Red Light Running Camera (Photo Enforcement) Engineering Safety Analysis Template

Highway Operations Section
Traffic Engineering Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

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VDOT
Traffic Signal Photo Enforcement
Engineering Analysis Template

Local Jurisdiction: City of Alexadria (County/City/Town) VDOT District: Northern Virginia

Intersection: South Patrick Street at Gibbon Street – NB approach
Street Name (Route #) at Street Name (Route #)

This Study performed under the direction of Bob Garbacz / Ravi Raut
(licensed professional engineer)

A. INTERSECTION & SIGNAL DATA

1. Signal Visibility

a. Minimum Sight Distance to Signal

Approach	Grade	Speed Limit (mph)	Measure (ft)	Required (ft)*
NB	0%	25	300+	215
SB	0%	25	300+	215
WB	1.5%	25	300+	215

*See attached table of minimum sight distance requirements from the MUTCD.

b. Are "SIGNAL AHEAD" signs present? ☐ Yes ☒ No
Are "SIGNAL AHEAD" signs needed? ☐ Yes ☒ No
Are other warning signs present in the vicinity of the intersection? ☐ Yes ☒ No
Explain:

c. Information on Signal Heads

Approach	Lens Size	Lens Type (LED or Bulb)	Back Plates (Yes or No)
NB	12"	Bulb	No
SB	12"	Bulb	No
WB	12"	Bulb	No

2. Pavement and Markings Data

a. Stop bars in "good" condition? ☒ Yes ☐ No
Explain: Faded Stop bars will be replaced prior to red light camera installation.

b. Lane lines "clearly" visible? ☒ Yes ☐ No
Explain:

c. Crosswalks "clearly" marked? ☒ Yes ☐ No
Explain: Faded crosswalks

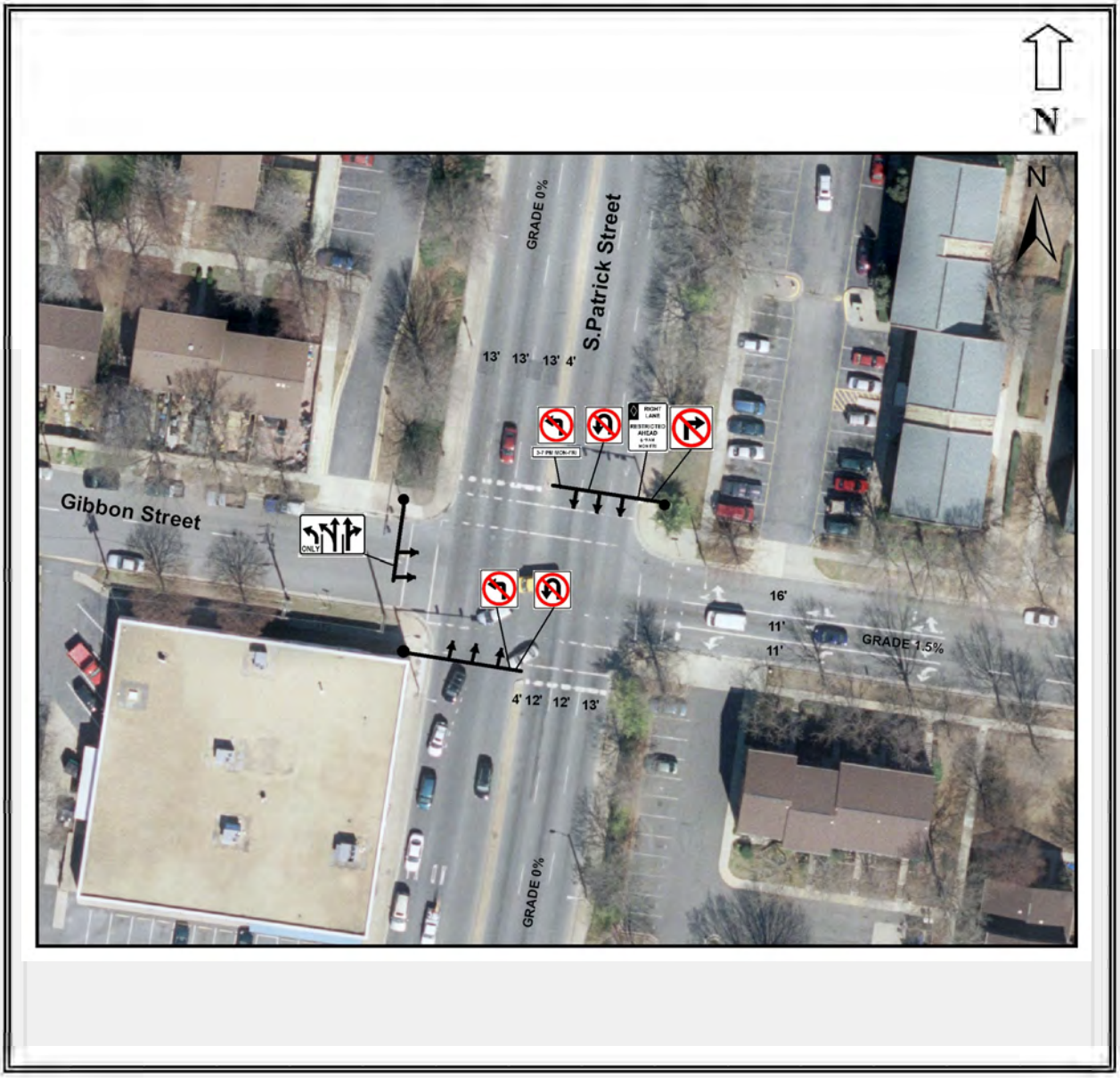
d. Pavement conditions (ruts, potholes, cracking, etc.)?

- ☒ Good Explain: Minor cracks on Gibbon Street
- ☒ Fair Explain: Minor cracks, ruts(uneven pavement) on Patrick Street
- ☐ Poor Explain: _____

e. Pavement surface treatments exist? (rumble strips, texturing, pavers, etc.)

- ☐ Yes Explain: _____
- ☒ No

3. Provide diagram of intersection including: pavement markings, width of lanes and medians, location of signal heads and signs, locations of loops/detectors, and grades.



B. SIGNAL TIMING & TRAFFIC DATA

1. Clearance Intervals

Approach	Posted Speed Limit	Grade	Width of Intersection	Yellow Interval		All Red Interval	
				Existing	Calculated*	Existing	Calculated*
NB	25	0%	61’	3	3	2.5	2.5
SB	25	0%	61’	3	3	2.5	2.5
WB	25	1.5%	105’	3	3	3.0	3.0

*Reference TE Memo 306 provided in Appendix E for calculation of Clearance Intervals

2. Include existing controller settings for each phase and each time-of-day. Information should include applicable settings such as minimum green, max 1 & 2, passage, minimum gap/ext, protected-permissive, lead-lag, yellow and all red, walk and ped clearance time, recall settings, offsets, cycle length, etc. Include analysis of peak hour conditions and a determination of whether signal timings are contributing to red-light running problem.

a. Does signal timing or phasing factor in as a possible contributor to RLR at this intersection?

☐ Yes Explain: Intersection operates at LOS B and C during AM and PM peak hours, respectively.

☒ No

b. List comments or recommendations on potential signal timing or phasing changes:

No plans to optimize signal timing or phasing in near future.

3. Vehicle Detection Data

Approach	Detection Type (loop, video, etc.)	Detector Location (measured from stop bar)
NB	N/A	N/A
SB	N/A	N/A
WB	N/A	N/A

4. Traffic Volume Data

Approach	Daily Volumes		Peak Hour Volumes	
	Total	Heavy Vehicles	Total	Heavy Vehicles
NB10/9/08	25687	514	2291/1234	46/25
SB10/9/08	23411	469	937/1670	19/34
WB10/9/08	10467	210	354/908	7/19

C. CRASH & ENFORCEMENT DATA

1. Three-Year Crash Data

Collision Type	3-year Total	Number of Injury Crashes	Number of Fatal Crashes	Crashes Associated With Red-Light-Running
Angle	8(7-NB)	5	0	5
Rear End	19(14_NB)	2	0	0
Head On	0	0	0	0
Sidewsipe	8	0	0	0
Pedestrian	0	0	0	0
Bicyclist	1	0	0	0
TOTAL	36	7	0	5

2. Crash Rate

a. Number of crashes per million entering vehicles: 0.5979MEV

b. Locality rate for comparison (if available): Not available

3. Violation Rate

a. Number of red light running citations per year issued by law enforcement at the evaluated intersection, if available.

Number: 5 Year: 2005-07

b. Observed Violations

Date: 2/4/09-SB 12/31/08-NB

Time Period: 8AM-9PM

Approach	Traffic Volume	Number of Violations
NB	14352	56
SB	26883	106

4. Enforcement and Operational Issues

a. Describe the difficulty experienced by law enforcement officers in patrol cars or on foot in apprehending violators.

The design of the intersection does not provide adequate space to allow target enforcement of red light violators without impeding the flow of traffic.

b. Describe the ability of law enforcement officers to apprehend violators safely within a reasonable distance from the violation.

The design of the intersection does not allow officers to safely stop violators within a reasonable distance to/from the intersection.

c. Are pedestrians at risk due to violations? ☒ Yes ☐ No

Explain: Designated crosswalks are present without pedestrian signals or push buttons. Pedestrians are at risk, while crossing when a violator disregard the red light.

Number of pedestrians per hour? 5peds/PM_peak_hour

Pedestrian crosswalk provided? ☒ Yes ☐ No

d. Have there been any changes to the operations of the intersection (signal timing, restriping, or increased enforcement) within the past three years? ☐ Yes ☒ No
Explain: _____

Minimum Sight Distance

85th Percentile Speed (mph)	Minimum Sight Distance (ft)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

Table 4D-1 *Manual on Uniform Traffic Control Devices*, (Revision 1, Nov 2004) Transportation Research Board (TRB), Washington, DC, 2003

Professional opinion
Intersection of S. Patrick Street and Gibbon Street is located approximately 2000 feet north of I-495. Due to its closeness to interstate system ramps and lack of intermediate signals (except for the signal at S. Patrick Street and Franklin Street) to the south of the intersection, some vehicles were detected both speeding and running red lights at the same time.

Selection criteria
This intersection was selected for installation of red light running camera based on the following factors:

1. Accidents at the intersection from Jan 2005 to Dec 2007

Intersection name	Intersection approach where red light running camera is requested	Total number of accidents at the intersection	Accident rate for the intersection MEV	Total number of angle accidents on an approach where red light running camera is requested
S. Patrick Street at Gibbon Street	NB-S. Patrick Street	39	0.598	7 Includes one(1) bicycle related accident

2. Number of violations

Intersection name	*Intersection approach where red light running camera is requested*	*Total number of violations where red light running camera is requested*	*Total approach traffic where red light running camera is requested*	*Violation rate per 1000 vehicles*
S. Patrick Street at Gibbon Street	Northbound S. Patrick Street	56	14352	3.90

3. The design of the intersection does not provide adequate space to allow target enforcement of red light violators without impeding the flow of traffic.
4. The design of the intersection does not allow officers to safely stop violators within a reasonable distance to/from the intersection.
5. Pedestrians are at risk while crossing if a violator were to disregard the red light.

Based on the number of angle and turning accidents, number of red light violations, difficulty experienced by law enforcement officers in apprehending violators within a reasonable distance, and in order to reduce risk to pedestrians and bicyclist and increase safety of the intersection by reducing number of drivers who run red light, we feel this location meets the criteria for installation of red light running cameras.

Attachments –

- Signal timing and LOS
- Accident History
- Intersection photographs

Intersection Name: Patrick Street and Gibbon Street
Speed Limits Patrick Street NB & SB 25 mph
Gibbon Street 25 mph

PHASE TIIMING	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**	**Phase 8**
Min Green	10	6						
Passage	2	2						
Max Green	40	36						
Yellow	3	3						
Red	2.5	3						
Walk								
FDW								
Min Recall	X							
Max Recall		X						

COORDINATION			**AM**			**PM**		
	End of Green		CL	Offset	Delay	CL	Offset	Delay
	Coord Phase 2		160	140	17.2	80	16	22.1
			AM LOS (B)			PM LOS (C)		
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**	**Phase 8**
AM Split	121	39						
PM Split	45	35						

Note: All times above in seconds

Phase 1 = N/S Patrick Street
Phase 2 = WB Gibbon Street
Phase 3 = Not Used
Phase 4 = Not Used
Phase 5 = Not Used
Phase 6 = Not Used
Phase 7 = Not Used
Phase 8 = Not Used

S Patrick Street and Gibbon Street

	2005	2006	2007	Till July 08	Total
Accident Severity					
Fatal	0	0	0	0	0
Injury Accidents	2	1	0	0	3
Property Damage Only	12	12	12	6	42
TOTAL	**14**	**13**	**12**	**6**	**45**
Accident Type					
Right Angle	2(NB 2)	3(NB 3)	3(NB 2)	2(NB 2)	10(NB-9, SB-1)
Left Turn	2(NB 2)	1(NB 1)	0	0	3(N-S Dir.)
Rear End	6(NB 6)	6(NB 4)	7(NB 4)	3(NB 1)	22(NB-12)
Sideswipe	3	3	2	1	9
Unknown	0	0	0	0	0
Fixed Object	0	0	0	0	0
Bicyclist	1	0	0	0	1(NB)
Pedestrian	0	0	0	0	0
Hit and Run	0	0	0	0	0
TOTAL	**14**	**13**	**12**	**6**	**45**

Looking north on Route 1 at Gibbon Street

Looking south on Route 1 at Gibbon Street

Looking west on Gibbon Street at Route 1

Looking east on Gibbon Street at Route 1