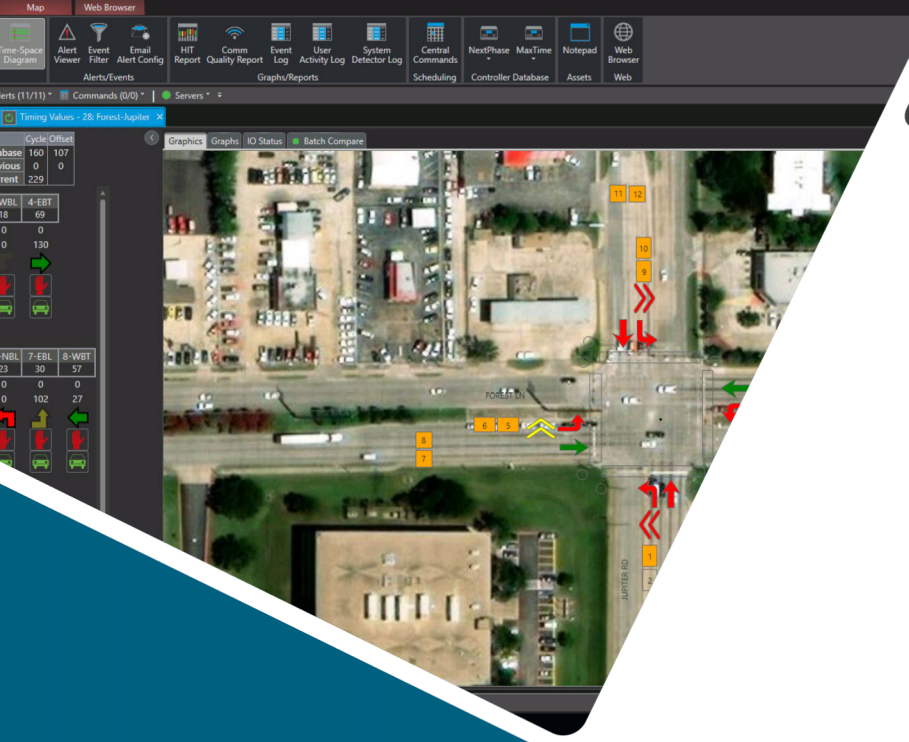
LEARN • COLLABORATE • SHARE • ENERGIZE



Kimley»Horn

SMART CITIES TECHNOLOGY FORUM

KPIs Before and After

»KITS
A Kimley-Horn Software Solution

»Kadence
A Kimley-Horn Software Solution

»Traction
A Kimley-Horn Software Solution

Agenda

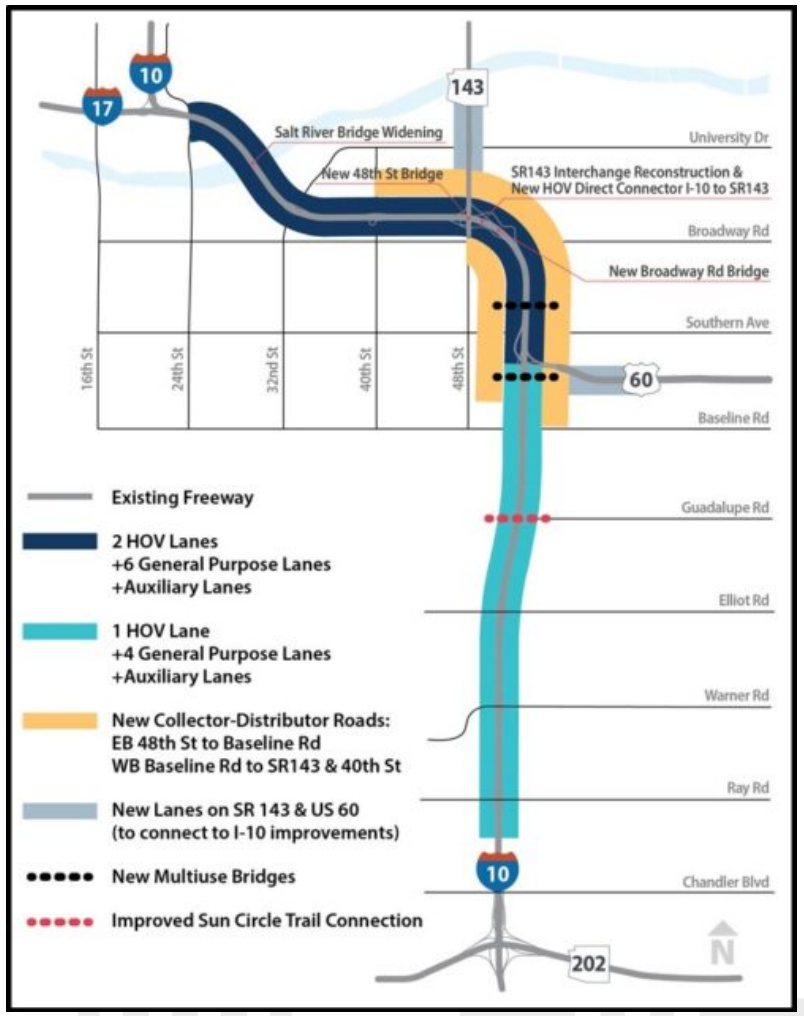
- Kadence
  - Brief Overview
  - Example use cases
    - City of Tempe
    - TxDOT
- Different ways Kadence has helped with KPIs

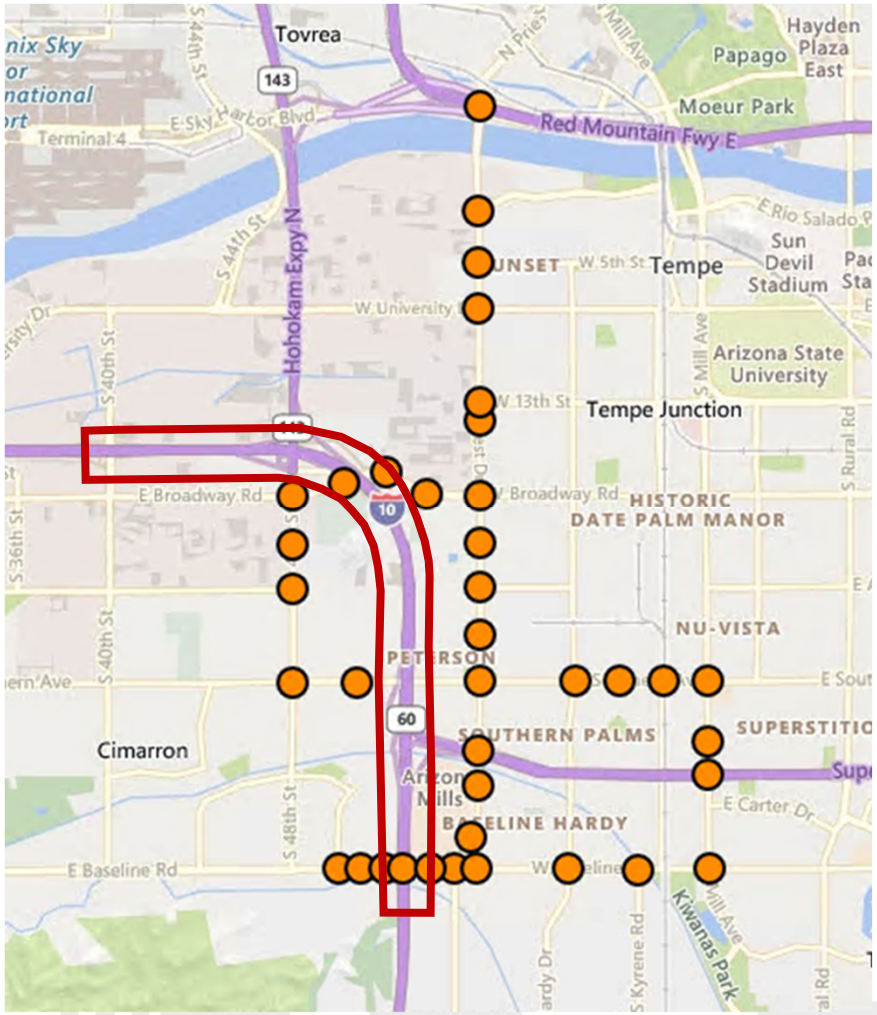
Kadence Overview

- Leverage existing infrastructure
  - No hardware to install
  - Need an application server and database server
- Highly configurable to tailor for multiple scenarios
  - Events
  - Freeway closures

City of Tempe – Broadway Curve Project

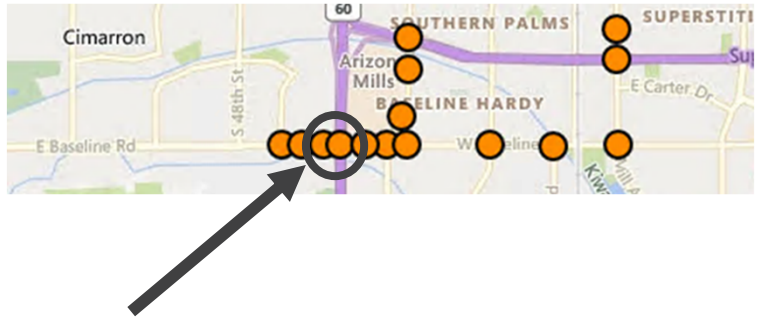
- Implemented Kadence to assist with traffic congestion and
- Assisted with configurations of detectors, sections and timing of signals for each





Results

Baseline and I-10

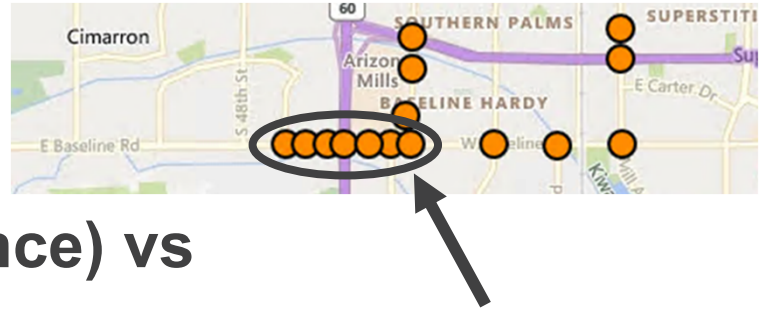


Time	Pattern	Cycle	Offset	Ph1	Ph2	Ph3	Ph4	Ph5	Ph6	Ph7	Ph8	Ring 1	Ring 2
9/10/2023 12:00:03 PM	50	130	101	51	39	0	40	38	62	0	30	1 4 | 2	8 5 | 6
9/10/2023 12:00:03 PM	4	130	101	51	39	0	40	38	62	0	30	1 4 | 2	8 5 | 6
9/10/2023 11:47:03 AM	49	95	29	30	31	0	34	42	31	0	22	1 4 | 2	8 5 | 6
9/10/2023 11:41:03 AM	50	95	29	29	34	0	32	41	34	0	20	1 4 | 2	8 5 | 6
9/10/2023 11:33:03 AM	49	95	29	33	29	0	33	43	29	0	23	1 4 | 2	8 5 | 6
9/10/2023 11:27:03 AM	50	95	29	31	32	0	32	41	32	0	22	1 4 | 2	8 5 | 6
9/10/2023 11:20:03 AM	49	95	29	29	35	0	31	40	35	0	20	1 4 | 2	8 5 | 6
9/10/2023 11:11:03 AM	50	95	29	27	34	0	34	38	34	0	23	1 4 | 2	8 5 | 6
9/10/2023 11:04:03 AM	49	100	31	28	37	0	35	40	37	0	23	1 4 | 2	8 5 | 6
9/10/2023 10:57:03 AM	50	105	33	32	38	0	35	47	38	0	20	1 4 | 2	8 5 | 6
9/10/2023 10:47:03 AM	49	110	35	37	38	0	35	49	38	0	23	1 4 | 2	8 5 | 6
9/10/2023 10:37:03 AM	50	115	37	32	43	0	40	54	43	0	18	1 4 | 2	8 5 | 6
9/10/2023 10:24:03 AM	49	120	39	31	43	0	46	61	43	0	16	1 4 | 2	8 5 | 6
9/10/2023 10:12:03 AM	50	125	41	33	48	0	44	56	48	0	21	1 4 | 2	8 5 | 6
9/10/2023 10:00:03 AM	49	130	43	36	48	0	46	61	48	0	21	1 4 | 2	8 5 | 6
9/10/2023 9:58:03 AM	50	95	43	26	35	0	34	45	35	0	15	1 4 | 2	8 5 | 6
9/10/2023 9:49:03 AM	49	100	46	26	39	0	35	47	39	0	14	1 4 | 2	8 5 | 6

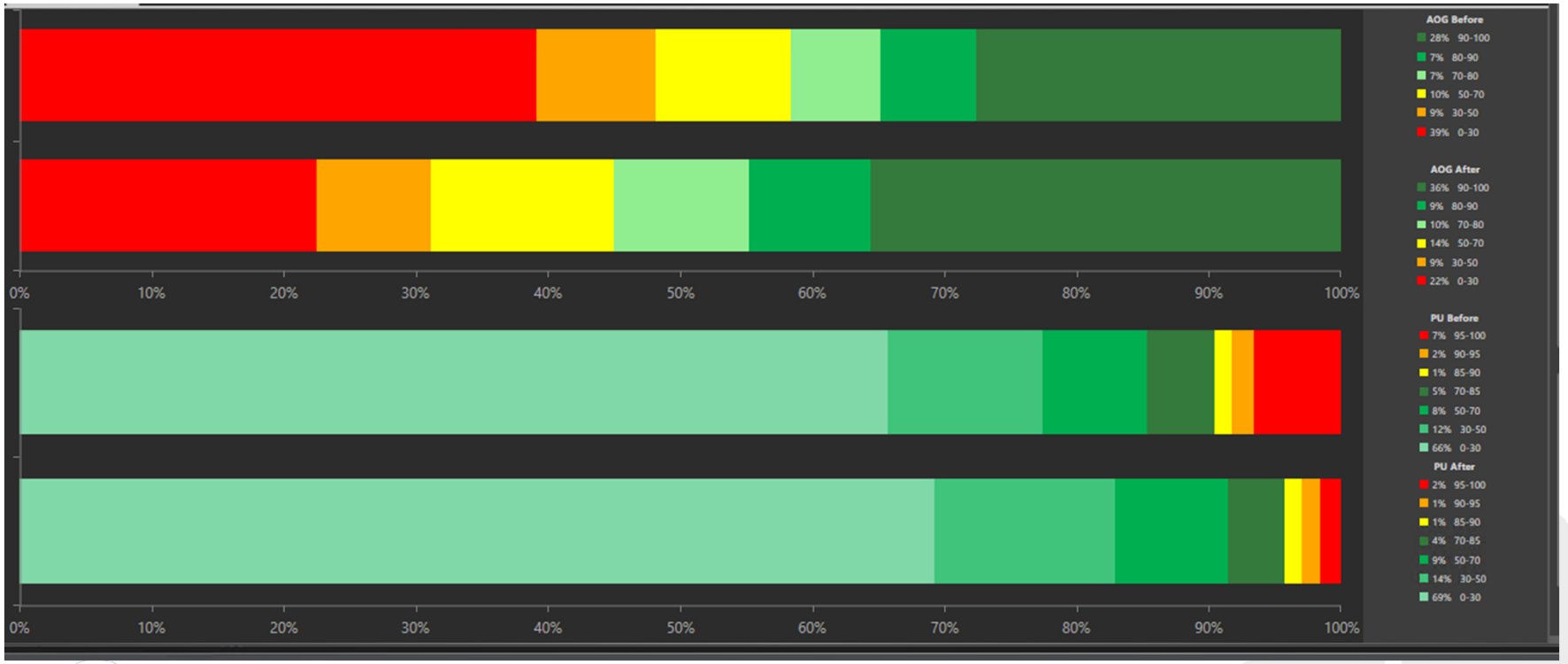
Color Coding: TOD Change | Monitor mode | Congestion Manager | Comm Fail Disable Section | Lower Value | Higher Value

Results

Baseline Section

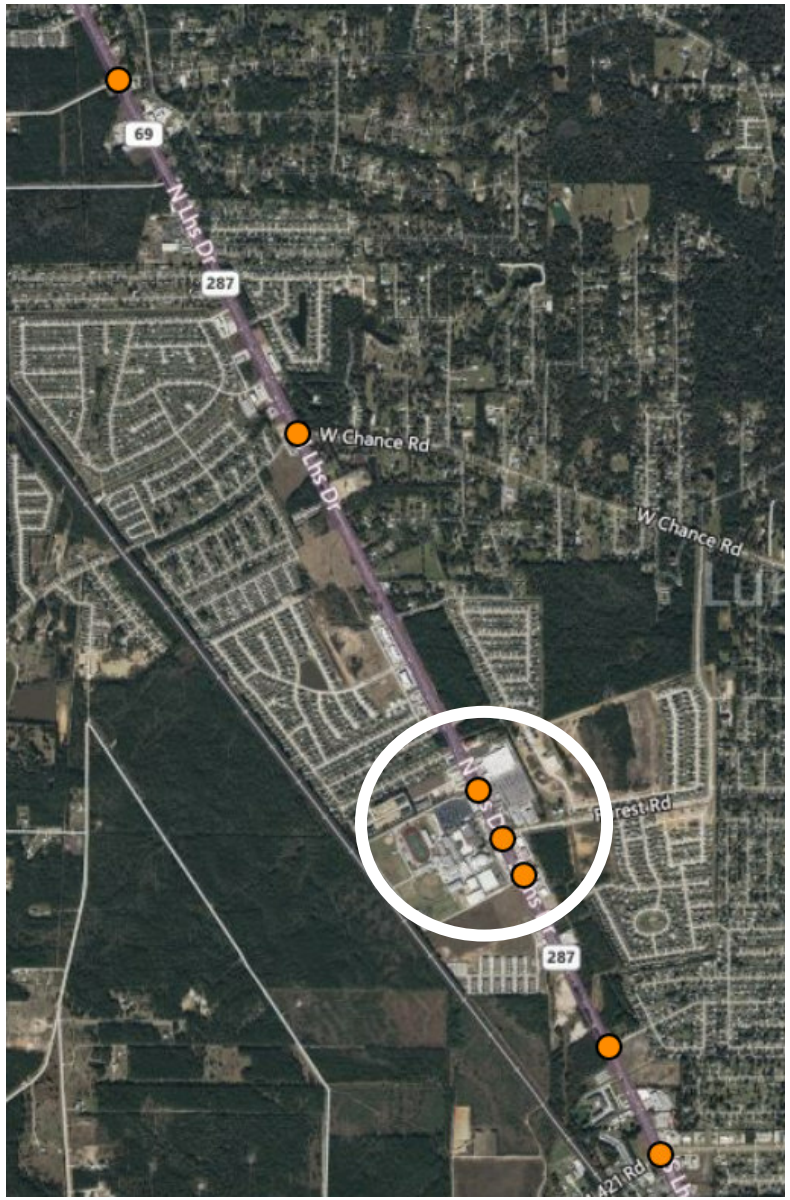


March Weekend Closure (No Kadence) vs June Weekend Closure (Kadence)



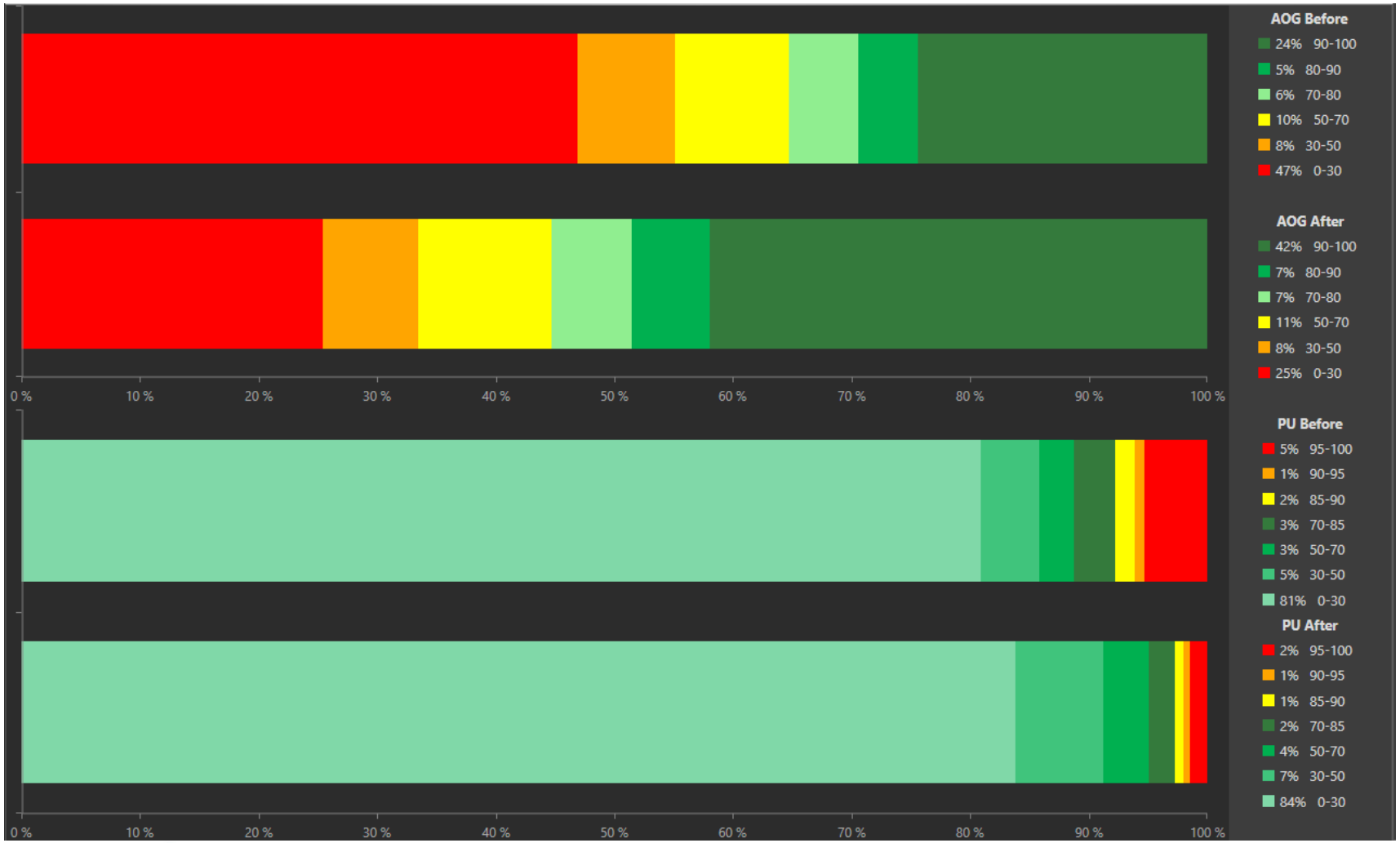
TxDOT

- Selected to address school peak traffic
- Difficulty with keeping closely clustered intersections coordinated



Results

All Day



Before Kadence

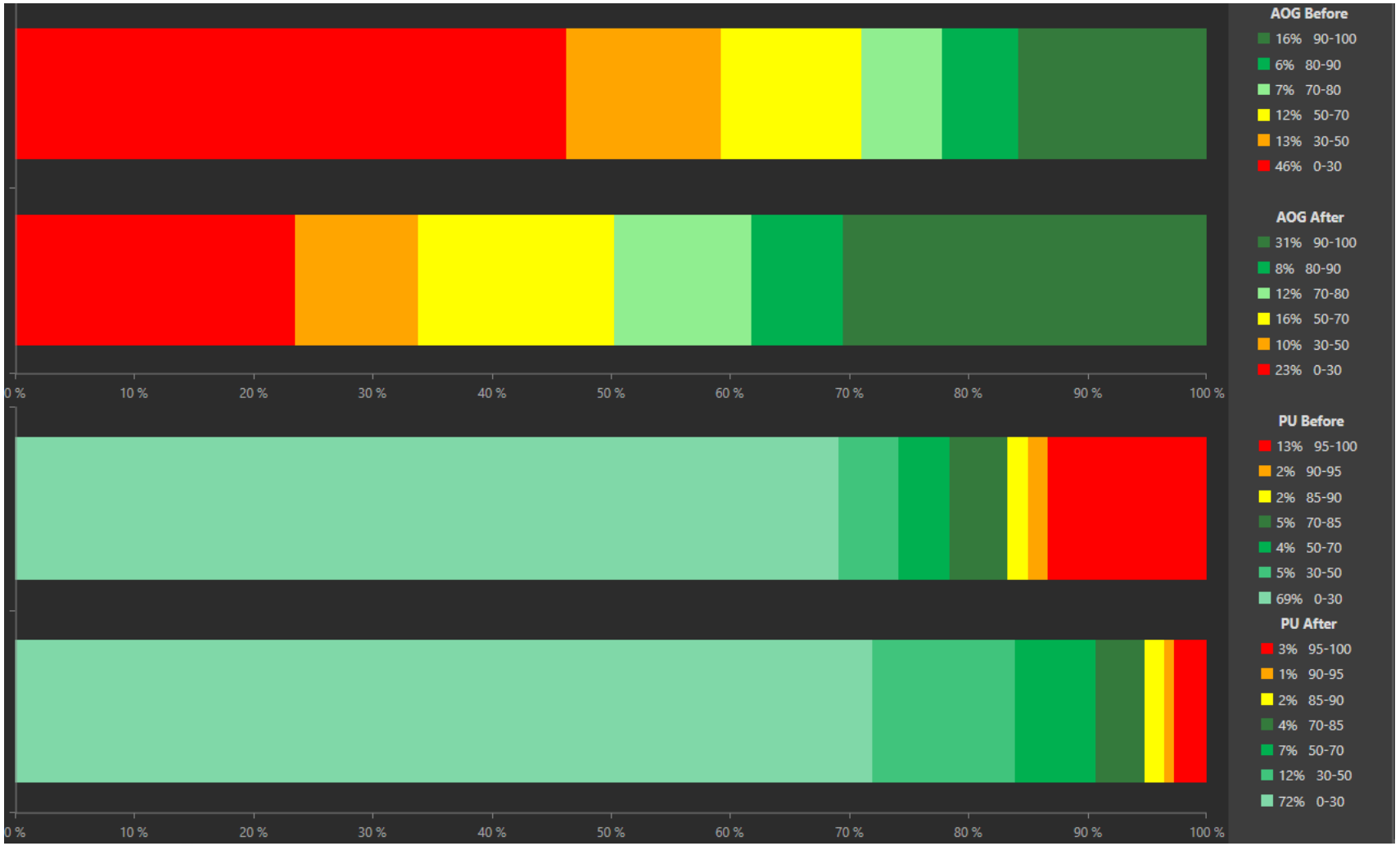
After Kadence

Before Kadence

After Kadence

Results

AM School Peak



Before Kadence

After Kadence

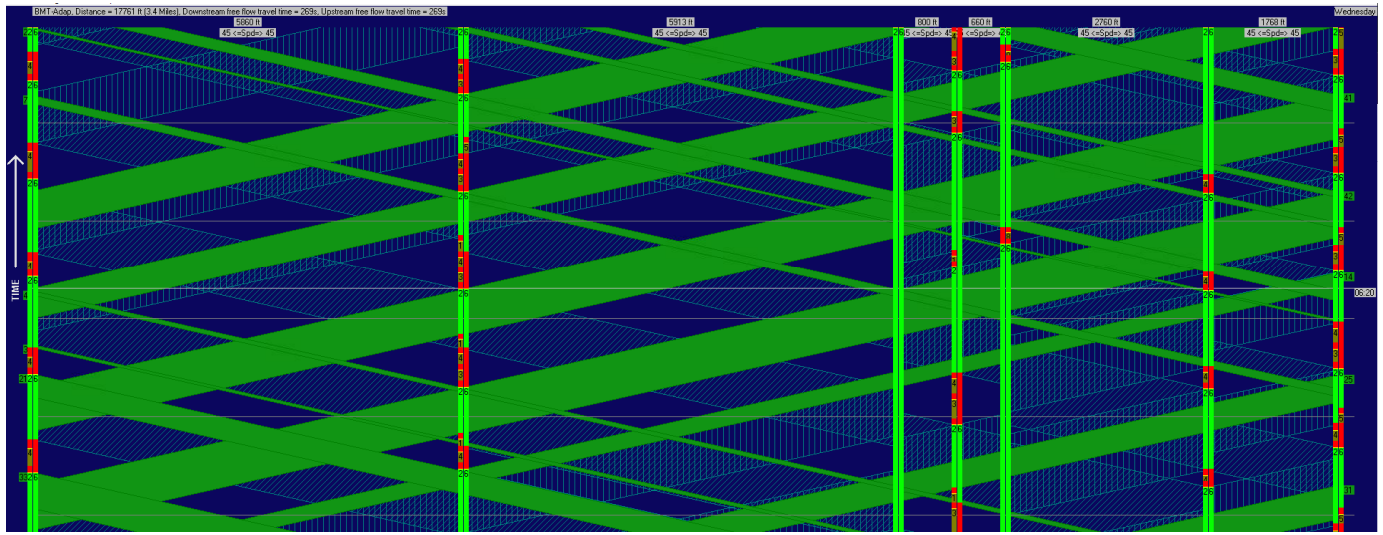
Before Kadence

After Kadence

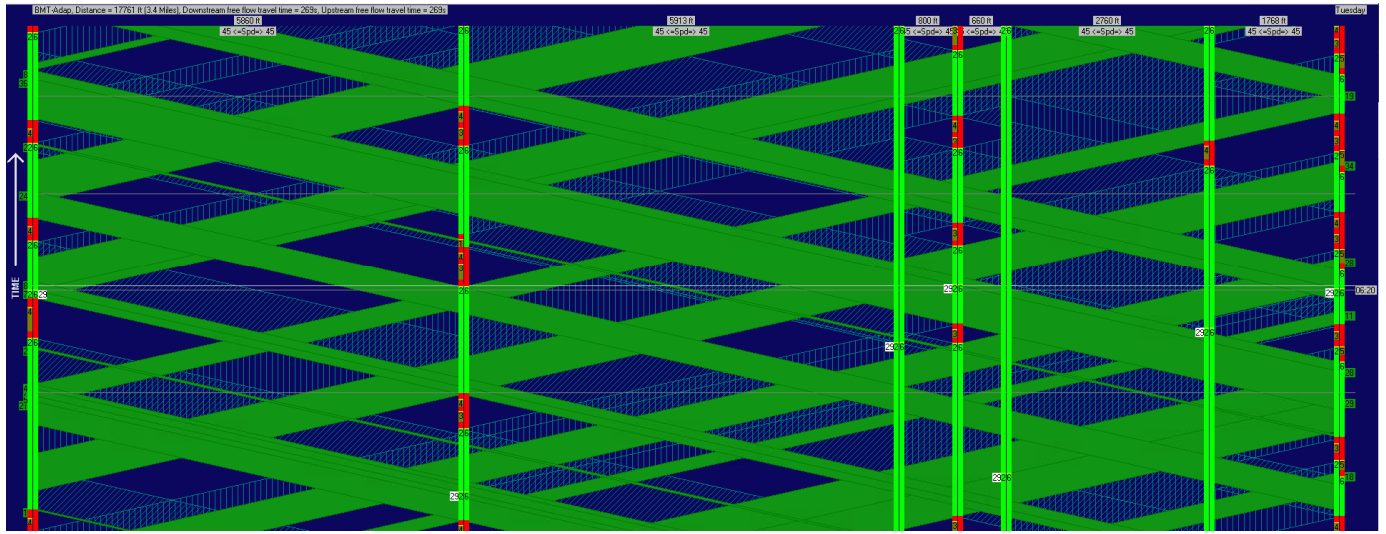
Results

North

South

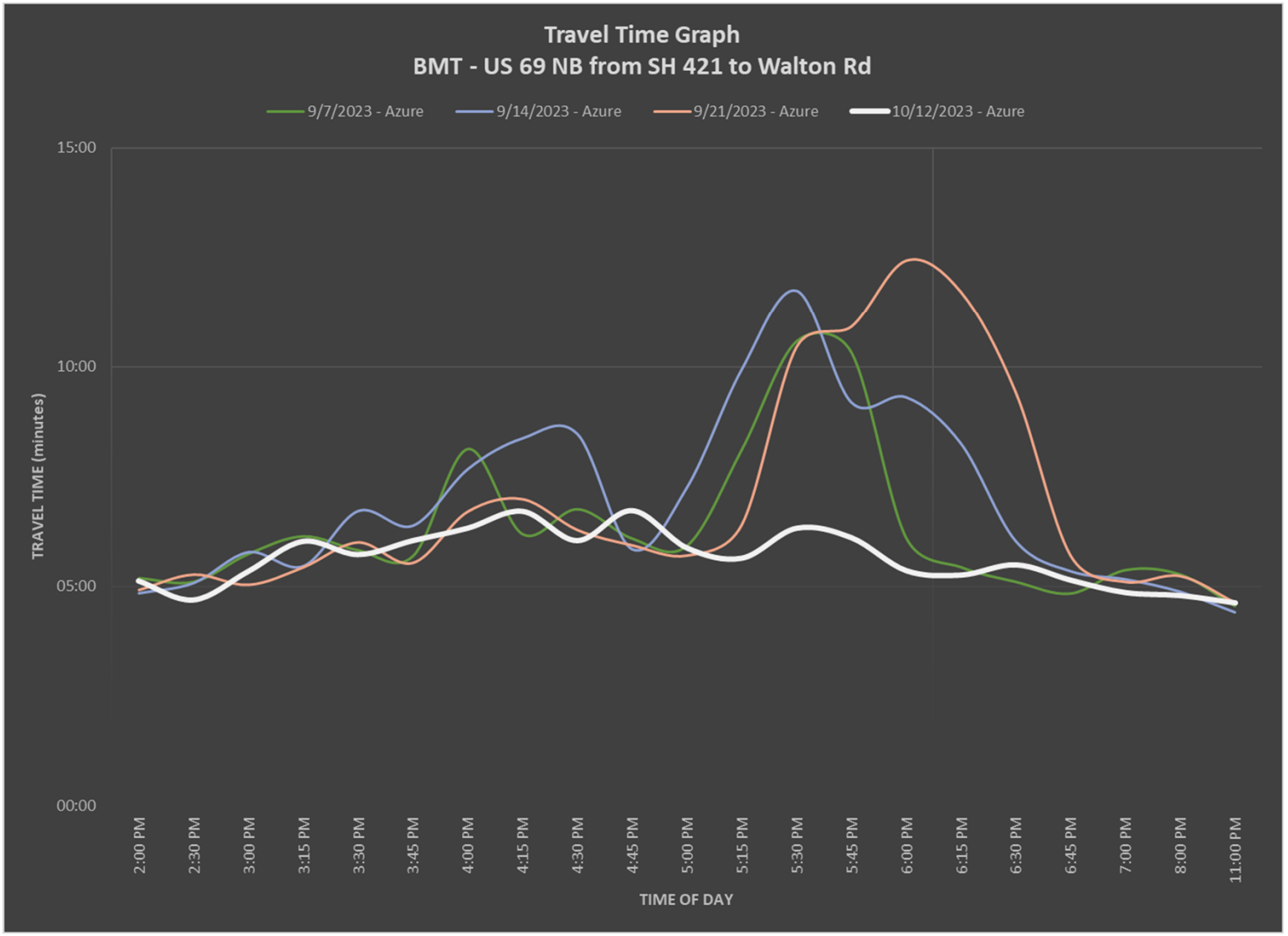


Before Kadence

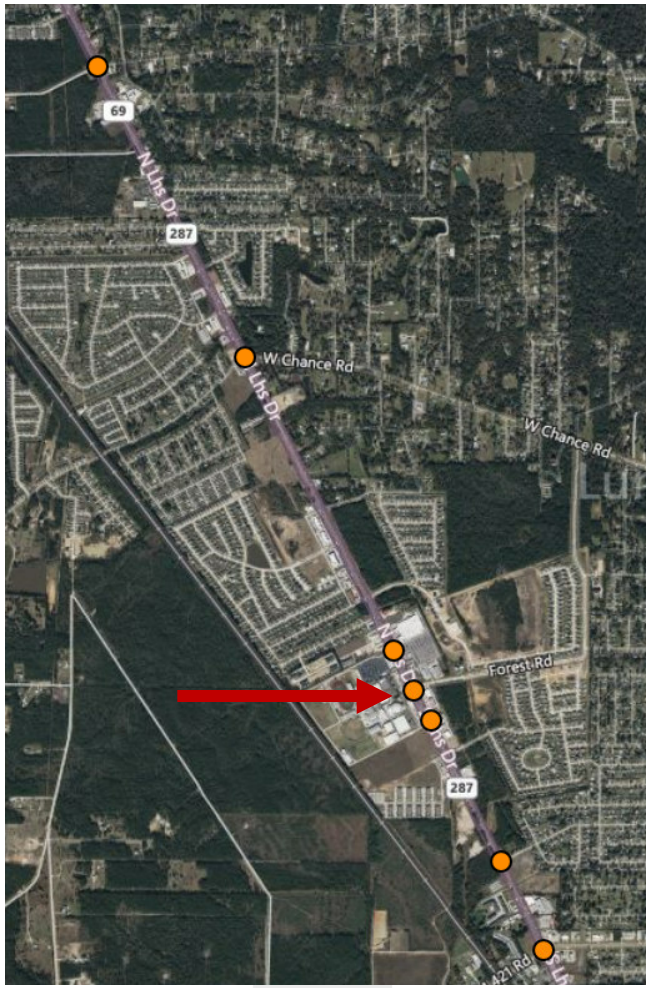


After Kadence

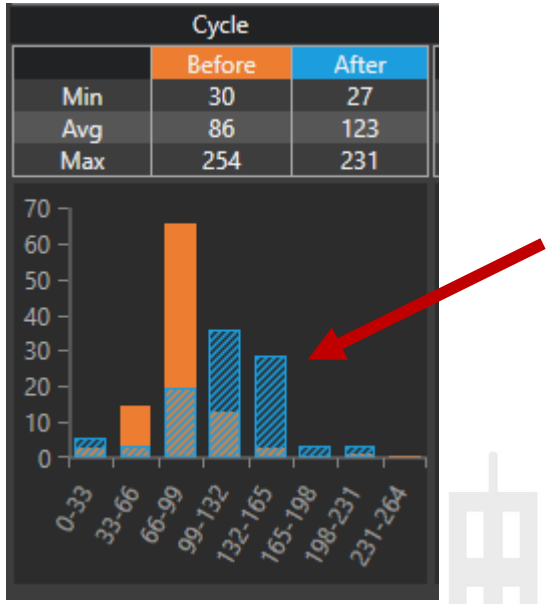
Results


Travel Time Graph
BMT - US 69 NB from SH 421 to Walton Rd
9/7/2023 - Azure
9/14/2023 - Azure
9/21/2023 - Azure
10/12/2023 - Azure
15:00
10:00
05:00
00:00
TRAVEL TIME (minutes)
2:00 PM
2:30 PM
3:00 PM
3:15 PM
3:30 PM
3:45 PM
4:00 PM
4:15 PM
4:30 PM
4:45 PM
5:00 PM
5:15 PM
5:30 PM
5:45 PM
6:00 PM
6:15 PM
6:30 PM
6:45 PM
7:00 PM
8:00 PM
11:00 PM
TIME OF DAY

Results



- Forest Road – between two school access drives
- Noticed cycle length was constantly being increased



Results

Time	Pattern	Cycle	Offset	Ph1	Ph2	Ph3	Ph4	Ph5	Ph6
10/25/2023 10:13:01 AM	30	95	58	11	26	42	16	12	25
10/25/2023 10:08:01 AM	29	80	49	11	26	27	16	12	25
10/25/2023 10:00:01 AM	102	80	49	12	24	28	16	12	24
10/25/2023 9:51:01 AM	30	90	78	11	31	32	16	12	30
10/25/2023 9:46:01 AM	29	105	91	11	39	39	16	14	36
10/25/2023 9:37:01 AM	30	105	91	11	39	36	19	12	38
10/25/2023 9:31:01 AM	29	90	78	11	31	27	21	12	30
10/25/2023 9:24:01 AM	30	90	78	13	30	29	18	12	31
10/25/2023 9:12:01 AM	29	105	91	20	34	32	19	13	41
10/25/2023 9:10:01 AM	30	90	78	17	30	27	16	12	35
10/25/2023 8:50:01 AM	29	90	78	11	31	32	16	12	30
10/25/2023 8:43:01 AM	30	105	91	11	32	39	23	12	31
10/25/2023 8:35:01 AM	29	105	91	11	31	47	16	12	30
10/25/2023 8:23:01 AM	30	120	104	11	39	54	16	12	38
10/25/2023 8:12:01 AM	29	135	117	11	47	54	23	12	46
10/25/2023 7:59:01 AM	30	150	130	18	49	54	29	12	55
10/25/2023 7:56:01 AM	29	165	143	20	54	59	32	12	62
10/25/2023 7:42:01 AM	30	165	143	30	54	49	32	12	72
10/25/2023 7:29:01 AM	29	160	139	22	54	58	26	12	64
10/25/2023 7:19:01 AM	30	145	126	22	53	48	22	12	63
10/25/2023 7:07:01 AM	29	145	126	20	58	46	21	13	65
10/25/2023 6:57:01 AM	30	130	113	16	56	38	20	15	57
10/25/2023 6:49:01 AM	29	115	100	14	45	40	16	12	47
10/25/2023 6:39:01 AM	30	115	100	14	44	37	20	12	46
10/25/2023 6:31:01 AM	29	130	114	12	48	46	24	12	48
10/25/2023 6:30:01 AM	101	120	114	11	45	42	22	12	44

Time	Pattern	Cycle	Offset	Ph1	Ph2	Ph3	Ph4	Ph5	Ph6
10/11/2023 10:07:01 AM	29	80	49	11	26	27	16	12	25
10/11/2023 10:00:01 AM	102	80	49	12	24	28	16	12	24
10/11/2023 9:33:01 AM	30	90	81	11	31	32	16	12	30
10/11/2023 9:23:01 AM	29	90	81	12	30	27	21	12	30
10/11/2023 9:15:01 AM	30	90	81	12	30	32	16	12	30
10/11/2023 9:09:01 AM	29	100	91	12	30	42	16	12	30
10/11/2023 9:00:01 AM	30	100	91	11	31	42	16	12	30
10/11/2023 8:53:01 AM	29	110	101	14	32	41	23	12	34
10/11/2023 8:44:01 AM	30	110	101	11	31	48	20	12	30
10/11/2023 8:34:01 AM	29	120	111	11	35	58	16	12	34
10/11/2023 8:23:01 AM	30	130	121	12	53	48	17	12	53
10/11/2023 8:11:01 AM	29	140	131	12	58	48	22	12	58
10/11/2023 8:01:01 AM	30	150	141	12	58	48	32	12	58
10/11/2023 7:49:01 AM	29	150	141	22	51	38	39	12	61
10/11/2023 7:37:01 AM	30	140	132	15	47	48	30	12	50
10/11/2023 7:26:01 AM	29	130	123	12	47	43	28	12	47
10/11/2023 7:16:01 AM	30	120	114	11	45	42	22	12	44
10/11/2023 7:09:01 AM	29	110	105	15	37	39	19	12	40
10/11/2023 7:00:01 AM	30	110	105	14	39	38	19	12	41
10/11/2023 6:53:01 AM	29	100	96	14	33	34	19	12	35
10/11/2023 6:45:01 AM	30	100	96	15	33	36	16	12	36
10/11/2023 6:39:01 AM	29	90	87	14	33	27	16	12	35
10/11/2023 6:33:01 AM	30	90	87	11	31	32	16	12	30
10/11/2023 6:27:01 AM	29	90	87	11	32	27	20	12	31
10/11/2023 6:18:01 AM	30	90	87	11	31	32	16	12	30
10/11/2023 6:08:01 AM	29	90	87	15	31	28	16	14	32
10/11/2023 6:00:00 AM	101	90	87	15	31	28	16	14	32

Questions?

Thank you