

Technical Report

Professional Services Delaware Valley Regional Planning Commission New Jersey Traffic Signal Retiming Initiative

Mercer County Route 638, Clarksville Road From N. Post Road to Penn Lyle Road/Harris Road

In West Windsor Township, Mercer County, NJ

November 12, 2019

Prepared For:



Prepared By:



I. Summary

A. *Project Overview*

Under contract with Delaware Valley Regional Planning Commission (DVPRC), in cooperation with Mercer County and the New Jersey Department of Transportation, the Consultant Project Team has completed traffic signal retiming work at two (2) signalized intersections along County Route 638, Clarksville Road, in West Windsor Township, Mercer County. This work started in May 2018, following the completion of the Phase 1 of the project which established a corridor priority list with the County. In accordance with the process established by DVPRC, updated timing plans, including adjustments to cycle length and splits, were completed by December 15, 2018.

Between the project meeting and implementation, field data collection activities were conducted, including peak hour turning movement counts, controller assessments and 'before' travel time runs. The collected data was analyzed using traffic engineering software including Synchro™ and Tru-Traffic™. New timing plans were developed for the two intersections which were implemented by the consultant team in October 2018. Fine-tuning and field observations were conducted throughout implementation, resulting in timing/program changes to those initially implemented. The final timings are documented herein. This brief report summarizes the activities, observations, and results of this project.

B. *Project Description*

The project consists of the two intersections of Mercer County Route 638 (Clarksville Road) and North Post Road as well as Clarksville Road (CR 638) & Penn Lyle Road/Harris Road. Clarksville Road is oriented in



Photo 1: Looking SB on North Post Road during typical PM peak hour.

an east-west direction and is a major connector between Quakerbridge Road to the west and Princeton-Hightstown Road and Cranbury Road to the east. The roadway is heavily used by commuter traffic.

Initially, the intention of the project was to coordinate the two traffic signals on Clarksville Road, providing for progression of traffic. The spacing between the two project signals is approximately 3,275 feet (0.62 miles). The roadway between the two signals is a two lane, bidirectional roadway, with twelve-foot lanes and varying

shoulder width. The east to west oriented corridor is an Urban Minor Arterial with varying speed limits of 35 and 45 miles per hour. The major street at both intersections is Clarksville Road.

A decision was made during implementation to maintain free controller operation at the two intersections for four major reasons:

1. The controller assembly at Clarksville Road and Penn Lyle Road/Harris Road was at the end of its useful life. The controller unit in the assembly was a Multisonics 820A, which has been out of production for approximately ten years. The assembly on the street was in an undersized cabinet, with the controller, detection and preemption devices present. The controller appeared to be

about twenty years old. The consultant team approached Mercer County about replacing the controller unit, but given the highly constrained space in the cabinet, a decision was made to leave the Multisonics 820 in place. Given the age of the controller, the possibility of controller time clock drift seemed highly likely.

2. A school zone dropping the speed limit to 25 MPH in the vicinity of the Maurice Hawk Elementary School impacted progression.
3. An actuated pedestrian crossing with a rectangular rapid-flashing beacon, and a crossing guard requiring motorists to stop for pedestrians in the crosswalk impacted progression during school arrival/departure hours.
4. The impact of the Princeton Junction Transit Station on operations at North Post Road was significant. The North Post Road approaches operate capacity-restrained during commuter peak hours, largely due to the influence of the transit station.

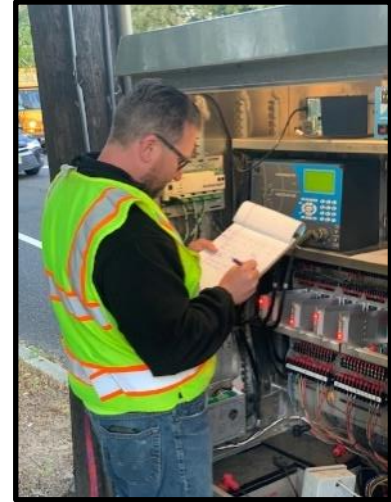


Photo 2: McMahon Associates checking controller settings at Clarksville Road and North Post Road.

Clarksville Road and North Post Road: The intersection of Clarksville Road & North Post Road has exclusive left turn lanes with storage. Eastbound Clarksville Road approach has a protected/permissive left turn phase, while the other three approach legs experience permissive left turns. Countdown pedestrian signal heads and crosswalks exist for all pedestrian movements. Autoscope™ video detection exists for the Clarksville Road approaches, and for the southbound North Post Road approach.

The controller at this intersection is on the southeast corner and is base mounted with battery backup. The current controller is an Econolite ASC/3-2100; the cabinet, in general, was in good to excellent condition.



Photo 3: Multisonics 820A controller at Penn Lyle/Harris. Note presence of emergency preemption, NEMA monitor, and Autoscope interface. Monitor is placed on its side as space is limited in this cabinet.

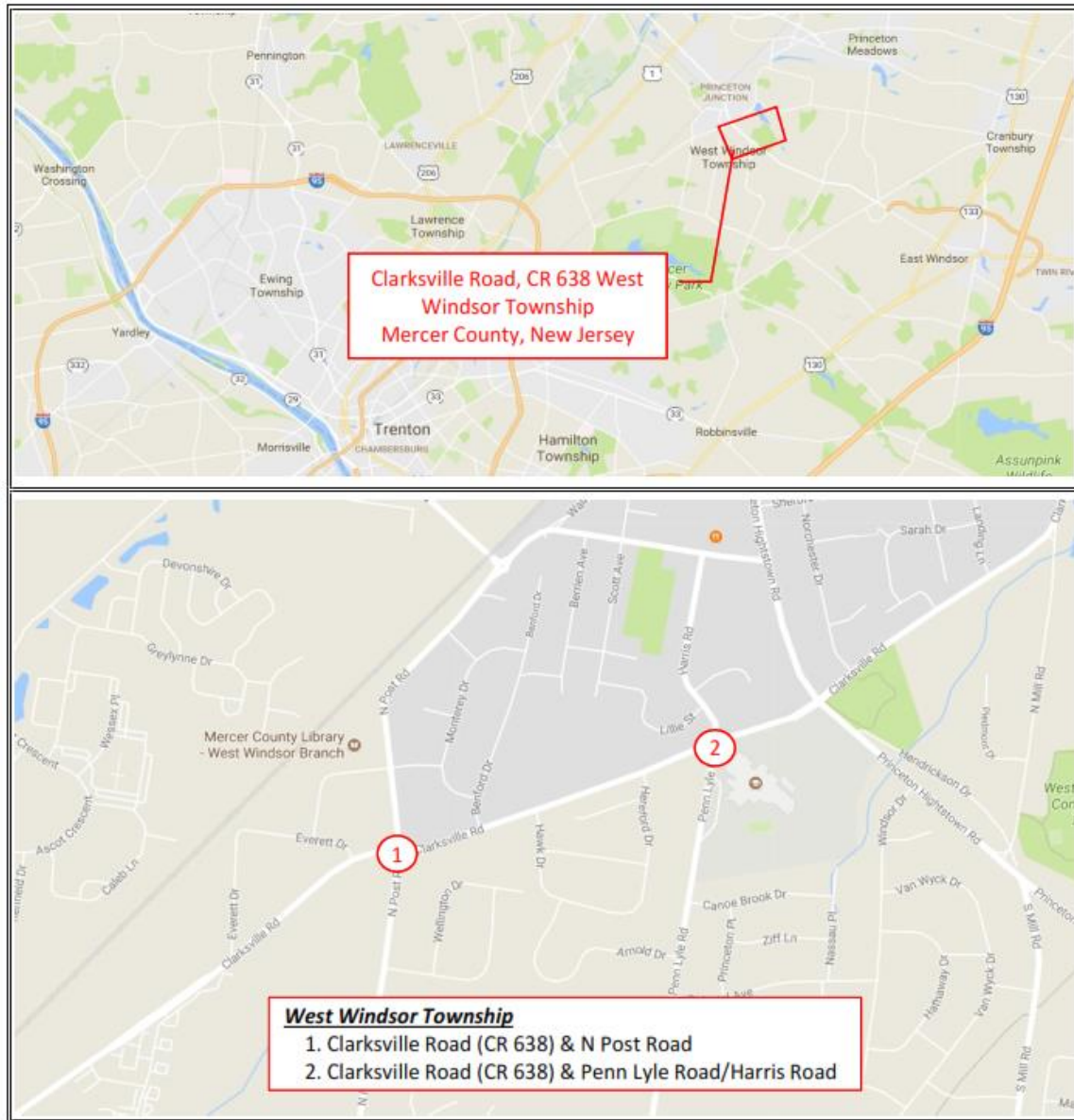
Clarksville Road and Penn Lyle/Harris Road: The intersection of Clarksville Road and Penn Lyle Road from the south and Harris Road from the north is a 3-phase signal; eastbound Clarksville Road lead left and thru phase (2+5), eastbound/westbound Clarksville Road main street phase (2+6), and lastly northbound/southbound Penn Lyle Road/Harris Road right of way (4+8). Pedestrian signal heads and crosswalks exist for all pedestrian movements. Autoscope™ video detection is utilized at all approach legs, as well as the presence of a non-operational preemption for emergency vehicles. The controller at this intersection is on the southwest corner and is base mounted. The current controller is a Multisonics 820A; the cabinet, in general, was in poor to fair condition. Equipment appears to be at the end of its useful life.

Land use around these two intersections is primarily residential. The West Windsor Municipal Complex is located on the northwest quadrant of Clarksville Road (CR 638) & North Post Road. Between the two signalized intersections, on the north side of Clarksville

Road (CR 638) is the Maurice Hawk Elementary School. To the east, on the southeast quadrant of Clarksville Road (CR 638) & Penn Lyle Road/Harris Road is the West Windsor-Plainsboro High School South.

The project location is shown in **Exhibit 1**.

Exhibit 1 - Project Location and Intersections



Each of the intersection controller cabinets was missing a hard copy of the intersection electrical plan and layout plan. The existing day plan for the project intersections was free of coordination, 24 hours a day, every weekday and weekend. The existing day plan schedule for the two intersections is shown in Appendix A.

II. Data Collection

A. *Turning Movement Counts*

Peak hour intersection counts were conducted at the above intersections during the weekday morning (7:00 am to 9:00 am), weekday mid-day (11:00 am to 1:00 pm) and evening (4:00 pm to 6:00 pm) peak hour periods. Saturday counts were taken between 11:00 am and 1:00 pm. The manual turning movement counts were taken on Saturday, November 11, 2017 and Tuesday, November 14, 2017 by Imperial Traffic & Data Collection. The TMCs are available on the project website, <http://dvrpc.taylorwiseman.com/>.



Photo 4: Observed Congestion WB on Clarksville Road at Post Road during the AM Peak Hour.

B. *Automatic Traffic Recorder (ATR) Counts*

In May 2018, automatic traffic recorder counts were taken. The recorded volume was as follows:

Table 1
Average Daily Traffic
Clarksville Road, Mercer County Route 638
May 2018

Location	Average Daily Traffic
131: Clarksville Road, between N Post Road & Penn Lyle Road – EB Traffic	8,234 vehicles
Clarksville Road, between N Post Road & Penn Lyle Road – WB Traffic	9,553 vehicles
Total ADT	17,787 vehicles

The twenty-four hour counts clearly show the fluctuation of traffic volumes during the day along Mercer County Route 638. Based on the daily volumes, motorists tend to travel west in the morning, and east in the evening peak hours. Field observations confirmed the traffic data.

C. *Traffic Signal Timing and Phasing Data*

Traffic signal timing and phasing data were obtained from the existing timing directives obtained from Mercer County (**see Appendix A**). Movement, sequence and timing information was documented from the controller panel on each controller. The time and date settings were compared to atomic time and synchronized.

D. *Traffic Signal Timing and Phasing Data*

Traffic signal timing and phasing data were obtained from the existing timing directives obtained from Mercer County (**see Appendix A**). Movement, sequence and timing information was documented from the

controller panel on each controller. The time and date settings were compared to atomic time and synchronized.

E. Field Review of Existing Operations

Field notes were collected at both intersections on various signal, geometric and traffic characteristics to assist in model development and signal optimization. Information gathered included lane geometry, storage lengths, number and types of signal heads, cabinet and pedestrian push button locations, and signal phasing.



Photo 5: PM Congestion EB on Clarksville at Post.

Posted speed limits, left turn types (protected, protected/permitted, or permitted), turn restrictions, and the presence of roadway lighting and signal back plates were noted. Pedestrian push buttons were tested for proper operation during the field review. Any other unique characteristics were also recorded.

III. Analysis and Implementation

A. Modeling

The Project Team developed a set of base Synchro™ Version 10 models for management of the new traffic data, initial analysis of the intersection with and without various timing changes and a screening level review of each intersection's overall potential for capacity-level improvements using the Intersection Capacity Utilization (ICU) Methodology. Microscopic simulation using SimTraffic™ was used to assess the impact of unmet demand, turn pocket overflow, metering and spillback, and the effects of origin-destination pairs.

B. Implementation

In October 2018, the consultant team implemented the optimized timing plans into each of two field controllers. The implemented timing plans call for the signals to remain uncoordinated. The consultant team verified that each controller maintained a common time standard throughout implementation.

Clarksville Road and North Post Road: Traffic conditions at this intersection presented a unique challenge as traffic patterns were more complex than the intersection turning movement count/Synchro analysis suggested. As previously discussed, Clarksville Road has numerous constraints, including a pedestrian crosswalk and school crossing immediately to the east of Post Road combined with significant directional commuter movements (to the west in the AM peak, to the east in the PM peak.) Post Road also has substantial directional demand largely due to the proximity of the Princeton Junction Transit Station, a major NJ Transit/AMTRAK hub less than a mile north of the intersection. Post Road traffic is most notable northbound in the AM peak and southbound in the PM peak. During peak commuter hours (morning and evening), both the major street (Clarksville Road) and the minor street (North Post Road) are at capacity, so much so that moving one second from one phase to another had notable impact on intersection operations. In an effort to make the intersection as responsive as possible to known traffic patterns, and to minimize delay at the intersection, the TWT team implemented a “ramp-up” approach during both the morning and afternoon commuter hours. In the periods between 6:00 AM and 7:30 AM, and 2:00 PM and 5:00 PM, we have allocated time aggressively in favor of North Post Road. During the second half of both

the morning and afternoon commuter hours, time is taken from North Post Road and added to Clarksville Road to mitigate what appears to be continuous flow. This strategy resulted in most motorists being accommodated in one cycle length or less, which is an improvement over the existing scenario. A summary of the programs implemented at Clarksville Road and North Post Road is presented in **Table 2**.

The phasing at the intersection provides for an eastbound advance (left-turn, permissive) on Clarksville Road. The post-implementation timing plan is presented in Appendix B.

Table 2
Weekly Program Chart
Clarksville Road and North Post Road
October 2019

Event	Day	Time	Program	Remarks
1	1-5	00:00	FREE	FREE/WEEKDAY OVERNIGHT
2	1-5	06:00	4	WEEKDAY AM RAMP UP
3	1-5	7:30	1	WEEKDAY AM
3	1-5	9:30	2	WEEKDAY MIDDAY
4	1-5	14:00	3	WEEKDAY PM RAMP UP
5	1-5	17:00	1	WEEKDAY PM
6	1-5	18:30	3	WEEKDAY EVENING
6	1-5	20:00	FREE	FREE/WEEKDAY OVERNIGHT
7	6-7	09:00	2	WEEKEND PEAK
8	6-7	20:00	FREE	FREE/WEEKDAY OVERNIGHT

Day 1 = MONDAY
Field Verified: 10-01-2019

Clarksville Road and Penn Lyle/Harris Road: At Clarksville Road & Penn Lyle Road/Harris Road, the signal runs in free operation with a background cycle length of 90 seconds throughout the day. The corridor was observed during all (AM, Midday, PM, PM Off-Peak, and weekend) timing plans once implemented. No issues were identified at this intersection during the implementation period. The post-implementation timing plan is presented in Appendix B.

C. Fine-Tuning of Signal Timings

The TWT Team observed each new timing plan at each intersection during each programmed time period to ensure each phase split was appropriate for the traffic conditions present. If a movement or intersection was over capacity, split adjustments were made to manage and minimize queue spillback and lane blockage.

As noted in the narrative, the intersection of Clarksville Road and North Post Road provided significant challenges as the intersection is operating near or at capacity during both the morning and evening

commuter hours. During these time periods, movement of one second from the major street to the minor, or vice-versa, did make a difference in queuing.

The revised signal timings are presented in **Appendix B**, and are also available from the project website, <http://dvrpc.taylorwiseman.com/>. Updated signal timing directives were developed by the consultant team, with electronic and paper copies delivered to Mercer County and laminated copies placed in each controller.

IV. **Results**

A. Intersection Operations

The consultant team did improve traffic operations slightly at the two intersections along Clarksville Road at North Post Road and Penn Lyle Road/Harris Road. The intersection of Clarksville Road and Penn Lyle Road/Harris Road needed very little attention. Clearance interval and pedestrian times were updated to the current 2009 MUTCD standard. A decision was made to maintain free controller operation on the corridor for reasons presented earlier in this report. The combined impact of the school zone between the intersections and the transit hub traffic patterns require conflicting needs in different directions limited the ability to achieve dramatic improvements. The consultant team likely reduced total intersection delay during both the commuter AM and PM peak hours, but for the most part the intersection remains subject to significant recurring congestion.

B. Opportunities for Future Improvement

The Clarksville Road corridor provides numerous opportunities for improvement.

1. The controller cabinet at Penn Lyle/Harris Road is a candidate for replacement. If the controller is replaced at this intersection, a GPS antenna should be installed in the new cabinet and at North Post Road to assure synchronization of the controller clocks.
2. At the intersection of North Post Road, the intersection should be carefully evaluated for additional left turn phasing. At the current time, the intersection provides for an EB Clarksville Road advance phase. Traffic volumes indicate that the intersection may be better served by left-turns in all directions, as drivers aggressively try and utilize every available gap. A review of crash history, as well as a detailed review of traffic data should be completed. In developing the timing plan, the consultant team tried to mimic an “adaptive” operation at this intersection. Given the high volumes of traffic at this location, an adaptive solution might provide an improved level of service.
3. The intersection of North Post Road might be a candidate for widening, but the costs associated with the project would be high as three of the four corners are occupied by residential dwellings. The NW quadrant is occupied by the West Windsor municipal complex.

▪ **Additional Resources/Project Data**

Additional supporting information, including project data, analysis files, and other detailed reports are available on the project website at: <http://dvrpc.taylorwiseman.com/>.

Appendix A

Timing Directives—Existing Conditions

Traffic Signal Timing Directive
 Clarksville Rd. (CR 638) and North Post Rd.
 Township of West Windsor, Mercer County

Effective 9/21/17

VARIABLE CYCLE LENGTH

VEHICLE ACTUATION		INDICATIONS										TIMING PLAN 1 (FREE)	TIMING PLAN 2 (100 SEC)
Phase	2,3,4,5	8	9,10,11	14,15, 18,19	1,12	6,7	13,16, 17,20						
A. Clarksville Rd EB Left Change	R R	G G	←-G/G ←-Y/G	R R	DW DW	W W	DW DW					6-10 3	6-10 3
B. Clarksville Rd EB/WB R.O.W. Ped Clearance Change Clear	G G Y R	G G Y R	G G Y R	R R R R	W FDW DW DW	W FDW DW DW	DW DW DW DW					22 18 4 2	29 18 4 2
C. North Post Rd NB/SB R.O.W. Change Clear	R R R	R R R	R R R	G Y R	DW DW DW	DW DW DW	DW DW DW					8-30 4 2	8-28 4 2
EMERGENCY FLASH	Y	Y	Y	R	DARK	DARK	DARK						

NOTES:

- 1) The memory circuits are to be disconnected.
- 2) The vehicle extension shall be set at 2.0 seconds
- 3) The manual control is to be disconnected.
- 4) Phase A may be skipped in the absence of vehicular demand.
- 5) Phase A shall only follow Phase C.
- 6) Phase A and Phase C may be skipped in the absence of vehicular demand.
- 7) The signal shall rest in Phase B walk.
- 8) Plan 2 (100 second cycle with 75 second offset) shall be in effect 8 AM to 9:30 A.M. (M-F)
- 9) Plan 1 shall be in effect all other times.

Traffic Signal Timing Directive
 Clarksville Rd. (CR 638) and North Post Rd.
 Township of West Windsor, Mercer County

VARIABLE CYCLE LENGTH

PEDESTRIAN ACTUATION		INDICATIONS										TIMING PLAN 1 (FREE)	TIMING PLAN 2 (100 SEC)
Phase	2,3,4,5	8	9,10,11	14,15,18,19	1,12	6,7	13,16,17,20						
A. Clarksville Rd EB Left Change	R R	G G	←G/G ←Y/G	R R	DW DW	W W	DW DW					6-10 3	6-10 3
B. Clarksville Rd EB/WB R.O.W. Ped Clearance Change Clear	G G Y R	G G Y R	G G Y R	R R R R	W FDW DW DW	W FDW DW DW	DW DW DW DW					22 18 4 2	29 18 4 2
C. North Post Rd NB/SB R.O.W. Ped Clearance Change Clear	R R R R	R R R R	R R R R	G G Y R	DW DW DW DW	DW DW DW DW	W FDW DW DW					7 18 4 2	7 18 4 2
EMERGENCY FLASH		Y	Y	Y	R	DARK	DARK	DARK					



Clarksville & Penn Lyle

Effective 9/21/17

File # WW09

Pole # A60054WW

Controller: 820A (7548415006)

Monitor: EDI NSM-12 (080707580)

Command: TIC

Ring Sequence: 241 / 685

TIMING

FLASH	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
WALK		26		7		26		7
PED CLEAR		14		19		14		19
MIN. GREEN	6	14		8	6	14		8
EXTENSION	2.0			2.0	2.0			2.0
MAX GREEN	12	40		20	12	40		20
MAX II								
MAX STEP								
MAX LIMIT								
AMBER	3.0	4.0		4.0	3.0	4.0		4.0
RED CLEAR		2.0		2.0		2.0		2.0

Ø 1 & 6 Clarksville Rd. NB

Ø 4 Penn Lyle Rd.

Ø 2 & 5 Clarksville Rd. SB

Ø 8 Harris Rd.

RECALLS

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
MIN RECALL	OFF	OFF		OFF	OFF	OFF		OFF
PED RECALL	OFF	OFF		OFF	OFF	OFF		OFF
MAX RECALL	OFF	OFF		OFF	OFF	OFF		OFF
MEMORY	OFF	OFF		OFF	OFF	OFF		OFF

Ø 2 & 6 rests in walk

Ø 2 & 6 ped recycle

DETECTORS (Video detection)

	1	2	3	4	5	6	7	8
DELAY								
INHIBIT DELAY								
ASSOCIATION	Ø 1	Ø 2	Ø 3	Ø4&8	Ø 5	Ø 6	Ø 7	Ø4&8



Clarksville & Penn Lyle

TIME IMPLEMENTED COMMANDS

EVENT	TIME	COMMAND
001	00:00	OVRD FREE PLAN 1
002	08:00	OVRD COORD PLAN 1
003	09:30	OVRD FREE PLAN 1
004		
005		
006		

DAY PLAN 1	EVENTS 1, 2 & #3 SELECTED
DAY PLAN 2	EVENT 1 SELECTED

WEEK PLAN

SUN	MON	TUE	WED	THU	FRI	SAT
02	01	01	01	01	01	02

YEAR PLAN 55



Clarksville & Penn Lyle

COORDINATION CONSTANTS

TO REFERENCE	00:00	DET. ACCUM. INTERVAL	CYCLE
OFFSET REFERENCE	T0	CYCLES OF DET. ACCUM.	001
EXT. COORD. TYPE	NONE	MINUTES OF DET. ACCUM.	001
CYCLES OF NO SYNC	000	COORD. DUAL ENTRY	2 4 6 8

COORDINATION PLAN 1

PERM STRATEGY	T0	OMIT STRATEGY	MAX
TO LOCATION	END OF STEP 1	3% WINDOW	NO
STRETCH 3% BY	000	GBP OMTS	NO
EARLY RETURN	YES	ONCE AROUND	YES
CYCLE LENGTH	100	MIN. CYCLE LENGTH	80
MAX CYCLE LENGTH	120	OFFSET	0
EXT. SYNC	NO	ACTIVE S.F.C.	
DET. PLAN	001	PROT. ONLT ENABLE	
CALC. WALK	2&6	REST IN WALK	2&6
NO SKIP			

RING 1: 241

STEP	1	2	3	4	5	6	7	8	9	10
ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	46	88	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
PED?	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO

RING 2: 685

STEP	1	2	3	4	5	6	7	8	9	10
ST PRM	000	000	000	000	000	000	000	000	000	000
AC SPLIT	46	88	100	000	000	000	000	000	000	000
OPTION	MAX	NO	NO	NO	NO	NO	NO	NO	NO	NO
SPLIT	GBP	REL	REL	REL	REL	REL	REL	REL	REL	REL
RESERV	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO
PED?				NO	NO	NO	NO	NO	NO	NO



Clarksville & Penn Lyle

PREEMPTION

	1	2	3	4
TYPE	EVP	EVP	EVP	EVP
INPUT LATCH	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK
INPUT SENSE	NON-INVERT	NON-INVERT	NON-INVERT	NON-INVERT
ABORT RED REVERT	ABORT	ABORT	ABORT	ABORT
FLASH PRIORITY	FLASH	FLASH	FLASH	FLASH
MAN. CONTROL ENABLE	ALLOWED	ALLOWED	ALLOWED	ALLOWED
DELAY OUTPUT	DELAY	DELAY	DELAY	DELAY
OVRD. MIN. TIME	005	005	005	005
OVRD. WALK TIME	000	000	000	000
OVRD. F.D.W. TIME	007	007	007	007
DELAY TIME	000	000	000	000
HOLD TIME	000	000	000	000
CLEAR PHASES 1				
DVLP. RED				
CLEAR GREEN TIME 1	001	001	001	001
CLEAR PHASES 2				
DVLP. RED 2				
CLEAR GREEN TIME 2	000	000	000	000
PREEMPT PHASES	2 & 5	1 & 6	4	8
INT. 5 FLASH	NO	NO	NO	NO
INT. 5 DVLP. RD/FYL				
INT. 5 MIN TIME	010	010	010	010
INT. 5 MAX TIME	002	002	002	002
INT. 6 YELLOW	00.0	00.0	00.0	00.0
INT. 7 RED	00.0	00.0	00.0	00.0
RETURN PHASES	2 & 6	2 & 6	4 & 8	4 & 8
RETURN VEH. CALLS				
RETURN PED. CALLS				

Appendix B

Timing Directives—Implemented, October 2018

Clarksville Road (CR 638) and North Post Road

Township of West Windsor, Mercer County, New Jersey

File: WW02

Controller: ASC/3-2100

Monitor: EDI SSM 12LE



TIMING

FLASH	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM	6	26		8		26		8
EXTENSION	2			2				2
MAX I	10	40		40		53		40
MAX II								
PED WALK		7		7		7		7
PED CLEAR		19		17		19		17
AMBER	3	4		4		4		4
RED		2		2		2		2
MIN RECALL	OFF	OFF		OFF		OFF		OFF
PED RECALL	OFF	ON		OFF		ON		OFF
MAX RECALL	OFF	OFF		OFF		OFF		OFF
MEMORY	OFF	OFF		OFF		OFF		OFF

Ø 1 Clarksville Road EB LEFT

1 Phases 1+6 may be skipped in the absence of vehicular demand

Ø 2 Clarksville Road WB

2 Phases 1+6 shall only follow Phases 4+8

Ø 4 North Post Road SB

3 The signal shall rest in Phases 2+6 Walk

Ø 6 Clarksville Road EB

Ø 8 North Post Road NB

PROGRAM

PROGRAM/ SPLITS	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	CYCLE	OFFSET	OFFSET REFERENCE
1	10 (LEAD)	56		44		66		44	110	0	-
2	10 (LEAD)	46		24		56		24	80	0	-
3	10 (LEAD)	46		44		56		44	100	0	-
4	10 (LEAD)	40		60		50		60	110	0	-
5											-

WEEKLY PROGRAM CHART

EVENT	DAY	TIME	PROGRAM	REMARKS
1	1-5	00:00	FREE	FREE/WEEKDAY OVERNIGHT
2	1-5	06:00	4	WEEKDAY AM RAMP UP
3	1-5	7:30	1	WEEKDAY AM
3	1-5	9:30	2	WEEKDAY MIDDAY
4	1-5	14:00	3	WEEKDAY PM RAMP UP
5	1-5	17:00	1	WEEKDAY PM
6	1-5	18:30	3	WEEKDAY EVENING
6	1-5	20:00	FREE	FREE/WEEKDAY OVERNIGHT
7	6-7	09:00	2	WEEKEND PEAK
8	6-7	20:00	FREE	FREE/WEEKDAY OVERNIGHT

Day 1 = MONDAY

Field Verified: 10-01-2019

Clarksville Road (CR 638) and Penn Lyle Road

Township of West Windsor, Mercer County, New Jersey

File: WW09

Controller: 820A

Monitor: EDI NSM-12



TIMING

FLASH	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM	6	26		8	6	26		8
EXTENSION	2			2	2			2
MAX I	15	43		32	15	43		32
MAX II								
PED WALK		7		7		7		7
PED CLEAR		19		19		19		19
AMBER	3	4		4	3	4		4
RED		2		3		2		3
MIN RECALL	OFF	OFF		OFF	OFF	OFF		OFF
PED RECALL	OFF	ON		OFF	OFF	ON		OFF
MAX RECALL	OFF	ON		OFF	OFF	ON		OFF
MEMORY	OFF	OFF		OFF	OFF	OFF		OFF

Ø 1 Clarksville Road EB LEFT

Ø 2 Clarksville Road WB

Ø 4 Penn Lyle Road

Ø 5 Clarksville Road WB LEFT

Ø 6 Clarksville Road EB

Ø 8 Harris Road

1 Phases 1+5 may be skipped in the absence of vehicular demand

2 Phases 1+5, 1+6, and 2+5 shall only follow Phases 4+8

3 The signal shall rest in Phases 2+6 Walk

PROGRAM

PROGRAM/ SPLITS	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	CYCLE	OFFSET	OFFSET REFERENCE
1	-	-		-	-	-		-	-	-	-
2	-	-		-	-	-		-	-	-	-
3	-	-		-	-	-		-	-	-	-
4	-	-		-	-	-		-	-	-	-

WEEKLY PROGRAM CHART

EVENT	DAY	TIME	PROGRAM	REMARKS
1	1-7	00:00	FREE	FREE

Day 1 = MONDAY