Appendix O

FEHR PEERS

Memorandum

Date: September 6, 2021

To: Heidi Tschudin, Tschudin Consulting Group

From: David Manciati, Fehr & Peers

Subject: Teichert Shifler Mining and Reclamation Project – Additional Traffic Analysis

RS19-3831

As requested by Yolo County, this memorandum provides a summary of the following items related to the Teichert Shifler Mining and Reclamation Project EIR:

- Intersection operations analysis methodology and results for the SR 16/Wildwing Drive intersection
- Revised project fair share estimates at State Route 16/CR 94B and State Route 16/CR 96

SR 16/Wildwing Drive Intersection Operations

Background

In November 2013, Fehr & Peers prepared a scope of work for a traffic study of the proposed project, which was subsequently approved by Yolo County. The scope of work identified several study intersections within the vicinity of the project site. However, the SR 16/Wildwing Drive intersection was not identified as a study intersection. Fehr & Peers could not locate documentation related to the reasoning for not including SR 16/Wildwing Drive as a study intersection.

It is possible that the intersection was not included because Wildwing Drive is a private roadway and, therefore, outside the jurisdiction of Yolo County and Yolo County General Plan policies. This practice is not uncommon in instances where a private roadway or driveway constitute one or more legs of an intersection within a study area. However, absent additional information regarding the traffic study scoping process, it would be speculative to assume that this was the rationale.

The Teichert Shifler Mining and Reclamation Project DEIR was released in December 2020. Multiple DEIR public comments pertained to traffic operations at SR 16/Wildwing Drive. As a result, Yolo County requested additional information regarding traffic operations at SR 16/Wildwing Drive to inform the preparation of the FEIR. Fehr & Peers subsequently prepared an intersection operations analysis for the SR 16/Wildwing Drive intersection, which is summarized in the following section.

LOS Analysis

Methodology

In support of the original traffic study, intersection turning movement data was collected at study intersections in 2014. Because SR 16/Wildwing Drive was not a study intersection, existing traffic volume data at this intersection is not currently available. Therefore, this analysis utilizes available nearby traffic volume data and industry standards to estimate peak hour traffic volumes at SR 16/Wildwing Drive.

Turning movement volumes collected at adjacent study intersections (SR 16/CR 94B and SR 16/I-505 Northbound Ramps) in 2014 were utilized to estimate eastbound and westbound approach volumes at SR 16/Wildwing Drive. Traffic volume estimates for vehicles entering and exiting the Wild Wings subdivision at Wildwing Drive were derived using trip generation data contained in the *Trip General Manual, 10th Edition* (Institute of Transportation Engineers, 2017). Peak hour trip rates for the Wild Wings subdivision were applied based on the manual's single-family detached home category (ITE Code 210) and the golf course category (ITE Code 430). Internalization (i.e., internal trips between single-family homes and between single-family homes and the golf course) was estimated using Fehr & Peers' MXD+ tool.

Table 1 presents the estimated number of vehicle trips generated by the Wild Wings subdivision during the AM and PM peak hours.

Table 1: Vehicle Trip Generation Estimate – Wild Wings Subdivision

Use	Unit	Vehicle Trip Generation Estimate					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing[1]	337 dwelling units	61	183	244	205	121	326
Golf Course[2]	9 holes	13	3	16	14	12	26
Net Raw Project Trips		74	186	260	219	133	352
Internal Capture[3]		-9	-23	-32	-15	-9	-24
Total		**65**	**163**	**228**	**204**	**124**	**328**

Notes:

1. Vehicle trip generation estimate calculated using fitted curve equations obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for single-family detached housing (land use code 210).
2. Vehicle trip generation estimate calculated using fitted curve equations obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for golf course (land use code 430).
3. Internalization estimated using Fehr & Peers' MXD+ tool.

Source: Fehr & Peers, 2021.

The following summarizes other components of the analysis methodology:

- The operations analysis was conducted using procedures and methodologies consistent with the *Highway Capacity Manual (HCM), 6th Edition* (Transportation Research Board, 2016). These methodologies were applied using the Synchro 11 traffic analysis software.
- The SR 16/Wildwing Drive intersection was analyzed for the AM and PM peak hours under existing (2014) plus project, cumulative no project, and cumulative plus project conditions.
- Wild Wings trip generation estimates were assigned to the SR 16/Wildwing Drive intersection based on outputs from the SACMET base year travel demand forecasting model used in the traffic study.
- Heavy vehicle percentages for through movements were estimated based on original data collected for adjacent study intersections (i.e., SR 16/CR 94B and SR 16/I-505 northbound ramps). Where settings differed between the adjacent study intersections, the more conservative value was used. A heavy vehicle percentage of 3% was used for entering/exiting movements at Wildwing Drive.
- Peak hour factors for through movements were estimated based on original data collected for adjacent study intersections (i.e., SR 16/CR 94B and SR 16/I-505 northbound ramps). Where settings differed between the adjacent study intersections, the more conservative value was used. The HCM recommended default rural area peak hour factor of 0.88 was used for entering/exiting movements at Wildwing Drive.
- For the purposes of this analysis, the Yolo County General Plan was utilized to establish thresholds for acceptable intersection operations. Policy CI-3.1 H establishes LOS D or better as acceptable for SR 16 between I-505 and CR 98, which includes the SR 16/Wildwing Drive intersection. Because the intersection is side-street stop-controlled, this threshold is applied to the worst-case movement LOS.

Intersection Operations

Table 2 presents the weekday AM and PM peak hour traffic operations analysis results at SR 16/Wildwing Drive under existing plus project, cumulative, and cumulative plus project conditions (refer to Appendix for technical calculations).

The intersection would operate at acceptable LOS D or better under existing plus project conditions during both peak hours.

Under cumulative no project conditions, the intersection would operate at unacceptable LOS E during the AM peak hour and LOS F during the PM peak hour. Under cumulative plus project conditions, the project would increase delay but maintain LOS E during the AM peak hour. The project would not change PM Peak hour delay or LOS from cumulative no project conditions.

Table 2: Peak Hour Intersection Operations

Intersection	Traffic Control[1]	Peak Hour	Existing Plus Project Conditions		Cumulative No Project Conditions		Cumulative Plus Project Conditions	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]
State Route 16/Wildwing Drive	SSSC	AM	3 (19)	A (C)	**4 (36)**	**A (E)**	**4 (42)**	**A (E)**
		PM	4 (30)	A (D)	**6 (82)**	**A (F)**	**6 (82)**	**A (F)**

Notes: **Bold** indicates unacceptable conditions.

1. SSSC = side-street stop-controlled intersection
2. The table presents the average control delay for the whole intersection with the control delay for the lane group with the highest delay presented in parentheses.
3. LOS = level of service; calculated based on methodologies contained in the *Highway Capacity Manual* (HCM) *6th Edition*.

Source: Fehr & Peers, 2021.

The Yolo County TIS Guidelines establish that a project would cause an adverse effect to off-site traffic operations if an intersection operates unacceptably according to Policy CI-3.1 and CI-3.2 under a no project scenario and the project would add 10 or more peak hour trips. Under both cumulative no project and cumulative plus project conditions, the intersection would operate unacceptably during both peak hours. Moreover, the project would add 58 trips during the AM peak hour and 4 trips during the PM peak hour between cumulative no project and cumulative plus project conditions. Therefore, the project would cause an adverse effect to intersection operations under cumulative plus project conditions.

Peak Hour Signal Warrant Analysis

The California Manual on Uniform Traffic Control Devices (MUTCD) contains warrants to determine whether the installation of a traffic signal at a particular location is appropriate. The peak hour signal warrant (Warrant 3), one of nine warrants, was evaluated at SR 16/Wildwing Drive for both the AM and PM peak hours under existing plus project, cumulative, and cumulative plus project conditions. Because the surrounding community has a population of less than 10,000 people, the "rural" peak hour warrant analysis was applied.

The analysis showed that the peak hour signal warrant was met for the following scenarios (refer to Appendix for technical calculations):

- Existing plus project conditions – PM peak hour only (Warrant 3B)
- Cumulative no project conditions – Both AM and PM peak hours (Warrant 3B)
- Cumulative plus project conditions – Both AM and PM peak hours (Warrant 3B)

Potential Improvements

The following potential modifications would improve peak hour operations at SR 16/Wildwing Drive to acceptable LOS D or better under cumulative plus project conditions:

- The installation of a traffic signal.
- The installation of an eastbound merge lane on the east leg of the intersection. Such a merge lane would facilitate two-stage turning movements for southbound left-turning vehicles. First, the vehicle would use a gap in westbound traffic to turn into the merge lane and, second, the vehicle would merge with eastbound traffic to travel eastbound on SR 16. This improvement would result in LOS C operations during the AM peak hour and LOS D operations during the PM peak hour under cumulative plus project conditions.

The feasibility of these potential modifications requires further evaluation. The modifications would occur within Caltrans right-of-way, and thus would require review and approval by Caltrans. Furthermore, right-of-way acquisition may be necessary to accommodate the potential modifications described above.

Fair Share Assessment

Table 3 shows the project's fair share percentages at SR 16/Wildwing Drive by peak hour. Fair share percentages were derived using the Caltrans' Equitable Share Responsibility method. Using this method, the project's fair share is determined by estimating the percentage of total future traffic growth that would be attributable to the project.

Table 3: Fair Share Percentages – SR 16/Wildwing Drive

Intersection	Fair Share Percentage[1]	
	AM Peak Hour	PM Peak Hour
State Route 16/Wildwing Drive	10.9%	0.6%

Notes: 1. Fair share percentage based on Caltrans' Equitable Share Responsibility method.
Source: Fehr & Peers, 2021.

Fair Share at State Route 16/CR 94B and State Route 16/CR 96

Background

The traffic study concluded that the proposed project would cause a General Plan inconsistency related to LOS at the SR 16/CR 94B and SR 16/CR 96 intersections during the AM peak hour under cumulative plus project conditions. Fehr & Peers provided Yolo County with fair share percentages that reflected the proposed project's cumulative plus project contribution to unacceptable traffic operations at those two

intersections. While responding to DEIR comments, Fehr & Peers discovered a spreadsheet error that resulted in the need to correct the fair share percentages.

Revised Fair Share Percentages

Table 4 shows peak hour fair share percentages as originally submitted, as well as the revised values.

Table 4: Fair Share Percentages – SR 16/CR 94B and SR 16/CR 96

Intersection	Peak Hour Fair Share Percentage[1]			
	Original Submittal		Revised Values	
	AM	PM	AM	PM
State Route 16/County Road 94B	3.2%	0.2%	11.3%	0.9%
State Route 16/County Road 96	3.4%	0.3%	19.6%	2.6%

Notes:

1. Fair share percentage based on Caltrans' Equitable Share Responsibility method.

Source: Fehr & Peers, 2021.