Alabama’s First Diverging Diamond Interchange
SR-181 at I-10 in Baldwin County

Jen Eubanks, P.E. – Asst Construction Engineer
ALDOT SW Region - Mobile Area
Alabama’s First DDI: SR-181@ I-10

- Location Overview
- Project Description and Timeline
- Construction
- Closure Sequence and Detour Planning
- Signal Operations
- Lessons Learned
- Questions
Growth and Development
Background Information
Purpose and Need

- Reduce congestion and delays
  - ADT (2018) = 47,567
  - ADT (2038) = 77,943

- Improve traffic operation and efficiency
  - LOS improvements throughout
  - Additional N. Bound lane on SR-181

- Safety improvements
Why a DDI?

Safety benefits:
- Fewer conflict points (14 vs. 26)
- Reduces crash severity.
- Improved sight distance at turns.
- Helps prevent wrong-way entry on ramps.

Operation and Efficiency benefits:
- Elimination of signal phases. (2 vs. 4)
- Improved Levels of Service

- Utilize existing bridge structures
- No Additional Right-of-Way
Construction

- Construction Letting – August 31, 2018
- Arrington Curb and Excavation Inc. – Prime Contractor
  - Ingram Signalization-Signals & Lighting
  - Ozark Striping-Striping/Markings/RPMs
  - Mobile Asphalt Company-Paving
  - Ozark Safety- Signs
  - Parker Grassing-Erosion Control
- $7,371,371.71
- Work began March 4, 2019 (Delayed start)
- Anticipated project completion – March 2021
- Current construction items: permanent striping, signage, minor concrete items, punch list cleanup and grading/dressing etc.
Construction Phasing

- **Phase II**
  - Deceleration Lane on EB I-10, Outside Ramp Widening, Outside US 90 & SR 181 Widening
  - Drainage N & S side of US 90 & Slope Paving/Sidewalks/ADA at US 90/SR-181
  - Signals on SR-181 at US 90, Dimitrios, & Eastern Shore Blvd. (All but the DDI)

- **Phase III**
  - Bridge Rail Retrofits, Slope paving @ 90/181, & Sidewalks/ADA @ Dimitrios
  - Signals at Ramps
  - Inside Ramp Widening & Leveling
  - Activate Signals & Switch to Final DDI Configuration

- **Phase IV**
  - Safety Barrier & Impact Attenuators & Construct Slope Paved Islands
  - Mill & Level SR-181, Mill US 90, & Place Wearing Surface on US 90/SR-181/Ramps
  - Install High Mast Lighting & Place Permanent Striping/Markings/RPMs
Signals / Pedestrian Items

- Lighting at all intersections and high mast for DDI
- Additional signage at pedestrian cross walks
October/
November 2019

Ramp Widening
& Drainage
December 2019/
January 2020

Bridge Rail Retrofits & Continued Ramp Widening Efforts
Spring 2020

Ramp Widening & Preparing for Swap
Closure Sequence & Detour Planning

- State and local officials coordinated to ensure the community was well represented in the decision-making process to switch traffic.
  - Multiple stakeholder meetings to clearly defined expectations & to establish productive communication lines
- Area Construction staff worked closely with Pre-Construction and Traffic staff to develop a detour plan for NB/SB AL-181
  - Kept as much access as possible to local businesses
- Final decision - 24/7 operations
  - Closing Sunday, June 28th at 9:00 pm
  - Opening by Wednesday, July 1st at 5:00 am.
Summer 2020

Traffic Swapped/
Preparing for Island work
and Final Asphalt work
Signal Operations

- Installed new controllers on Tuesday while interchange was closed
- Tested new timings in the field
Coordinated System

- TOD Plans
- 8 signalized intersections (including DDI)
- Approximately 1.5-mile length
- 120 second cycle length
- DDI has one single controller, runs in pre-time
DDI Phasing

Full Cycle

Condensed Cycle
Signal Phasing
Signal Phasing

Free

1

2

3

4

5
Signal Phasing

Free

2

5

7
Signal Phasing
Opening Morning

- Soft opening at 4:00 am
- Traffic began to build around 6:00 am
- Adjusted signal timings throughout the day
- One big problem arose – clock drift!
  - Mitigated with cell modems
  - Pulled corridor into central software
  - Scheduled clock checks within program
    - Resets clocks when exceeds threshold
    - Checks often
  - Haven’t had clock issues since
Alert

Information alert
Name: Clock Drift
Description:
Device: Signal US 31 @ AL 181
Detail: 5s, Time above Maximum Drift of 5s
DDI Signal Cabinet Wiring Anomaly

- Signal contractor was still working until Tuesday evening
- Report of issue with signal operation about 11pm
- Two conflicting phases were green at the same time!
Lessons Learned

- Signage and Stripe/Legends/Markings
- Concrete Island phasing
- TCP & more defined timeframes for control of work
- Single signal cabinet and controller for the DDI
- Pre-timed DDI signal operation
- Plan for implementation early
- Communications to mitigate clock drift
- Communication: Public Outreach & Media Relations
Questions?

- **Special Thanks to the Following:**
  - The City of Daphne, City of Spanish Fort, & Law Enforcement (Troopers and City)
  - Contractors & Vendor Support
  - Central Office Partners: Steve Walker, P.E., Taylor Stoudenmire, P.E., Cooper Calhoun, P.E., Jason Levandoski, P.E., and Supporting Staff
  - Local ALDOT Personnel
  - Michael Baker Intl
  - Local Traffic Section & Kimley-Horn

- **Contact Info:**
  - Jenifer Eubanks, PE – ALDOT
  - eubanksj@dot.state.al.us