



# **APPENDIX M**

**Fehr & Peers Prepared “No Waiale Bypass Analysis”  
Memorandum**





## MEMORANDUM

Date: October 17, 2016  
To: Mike Summers, Planning Consultants Hawaii, LLC  
From: Netai Basu & Christine Mercado, Fehr & Peers  
**Subject: Waikapu Country Town Project – Analysis of 2026 Conditions without the Waiale Bypass**

*SD13-0085.01*

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Coordination with local and state agencies, such as the County of Maui, and the project team during the early preparation stages of the Transportation Impact Analysis Report (TIAR) for the Waikapu Country Town Project led to the decision to assume the completion of the planned Waiale Bypass in the study's future analysis scenarios. The Waiale Bypass is a planned southward extension of Waiale Road from its existing terminus at Waiko Road to intersect with Honoapi'ilani Highway approximately one mile south of Honoapi'ilani Highway/Waiko Road. The roadway extension would provide additional access to the project land uses on the makai side via a roundabout intersection with the future east-west roadway within the project ("Main Street") and via a 3-legged intersection with the major North-South Residential Street. This bypass is not identified in the County's FY 2017 CIP, and the precise schedule for construction of this roadway is now uncertain. As planned, Waiale Road would be extended southward from Waiko Road to a new connection with Honoapiilani Highway. It would create a new north-south roadway connection in this area with multiple connections to Kuihelani Highway through the County's planned Base Yard and Regional Park.

During the DEIS public circulation period, some comments have questioned this baseline street improvement assumption, especially given the significance of the bypass road for project circulation, and have asked about impacts on project design and the study area's transportation facilities if the roadway improvement is not funded and built in time for the project. In response, **Fehr & Peers has developed and analyzed forecast traffic volumes in Year 2026 without the Waiale Bypass in place, both before and after the addition of project traffic. These traffic volumes**



were then used to conduct a full quantitative impact analysis of future no-bypass scenarios. The results of the analysis are summarized in this memorandum.

## FUTURE TRAFFIC PROJECTIONS

Estimates of the future traffic conditions without the proposed project in place were derived using the Maui Travel Demand Forecasting Model. Particularly, the same 2026 model developed for the TIAR was used; however, the Waiale Bypass (north of the intersection with the planned north-south residential street that would be constructed as part of the project [Study Intersection #12]) was excluded from the roadway network. The resulting post-processed cumulative base traffic volumes and the anticipated lane configurations, representing future conditions without the project and the bypass for year 2026, is presented in **Figure 1**.

### 2026 NO PROJECT VOLUME COMPARISON

A comparison of the 2026 No Project peak hour volumes with and without the Waiale Bypass showed that the traffic projected to use the roadway extension would shift to use Honoapi'ilani Highway and Kuihelani Highway. Details of the shift in traffic volumes in the study area between Waiko Road and the intersection of Honoapi'ilani Highway & Kuihelani Highway under the 2026 No Project, No Bypass Condition are summarized below:

- During the AM peak hour, 210 additional northbound trips and 70 additional southbound trips would traverse Honoapi'ilani Highway.
- Along Kuihelani Highway, it is projected that there would be 110 additional northbound trips and 130 additional southbound trips traversing this portion of the study area in the AM peak hour.
- During the PM peak hour, 50 additional northbound trips and 210 additional southbound trips would traverse Honoapi'ilani Highway.
- Along Kuihelani Highway, it is projected that there would be 130 additional northbound trips and 80 additional southbound trips traversing this portion of the study area in the PM peak hour.



<b>1. Honoapiʻilani Highway/Kuikahi Drive</b> 	<b>2. Waiale Road/Kuikahi Drive</b> 	<b>3. S. Kamehameha Avenue/Maui Lani Parkway</b> 	<b>4. Kūihelani Highway/Maui Lani Parkway</b> 	<b>5. Honoapiʻilani Highway/Waiko Road</b> 
<b>6. Waiale Road/Waiko Road</b> 	<b>7. S. Kamehameha Avenue/Waiko Road</b> 	<b>8. Kūihelani Highway/Waiko Road</b> 	<b>9. Honoapiʻilani Highway/Main Street</b> <p><i>Intersection does not exist under No Project Conditions</i></p>	<b>10. Waiale Road/Main Street</b> <p><i>Intersection does not exist without the Waiale Bypass</i></p>
<b>11. Honoapiʻilani Hwy/E-W Residential Street</b> <p><i>Intersection does not exist under No Project Conditions</i></p>	<b>12. N-S Residential Street/Waiale Road</b> <p><i>Intersection does not exist under No Project Conditions</i></p>	<b>13. Honoapiʻilani Highway/Waiale Road</b> <p><i>Intersection does not exist under No Project Conditions</i></p>	<b>14. Honoapiʻilani Highway/Kūihelani Highway</b> 	

Figure 1  
Peak Hour Traffic Volumes and Lane Configurations  
Year 2026 No Project Conditions





## PROJECT TRAFFIC PROJECTIONS

Using the same trip generation and overall trip distribution pattern presented in the TIAR, the project trips were assigned to the 2026 roadway network without the bypass. The trip assignment differs from the TIAR as trips to/from land uses on the makai side that were originally using Waiale Road were re-routed to use the site's internal roadways (i.e., Main Street, E-W Residential Road, and N-S Residential Road) and Honoapi'ilani Highway. **Figure 2** illustrates the net new 2026 project generated traffic volumes at full buildout for the AM and PM peak hours at each study intersection.

The project generated traffic volumes (**Figure 2**) were then added to the 2026 base traffic projection (**Figure 1**) to develop 2026 with Project traffic forecasts for the no-bypass scenario shown in **Figure 3**.

## KEY STREET SYSTEM CHANGES

In addition to using the revised traffic projections in the 2026 intersection operations analysis presented in this memorandum, there have been changes to the baseline street system assumptions since the completion of the TIAR, as well as changes to the project street system assumptions due to not constructing that Waiale Bypass that have been applied. Described below are the key changes in study intersection configuration used in this analysis:

- Intersection 1: Honoapi'ilani Highway & Kuikahi Drive – Based on the May 2016 field observations, the eastbound and westbound approaches have been re-stripped from one shared through/left-turn lane and one right-turn lane to one left-turn lane, one through lane, and one right-turn lane. Additionally, the eastbound and westbound left-turn phasing has been modified to protected/permitted. These modifications were used in the revised 2026 intersection operations analysis with and without the project in place.
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway – A roundabout will be replacing the all-way stop-controlled intersection and construction is likely to begin operation sometime in Summer 2017. This intersection control modification was used in the revised 2026 intersection operations analysis with and without the project in place.
- Intersection 6: Waiko Road & Waiale Road – Signalization and construction of the fourth leg of this intersection are associated with the Waiale Bypass. Since this analysis evaluates



no-bypass scenarios, the existing control and configuration were maintained in the revised 2026 intersection operations analysis with and without the project in place.

- Intersection 9: Honoapi'ilani Highway & Main Street – This future intersection will be constructed as part of the project. Due to the increase in volumes at this location without the Waiale Bypass in place, the intersection configuration has been revised from what was assumed in the TIAR in order to yield acceptable operating conditions (i.e., minimum level of service [LOS] D or better). Thus, this analysis assumes that the intersection is configured with one left-turn lane, one through lane, and one right-turn lane across all approaches. Signal phasing is assumed to be protected/permitted across all approaches, and there would be an overlap phase for the westbound right-turn. These modifications were used in the revised 2026 with project intersection operations analysis.
- Intersection 10: Waiale Bypass & Main Street – This future intersection will not exist without the Waiale Bypass in place.
- Intersection 12: North-South Street Residential & Waiale Bypass– This future intersection will be constructed as part of the project. Without the Waiale Bypass in place this intersection would be a 2-legged, side-street stop-controlled intersection. These modifications were used in the revised 2026 with project intersection operations analysis.
- Intersection 13: Honoapi'ilani Highway & Waiale Bypass – This future intersection will be constructed as part of the project. Without the Waiale Bypass in place, this intersection would be a 4-legged, side-street intersection with stop-control on the minor approach.



1. Honoapiʻilani Highway/Kuikahi Drive	2. Waiale Road/Kuikahi Drive	3. S. Kamehameha Avenue/Maui Lani Parkway	4. Kuihelani Highway/Maui Lani Parkway	5. Honoapiʻilani Highway/Waiko Road
6. Waiale Road/Waiko Road	7. S. Kamehameha Avenue/Waiko Road	8. Kuihelani Highway/Waiko Road	9. Honoapiʻilani Highway/Main Street	10. Waiale Road/Main Street
				<p style="text-align: center;"><i>Intersection does not exist without the Waiale Bypass</i></p>
11. Honoapiʻilani Hwy/E-W Residential Street	12. N-S Residential Street/Waiale Road	13. Honoapiʻilani Highway/Waiale Road	14. Honoapiʻilani Highway/Kuihelani Highway	

Figure 2  
Peak Hour Traffic Volumes and Lane Configurations  
Net New Project Only, Phase 1 & 2 (2026)





1. Honoapiʻilani Highway/Kuikahi Drive	2. Waiale Road/Kuikahi Drive	3. S. Kamehameha Avenue/Maui Lani Parkway	4. Kūihelani Highway/Maui Lani Parkway	5. Honoapiʻilani Highway/Waiko Road
6. Waiale Road/Waiko Road	7. S. Kamehameha Avenue/Waiko Road	8. Kūihelani Highway/Waiko Road	9. Honoapiʻilani Highway/Main Street*	10. Waiale Road/Main Street
				<p style="text-align: center;"><i>Intersection does not exist without the Waiale Bypass</i></p>
11. Honoapiʻilani Hwy/E-W Residential Street	12. N-S Residential Street/Waiale Road	13. Honoapiʻilani Highway/Waiale Road	14. Honoapiʻilani Highway/Kūihelani Highway	

- Study Intersection
- Turn Lane
- AM (PM) Peak Hour Traffic Volume
- \* Includes Pass-by Trips
- Traffic Signal
- Stop Sign
- Waiale Bypass

Figure 3  
Peak Hour Traffic Volumes and Lane Configurations  
2026 with Project (Phase 1 & 2) without Bypass Conditions







## INTERSECTION ANALYSIS

The intersection operations analysis compares the projected levels of service at each study intersection under cumulative conditions for 2026 with and without the proposed project and without the Waiale Bypass to determine the potential impacts. Results of this analysis are presented in **Table 1**.

### 2026 NO PROJECT TRAFFIC CONDITIONS

The results of the LOS calculations indicate that all of the future study intersections operate at an overall desirable LOS (LOS D or better) under 2026 No Project Conditions, with the exception of the following locations:

- Intersection 1: Honoapi'ilani Highway & Kuikahi Drive (LOS F – AM peak hour)
- Intersection 2: Waiale Road & Kuikahi Drive (LOS E – AM peak hour hour)
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway (LOS F – AM and PM peak hours)
- Intersection 4: Kuihelani Highway & Maui Lani Parkway (LOS F – AM and PM peak hours)
- Intersection 6: Waiale Road & Waiko Road (LOS F – AM Peak hour and LOS E – PM peak hour)
- Intersection 7: S. Kamehameha Avenue & Waiko Road (LOS F – AM and PM peak hours)
- Intersection 8: Kuihelani Highway & Waiko Road (LOS E – AM peak hour)
- Intersection 13: Honoapi'ilani Highway & Waiale Road (LOS F – AM and PM peak hours)

When compared to the 2026 No Project results presented in the TIAR, Intersection 6: Waiale Road & Waiko Road and Intersection 8: Kuihelani Highway & Waiko Road are new locations that would operate at undesirable LOS if the Waiale Bypass is not in place.

### 2026 WITH PROJECT TRAFFIC CONDITIONS

The proposed project would contribute to cumulative impacts (LOS E or LOS F conditions) during one or both of the peak hours at the seven study intersection listed in the previous section. In addition, project-specific impacts have been identified at intersections where the addition of



project-generated traffic would cause their overall intersection operations to degrade below LOS D in one or both peak hours. The project-related impacts identified are:

- Intersection 1: Honoapi'ilani Highway & Kuikahi Drive (cumulative and project-specific impact)
- Intersection 2: Waiale Road & Kuikahi Drive (cumulative and project-specific impact)
- Intersection 5: Honoapi'ilani Highway & Waiko Road (LOS F in the AM and PM peak hour)

The results of this no-bypass analysis shows that Intersection 5: Honoapi'ilani Highway & Waiko Road and Intersection 6: Waiale Road & Waiko Road are new impacts not identified in the TIAR. Additionally, when comparing these results to the 2026 intersection operations analysis results presented in the TIAR, the impact type at the following locations change:

- Intersection 2: Waiale Road & Kuikahi Drive would also have a project-specific impact in the PM peak hour.
- Intersection 8: Kuihelani Highway & Waiko Road would be identified as a cumulative impact instead of a project-specific impact under the 2026 with Project without Bypass Condition.
- Intersection 13: Honoapi'ilani Highway & Waiale Road would have a project-specific impact in the AM and PM peak hours.



**TABLE 1 – YEAR 2026 LEVELS OF SERVICE - WAIKAPU COUNTRY TOWN FULL DEVELOPMENT (PHASE 1 & 2)**

Intersection	Traffic Control	Peak Hour	Year 2026 No Project, No Bypass Conditions		Year 2026 with Project Without Bypass Conditions		Delay Change	Mitigation Required?	Impacted in the DEIS?	Mitigated to:		LOS D or Better Conditions	
			Del/Veh <sup>1</sup>	LOS <sup>2,3</sup>	Del/Veh <sup>1</sup>	LOS <sup>2,3</sup>				Pre-Project or Better Conditions (≤ LOS D)	Del/Veh <sup>1</sup>	LOS <sup>2,3</sup>	Del/Veh <sup>1</sup>
1. Honoapi'ilani Highway & Kuikahi Drive	Signal	AM	85.5	<b>F</b>	116.5	<b>F</b>	31.0	<b>YES</b>	<b>YES</b>	51.2	D	Same as Pre-Project Mitigation	
		PM	35.1	D	86.2	<b>F</b>	51.1	<b>YES</b>	<b>YES</b>	37.7	D		
2. Waiale Road & Kuikahi Drive	Signal	AM	62.1	<b>E</b>	86.7	<b>F</b>	24.6	<b>YES</b>	<b>YES</b>	46.7	D	Same as Pre-Project Mitigation	
		PM	51.0	D	85.4	<b>F</b>	34.4	<b>YES</b>	<b>YES</b>	36.4	D		
3. S. Kamehameha Avenue & Maui Lani Parkway	Roundabout	AM	> 180	<b>F</b>	> 180	<b>F</b>	**	<b>YES</b>	<b>YES</b>	167.4 <sup>4</sup>	<b>F</b> <sup>4</sup>	23.8	C
		PM	> 180	<b>F</b>	> 180	<b>F</b>	**	<b>YES</b>	<b>YES</b>	163.4 <sup>4</sup>	<b>F</b> <sup>4</sup>	15.7	B
4. Kuihelani Highway & Maui Lani Parkway	Signal	AM	112.0	<b>F</b>	125.5	<b>F</b>	13.5	<b>YES</b>	<b>YES</b>	25.8	C	Same as Pre-Project Mitigation	
		PM	86.4	<b>F</b>	92.8	<b>F</b>	6.4	<b>YES</b>	<b>YES</b>	33.4	C		
5. Honoapi'ilani Highway & Waiko Road	Signal	AM	40.6	D	> 180	<b>F</b>	**	<b>YES</b>	NO	33.3	C	Same as Pre-Project Mitigation	
		PM	22.8	C	156.0	<b>F</b>	133.2	<b>YES</b>	NO	51.3	D		
6. Waiale Road & Waiko Road	SSSC	AM	> 180	<b>F</b>	>180	<b>F</b>	**	<b>YES</b>	NO	23.9	C	Same as Pre-Project Mitigation	
		PM	48.5	<b>E</b>	>180	<b>F</b>	**	<b>YES</b>	NO	16.3	B		
7. S. Kamehameha Avenue & Waiko Road	SSSC	AM	> 180	<b>F</b>	**	<b>F</b>	**	<b>YES</b>	<b>YES</b>	10.9	B	Same as Pre-Project Mitigation	
		PM	80.1	<b>F</b>	**	<b>F</b>	**	<b>YES</b>	<b>YES</b>	8.3	A		
8. Kuihelani Highway & Waiko Road	Signal	AM	70.5	<b>E</b>	113.1	<b>F</b>	42.6	<b>YES</b>	<b>YES</b>	32.3	C	Same as Pre-Project Mitigation	
		PM	21.0	C	26.6	C	5.6	NO	NO	18.6	B		
9. Honoapi'ilani Highway & Main Street	Signal	AM	Only built with project		46.3	D	46.3	NO	NO	No Mitigation Required			
		AM			44.9	D	44.9	NO	NO				
10. Waiale Road & Main Street	Roundabout	AM					Does not exist without the Waiale Bypass						
		PM											
11. Honoapi'ilani Highway & East-West Residential Street	Signal	AM	Only built with project		13.1	B	13.1	NO	NO	No Mitigation Required			
		PM			9.2	A	9.2	NO	NO				
12. North-South Residential Street & Waiale Road	SSSC	AM	Only built with project		8.9	A	8.9	NO	NO	No Mitigation Required			
		PM			8.6	A	8.6	NO	NO				
13. Honoapi'ilani Highway & Waiale Road	SSSC	AM	Only built with project		>180	F	>180	<b>YES</b>	NO	14.9	B	Same as Pre-Project Mitigation	
		PM			>180	F	>180	<b>YES</b>	NO	9.7	A		
14. Honoapi'ilani Highway & Kuihelani Highway	Signal	AM	21.3	C	22.8	C	1.5	NO	NO	No Mitigation Required			
		PM	23.4	C	26.7	C	3.3	NO	NO				

Source: Fehr & Peers, 2016

**Notes:**

\*\* Indicated oversaturated conditions. Delay cannot be calculated. AWSC = All-way stop-controlled intersection; SSSC = Side-street stop-controlled intersection.

<sup>1</sup> Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop control intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

<sup>2</sup> LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

<sup>3</sup> Unacceptable LOS highlighted in **bold**.

<sup>4</sup> The mitigation needed to have the intersection operate better than pre-project conditions is installing signal control and having the existing intersection configuration (i.e., a shared left/through/right lane on the eastbound and westbound approaches and a left-turn lane and a shared through/right-turn lane on the northbound and southbound approaches) in place.



## POTENTIAL TRAFFIC IMPROVEMENTS

Physical mitigation measures developed in the TIAR were first applied to the impacted locations and others were investigated as necessary. The emphasis was to identify physical and/or operational improvements that could be implemented within the existing or planned roadway rights-of-way. **Table 1** summarizes the projected LOS in 2026 at the impacted locations with these proposed measures in place.

The full range of improvements that address both project-related and/or cumulative traffic impacts are discussed in detail below.

**Intersection 1: Honoapiʻilani Highway & Kuikahi Drive** – The mitigation presented in the TIAR is not sufficient to mitigate the impact under the no-bypass scenario. Thus, the impact at this intersection could be reduced by widening the northbound approach from a left-turn lane, a through lane, and a right-turn to a left-turn lane, a through lane, and two right-turn lanes, widening the southbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and a right-turn lane, and widening the westbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and two right-turn lanes. Additionally, to complement the addition of a second southbound left-turn lane and a second westbound left-turn lane, the east and south legs of the intersection would each need to be widened to provide a second departure lane. Signal modifications at this intersection would include protected phasing on all approaches and right-turn overlap phasing on the westbound and northbound approaches. Additional right-of-way would be needed on both Honoapiilani Highway and on Kuikahi Drive to fully implement this improvement, which would result in LOS D operations at an overall intersection level.

**Intersection 2: Waiale Road & Kuikahi Drive** – The impact at this intersection could be mitigated using a reduced version of the improvements proposed in the TIAR for this location. The improvements needed to mitigate the impacts identified under the no-bypass scenario include widening the eastbound and westbound approaches to provide a left-turn lane, two through lanes, and a right-turn lane. To complement the widening of the eastbound and westbound approaches, both the eastbound and westbound departures would also need to be widened to each provide a second receiving lane. This improvement would result in LOS D operations at an overall intersection level.



**Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway** – The impact at this intersection could be mitigated by implementing the improvements presented in the TIAR, which is signalization of the intersection and maintaining the existing lane configuration (i.e., a shared left/through/right lane on the eastbound and westbound approaches and a left-turn lane and a shared through/right-turn lane on the northbound and southbound approaches). It should be noted, however, that the updated 2026 No Project Condition now assumes that the intersection would be configured as a single-lane roundabout.

As discussed in the TIAR, the pre-project improvement is install a traffic control signal with permitted phasing at all approaches. For LOS D or better operations at an overall intersection level, not only would a traffic signal need to be installed, but the eastbound and northbound approaches would need to provide a left-turn lane and a shared through/right-turn lane and the westbound and southbound approaches to provide a left-turn lane, a through lane, and a right-turn lane.

**Intersection 4: Kuihelani Highway & Maui Lani Parkway** – The impact at this intersection could be mitigated by implementing the improvements presented in the TIAR, which is to widen the eastbound approach to provide a left-turn lane, a shared through/left-turn lane, and a right-turn lane. In addition to the change in configuration, the eastbound and westbound left-turn phasing would need to be modified to split phasing. This improvement would result in LOS D operations at an overall intersection level.

**Intersection 5: Honoapiʻilani Highway & Waiko Road** – This intersection is a new impact not previously identified in the TIAR. Thus, the impact at this intersection could be reduced by widening the northbound approach from a left-turn lane and a shared through/right-turn lane to provide a left-turn lane, a through lane, and a shared through/right-turn lane, and widening the eastbound and westbound approaches to provide a left-turn lane and a shared through/right-turn lane. The northbound departure of the highway would require widening for a minimum of approximately 250 feet to provide a second receiving lane, which would transition back into the existing single northbound lane. Additional right-of-way may be needed on both Honoapiilani Drive and Waiko Road to fully implement this improvement, which would result in LOS D operations at an overall intersection level.

**Intersection 6: Waiale Road & Waiko Road** – The impact at this intersection is a new impact not previously identified in the TIAR. It could be mitigated with the installation of a traffic signal,



which was assumed to be in place in the Cumulative, pre-project condition in the TIAR due to its key location on the planned Waiale Bypass. This improvement would result in LOS D operations at an overall intersection level and the turning movement level.

**Intersection 7: S. Kamehameha Avenue & Waiko Road** – The impact at this intersection could be mitigated using the improvement presented in the TIAR, which is installing a traffic signal with permitted phasing at all approaches. This improvement would result in LOS D or better operations at both the overall intersection level and the turning movement level.

**Intersection 8: Kuihelani Highway & Waiko Road** – The impact at this intersection could be mitigated using the improvement presented in the TIAR, which is widening and restriping the eastbound approach to provide a left-turn lane and a right-turn lane. This improvement would result in LOS D or better operations at an overall intersection level.

**Intersection 13: Honoapi'ilani Highway & Waiale Road** – The impact at this intersection is a new impact not previously identified in the TIAR. It could be mitigated with the installation of a traffic signal, which was assumed to be in place in the Cumulative, pre-project condition in the TIAR due to its key location on the planned Waiale Bypass. This improvement would result in LOS D or better operations at an overall intersection level and the turning movement level.

## CONCLUSIONS

This memorandum documents analysis conducted to assess project-related and cumulative impacts upon full build-out of the proposed Waikapu Country Town project if the planned Waiale Bypass were not constructed by 2026. While three more study intersections would be significantly impacted under this scenario than in the “with Bypass” scenario analyzed in the TIAR, LOS D can be achieved at the impacted locations with an expanded program of roadway improvements as mitigation.