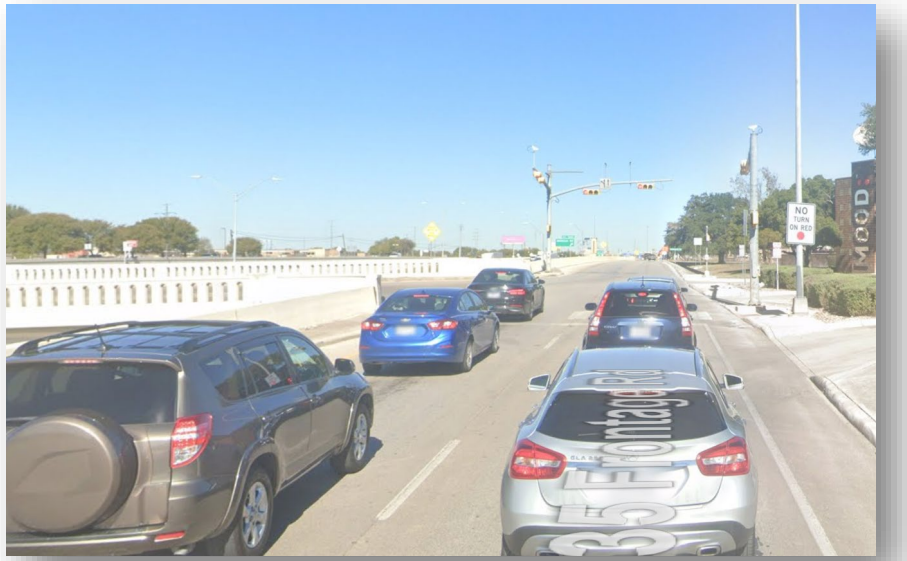
Traffic Signal Complaints Drive Most 311 Requests

- Majority of complaints relate to traffic signal maintenance
- Most request involve adjusting signal timings to reduce queues
- Goal is to keep traffic flowing smoothly across intersections
- In some cases, intersection design changes are proposed



Call The Traffic Engineer #311

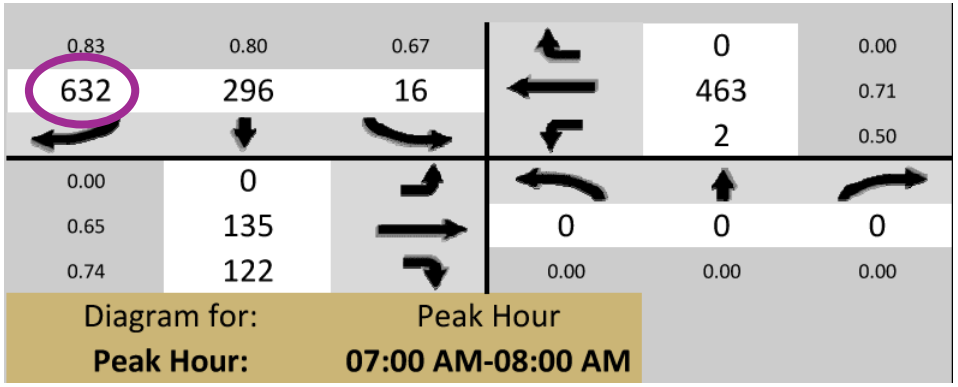
- **Location: IH 35 @ George Beach**
- **Caller Information: BAMC (Brooke Army Medical Center) – Base General**
- **Reason for the Call: “At commute times, the left-turn queue at BAMC overflows and the green is too brief, causing repeated missed lights and making employees late.**



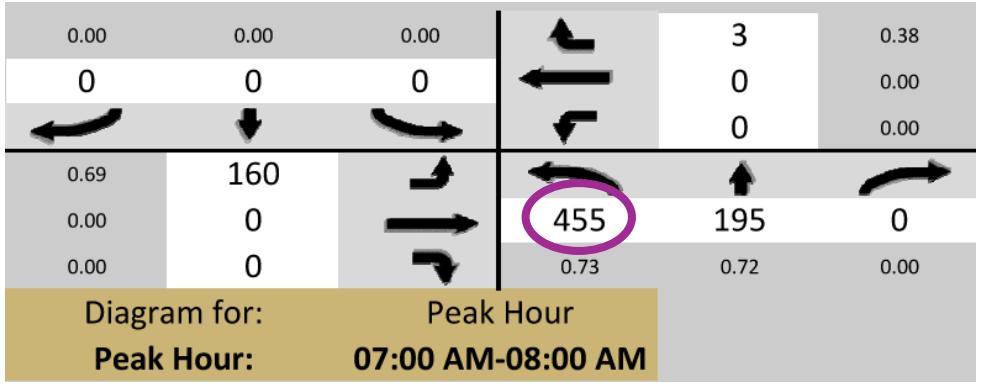


Area of interest: Northbound traffic going to BAMC

Peak Hour Volumes

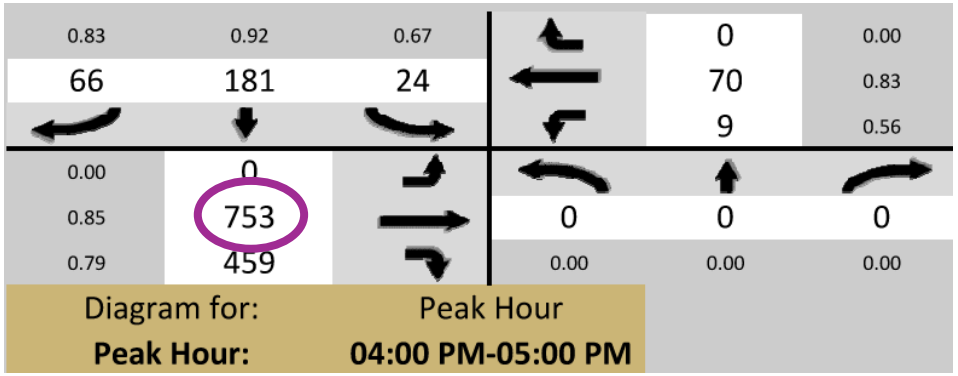


AM Peak Hour

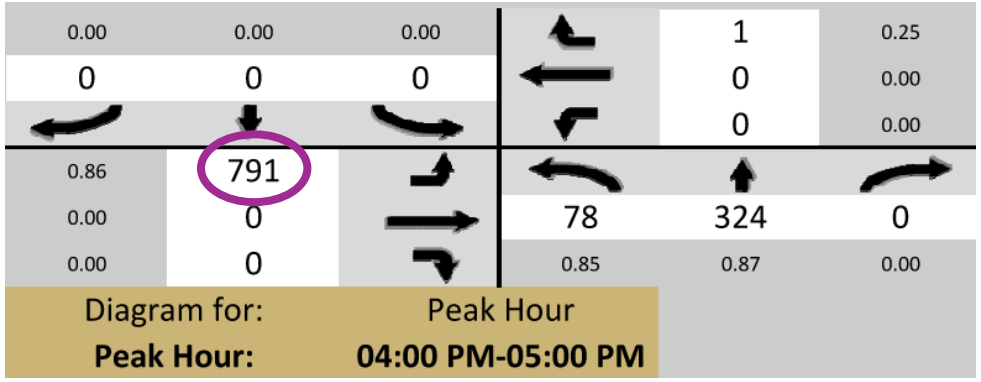


SB Frontage Road

NB Frontage Road



PM Peak Hour



Solution

IH – 35 @ George Beach

CITY OF SAN ANTONIO — TEXAS

PAPE–DAWSON

Challenge:

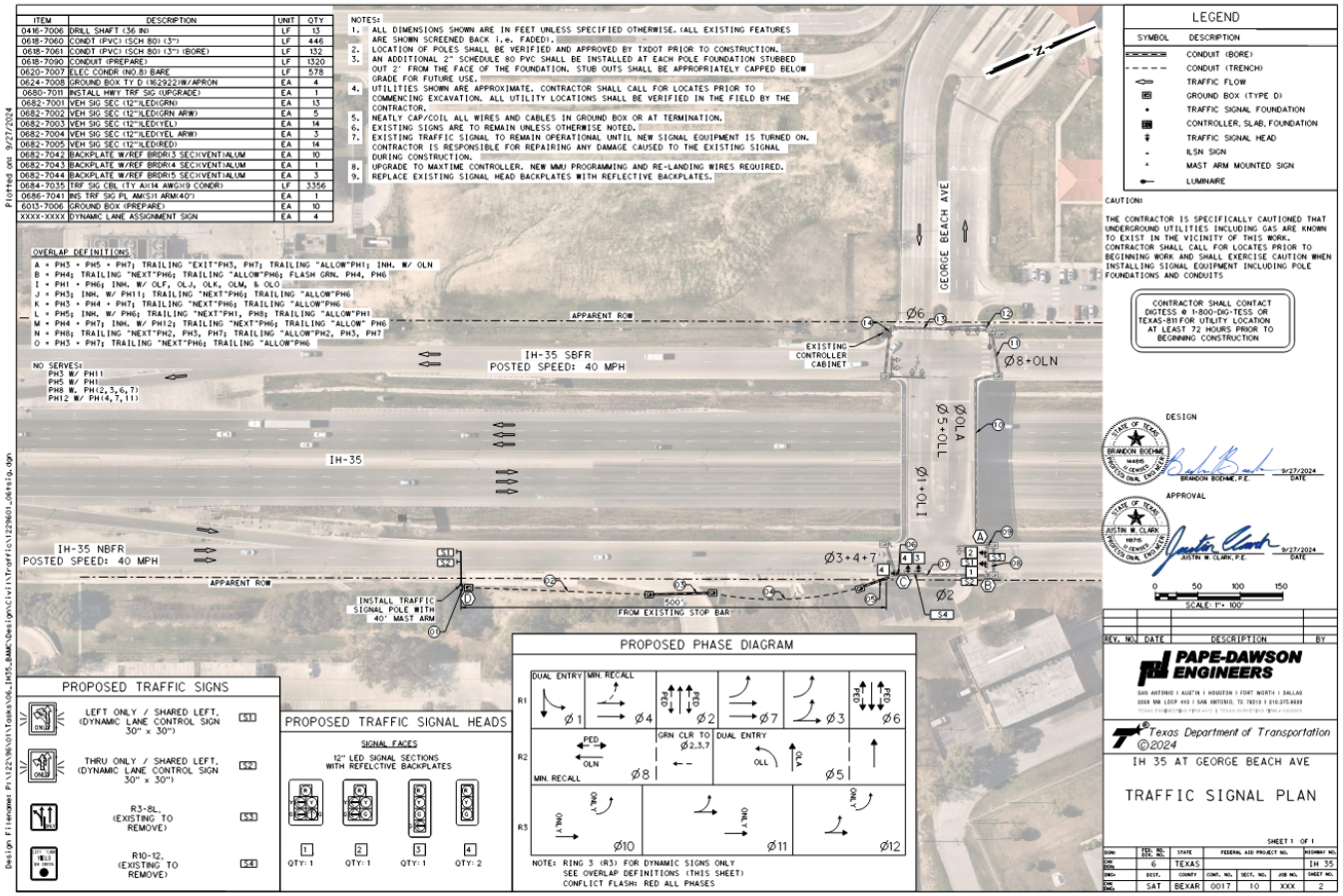
Boost left-turn discharge during peaks without widening or geometric changes

Improve peak-hour left-turn queue clearance through signal timing/phasing only—no capital construction

Provide opportunity for 3 phase operation during off-peaks for 35 NEX lane closures

Solution:

Deploy LED lane-control signs to temporarily reassign lanes and expand left-turn capacity during peaks



Why Dynamic Signs?

- Match lanes to directional peaks
- Improve Lane Balance during peaks
- Increase left-turn capacity
- Previous experience at standard intersection



Timberhill at Grissom Rd

Product Specs

PAPE-DAWSON

PRODUCT ID: 49603
DOT LED Blank-Out Sign

MODEL
DOT3630WW-K960H/100-240VAC

DIMENSIONS
36" H x 30" W x 5" D (est. 70.728 lbs)

CLASS
Class: DOT Series
Control Method: Switch (not included) or external relay.

CONSTRUCTION
Cabinet: Extruded aluminum cabinet with welded seams, NEMA 4X rated/IP66. Hinged door with 1" silicone gasket, tool-less stainless-steel latches. 5.0" Deep.
Face Material: Replaceable 1/4" thick smoke-tinted polycarbonate (5109)
Faces: Single Faced Sign
Finish: Powdercoat Black
Integral Hood: Single piece 1/8" brake formed 6" deep aluminum hood
Mounting Channel: None

ELECTRICAL
Input Voltage: 100-240 VAC
Photodimming: (3) Redundant fail-safe photocells for auto photodimming
Power Supplies: Redundant
UL/cUL Listed: Listed for wet locations

MESSAGE
Illumination: Super bright direct view LEDs. Message blanks out when off.
Sign Messages: See message table below

MESSAGE	LED/COLOR	HEIGHT	AMPS
Up Arrow w/Veering Left Arrow	White Narrow Angle LED	27.125"	0.141-0.059
Veering Left Arrow w/ONLY	White Narrow Angle LED	17.375", 6.0"	0.158-0.066

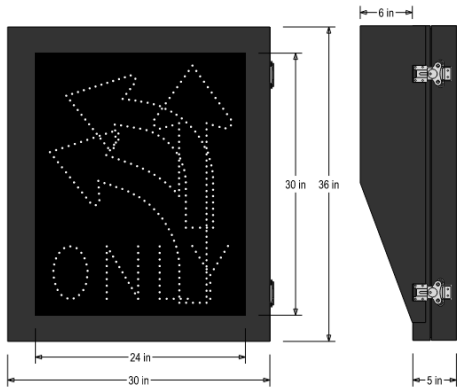
NOTE: Above messages are independently controlled.

Signal-Tech
4985 Pittsburgh Ave.
Erie, PA 16509
Phone: (877) 547-9900
Fax: (814) 835-2300
Email: sales@signal-tech.com
Website: www.signal-tech.com

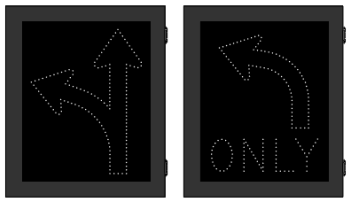
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Product View

NOTE: Sign image may not exactly represent the finished product. For illustration purposes only.



Sample Display Options



05202022 | DP

PRODUCT ID: 32222
DOT LED Blank-Out Sign

MODEL
DOT3630WW-I060/100-240VAC

DIMENSIONS
36" H x 30" W x 5" D (est. 60.204 lbs)

CLASS
Class: DOT Series
Control Method: Switch (not included) or external relay.

CONSTRUCTION
Cabinet: Extruded aluminum cabinet with welded seams, NEMA 4X rated/IP66. Hinged door with 1" silicone gasket, tool-less stainless-steel latches. 5.0" Deep.
Face Material: Replaceable 1/4" thick smoke-tinted polycarbonate (5109)
Faces: Single Faced Sign
Finish: Powdercoat Black
Integral Hood: Optional hood available
Mounting Channel: None

ELECTRICAL
Input Voltage: 100-240 VAC
Photodimming: (3) Redundant fail-safe photocells for auto photodimming
Power Supplies: Redundant
UL/cUL Listed: Listed for wet locations

MESSAGE
Illumination: Super bright direct view LEDs. Message blanks out when off.
Sign Messages: See message table below

MESSAGE	LED/COLOR	HEIGHT	AMPS
Up Arrow w/ ONLY	White Narrow Angle LED	16.375", 7.0"	0.202-0.084
Up Arrow w/ Verring Left Arrow	White Narrow Angle LED	25.625"	0.170-0.071

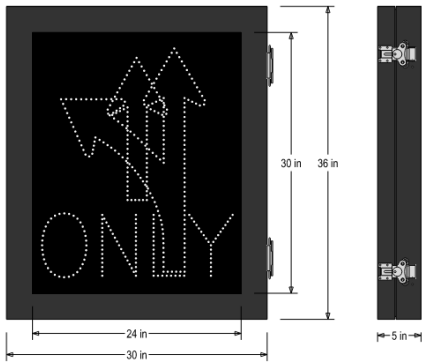
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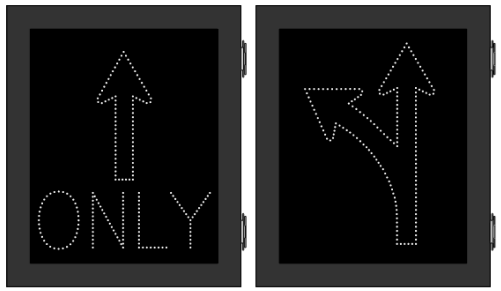
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Product View

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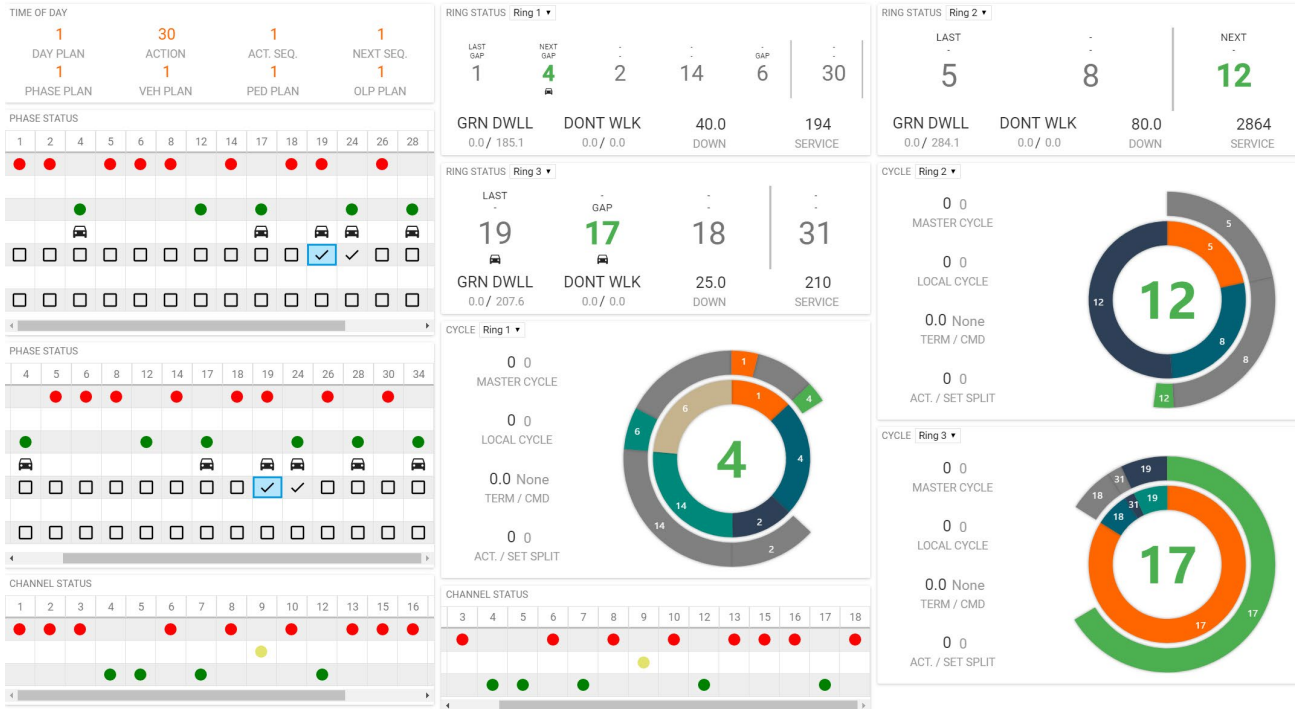


Sample Display Options



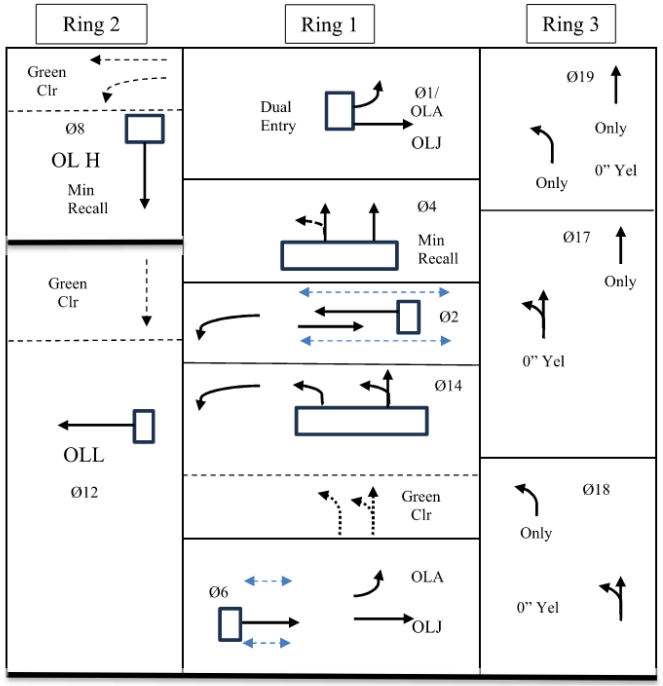
01312022 | DP

Developing Signal Timings



Switch between 4-Phase and 3-Phase Diamond operations by time of day.

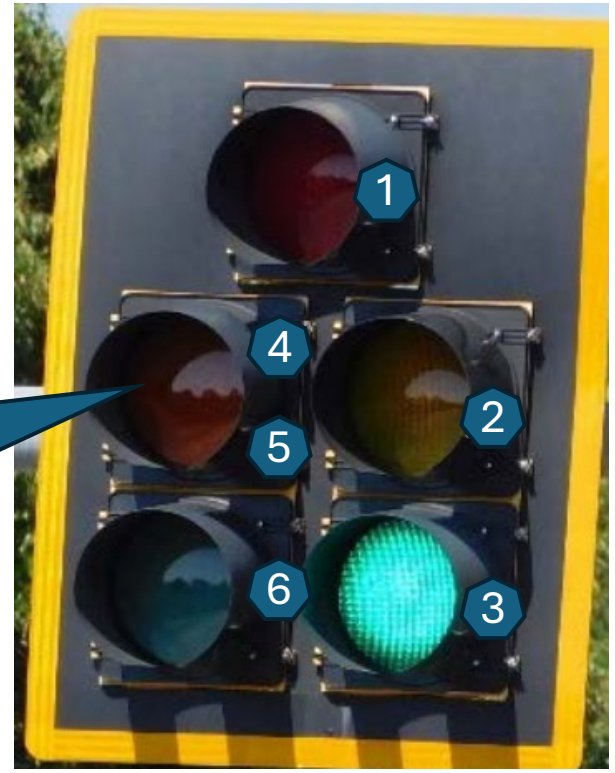
No- Serves:
Ø1 with Ø12
Ø8 with Ø2, Ø6, Ø14



Overlaps:
A = Ø1+Ø6; Neg Ov 3,4,7,9
B = Ø2
C = Ø14; Trailing Skip Ø1, Ø2+Ø8;
D = Ø4 +14; Neg Ph Ø17+Ø19; Trailing Skip Ø1, Ø2+Ø8;
E = Ø2 + Ø4+ Ø14; Neg Ph Ø8; Neg OLP 8; Trailing Skip Ø6; Green Suppress Ø8
F = Ø6
G = Ø4; Trailing Skip Ø1, Ø2+Ø8;
H = Ø8; Neg Ph Ø12; Trailing Skip Ø12;
I = Ø4; Modifier Ø14; FYA 3 Section; Trailing Skip Ø1, Ø2+Ø8;
J = Ø1 +Ø2 + Ø6; Neg Ov 3,4,7,9
L = Ø2 +Ø4 + Ø6+ Ø12 +Ø14; Neg Ph Ø8; Neg OLP 8; ; Green Suppress Ø8

6 Indications in 5 Section head

- Needed to warn drivers making permitted lefts during 3 phase operations.
- **FHWA Interim Approval IA-10 - 2006**
  - Allowed Bi-modal indications and incorporated in MUTCD 11th edition
- **Yellow Arrow Overlap Programming**
  - Overlap type 3 section FYA
    - Protected - Displays as Solid Yellow only
    - Permissive – Displays FYA and Clears Solid Yellow



Condition 1: Left Only & Shared Left – Thru AM Peak



Condition 2: Transition to Left only & Thru Only



Logic Requires NB Frontage Road to service 3 times before signs switch phases.

Condition 3: Transition to Shared Left-Thru & Thru Only (Off-peak)



Challenges and Solutions

- Conversion from Nextphase to Maxtime
- Using Channels 17 &18 to Monitor Dynamic Signs
- Collapsed Conduit in bridge – Rail Mounted Condit
- Ped knockdowns and VIVDS Detection
- 35 NEX TCP SB Entrance Ramp Closure – 3 Phase Operation
- Enhance roadway safety – FYA to warning left-turns
- Queue no longer backing up into 35 Mainlanes

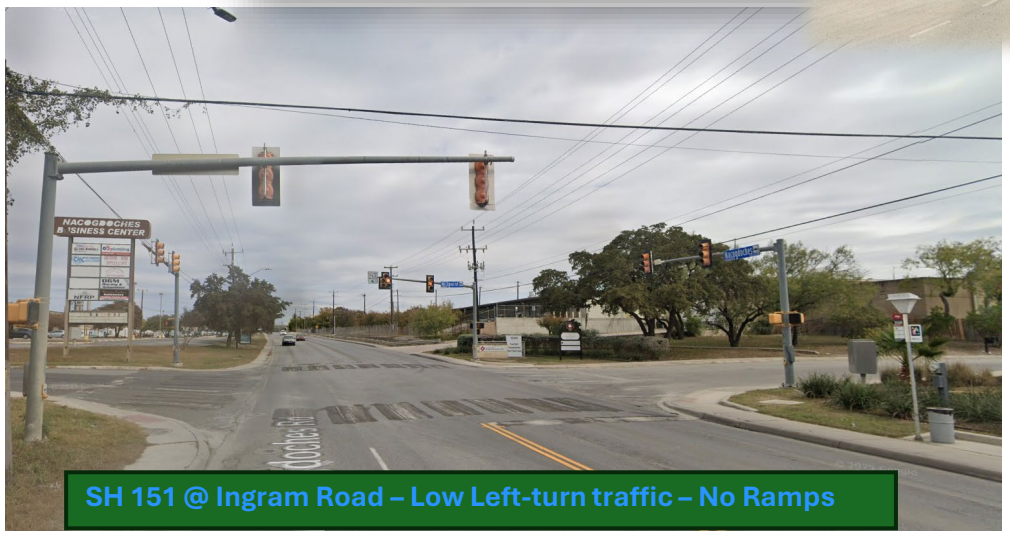




Future Projects Ideas

- Low Left-Turn Diamonds
- Incident Management
- Frontage Road Progression
- 4 lane Undivided Roadways
- Modernize traffic management systems
- Improve overall traffic-flow efficiency
- Lower Cost Solution where widening is difficult





Questions?



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