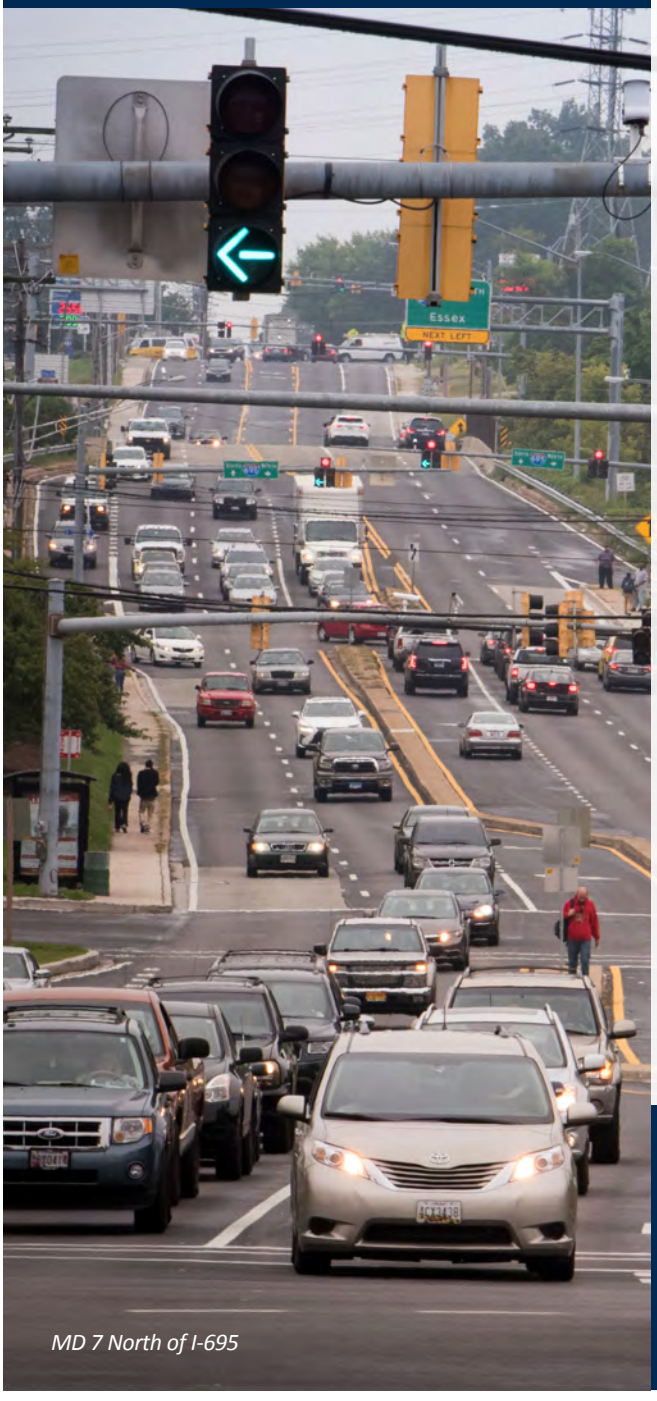
MD 97

MDOT SHA maintains 1,561 traffic signals in 257 signal systems in Maryland's 23 Counties.

2. SIGNAL OPERATIONS

Traffic signals provide control for conflicting movements at intersections along many arterial, collector and local roadways. This allows for roadway users to pass through the locations safely and efficiently. When signals are not properly timed or new traffic patterns emerge as a result of development they can result in longer travel time and delay. One of the most cost-effective ways to reduce delay and improve mobility is to optimize traffic signals to provide better progression. These projects provide improved safety and increased person throughput on corridors, by retiming of signals to be more responsive to traffic flows, thereby reducing delay to motorists and decreasing automobile emissions. Another benefit of signal retiming is that a more walkable environment can be established. The benefit cost ratio of improving signal timings ranges up to 40:1 on a nationwide basis as a result improving travel time, reducing the number of vehicles stopped, and fuel consumed.

In 2016, MDOT SHA's Signal Retiming Program reduced delay by 875,000 hours and saved 231,000 gallons of fuel. This resulted in $28.7 annual user savings.



MD 7 North of I-695

Various counties and municipalities operate traffic signals, but the majority are operated by MDOT SHA. These signal systems are often in need of timing upgrades due to changes in traffic volumes. The process of upgrading signal timing includes gathering new traffic volume data, performing traffic modeling, developing adjustments to the timing patterns, and conducting travel time analysis to evaluate the before and after results and performing final iterations to the signal timings. A total of 306 signals were reviewed and 202 signals were proposed to be retimed. New timings were installed on 16 systems involving 71 signals in calendar year 2016 throughout the state.

The signal systems that were reviewed are shown in Table II-3 and in Figure II-6 .

The highest benefits associated with any signal system upgrade from a number of vehicle hours of delay are as follows:

- MD 193 - Metzrott Rd. to 15th Ave.
- MD 4 - Ward Rd. to Town Center Blvd.
- MD 139 - I-695 Ramps to Kenilworth Dr.
- MD 210 - Old Fort Rd. South to Wilson Bridge Rd.
- MD 198 - Russett Green East to MD 197
- MD 450 - MD 202 to MD 564

These six (6) systems provide a reduction of more than 55,000 vehicle hours of delay annually. In addition, the following systems provided more than a 20% reduction in delay:

- Konterra Dr. at Muirkirk Rd.
- MD 4 - Ward Rd. to Town Center Blvd.
- MD 139 - I-695 Ramps to Kenilworth Dr.
- MD 108 - Centennial Ln. to Ten Mills Rd.

Overall, signal retiming and optimization modifications provided an estimated reduction of 875,000 hours of delay (8%) for motorists and saved nearly 231,000 gallons of gasoline.

Retimed signals in 2016 reduced delay by 8% compared to 2015 levels.

Figure II-6

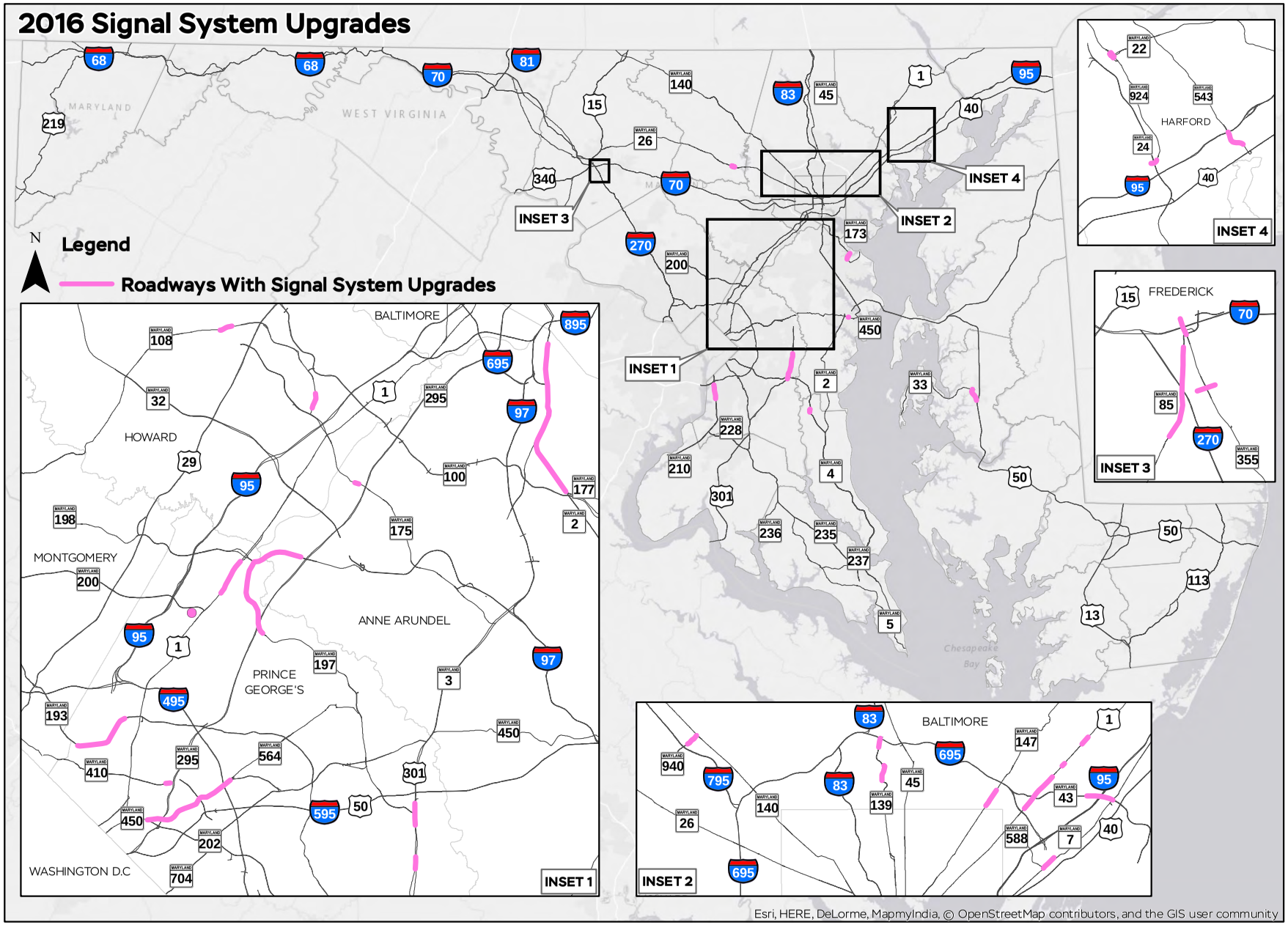

2016 Signal System Upgrades
N
Legend
Roadways With Signal System Upgrades
MARYLAND
WEST VIRGINIA
INSET 1
INSET 2
INSET 3
INSET 4
BALTIMORE
HOWARD
MONTGOMERY
PRINCE GEORGE'S
ANNE ARUNDEL
WASHINGTON D.C
HARFORD
FREDERICK
Chesapeake Bay
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Table II-3

2016 NETWORK DELAY SAVINGS FOR SIGNAL SYSTEM UPGRADES		
LOCATION	**NO. OF SIGNALS**	**DELAY SAVINGS (VEH-HRS)**
MD 193 - Metzerott Rd. to 15th Ave.	8	120,000
MD 4 - Ward Rd to Town Center Blvd.	2	101,000
MD 139 - I-695 Ramps to Kenilworth Dr.	3	96,000
MD 210 - Old Fort Rd. South to Wilson Bridge Dr.	7	76,000
MD 198 - Russett Green East to MD 197	8	68,000
MD 450 - MD 202 to MD 564	20	56,000
Konterra Dr. at Muirkirk Rd.	1	52,000
US 1 - Contee Rd. to Montrose Ave.	7	43,000
MD 43 at I-95 between NB and SB on and off ramps	3	38,000
MD 197 - S. Laurel Dr. to MD 198	14	30,000
MD 108 - Centennial Ln. to Ten Mills Rd.	2	22,000
US 301 - Excalibur Rd. to Governor Bridge Rd.	4	21,000
MD 85 - Guilford Dr. to Westview Dr.	10	18,000
MD 322 - MD 33 to Washington St.	6	17,000
MD 26 - Hemlock Dr. to Monroe Ave.	3	15,000
MD 7 - MD 588 to Rossville Blvd.	5	14,000
MD 175 - National Business Pkwy to Shannons Glen Dr.	2	12,000
MD 147 - Putty Hill Rd. to Taylor Ave.	4	12,000
MD 450 - Admiral Dr. to Chinqupin Round Rd.	2	10,000
US 301 - Trade Zone Ave. to Marlboro Square SC	7	9,000
MD 173 - Bar Harbor Rd. to Edwin Raynor Blvd.	5	8,000
US 1 - Fitch Ave. to Silver Spring Rd.	10	7,000
MD 410 - 62nd Ave. to 67th Ave.	6	6,000
US 1 BUS/MD 22/MD 924 - Pennsylvania Ave. to Fulford Ave.	10	6,000
MD 2 - 8th Ave. to MD 177	14	6,000
MD 543 - I-95 Ramps to Brass Mill Rd.	5	5,000
MD 924 - Constant Friendship Blvd. to Woodsdale Rd.	4	4,000
MD 108 - Lark Brown Rd. to Mayfield Blvd.	4	3,000
MD 139 - GBMC to Chestnut Rd.	3	N/A
MD 355 - Holiday Dr./Genstar Dr.	3	N/A
MD 355 - MD 85 to Walser Dr.	6	N/A
MD 940 - Dolfield Rd. to MD 140 Connector	2	N/A
US 1 - Chapel Rd. to Forge Rd.	3	N/A
US 1 - Joppa Rd./India Ave. to Ebenezer Rd.	3	N/A
US 301 - Mitchellville Rd. to Pointer Ridge Dr.	2	N/A
Total	198	875,000

MD 24

A major part of the optimization effort relates to the implementation of Centracs for adaptive signal system operations. The adaptive system allows for timings to be adjusted based on conditions such as allowing more green time for the major road when necessary. The second adaptive signal system was implemented on MD 24 in the Bel Air area at 13 intersections. An 8.1% delay reduction has occurred for corridors with an adaptive signal system.

Transit signal priority (TSP) is another initiative to improve person throughput. This allows transit vehicles to either pre-empt a signal to provide a queue jump or to extend the green to improve travel time and reliability. A joint state/county policy and criteria for location identification has been developed, and corridors have been screened to determine the most beneficial locations for potential implementation. The first project is located on MD 355 in Montgomery County. Initial deployment with funding is anticipated in 2017/2018 and will be for Ride On additional express bus service between Lakeforest Mall and the Medical Center Metro Station. TSP is being installed at 30 intersections along the route to allow Ride On Extra buses to take advantage of the technology. Transit service is scheduled to begin in the Fall of 2017.