



**Washington State
Department of Transportation**

Traffic Signal Permit

Check Appropriate Box: Permit Application (Complete Parts A and B)
 Report of Change (Complete Parts A, E, and F)
 Report of Installation (Complete Parts A, D, and F)

F	Permit No. 4051 To be Assigned by Headquarters
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A	Applying or Reporting Agency	State Route 513	Milepost 1.33	Control Section 1794	WSDOT Region Northwest Region	70% Rule By <input type="checkbox"/> Speed <input type="checkbox"/> Population		
		Location / Cross Street 2700 Blk NE 45th St at QFC Driveway			County King	City Seattle	City Population 568,100	
		Signal Type - Check Appropriate Boxes: <input checked="" type="checkbox"/> Conventional <input type="checkbox"/> Intersection Control Beacon <input type="checkbox"/> Ramp Meter <input type="checkbox"/> School <input type="checkbox"/> Other (Specify) <input type="checkbox"/> Emergency Vehicle <input type="checkbox"/> Moveable Bridges <input type="checkbox"/> Reverse Lane <input type="checkbox"/> Temporary						
B	Applying Agency - Application information	Agency City of Seattle			Applicant Name Joe Couples		Date Oct 31, 2005	
		Address 700 5th Ave Suite 3900			City Seattle		State WA	Zip Code 98104
		Warrant Checklist			Hours Met			
		<input checked="" type="checkbox"/> 1. Eight-Hour Vehicular Volume <input checked="" type="checkbox"/> 2. Four-Hour Vehicular Volume <input checked="" type="checkbox"/> 3. Peak Hour <input type="checkbox"/> 4. Pedestrian Volume <input type="checkbox"/> 5. School Crossing <input type="checkbox"/> 6. Coordinated Signal System <input checked="" type="checkbox"/> 7. Crash Experience			1A 10, 1B 10 9 6		<input type="checkbox"/> 8. Roadway Network <input type="checkbox"/> 9. Non-MUTCD Warrant <input type="checkbox"/> 10. Other	
Support Data Checklist - Check appropriate boxes and describe the problem being addressed by this installation <input checked="" type="checkbox"/> Vehicular Volume Counts <input checked="" type="checkbox"/> Intersection Sketch <input type="checkbox"/> Projected Volumes <input type="checkbox"/> Speed Study <input type="checkbox"/> Other <input type="checkbox"/> Pedestrian Volume Counts <input checked="" type="checkbox"/> Warrant Analysis <input type="checkbox"/> Gap Study <input checked="" type="checkbox"/> Accident Study								
Problem Statement Four Warrants for considering signalization have been met including Crash Experience Warrant. Revised channelization was tried but this measure was not successful in reducing crash occurrence.								
C	Region Authorization	Under authority of RCW 46.61.085, the above described installation is authorized.						
		 Regional Administrator Signature <u>Traffic Engineer</u>					Approval Date <u>11/16/05</u>	
Conditions of Permit								
D	Operating Agency	Report of Installation (Fill in Agreement Number if Owning Agency does not operate and/or maintain the signal)						
		Turn-On Date	Agency Owning Signal			Agency Operating Signal		
		Control Type <input type="checkbox"/> Cyclic <input type="checkbox"/> Flashing	Agency Maintaining Signal			Agreement Number		
E	Operating Agency	Report of Change (Report change in Type of Signal, Type of Control, or if signal was removed)						
		Signal Type Changed From _____ To _____					Date Changed	
		Control Type Changed From _____ To _____					Date Changed	
		Date Signal Removed	Reported By			Title	Date	

Eight Hour Warrant

Hour	Major Rd Volume			Minor Rd Volume			Warrant 1A		Warrant 1B		Hours Met 1A	Hours Met 1B
	West	Total	High	600 Major	150 Minor	900 Major	75 Minor					
								East				
900	1779	1779	68	Met	Not Met	Met	Not Met					
1000	1505	1505	141	Met	Not Met	Met	Met				Y	
1100	1276	1276	188	Met	Met	Met	Met			Y	Y	
1200	1248	1248	199	Met	Met	Met	Met			Y	Y	
1300	1313	1313	225	Met	Met	Met	Met			Y	Y	
1400	1260	1260	186	Met	Met	Met	Met			Y	Y	
1500	1303	1303	43	Met	Not Met	Met	Not Met			*	*	
1600	1425	1425	193	Met	Met	Met	Met			Y	Y	
1700	1380	1380	213	Met	Met	Met	Met			Y	Y	
1800	1414	1414	209	Met	Met	Met	Met			Y	Y	
1900	1142	1142	250	Met	Met	Met	Met			Y	Y	
2000	951	951	203	Met	Met	Met	Met			Y	Y	
2100	719	719	150	Met	Not Met	Not Met	Met					
2200	696	696	118	Met	Not Met	Not Met	Met					
2300	370	370	82	Not Met	Not Met	Not Met	Met					
2400	236	236	37	Not Met	Not Met	Not Met	Not Met					

9+

10+

INTERVAL	09-Oct-2005 SUN MISSING	10-Oct-2005 MON MISSING	04-Oct-2005 TUE	05-Oct-2005 WED	06-Oct-2005 THU MISSING	07-Oct-2005 FRI MISSING	08-Oct-2005 SAT MISSING
1:00	0	0	0	28	0	0	0
2:00	0	0	0	7	0	0	0
3:00	0	0	0	11	0	0	0
4:00	0	0	0	7	0	0	0
5:00	0	0	0	18	0	0	0
6:00	0	0	0	36	0	0	0
7:00	0	0	0	44	0	0	0
8:00	0	0	0	46	0	0	0
9:00	0	0	0	68	0	0	0
10:00	0	0	0	141	0	0	0
11:00	0	0	0	188	0	0	0
12:00	0	0	0	199	0	0	0
13:00	0	0	0	225	0	0	0
14:00	0	0	0	186	0	0	0
15:00	0	0	43	0	0	0	0
16:00	0	0	193	0	0	0	0
17:00	0	0	213	0	0	0	0
18:00	0	0	209	0	0	0	0
19:00	0	0	250	0	0	0	0
20:00	0	0	203	0	0	0	0
21:00	0	0	150	0	0	0	0
22:00	0	0	118	0	0	0	0
23:00	0	0	82	0	0	0	0
24:00	0	0	37	0	0	0	0
Daily Total			1,498	1,204			
AM Peak Vol	0	0	0	199	0	0	0
AM Peak Hr				11:00 - 12:00			
AM Peak Fac	0.000	0.000	0.000	0.816	0.000	0.000	0.000
AM 15min Hi				12:00			
PM Peak Vol	0	0	250	225	0	0	0
PM Peak Hr			18:00 - 19:00	12:00 - 13:00			
PM Peak Fac	0.000	0.000	0.880	0.953	0.000	0.000	0.000
PM 15min Hi			18:45	12:45			
Max8 Vol	0	0	1,447	1,097	0	0	0
Max8 %/DT	0.000	0.000	0.966	0.911	0.000	0.000	0.000
Max8 Time			14:45 - 22:45	06:00 - 14:00			

Average Daily Traffic (ADT) = 386 based on 7 days

Average Weekday Traffic (AWDT) = 540 based on 5 weekdays

AWDT Max8 Volume = 509 (94.2% of AWDT)

AWDT AM Peak Hour Volume = 40 based on 5 weekdays

AWDT PM Peak Hour Volume = 95 based on 5 weekdays

INTERVAL	10-Oct-2004 SUN	11-Oct-2004 MON	12-Oct-2004 TUE	06-Oct-2004 WED	07-Oct-2004 THU	08-Oct-2004 FRI	09-Oct-2004 SAT
1:00	230	74	71	106	86	108	192
2:00	129	51	34	57	58	52	117
3:00	111	32	31	36	43	54	78
4:00	56	35	17	33	25	31	42
5:00	47	77	85	80	96	102	47
6:00	61	237	279	276	266	256	79
7:00	165	867	962	976	951	888	252
8:00	309	1,829	2,014	1,989	1,933	1,636	565
9:00	525	1,731	1,779	1,781	1,775	1,685	820
10:00	916	1,340	1,505	1,536	1,529	1,408	1,049
11:00	1,048	1,245	1,276	1,250	1,261	1,359	1,153
12:00	1,294	1,263	1,248	1,362	1,339	1,489	1,112
13:00	1,365	1,239	1,313	1,323	1,303	1,436	1,062
14:00	1,236	1,204	1,260	1,272	1,288	1,391	1,032
15:00	1,094	1,340	1,303	1,393	1,324	1,360	1,073
16:00	1,121	1,337	1,425	1,364	1,439	1,350	1,079
17:00	1,060	1,346	1,380	1,276	1,359	1,236	896
18:00	1,015	1,299	1,414	1,365	1,392	1,186	1,059
19:00	915	1,156	1,142	1,228	1,331	1,094	1,095
20:00	667	833	951	972	955	838	910
21:00	565	701	719	802	656	749	607
22:00	428	485	696	608	649	579	537
23:00	257	270	370	347	363	453	501
24:00	151	193	236	247	244	320	361
Daily Total	14,765	20,184	21,510	21,679	21,665	21,060	15,718
AM Peak Vol	1,296	1,849	2,066	2,027	2,006	1,817	1,176
AM Peak Hr	10:45 - 11:45	07:15 - 08:15	07:15 - 08:15	07:15 - 08:15	07:15 - 08:15	07:30 - 08:30	09:45 - 10:45
AM Peak Fac	0.970	0.917	0.965	0.886	0.966	0.950	0.980
AM 15min Hi	11:30	08:00	08:00	07:30	08:00	08:15	10:15
PM Peak Vol	1,385	1,389	1,462	1,414	1,464	1,436	1,128
PM Peak Hr	12:30 - 13:30	14:45 - 15:45	16:30 - 17:30	14:45 - 15:45	15:15 - 16:15	12:00 - 13:00	17:30 - 18:30
PM Peak Fac	0.936	0.959	0.923	0.902	0.934	0.928	0.956
PM 15min Hi	13:00	15:00	17:15	15:45	15:45	12:15	18:00
Max8 Vol	9,303	11,191	11,706	11,906	11,757	11,808	8,525
Max8 %/DT	0.630	0.554	0.544	0.549	0.543	0.561	0.542
Max8 Time	09:30 - 17:30	07:00 - 15:00	06:45 - 14:45	07:00 - 15:00	06:45 - 14:45	06:45 - 14:45	08:30 - 16:30

Average Daily Traffic (ADT) = 19,512 based on 7 days

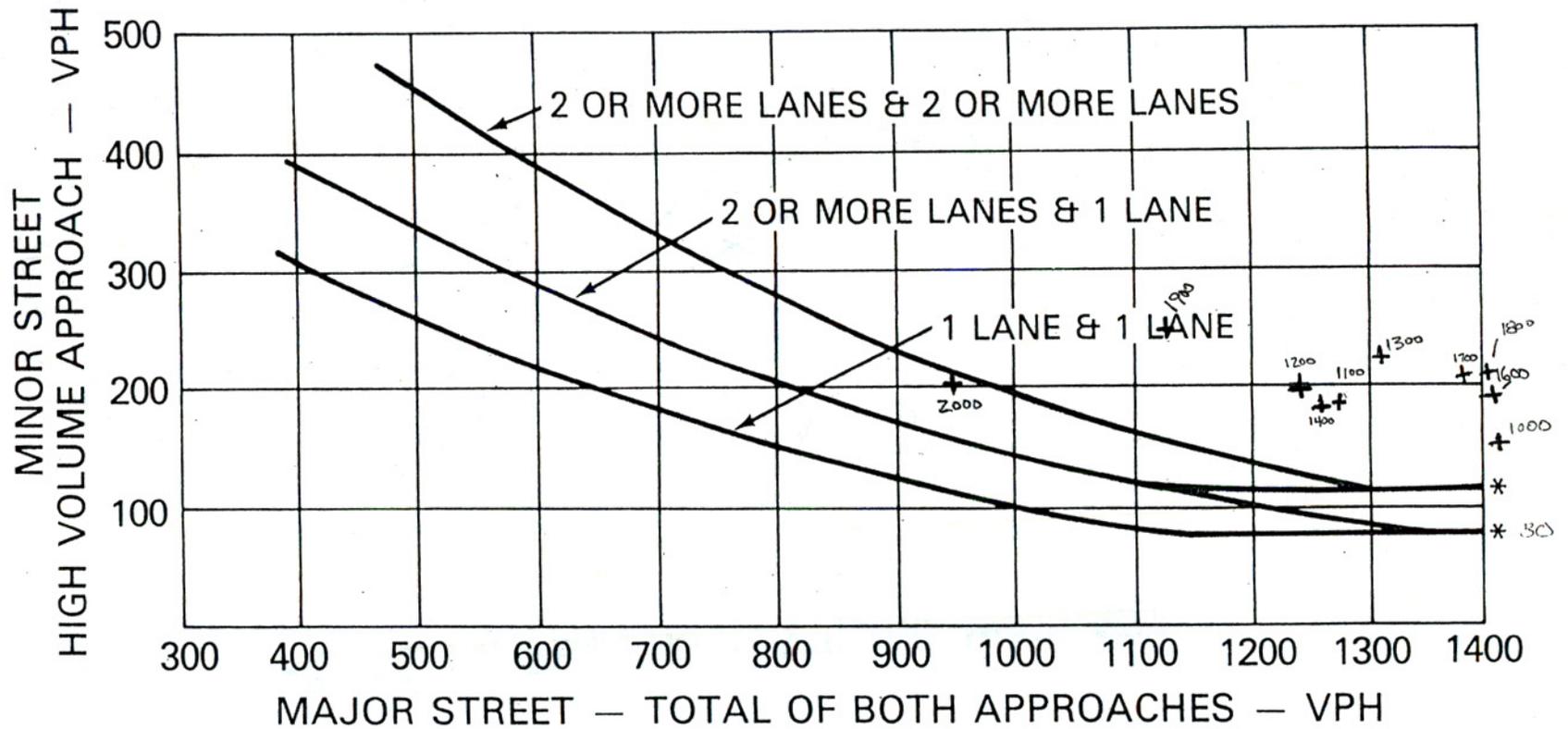
Average Weekday Traffic (AWDT) = 21,220 based on 5 weekdays

AWDT Max8 Volume = 11,674 (55.0% of AWDT)

AWDT AM Peak Hour Volume = 1,953 based on 5 weekdays

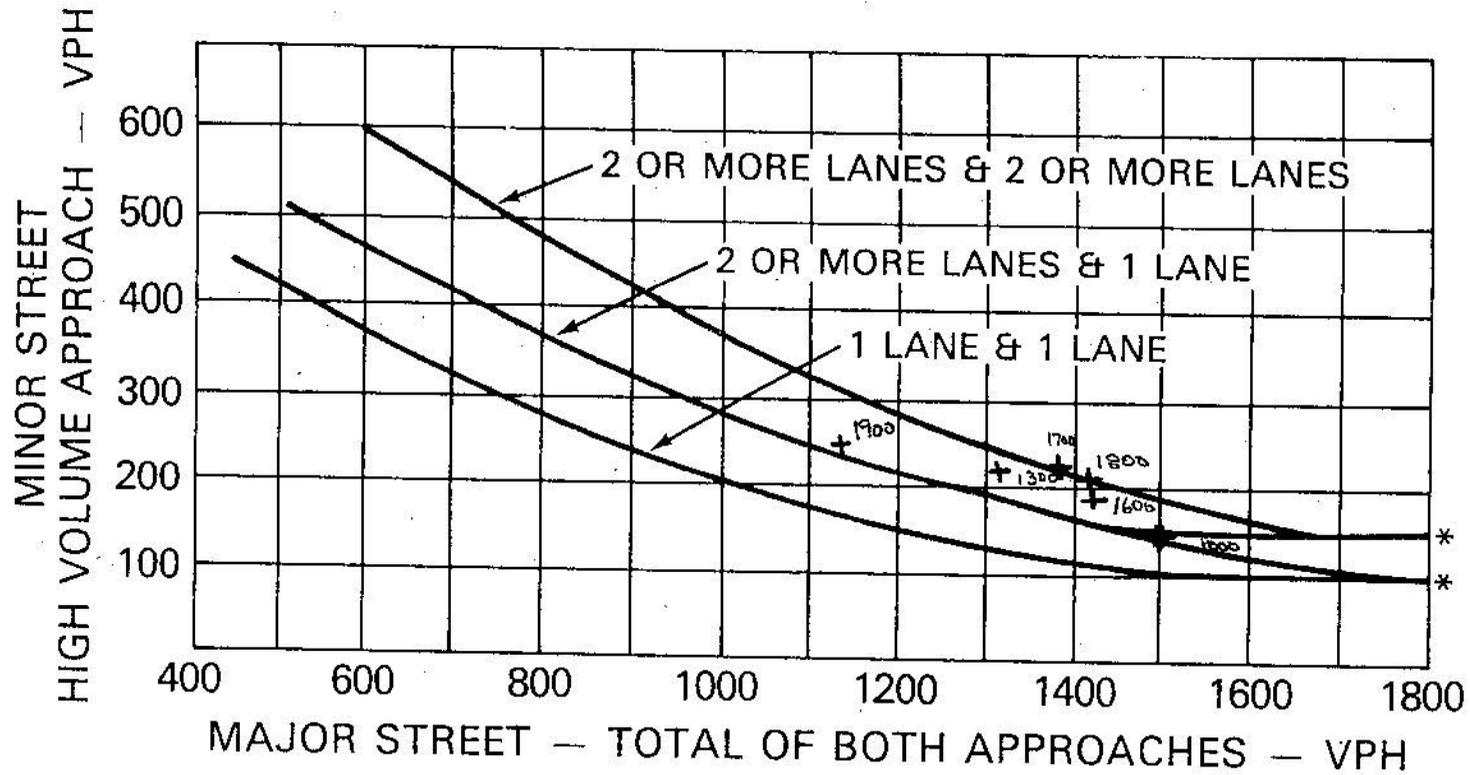
AWDT PM Peak Hour Volume = 1,433 based on 5 weekdays

FIGURE 4-7. FOUR HOUR VOLUME WARRANT



*NOTE: 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

FIGURE 4-5. PEAK HOUR VOLUME WARRANT



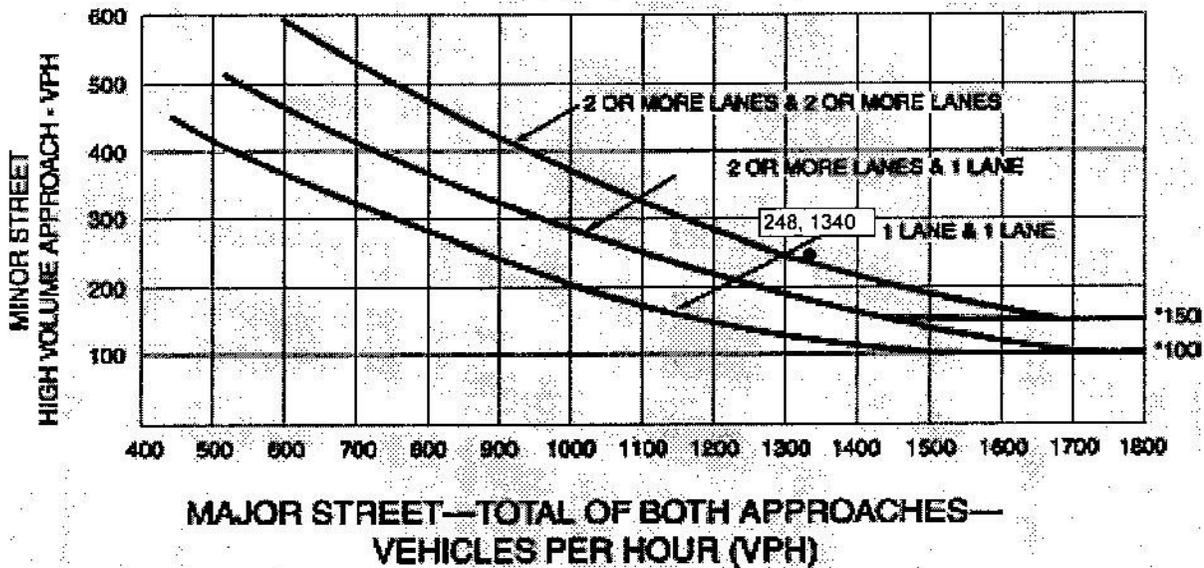
*NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

QFC U-Village Access Study
 TENW Project No. 2400

Signal Warrant Analysis for NE 45th Street/SE QFC Dwy
 2004 Existing with Alternate Approach methodology - left-turn traffic vs. opposing thru traffic

**Warrant 3 - Peak Hour (5 to 6 p.m.)
 Condition B**

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

WARRANT MET (2) = YES

Notes:

- (1) The highest hourly minor/major approach volumes are based on the existing 2004 traffic counts conducted on 10/13/04.
- (2) The signal warrant is satisfied when the conditions given below exist for one hour of an average day.

MUTCD Warrant Requirements

Warrant 3: Peak Hour - Condition B

The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) for 1 hour of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

NOTE:

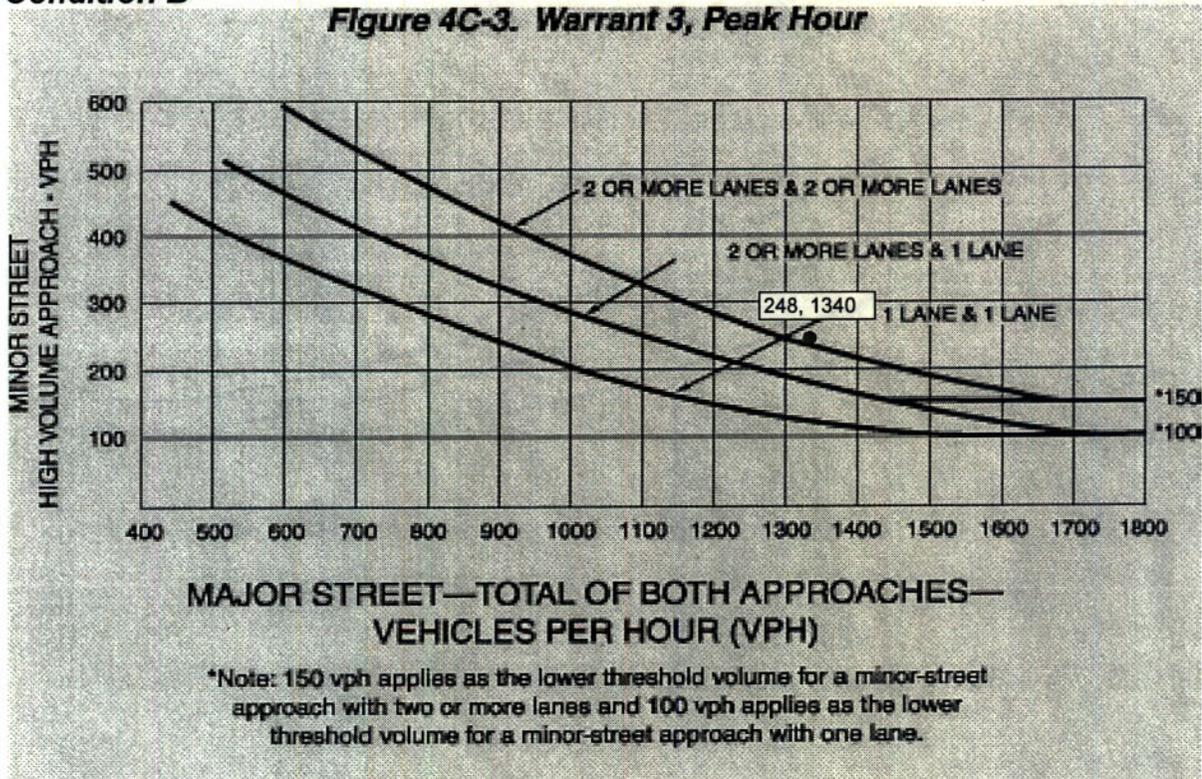
This signal warrant shall only be applied in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

QFC U-Village Access Study
TENW Project No. 2400

Signal Warrant Analysis for NE 45th Street/SE QFC Dwy
2004 Existing with Alternate Approach methodology - left-turn traffic vs. opposing thru traffic

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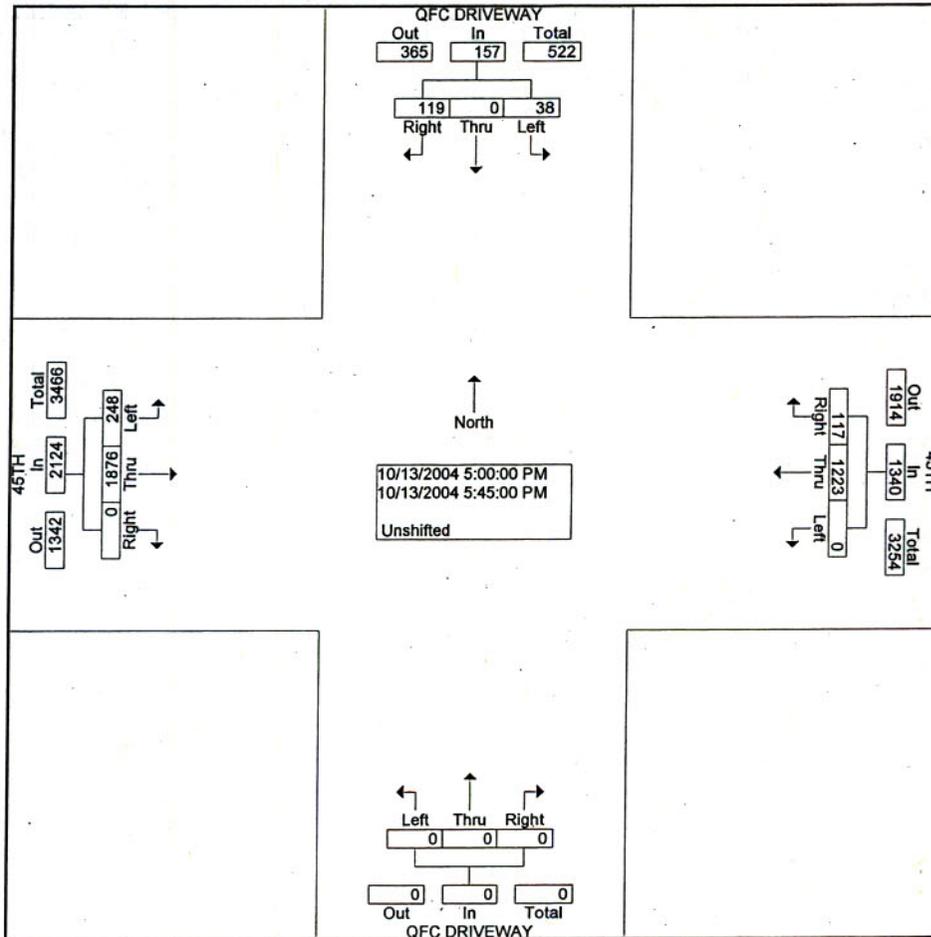
NOTE:

This signal warrant shall only be applied in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

All Traffic Data Services Inc.
 2225 NE 27th St
 Renton, WA 98056

File Name : QFCDrive&45th
 Site Code : 00000000
 Start Date : 10/13/2004
 Page No : 2

Start Time	QFC DRIVEWAY Southbound				45TH Westbound				QFC DRIVEWAY Northbound				45TH Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 05:00 PM	38	0	119	157	0	1223	117	1340	0	0	0	0	248	1876	0	2124	3621
Volume	24.2	0.0	75.8		0.0	91.3	8.7		0.0	0.0	0.0		11.7	88.3	0.0		
Percent	10	0	24	34	0	314	27	341	0	0	0	0	73	468	0	541	916
05:15 Volume																	
Peak Factor																	
High Int. Volume	7	0	34	41	0	314	27	341	0	0	0	0	73	468	0	541	916
Peak Factor																	
					0.957				0.982								0.982



All Traffic Data Services Inc.
 2225 NE 27th St
 Renton, WA 98056

File Name : QFCDrive&45th
 Site Code : 00000000
 Start Date : 10/13/2004
 Page No : 1

Groups Printed- Unshifted

Start Time	QFC DRIVEWAY Southbound					45TH Westbound					QFC DRIVEWAY Northbound					45TH Eastbound					Exclu Total	Inclu Total	Int. Total
	Left	Thru	Rig ht	HV	App. Total	Left	Thru	Rig ht	HV	App. Total	Left	Thru	Rig ht	HV	App. Total	Left	Thru	Rig ht	HV	App. Total			
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0				
04:00 PM	5	0	42	0	47	0	364	26	9	390	0	0	0	0	0	74	364	0	0	438	9	875	884
04:15 PM	8	0	33	0	41	0	290	30	7	320	0	0	0	0	0	59	355	0	0	414	7	775	782
04:30 PM	4	0	24	0	28	0	301	30	10	331	0	0	0	0	0	72	368	0	0	440	10	799	809
04:45 PM	3	0	31	0	34	0	319	35	4	354	0	0	0	0	0	66	399	0	0	465	4	853	857
Total	20	0	130	0	150	0	1274	121	30	1395	0	0	0	0	0	271	1486	0	0	1757	30	3302	3332
05:00 PM	7	0	34	0	41	0	301	31	6	332	0	0	0	0	0	61	463	0	0	524	6	897	903
05:15 PM	10	0	24	0	34	0	314	27	8	341	0	0	0	0	0	73	468	0	0	541	8	916	924
05:30 PM	9	0	32	0	41	0	302	31	4	333	0	0	0	0	0	56	478	0	0	534	4	908	912
05:45 PM	12	0	29	0	41	0	306	28	5	334	0	0	0	0	0	58	467	0	0	525	5	900	905
Total	38	0	119	0	157	0	1223	117	23	1340	0	0	0	0	0	248	1875	0	0	2124	23	3621	3644
Grand Total	58	0	249	0	307	0	2497	238	53	2735	0	0	0	0	0	519	3362	0	0	3881	53	6923	6976
Apprch %	18.9	0.0	81.1			0.0	91.3	8.7			0.0	0.0	0.0			13.4	86.6	0.0					
Total %	0.8	0.0	3.6		4.4	0.0	36.1	3.4		39.5	0.0	0.0	0.0		0.0	7.5	48.6	0.0		56.1	0.8	99.2	

6/24/05

**COLLISION HISTORY AT
2700 NE 45TH STREET**

<u>Year</u>	<u>Collisions between LT's into Driveway and WB Through's</u>	<u>Collisions between LT's out of Driveway and WB Through's</u>
2000	6	2
2001	4	2
2002	6	2
2003	9	1
2004 up to 6/8	5	1
6/8/04 to 6/24/05	6	1

New channelization was put in at the driveway location on 6/8/04. This created a 4-foot lane between the middle westbound lane and the outside, free-flow lane that continues to the 45th Street viaduct. The 4-foot lane was intended to give left-turning drivers room to slowly pull their vehicles past stopped vehicles in the middle lane and improve line of sight to traffic in the outside free-flow lane to the viaduct. SDOT has been monitoring the location since.

Dates of Collisions since 6/8/04

6/22/04	left turn into driveway.
10/22/04	left turn out of driveway.
11/12/04	left turn into driveway.
12/4/04	left turn into driveway.
1/26/05	left turn into driveway.
2/6/05	left turn into driveway.
3/19/05	left turn into driveway.