January 15, 2020

Mr. Jessy Pu, PE
Town of Los Gatos
41 Miles Avenue
Los Gatos, CA 95030

Hillbrook School 2019-2020 Monitoring

Dear Mr. Pu;

As requested, W-Trans has prepared a summary of the Fall Trimester traffic monitoring of Hillbrook School in Los Gatos for the 2019-2020 school year. The purpose of this memo is to summarize the 2019 Fall Trimester manual data collection and daily vehicle trips and to note any discrepancies in the data collection. Overall, Hillbrook School did not exceed the maximum number of daily vehicle trips during Fall Trimester.

Existing Conditions

The Hillbrook School is located at 300 Marchmont Drive in the Town of Los Gatos. According to Condition 17 of the School's Conditional Use Permit, "the maximum number of daily vehicle trips shall not exceed 880." The School can identify up to 10 exception days where they are permitted to exceed the maximum number of daily trips, however, the total number of trips on these exception days shall not exceed 960. During the summer trimester "the maximum number of daily vehicle trips shall not exceed 300." The school maintains two Sensys magnetometer traffic counters embedded in the pavement of the exit lane outside the school's gate, approximately 30 feet apart. These magnetometers (Sensys counters) are calibrated to detect the presence of vehicles and motorcycles, but not bicycles or other non-motorized means of transportation.

Hillbrook School and Sensys staff continuously monitor the functionality of the system. The magnetometers are self-calibrating and self-tuning, and are upgraded remotely as new software is released. The sensors are to be calibrated and validated each trimester. Hillbrook School confirmed that the sensors were reviewed at the beginning of the 2019-2020 school year. Sensys staff have previously conducted an independent validation of the county system and concluded the daily counts are showing between 97% and 99.75% accuracy. Hillbrook School has implemented traffic control measures to improve the flow of vehicles over the sensors in order to maintain data accuracy, such as lane delineators along Marchmont Drive.

Hillbrook School has only one vehicular access point, and because of this it is assumed that all exit trips also made an entrance trip through this location. For reporting purposes, the maximum of either Exit A or Exit B is used to determine the number of daily trips. During previous trimesters, construction activity at adjacent properties has been detected by the Sensys system and parked vehicles have interfered with data collection. Since construction activity has ended, normal daily vehicle trips from the houses located adjacent to Hillbrook School on Marchmont Drive now have the potential to also be detected by the Sensys counters. The trips have the potential to be detected by one or both sensors, and thus could possibly increase in the number of days where the difference between sensors is larger than five percent.

The Conditional Use Permit also outlines the requirements of manual data collection in Condition 19 and "the school shall be considered out of compliance if any mechanical readings exceed the Sensys counts by more than five percent and where the readings are above the maximum number of daily vehicle trips."

A permanent backup pneumatic tube counter, a MetroCount MC56000 Vehicle Classifier System, is located in both the entrance and exit lanes just outside of the School's gate. Pneumatic tube systems utilize rubber tubes placed across traffic lanes in specific configurations. When a vehicle travels over the tube the air pressure in the tube is compressed and this compression triggers an event recording. The system is programed to classify vehicles based on the distance between the front and rear axle. The School's MetroCount system counts the total number of trips,

both entrance and exit trips.   While the Sensys system can be accessed remotely online, the MetroCount system is local to the School's network. The School has agreed to, and continues to, actively provide W-Trans with backup data directly from the MetroCount system when necessary.

24-hour Manual Counts and Observations

For the 2019 Fall Trimester, traffic counts were obtained on Marchmont Drive on September 18, 2019, October 1, 2019, and October 17, 2019. These dates were selected to cover a variety of on-campus activities. Tuesday October 1 was an exception day, as daytime home games were scheduled on-campus.

The traffic counts based on video taken by W-Trans represent the total sum of entrance and exit trips for 24-hours, broken down into 15-minute intervals. The Sensys counts represent the exit trips for the same 24-hour period. In order to convert exit trips to both entrance and exit trips, the maximum count from either Exit A or Exit B was determined and then doubled (assuming one trip in is equivalent to one trip out). The data from the Exit A sensor was higher than the data from the Exit B sensor on September 18 and October 17, so the Sensys counts compared to the video counts on those days were the doubled count from the Exit A sensor. On Tuesday October 1, there were no Sensys counts recorded prior to 9:30 a.m., which is atypical of regular vehicle egress from Hillbrook School during the morning period. By performing a manual review of video counts, it was determined that over 100 vehicles exited Hillbrook School prior to 9:30 a.m It is reasonable to assume that the Sensys counters experienced an outage during the morning of October 1, and thus the Sensys data collected on that day is not reasonable to analyze. Therefore, the backup tube counter data was requested from the school and compared to the manual video data collection. The raw Sensys data, tube count data, and video counts are attached. The manual counts were then compared to the Sensys data for the same time period in Table 1.

Table 1 – Summary of 24-Hour Counts for Fall Trimester 2019					
Date	**Day of the Week**	**Counts (# of Vehicles)**		**Summary of Counts**	
		Video	**Sensys**	**Percent Difference**	**Difference in Trips**
09/18/19	Wednesday	752	694	8.02%	58
10/01/19	Tuesday	784	774*	1.28%	10
10/17/19	Thursday	748	790	5.46%	42
Average		**761**	**753**	**4.84%**	**37**

Note: Red Text = value exceeds conditional use permit threshold; *=data from backup tube counter system

The manually counted video counts were reviewed to ensure accuracy. The video counts were higher than the Sensys counts on September 18 and October 1, while the Sensys counts on October 17 were higher than the video counts. On both October 1 and October 17, the percent difference was larger than five percent. However, the average difference, overall, was less than five percent. Additionally, none of the data points exceeded the Conditional Use Permit daily trip cap.

2019 Fall Trimester Summary

- During the 2019 Fall Trimester, Hillbrook School did not exceed the maximum number of daily trips (880). Attached, in Table 2, is the daily summary of Sensys counts for the 2019 Fall Trimester. There were five exception days during the 2019 Fall Trimester. However, the number of daily trips on the exception days did not exceed the maximum number of daily trips (960) for an exception day or the maximum number of daily trips (880) for a regular school day.

- The highest number of daily vehicle trips was 832 trips and occurred on October 29, 2019.

- The average number of school day vehicle trips for the 2019 Fall Trimester was approximately 696 trips.

- Excluding weekends and school holidays, there were 27 instances where the difference between Sensor A and Senor B was greater than five percent (5%). The average difference between the Sensor A and Sensor B counts was 18 vehicles.

- The cumulative percent difference between Sensor A and Sensor B for the 2019 Fall Trimester was 4.81%.

- The largest daily difference between Sensor A and Sensor B was 39 vehicles on September 12, 2019. In August 2019 the average daily difference between Sensor A and Sensor B was approximately 21 vehicles. The difference was approximately 21 vehicles in September, 14 vehicles in October, 16 vehicles in November, and 19 vehicles in December.

Conclusions

Overall, Hillbrook School was in compliance with Condition 17 of the School's Conditional Use Permit for the school year 2019-2020 Fall Trimester. The next monitoring report is the Spring Trimester Manual Counts that is anticipated to be completed in June 2020, prior to the conclusion of Hillbrook School's Spring Trimester. We will continue to provide monthly downloads of Sensys data during the first week of each month.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

Sincerely,

Allison Woodworth, EIT
Assistant Engineer

Mark Spencer, PE
Senior Principal

MES/akw /LGA004-10.L1

Enclosures: Fall Trimester Count Summary

Date	Day of the Week	Sensys Counts (# of Vehicles)		Summary of Sensys Counts		Notes
		Exit A	Exit B	Percent Difference	Daily Trips	
08/28/19	Wednesday	256	228	11.6%	512	First Day of Trimester
08/29/19	Thursday	351	324	8.0%	702	
08/30/19	Friday	316	309	2.2%	632	
08/31/19	*Saturday*	18	15	18.2%	36	
09/01/19	*Sunday*	10	8	22.2%	20	
09/02/19	Monday	13	11	16.7%	26	No School
09/03/19	Tuesday	350	333	5.0%	700	
09/04/19	Wednesday	315	300	4.9%	630	
09/05/19	Thursday	363	324	11.4%	726	
09/06/19	Friday	390	357	8.8%	780	Exception Day
09/07/19	*Saturday*	18	19	5.4%	38	
09/08/19	*Sunday*	23	15	42.1%	46	
09/09/19	Monday	356	341	4.3%	712	
09/10/19	Tuesday	356	326	8.8%	712	
09/11/19	Wednesday	367	332	10.0%	734	
09/12/19	Thursday	411	372	10.0%	822	Exception Day
09/13/19	Friday	342	309	10.1%	684	
09/14/19	*Saturday*	18	16	11.8%	36	
09/15/19	*Sunday*	18	17	5.7%	36	
09/16/19	Monday	386	371	4.0%	772	
09/17/19	Tuesday	345	327	5.4%	690	
09/18/19	Wednesday	347	331	4.7%	694	
09/19/19	Thursday	356	323	9.7%	712	
09/20/19	Friday	330	326	1.2%	660	
09/21/19	*Saturday*	18	21	15.4%	42	
09/22/19	*Sunday*	15	17	12.5%	34	
09/23/19	Monday	365	353	3.3%	730	
09/24/19	Tuesday	377	367	2.7%	754	
09/25/19	Wednesday	345	340	1.5%	690	
09/26/19	Thursday	351	335	4.7%	702	
09/27/19	Friday	343	331	3.6%	686	
09/28/19	*Saturday*	26	21	21.3%	52	
09/29/19	*Sunday*	14	13	7.4%	28	

Table 2 – Daily Sensys Count Summary – 2019 Fall Trimester

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| Date | Day of the Week | Sensys Counts (# of Vehicles) | | Summary of Sensys Counts | | Notes |
		Exit A	Exit B	Percent Difference	Daily Trips	
09/30/19	Monday	370	352	5.0%	740	
10/01/19	Tuesday	-	-		744	Exception Day/Tube Count Backup Data
10/02/19	Wednesday	373	369	1.1%	746	
10/03/19	Thursday	369	348	5.9%	738	
10/04/19	Friday	356	340	4.6%	712	
10/05/19	Saturday	16	17	6.1%	34	
10/06/19	Sunday	9	6	40.0%	18	
10/07/19	Monday	31	27	13.8%	62	No School
10/08/19	Tuesday	368	353	4.2%	736	
10/09/19	Wednesday	327	316	3.4%	654	
10/10/19	Thursday	377	358	5.2%	754	Exception Day
10/11/19	Friday	350	340	2.9%	700	
10/12/19	Saturday	22	24	8.7%	48	
10/13/19	Sunday	17	14	19.4%	34	
10/14/19	Monday	382	368	3.7%	764	
10/15/19	Tuesday	378	380	0.5%	760	
10/16/19	Wednesday	358	343	4.3%	716	
10/17/19	Thursday	395	392	0.8%	790	
10/18/19	Friday	396	373	6.0%	792	
10/19/19	Saturday	16	17	6.1%	34	
10/20/19	Sunday	12	14	15.4%	28	
10/21/19	Monday	400	383	4.3%	800	
10/22/19	Tuesday	386	369	4.5%	772	
10/23/19	Wednesday	348	334	4.1%	696	
10/24/19	Thursday	375	358	4.6%	750	
10/25/19	Friday	374	359	4.1%	748	
10/26/19	Saturday	13	17	26.7%	34	
10/27/19	Sunday	0	0	-	0	
10/28/19	Monday	-	-	-	28	School Closed for PG&E Power Outage/Tube Count Backup Data
10/29/19	Tuesday	416	398	4.4%	832	
10/30/19	Wednesday	349	337	3.5%	698	
10/31/19	Thursday	304	287	5.8%	608	

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Date	Day of the Week	Sensys Counts (# of Vehicles)		Summary of Sensys Counts		Notes
		Exit A	Exit B	Percent Difference	Daily Trips	
11/01/19	Friday	342	327	4.5%	684	
11/02/19	*Saturday*	12	14	15.4%	28	
11/03/19	*Sunday*	16	15	6.5%	32	
11/04/19	Monday	220	214	2.8%	440	
11/05/19	Tuesday	311	280	10.5%	622	
11/06/19	Wednesday	349	337	3.5%	698	
11/07/19	Thursday	366	354	3.3%	732	
11/08/19	Friday	302	278	8.3%	604	
11/09/19	*Saturday*	146	129	12.4%	292	
11/10/19	*Sunday*	6	5	18.2%	12	
11/11/19	Monday	370	369	0.3%	740	
11/12/19	Tuesday	391	374	4.4%	782	
11/13/19	Wednesday	344	335	2.7%	688	
11/14/19	Thursday	347	334	3.8%	694	
11/15/19	Friday	352	339	3.8%	704	
11/16/19	*Saturday*	18	18	0.0%	36	
11/17/19	*Sunday*	8	8	0.0%	16	
11/18/19	Monday	375	341	9.5%	750	
11/19/19	Tuesday	386	371	4.0%	772	
11/20/19	Wednesday	340	329	3.3%	680	
11/21/19	Thursday	362	354	2.2%	724	
11/22/19	Friday	302	276	9.0%	604	
11/23/19	*Saturday*	12	8	40.0%	24	
11/24/19	*Sunday*	5	5	0.0%	10	
11/25/19	Monday	18	19	5.4%	38	No School
11/26/19	Tuesday	14	19	30.3%	38	No School
11/27/19	Wednesday	7	8	13.3%	16	No School
11/28/19	Thursday	5	8	46.2%	16	No School
11/29/19	Friday	3	6	66.7%	12	No School
11/30/19	*Saturday*	11	13	16.7%	26	
12/01/19	*Sunday*	1	1	0.0%	2	
12/02/19	Monday	387	372	4.0%	774	
12/03/19	Tuesday	397	377	5.2%	794	
12/04/19	Wednesday	112	100	11.3%	224	
12/05/19	Thursday	359	334	7.2%	718	

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		Exit A	Exit B	Percent Difference	Daily Trips	
12/06/19	Friday	367	350	4.7%	734	
12/07/19	*Saturday*	19	21	10.0%	42	
12/08/19	*Sunday*	6	11	58.8%	22	
12/09/19	Monday	396	375	5.4%	792	
12/10/19	Tuesday	408	395	3.2%	816	
12/11/19	Wednesday	377	356	5.7%	754	
12/12/19	Thursday	370	355	4.1%	740	
12/13/19	Friday	379	361	4.9%	758	
12/14/19	*Saturday*	18	18	0.0%	36	
12/15/19	*Sunday*	12	11	8.7%	24	
12/16/19	Monday	389	376	3.4%	778	
12/17/19	Tuesday	379	353	7.1%	758	
12/18/19	Wednesday	413	392	5.2%	826	Exception Day
12/19/19	Thursday	407	379	7.1%	814	
12/20/19	Friday	301	284	5.8%	602	Last Day of Trimester

Note: Red Text = value exceeds conditional use permit threshold; Green Text = value below conditional use permit threshold