

DE-71 at Main St/Pine Tree Rd in Townsend, DE

Revised February 2024

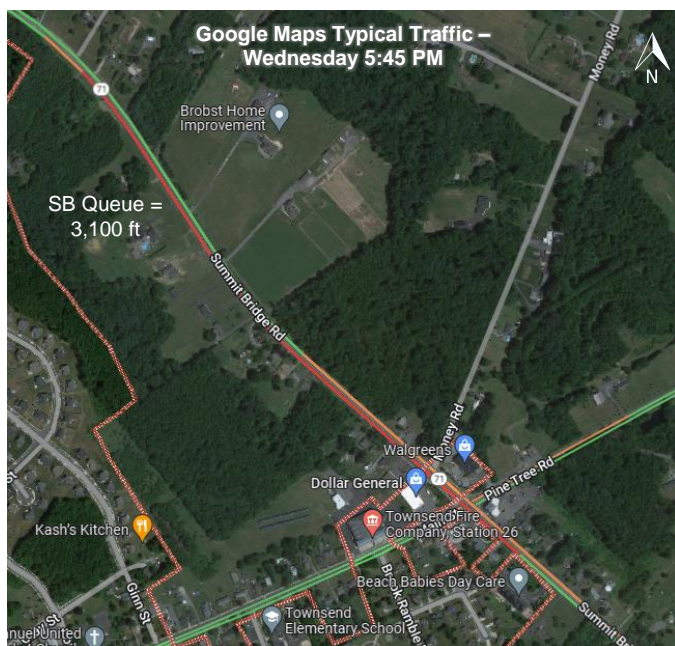
A Synchro/SimTraffic model was developed using traffic data from May 2022 and calibrated to match field conditions. The calibrated model was used to test 4 potential improvement options:



Field work was conducted in June and September 2022 to observe current conditions at the intersection of DE-71 (Summit Bridge Rd) and Main St/Pine Tree Rd

- Excessive queues were observed, particularly in the SB direction during the PM peak
- Cycle failure was observed frequently for the SB approach in PM peak period, from 5:00 PM to 6:00 PM, and occasionally in the AM peak
- Cycle failure was observed occasionally for NB in both peaks, and rarely for EB or WB approaches
- Left-turning motorists often blocked through vehicles and/or ran the red light

Intersection ranked in the Hazard Elimination Program (HEP): #90 in 2021, #172 in 2022, #82 in 2023 (among signalized intersections)



	Existing	Option A Recommend dropping Option A from consideration	Option B Recommend dropping Option B from consideration	*Option C	*Option D
Lane Configuration					
Left-Turn Phasing	Permissive	Split NB/SB EB/WB Permissive	Permissive	Permissive	Unsignalized
Separate Left-Turn?	No	No	Yes (NB, EB, WB)	Yes (All approaches)	No
Geometric Impacts	None	None	Partial pavement reconstruction, patching, milling, and repaving; reconstruction of signal infrastructure; restriping; and, removal of flex posts	Full signal redesign (partially remove the concrete channelization for SB right-turns, restriping, removal of flex posts, partial pavement reconstruction, patching, milling, and repaving)	Complete reconstruction as a roundabout ; would impact private properties on all 4 corners; additional improvements may be needed on approaches
95 th Percentile Queues	<ul style="list-style-type: none"> • SBLT queues calibrated to match field conditions, approximately 2,800 ft in PM peak 	<ul style="list-style-type: none"> • SBLT queues would reduce to 2,400 ft in PM peak • NBLT queues would increase to >3,000 ft in PM peak • EBLT queues would increase to >1,000 ft in PM peak 	<ul style="list-style-type: none"> • SBLT queues would reduce to 1,200 ft in PM peak • EB queues would increase to 2,200 ft in PM peak 	<ul style="list-style-type: none"> • NB queues would reduce to under 300 ft in both peak periods • SB queues would reduce to under 350 ft in both peak periods • EB queues would increase to 950 ft in PM peak 	<ul style="list-style-type: none"> • SBLT queues would reduce to under 125 ft in PM peak • All 95th queues projected to be under 225 ft in both peak periods
Overall Intersection LOS - AM (PM)	B (C)	F (F)	B (D)	B (B)	V/C ratio under 0.85 threshold in both peaks
Failing Approaches	<ul style="list-style-type: none"> • No failing approaches 	<ul style="list-style-type: none"> • EB & SB fail in AM Peak • EB, NB, & SB fail in PM Peak 	<ul style="list-style-type: none"> • EBL fails in PM Peak; Overall approach LOS E 	<ul style="list-style-type: none"> • No failing approaches or movements 	<ul style="list-style-type: none"> • No failing approaches or movements
Construction Cost Estimate in 2023 Dollars (Costs could fluctuate over time)	\$0	\$0	\$700,000	\$1,100,000 (Does not account for right-of-way or utility impacts)	TBD

* Denotes project requires nomination and prioritization in the Capital Transportation Program.

NOTE: All potential improvement options were evaluated using existing volumes and do not account for future growth.

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	Existing Storage Length (ft)	Existing				Option A (NB & SB Split-Phasing)				Modified Storage Length (ft)	Option B (NBL, EBL, WBL lane arrangements)				Modified Storage Length (ft)	Option C (All approaches Exclusive LT Lane)				
		Delay	LOS	Queue (average) (ft)	Queue (95th percentile) (ft)	Delay	LOS	Queue (average) (ft)	Queue (95th percentile) (ft)		Delay	LOS	Queue (average) (ft)	Queue (95th percentile) (ft)		Delay	LOS	Queue (average) (ft)	Queue (95th percentile) (ft)	
AM Peak	EBLT	-	29.3	C	125	225	115.6	F	500	900	-	-	-	-	-	-	-	-	-	-
	EBL	-	-	-	-	-	-	-	-	-	110	23.8	C	75	175	110	23.2	C	75	150
	EBTR	-	-	-	-	-	-	-	-	-	-	24.5	C	125	225	-	24.1	C	100	200
	EBR	225	18.9	B	25	75	38.1	D	125	325	-	-	-	-	-	-	-	-	-	-
	EB	-	27.1	C	-	-	99.0	F	-	-	-	24.3	C	-	-	-	23.8	C	-	-
	WBLT	-	20.6	C	75	125	43.3	D	100	200	-	-	-	-	-	-	-	-	-	-
	WBL	-	-	-	-	-	-	-	-	-	150	18.7	B	25	50	155	18.4	B	25	50
	WBTR	-	-	-	-	-	-	-	-	-	-	24.0	C	100	200	-	23.5	C	100	200
	WBR	275	19.2	B	50	100	38.5	D	50	125	-	-	-	-	-	-	-	-	-	-
	WB	-	19.9	B	-	-	40.8	D	-	-	-	23.7	C	-	-	-	23.2	C	-	-
	NBLT	-	14.7	B	175	350	82.6	F	375	725	-	-	-	-	-	-	-	-	-	-
	NBL	-	-	-	-	-	-	-	-	-	150	6.0	A	25	50	155	6.0	A	25	50
	NBTR	-	-	-	-	-	-	-	-	-	-	11.6	B	125	200	-	11.7	B	125	225
	NBR	175	7.3	A	<25	75	24.3	C	25	150	-	-	-	-	-	-	-	-	-	-
	NB	-	14.3	B	-	-	79.6	E	-	-	-	11.3	B	-	-	-	11.4	B	-	-
	SBLT	-	14.9	B	200	400	101.8	F	350	600	-	11.2	B	225	475	-	-	-	-	-
	SBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	7.3	A	50	100
	SBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	A	75	125
	SBR	110	7.4	A	25	100	31.9	C	25	100	110	5.8	A	25	100	95	5.9	A	<25	25
	SB	-	14.1	B	-	-	93.9	F	-	-	-	10.6	B	-	-	-	7.5	A	-	-
Total	-	18.0	B	-	-	81.0	F	-	-	-	16.1	B	-	-	-	15.1	B	-	-	
PM Peak	EBLT	-	69.6	E	150	275	179.4	F	625	1,175	-	-	-	-	-	-	-	-	-	
	EBL	-	-	-	-	-	-	-	-	-	110	127.0	F	125	225	110	18.0	B	100	200
	EBTR	-	-	-	-	-	-	-	-	-	-	39.9	D	800	2,200	-	17.4	B	300	950
	EBR	225	32.2	C	25	125	38.9	D	175	350	-	-	-	-	-	-	-	-	-	-
	EB	-	59.9	E	-	-	143.1	F	-	-	-	67.3	E	-	-	-	17.6	B	-	-
	WBLT	-	37.7	D	125	200	54.3	D	150	250	-	-	-	-	-	-	-	-	-	-
	WBL	-	-	-	-	-	-	-	-	-	150	35.8	D	25	125	155	15.5	B	25	75
	WBTR	-	-	-	-	-	-	-	-	-	-	58.4	E	200	375	-	20.0	C	150	325
	WBR	275	32.6	C	50	100	39.3	D	50	125	-	-	-	-	-	-	-	-	-	-
	WB	-	35.6	D	-	-	48.2	D	-	-	-	56.8	E	-	-	-	19.7	B	-	-
	NBLT	-	11.3	B	225	450	129.1	F	1,600	3,000	-	-	-	-	-	-	-	-	-	-
	NBL	-	-	-	-	-	-	-	-	-	150	7.5	A	25	75	155	11.4	B	25	100
	NBTR	-	-	-	-	-	-	-	-	-	-	10.7	B	150	275	-	18.5	B	150	275
	NBR	175	6.7	A	25	100	29.5	C	25	150	-	-	-	-	-	-	-	-	-	-
	NB	-	11.2	B	-	-	125.8	F	-	-	-	10.4	B	-	-	-	17.9	B	-	-
	SBLT	-	50.5	D	1,250	2,875	161.5	F	1,375	2,425	-	49.2	D	575	1,200	-	-	-	-	-
	SBL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	23.9	C	50	125
	SBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.9	C	125	250
	SBR	110	7.0	A	50	150	26.1	C	25	125	110	7.2	A	50	150	95	10.7	B	25	75
	SB	-	44.9	D	-	-	143.9	F	-	-	-	43.7	D	-	-	-	20.0	C	-	-
Total	-	34.8	C	-	-	120.9	F	-	-	-	39.1	D	-	-	-	18.9	B	-	-	

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		Option D – Hybrid Roundabout			
		Deg. Saturation (v/c)	Average Delay (s)	Level of Service	Queue (95th percentile) (ft)
AM Peak	EB	0.575	16.3	B	140
	WB	0.557	20.7	C	115
	NB	0.477	10.6	B	100
	SB	0.303	6.7	A	65
	Total	0.575	12.5	B	140
PM Peak	EB	0.598	19.9	B	130
	WB	0.760	31.9	C	210
	NB	0.523	11.1	B	120
	SB	0.531	9.9	A	125
	Total	0.760	15.8	B	210