

# MEMORANDUM

**Date:** November 2, 2022

**To:** City of Beaverton

**From:** Monica Leal, PE, PTOE

Richard Martin, EIT

**Subject:** Cor Deo Christian Academy Transportation Impact Analysis Addendum P20-012

This memorandum serves as an addendum to the Cor Deo Christian Academy Transportation Impact Analysis submitted on July 17, 2022. This addendum addresses the comments provided by the City of Beaverton on October 20, 2022. A copy of the comments is provided in the Appendix.

## PARKING CIRCULATION AND QUEUING ANALYSIS

Within the Fellowship Church parking lot, vehicles are provided with a prescribed route for student pick-up and drop-off. This route is shown in Figure 1.

The route shown in Figure 1 provides approximately 900 feet of storage for vehicle queuing between the access driveway and the area marked Student Drop Off & Pick Up. Based on an average vehicle length of 20 feet to 25 feet for commuter vehicles, this allows between 36 and 45 vehicles to queue for pick-up/drop-off before the queue begins to spill into SW Erickson Avenue.



Figure 1: Pick-Up and Drop-Off Route

### Field Observations

Field observations were conducted at the Cor Deo Christian Academy currently serving 64 students at 5755 SW Erickson Drive in Beaverton. Observations were conducted over two days during both drop-off and pick-up periods. The field observations showed a casual process where some drivers would park in the lot and talk with school staff for several minutes before dropping off/picking up students. Some drivers would also enter the drop-off/pick-up route and act in a similar fashion. With a planned expansion from 64 to 200 students, it is expected that drop-off/pick-up practices will become more uniform as more students will need to be served during a specific time frame. A summary of the field observations is shown in Table 1. Field observation data is provided in Appendix H of the original TIA.

**Table 1: Drop-Off and Pick-Up Field Observations**

Activity	Day	Time	Total Vehicles	Vehicles using Drop-Off/Pick-Up Route	Parents that Parked to Drop Off/Pick up Kids	Maximum Average # of Vehicles Observed During the 15-minute Interval	Average # of vehicles in Queue	Max # of Vehicles in Queue
Drop-Off	Day 1	8:00 to	39	25 <sup>(2)</sup>	14 <sup>(3)</sup>	12	2	4 (8:05 am)
	Day 2	9:00 am	32	17 <sup>(1)</sup>	15 <sup>(3)</sup>			
Pick-Up	Day 1	2:45 to	25	14	11 <sup>(4)</sup>	9	2	2
	Day 2	3:45 pm	29	18	11 <sup>(4)</sup>			

Notes: <sup>(1)</sup> 4 vehicles arrived before the school opened its doors.  
<sup>(2)</sup> 2 vehicles arrived before the school opened its doors.  
<sup>(3)</sup> Between 36% and 47% of parents parked to drop off students. Average = 42%  
<sup>(4)</sup> Between 38% and 44% of parents parked to pick up students. Average = 41%

Field observations showed that about 40% of the vehicles parked to drop off or pick up students. The observations also showed an average queue of 2 vehicles and a maximum queue of 4 vehicles. Based on information provided by the school about 50% of the kids carpool to school. However, this data was not collected.

The maximum average number of vehicles observed during a 15-minute interval was 12 vehicles. However, they arrive and drive off/pick up students forming a typical queue of two vehicles. The maximum queue was observed at 8:05 am while the vehicles were waiting for the school to open its doors.

### Additional Queue Calculations

The estimated queue lengths of the proposed development were determined based on the number of students and the average and maximum queues observed during student drop-off and pick-up activities. The Cor Deo Christian Academy plans for an enrollment of approximately 105 students in 2023. The goal is to grow to a student body of 200 students in 5-10 years.

Additional queue calculations were conducted to address the City of Beaverton comments. The additional queue calculations assume the following:

- 200 students split into 100 K-4 students and 100 K5-8 students.
- Staggered start times. The school is proposing 30 minutes between drop-off and pick-up times for grades K-4 and K5-8.
- No parking to drop off/pick up students. All vehicles will use the prescribed pick-up/drop-off route.
- No moving queue during a 15-minute interval.

A ratio of 100 students divided by the current 64 students (1.56x) was applied to the queues. Some vehicles will continue to park in the parking lot instead of queueing for pick-up/drop-off, but for a conservative analysis, all 15 vehicles shown to park during the Day 2 drop-off were added to the maximum number of vehicles observed during the 15-minute interval. Table 2 summarizes the estimated queues.

**Table 2: Queuing Summary**

	Existing Conditions (Field Observations)	Proposed Conditions (1.56x)
<b>Number of Students</b>	<b>64</b>	<b>100</b>
<b>Average # of Vehicles in the Queue</b>	<b>2</b>	<b>4</b>
<b>Average Queue Length <sup>(1)</sup></b>	<b>45</b>	<b>90</b>
<b>Maximum # of Vehicles in the Queue</b>	<b>4</b>	<b>7</b>
<b>Maximum Queue Length <sup>(1)</sup></b>	<b>90</b>	<b>158</b>
<b>Maximum Average # of Vehicles in a 15-Minute Interval</b>	<b>27<sup>(2)</sup></b>	<b>43</b>
<b>Maximum Queue Length in a 15-Minute Interval (Assuming a no moving queue) <sup>(1)</sup></b>	<b>608</b>	<b>968</b>
Notes:		
(1) Based on an average vehicle length of 20 feet to 25 feet for commuter vehicles (22.5 feet).		
(2) Based on all parked cars joining the queue. Field observations show 15 vehicles parked in the lot during the Day 2 drop-off period.		

Based on the observed average and maximum queues and the anticipated number of students, the proposed development will have an estimated average queue of 4 vehicles and a maximum queue of 7 vehicles for an estimated maximum queue length of 158 feet. Since the circulation route can accommodate between 36 and 45 vehicles with a storage length of approximately 900 feet, it is anticipated that the maximum moving queue will be accommodated within the parking lot and no cars will spill into SW Erickson Avenue. This is assuming that some parents will park to drop off or pick up students as shown in the field observations.

The maximum average number of vehicles observed during a 15-minute interval was 12 vehicles. For a conservative approach, all the 15 vehicles previously parking in the lot were added to the queue for a maximum queue of 27 vehicles. Applying a scale factor of 1.56 to this number gives an estimated 43 vehicles will enter the site during a 15-minute interval. Assuming a *no moving queue* for 15 minutes, a queue of 43 vehicles (968 ft) can potentially exceed the available storage by approximately 3 to 4 vehicles. This scenario is very unlikely since a moving queue is anticipated where parents would pull up to the drop-off/pick-up zone and students would be prepared for drop off/pick up.

It is recommended to monitor the queue during student drop-off/pick-up times. If the queue exceeds the available storage, the following mitigations can be explored:

- Install signing and stationing a flagger in the parking lot to keep drivers intending to park in the lot from joining the prescribed route for student pick-up and drop-off.
- Moving the pick-up/drop-off location to a different entrance to the building to add additional feet of queueing storage. The school has an additional entrance on the north side of the building that can add about 200 of additional queueing storage.
- Implementing additional carpooling and van services to transport students. Currently, the school has a van that transport 10 to 12 students from the Banks area to and from the school and approximately five carpool drivers that transport students.

## MITIGATIONS AND SUMMARY

This memorandum serves as an addendum to expand on the parking and circulation analysis presented in the Cor Deo Christian Academy Transportation Impact Analysis submitted on July 17, 2022. This addendum addresses the comments provided by the City of Beaverton on October 20, 2022.

A circulation analysis was performed to determine if queueing for drop-off/pick-up for the expanded school would spill into SW Erickson Avenue. The prescribed drop-off/pick-up route for the school provides about 900 feet of storage through the parking lot, which allows for approximately 36 to 45 vehicles to queue in the lot before reaching SW Erickson Avenue.

Additional queue calculations were conducted to address the City of Beaverton comments. The additional queue calculations assume 200 students split into 100 K-4 and 100 K5-8 students, staggered start times by 30 minutes between drop-off and pick-up times for grades K-4 and K5-8, no parking to drop off/pick up students, and a no moving queue for a 15-minute interval for a conservative approach.

Based on an analysis that scaled the existing circulation observations by a factor of 1.56 to account for the proposed increase in students, it is anticipated that the maximum queue for 100 students is 7 vehicles, with a maximum of 43 vehicles arriving during a 15-minute window. Because the pick-up/drop-off route provides storage for approximately 36 to 45 vehicles, the maximum queue of 43 vehicles can potentially exceed the storage by approximately 3 to 4 vehicles. Should a no-movement queueing situation arise for vehicles during the 15-minute interval, vehicles could spill into SW Erickson Avenue. However, this scenario is unlikely since the queues will move continuously and some vehicles may still park in the lot to drop-off/pick-up students. It is recommended to monitor the queue during student drop-off/pick-up times to determine if mitigation measures need to be implemented to accommodate and manage the queue. If the queue exceeds the available storage, the following mitigations can be explored:

- Install signing and stationing a flagger in the parking lot to keep drivers intending to park in the lot from joining the prescribed route for student pick-up and drop-off.
- Moving the pick-up/drop-off location to a different entrance to the building to add additional feet of queueing storage. The school has an additional entrance on the north side of the building that can add about 200 of additional queueing storage.
- Implementing additional carpooling and van services to transport students. Currently, the school has a van that transport 10 to 12 students from the Banks area to and from the school and approximately five carpool drivers that transport students.

The student body is not expected to reach 200 students for 5-10 years. With the proposed staggered start times, monitoring of queueing during drop-off/pick-up times, and the implementation of mitigation measures if queueing issues are observed, it is anticipated that queueing can be accommodated within the parking lot.

## APPENDIX

**From:** Brett Cannon  
**Sent:** Thursday, October 20, 2022 3:32 PM  
**To:** Greta <[gholmstrom@yahoo.com](mailto:gholmstrom@yahoo.com)>  
**Subject:** Cor Deo Christian-Queuing Discussion

Hi Greta,

Staff requires additional information as it relates to the queuing analysis provided by Global Transportation Engineers. Staff is unable to make positive findings as it relates to Facilities Review Criteria D, F and G because the Traffic Impact Analysis, specifically the queuing analysis, doesn't propose mitigation measures to successfully manage the que from spilling into SW Erickson Drive. Without additional information staff will be recommending **denial** in the **Draft** Facilities Review report. To change the denial recommendation to an approval recommendation staff requires new analysis that demonstrates a student body enrollment of X number of students will not cause a que of vehicles to spill into SW Erickson Drive.

Staff cites page 19 of the TIA which states, "field observations showed a casual process where some drivers would park in the lot and talk with school staff for several hours minutes before dropping off/picking up students. Some drivers would also enter the drop-off/pick-up route and act in a similar fashion. With a planned expansion from 64-200 students, it is expected that drop-off/pick-up practices will become more uniform." Based on these observations and assumptions of a more uniform drop-off/pick-up, a greater number of parents will be utilizing the queuing lane as the enrollment numbers increase. Therefore, the projection of a maximum of 38 vehicles in the que is too low. Staff maintains that maximum average number of vehicles 12 is too low a number to use as the multiplier with 3.125 when extrapolating out to 200 students.

Staff requires the following materials by **November 2** to ensure enough time to review and craft a staff report prior to the November 16<sup>th</sup> Planning Commission meeting.

1. A supplemental memorandum to the queuing with assumption for the maximum number of vehicles that will be in the queue with the understanding less parking will be utilized by parents.
2. How staggered start times of 30 minutes will reduce maximum number of vehicles in the queue.

For clarifying questions on assumptions to be used in the TIA memorandum please reach out to Jabra Khasho [jkhasho@beavertonoregon.gov](mailto:jkhasho@beavertonoregon.gov) and/or Kate McQuillan [kmcquillan@beavertonoregon.gov](mailto:kmcquillan@beavertonoregon.gov)

Staff understands that timing is becoming a critical issue and is willing to assist in making sure the required updates to the TIA have the correct assumptions based on staff's requests.

Please let me know if you have any questions.

Thank you,

**Brett Cannon**

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