4.6 TRAFFIC AND TRANSPORTATION

This section is an analysis of the potential impacts on traffic and transportation. For the MMR ROI, the affected roadway considered in this analysis is Farrington Highway, specifically those portions adjacent to MMR and within the Wai‘anae area. The PTA ROI is the travel corridor between Kawaihae Harbor and PTA.

4.6.1 Impact Methodology

The traffic impact analysis describes the potential impacts from construction traffic, from transporting troops on roads to training ranges, and from increased traffic due to the increased activity and number of military personnel at MMR or PTA.

Convoys would be restricted to non-peak hours. The analysis includes long-term traffic volumes and impacts on local intersections, local circulation, parking, access, and traffic safety.

The objectives of the traffic impact analysis are to quantify the impacts of the Proposed Action on traffic LOS and circulation, and to identify and evaluate potential roadway improvements and traffic demand management strategies to mitigate the traffic impacts of the proposed project. To accomplish these objectives, the following tasks were performed:

- *Task 1: Collect data.* Traffic volumes along the major streets and roadways within the study area were determined from traffic counts performed by Hawai‘i DOT and from traffic data contained in traffic studies for other area projects. Because intersections are typically the capacity constraints along a street or roadway, emphasis is placed on obtaining traffic data at key intersections within the study area. Other data collected include intersection configurations, traffic control devices, speed limits, and right-of-way controls. Adjacent land use constraints were also noted.

- *Task 2: Quantify project-generated traffic.* The number of peak hour trips that each project would generate was estimated using standard trip generation procedures described in the *Trip Generation Handbook* (Institute of Transportation Engineers 1998). The purpose of this task was to determine the level of analysis required. If the generation analysis determined an insignificant increase or resulted in fewer peak hour trips than for existing conditions, a traffic impact analysis would not be required.

- *Task 3: Analyze existing LOS.* Using the data collected for Task 1, traffic operating conditions in the project vicinity were determined.

The methodology for signalized and unsignalized intersections described in the 2000 HCM was used to determine the LOS at the study intersections (Institute of Transportation Engineers 1998).

- *Task 4: Determine future background traffic projections.* Future background traffic conditions are determined by estimating traffic conditions during the design year without the proposed project. The ITE provides guidelines for determining the design year for a traffic impact analysis. A project that generates less than 500 peak hour trips is designated a "small development." For a small development, the suggested study horizon, or design year, is the opening year. Since this project would be a small development, the design year would be 2005 (Institute of Transportation Engineers 1991).

- *Task 5: Distribute and assign project-generated trips.* Project-generated trips were distributed based on the available approach and departure routes. The project-related traffic was then superimposed on 2005 background traffic projections to estimate 2005 background plus project traffic projections.

- *Task 6: Quantify traffic impacts of the proposed project.* The HCM methodology was used to conduct an LOS analysis for background plus project conditions. The results of this analysis were compared to 2005 background (without project) conditions to determine the incremental impacts.

- *Task 7: Identify and evaluate potential mitigation measures.* The impact analysis identifies locations where the project would have a significant traffic impact. Improvements that would mitigate these impacts were identified and assessed. Improvements that would be most effective in mitigating the project's impacts and would be feasible were recommended.

For MMR, a more specific methodology to conduct the traffic impact assessment is described below. It has been adapted to include evaluation of the Army's convoy and hauling policies because the policies provide guidance about the transport of equipment and personnel to and from MMR. The methodology's components consist of the following:

- Establish existing traffic conditions by collecting and analyzing traffic count data and field observations. Identify the quantity and types of vehicles currently traveling to and from MMR for CALFEX activities. Evaluate existing convoy and ammunition hauling policies for consistency with Hawai'i DOT regulations

(this effort is documented in Section 3.6, Traffic and Transportation).

- Develop estimates of the number and types of vehicles traveling to and from MMR for No Action and for Alternatives 1, 2, and 3, and analyze the impact of project vehicles on roadway and intersection traffic conditions for each alternative. Identify possible traffic operational problems or conflicts with motorists or pedestrians using Farrington Highway in the Wai‘anae area.
- Compare the analytical results for each alternative with existing conditions to identify the potential traffic impact of an alternative. If there are any LOS F conditions, develop mitigation measures, where possible, to reduce the potential traffic impact of an alternative to LOS E or better.

While training may occasionally occur over a weekend, most CALFEXs and other training would be conducted on weekdays. For this reason, the analysis in this section is based on training exercises conducted Monday through Friday.

4.6.2 Factors Considered for Determining Significance of Impacts

Since there are no local standards, criteria established by the FHWA, ITE, and the AASHTO were used to prepare this analysis. Factors considered in determining whether an alternative would have a significant impact on traffic and transportation include the extent or degree to which implementing an alternative would:

- Result in inadequate movement of traffic volume;
- Result in traffic delays at an intersection or roadway segment;
- Result in increases in vehicle trips on local roads that would disrupt or alter local circulation patterns;
- Result in lane closures or impediments that would disrupt or alter local circulation patterns;
- Exceed the capacity of on- and off-ramps, cause LOS at intersections and freeway mainline segments to deteriorate from LOS A through D to LOS E or F, cause LOS to deteriorate from LOS E to LOS F, or increase congestion (to greater than 0.01 as shown in Table 4.6-1) at intersections currently operating at (or anticipated to operate at) LOS F;
- Result in activities that would create potential traffic safety hazards; and
- Result in an inconsistency of convoys and transportation of ammunition with state regulations and policies.

Table 4.6-1
Mākua Military Reservation Baseline Transport Activities for the Five-Day CALFEX Schedule

Time	Monday	Tuesday	Wednesday	Thursday	Friday
0500		At 0530, a convoy of 5 HMMWVs, 4 HMMWVs with trailers, and a PLS depart SBMR and travel to MMR.	At 0500, 2 fire trucks depart from Lualualei and an HMMWV departs from SBMR and travel to MMR.	At 0500, 2 fire trucks depart from Lualualei and a HMMWV departs from SBMR and travel to MMR.	
0600		At 0600, a convoy of 6 HMMWVs, 3 HMMWVs with trailers, and a PLS depart SBMR for MMR.	At 0600, 3 HMMWVs with food and a HMMWV with water depart SBMR and arrive at MMR at 0700, then depart MMR at 0830 and return to SBMR.	At 0600, 3 HMMWVs with food and an HMMWV with water depart SBMR and arrive at MMR at 0700, then depart MMR at 0830 and return to SBMR.	
0800		At 0800, 3 buses (or 6 PLSs) with Company A infantry depart SBMR for MMR.			
0900		At 0900, 3 buses (or 6 PLSs) with Company B support infantry depart SBMR for MMR.			Between 0900 and 1100, three convoys depart MMR for SBMR about 15 to 30 minutes apart. First convoy has 6 HMMWVs, 3 HMMWVs with trailers, and a PLS. Second convoy has 6 buses or 12 PLSs to transport infantry. Third convoy has 5 HMMWVs, 4 HMMWVs with trailers, and a PLS.
1300	At 1300, 6 HMMWVs and a PLS depart from SBMR and travel to MMR to set up the TOC.				At 1300, 6 HMMWVs and a PLS depart MMR and return to SBMR.
1400			At 1400, 2 fire trucks depart MMR and return to Lualualei, and an HMMWV departs MMR for SBMR.	At 1400, 2 fire trucks depart MMR and return to Lualualei, and an HMMWV departs MMR for SBMR.	
1600		At 1630, 3 HMMWVs with food and an HMMWV with water depart SBMR and arrive at MMR about 1730, then depart MMR at 1900 to return to SBMR.	At 1630, 3 HMMWVs with food and an HMMWV with water depart SBMR and arrive at MMR about 1730, then depart MMR at 1900 to return to SBMR.	At 1630, 3 HMMWVs with food and an HMMWV with water depart SBMR and arrive at MMR about 1730, then depart MMR at 1900 to return to SBMR.	

Notes: Battalion officers may visit MMR and observe field operations at any time during CALFEX; they may travel in military vehicles or POVs.

A contractor may deliver portable toilets at any time prior to the start of CALFEX. The contractor may pick up toilets anytime after end of CALFEX

Degradation of traffic conditions beyond LOS E is considered unacceptable and constitutes a significant impact. Consistency between Army convoy and ammunition hauling procedures and state regulations and policies reduces safety risks, minimizes traffic congestion, and avoids damage to transportation infrastructure.

In addition to the above factors, public concerns expressed during the EIS process were also considered in the impact analysis.

4.6.3 Summary of Impacts

As shown below in the impact summary table, the No-Action Alternative and MMR Alternatives 1, 2, and 3 would have less than significant impacts on traffic and transportation at intersections and along Farrington Highway. Alternative 4 would also have a similar less than significant impact on traffic between Kawaihae Harbor and PTA. Alternatives 1, 2, and 3 would not be consistent with state transportation regulations and polices, with impacts determined to be significant but mitigable to less than significant. The No-Action Alternative and Alternative 4 would be more consistent with state regulations and policies, with a less than significant impact.

Summary of Potential Traffic and Transportation Impacts

Impact Issues	No Action Alternative	Alternative 1 MMR (Reduced Capacity Use with Some Weapons Restrictions)	Alternative 2 MMR (Full Capacity Use with Some Weapons Restrictions)	Alternative 3 MMR (Full Capacity Use with Fewer Weapons Restrictions)	Alternative 4 PTA (Full Capacity Use with Fewer Weapons Restrictions)
Consistency with state regulations and policies	⊙	⊘	⊘	⊘	⊙
Intersection operations	⊙	⊙	⊙	⊙	⊙
Roadway/highway segment operations	⊙	⊙	⊙	⊙	⊙

LEGEND:

⊗ = Significant impact

⊘ = Significant impact mitigable to less than significant

⊙ = Less than significant impact

○ = No impact

\+ = Beneficial impact

Mākua Military Reservation Traffic Volumes

The actual number of vehicles for each CALFEX could vary because each battalion commander has discretion when planning the activities and transport schedules; however, most CALFEX activities would occur over five days (Monday through Friday). Also, battalion staff may visit MMR

on any day and at any time to assess the training activities during the CALFEX. The hypothetical schedule of transport activities for a CALFEX is summarized in Table 4.6-1 and is used for the analysis in this EIS.

Most vehicles would arrive at MMR on Day 2 (Tuesdays from 6:00 AM to 7:00 AM, and most would depart on Day 5 (Fridays between 9:00 AM and 11:00 AM).

The No Action scenario assumed that no live-fire military training would take place at MMR. There would be almost no military vehicular traffic resulting from aircraft lasing and UAV training. Therefore, the traffic volumes for the No Action scenario represent the existing traffic counts with reductions for the CALFEX vehicles that were included in the traffic count.

For the mid-morning period, Farrington Highway traffic volumes tend to be higher from 10:00 AM to 11:00 AM, rather than from 9:00 AM to 10:00 AM. Thus, for this traffic impact analysis, the selected analysis periods for all live-fire alternatives are as follows:

- Tuesday early morning peak hour (6:00 AM to 7:00 AM) for MMR arrivals; and
- Friday mid-morning peak hour (10:00 AM to 11:00 AM) for MMR departures.

The estimated number of vehicles traveling to and from MMR for each alternative is identified in Table 4.6-2 and Table 4.6-3 by vehicle type. The recent CALFEXs conducted under the Settlement Agreement and Alternatives 1 and 2 would have about the same number of vehicle trips per CALFEX during the peak arrival and departure hours. Alternatives 1 and 2 would require five fewer vehicle trips during each of the peak hours than Alternative 3.

For the intersection operations analysis, passenger car-equivalents (PCEs) were applied to the military vehicles because the analysis methodologies typically apply to passenger cars. The PCEs account for the differences in size and maneuverability of the military vehicles when compared to passenger cars. For the HMMWVs, a 1.2-PCE adjustment factor was applied, while 1.5 was applied to the HMMWVs with trailers and the sanitation truck. For the PLSs, a 2.0-PCE adjustment factor was applied.

If Stryker vehicles are used, they would replace HMMWVs, and the overall vehicle count would remain the same. For the intersection operations analysis, the Strykers were assumed to be comparable in size to the HMMWVs and would represent 1.2 PCEs.

Table 4.6-2
Tuesday Early Morning Peak Hour (Arrivals)

Alternatives 1 and 2	Alternative 3
16 HMMWVs	21 HMMWVs
7 HMMWVs with trailers	7 HMMWVs with trailers
2 PLSs	2 PLSs
Total: 25 vehicles	**Total: 30 vehicles**

Table 4.6-3
Friday Mid-Morning Peak Hour (Departures)

Alternatives 1 and 2	Alternative 3
16 HMMWVs	21 HMMWVs
7 HMMWVs with trailers	7 HMMWVs with trailers
2 PLSs	2 PLSs
Total: 25 vehicles	**Total: 30 vehicles**

The MMR trips for Alternatives 1 and 2 at the Farrington Highway intersections at the primary MMR south access road, at the secondary MMR access road, and at Mākaha Valley Road are shown in Figure 4.6-1 Similarly, the MMR trips for Alternative 3 are presented in Figure 4.6-2. Existing Traffic Conditions with Alternative 1 or 2 are illustrated in Figure 4.6-3.

Figure 4.6-3 combines existing traffic volumes with the MMR trips for Alternatives 1 and 2. Figure 4.6-4 combines existing traffic conditions with added vehicle trips from Alternative 3. When the traffic counts were taken in April 2003, there were ongoing CALFEX activities at MMR; thus, the CALFEX-related trips were deducted from the April 2003 traffic counts so that the transport movements would not be double counted in this analysis.

State Transportation Policy Considerations

The recently revised Army DTO instructions for convoy operations (25th ID[L] PAM 55-1) clarify previous inconsistent DTO convoy policies. The Army's proposed transportation scenario would not be consistent with Hawai‘i DOT convoy policies. Also, Army transportation of ammunition does not conform to the State of Hawai‘i requirement for 48-hour advance written notice.

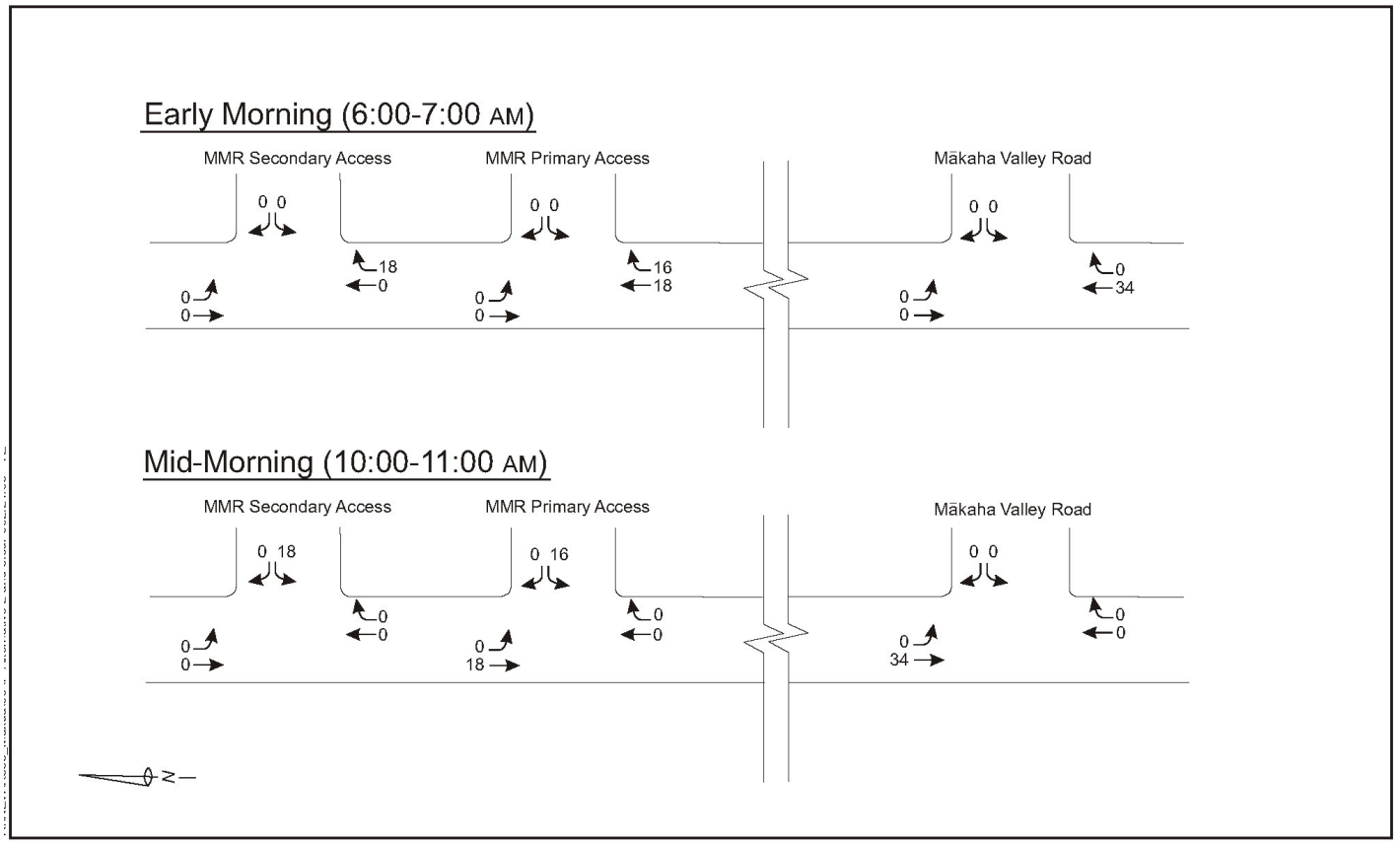
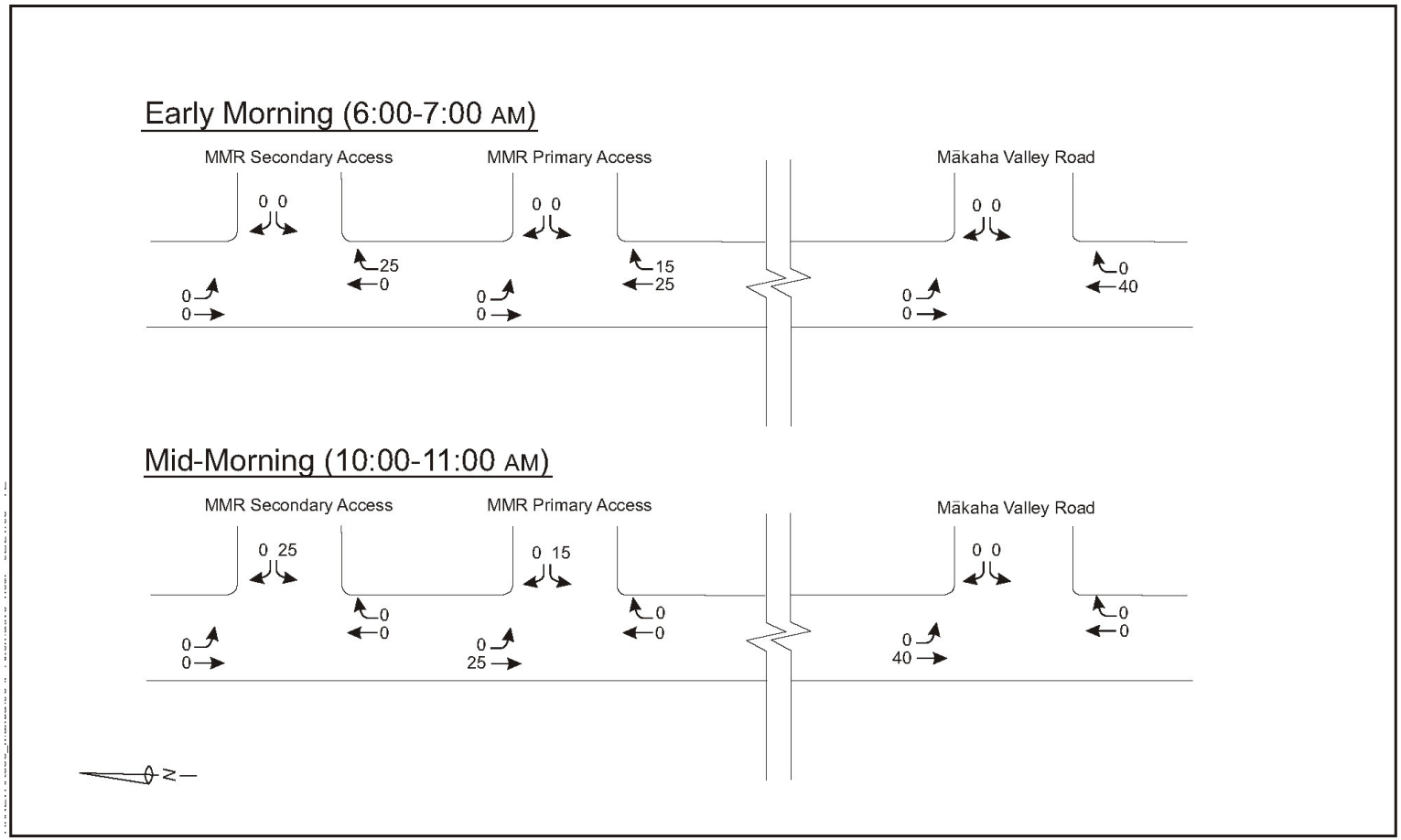


Figure 4.6-1 Alternatives 1 and 2 Project Traffic Volumes



Alternative 3 Project Traffic Volumes

Mākua Military Reservation
O'ahu, Hawai'i

Figure 4.6-2 Alternative 3 Project Traffic Volumes

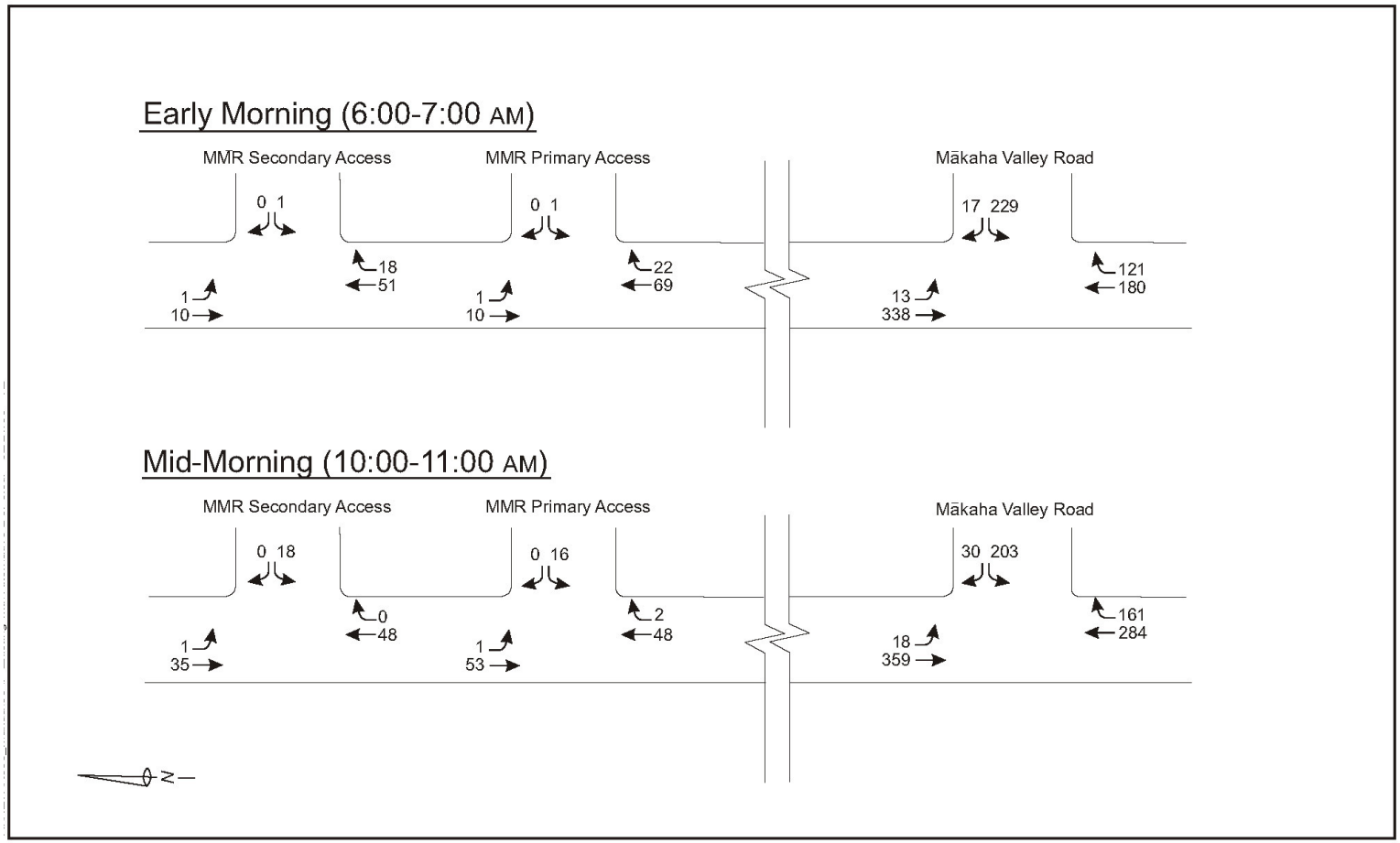


Figure 4.6-3 Existing Traffic Conditions with Alternative 1 or 2

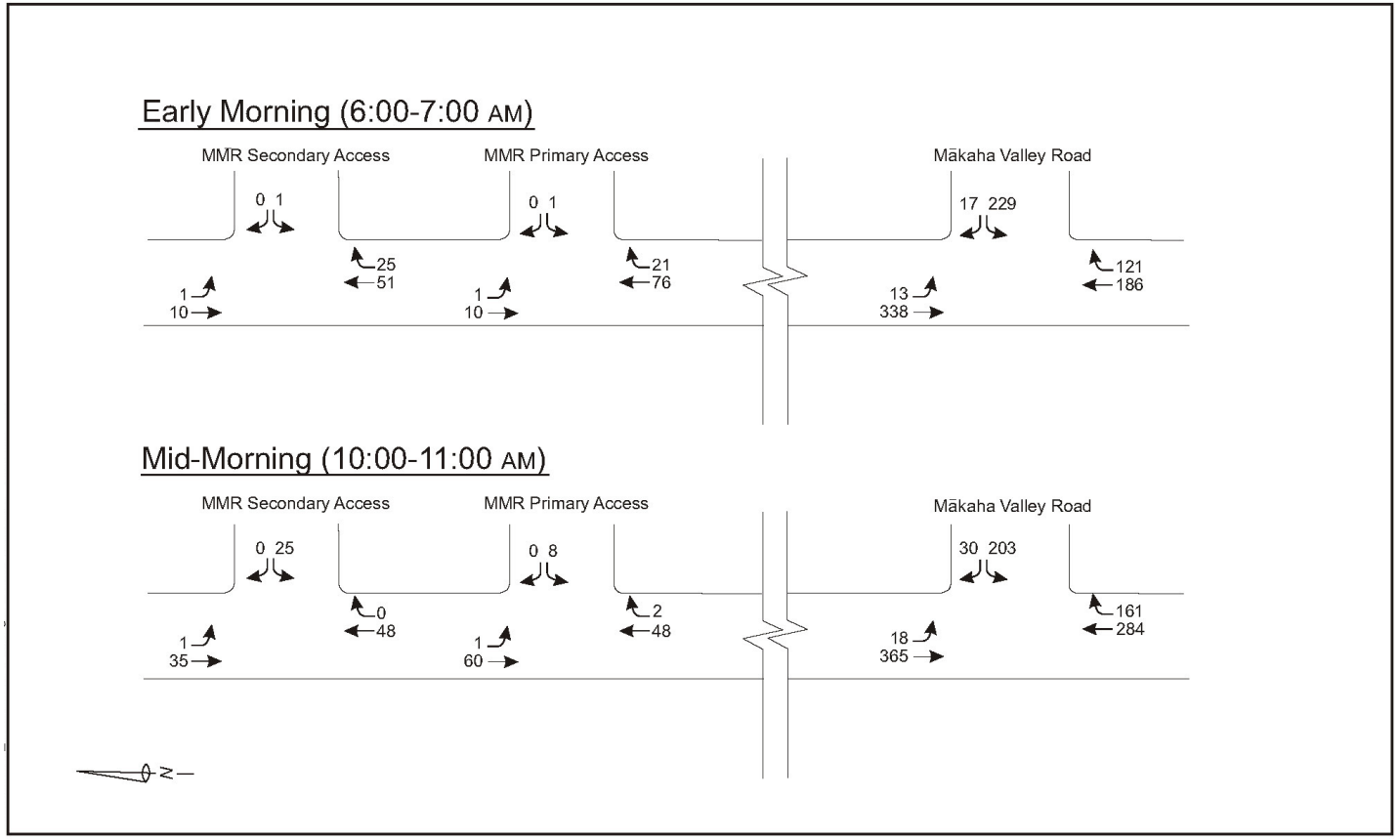


Figure 4.6-4 Existing Traffic Conditions with Alternative 3

Unsignalized Intersection Analysis Results

The HCM 2000 unsignalized intersection methodology is used to analyze the MMR primary and secondary driveway connections to Farrington Highway. The analytical results for the various alternatives are given in Table 4.6-4. Since side street traffic is controlled by stop signs and Farrington Highway is not, only the delays for traffic entering and exiting the two MMR access roads are shown. These unsignalized intersections would operate at LOS A with all of the alternatives, and the results would be the same as the existing LOS conditions.

While no motorists were observed making the southbound left turn from Farrington Highway into either the primary MMR south access road or the secondary MMR north access road, the delays shown in Table 4.6-4 for this movement represent the average delay if a motorist were to make such a move. Table 4.6-6 presents Farrington Highway Two-way Traffic Counts.

Signalized Intersection Analysis Results

The intersection of Farrington Highway and Mākaha Valley Road was analyzed according to the HCM 2000 signalized intersection methodology, and the results are given in Table 4.6-5. Although delays may differ slightly from the existing conditions, the LOS conditions remain the same. The average delay at the intersection results in LOS B conditions under all alternatives. A comparison of the analytical results for the unsignalized and signalized intersections indicates that No Action, Alternative 1, Alternative 2, and Alternative 3 would create LOS conditions similar to the existing traffic conditions, indicating there would be little impact from MMR trips at these locations.

Table 4.6-4
Unsignalized Intersection Analysis Results

	Existing Conditions (Traffic Counts)		No Action		Alternative 1		Alternative 2 and Alternative 3	
	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Farrington Highway at Primary MMR South Access Road								
Southbound Left Turn	7.3	A	7.3	A	7.4	A	7.4	A
Primary MMR Access Road	8.8	A	8.8	A	8.9	A	9.0	A
Farrington Highway at Secondary MMR North Access Road								
Southbound Left Turn	7.3	A	7.3	A	7.3	A	7.3	A
Primary MMR Access Road	8.8	A	8.8	A	8.8	A	8.9	A

Mid-Morning AM Peak Hour (10:00-11:00 am)

	Existing Conditions (Traffic Counts)		No Action		Alternative 1		Alternative 2 and Alternative 3	
	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Farrington Highway at Primary MMR South Access Road								
Southbound Left Turn	7.3	A	7.3	A	7.3	A	7.3	A
Primary MMR Access Road	9.0	A	8.9	A	9.1	A	9.1	A
Farrington Highway at Secondary MMR North Access Road								
Southbound Left Turn	7.3	A	7.3	A	7.3	A	7.3	A
Primary MMR Access Road	9.0	A	8.9	A	9.0	A	9.0	A

Table 4.6-5
Signalized Intersection Analysis Results

	Existing Conditions (Traffic Counts)		No Action		Alternative 1 and Alternative 2		Alternative 3	
Early AM Peak Hour (6:00-7:00 am)								
	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Farrington Highway at Makaha Valley Road								
Northbound Approach	9.3	A	9.3	A	9.4	A	9.4	A
Southbound Approach	6.4	A	6.3	A	6.3	A	6.3	A
Left Turn	36.0	D	36	D	36.0	D	36.0	D
Through Movement	5.3	A	5.2	A	5.2	A	5.2	A
Makaha Valley Road Approach	32.4	C	32.4	C	32.4	C	32.4	C
Overall Intersection	14.6	B	14.7	B	14.6	B	14.5	B
Mid-Morning AM Peak Hour (10:00-11:00 am)								
	Existing Conditions (Traffic Counts)		No Action		Alternative 1 and Alternative 2		Alternative 3	
	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS
Farrington Highway at Makaha Valley Road								
Northbound Approach	9.3	A	9.2	A	9.2	A	9.2	A
Southbound Approach	6.8	A	6.9	A	6.8	A	6.7	A
Left Turn	31.5	C	31.5	C	31.5	C	31.5	C
Through Movement	5.5	A	5.5	A	5.5	A	5.5	A
Makaha Valley Road Approach	26.1	C	26.1	C	26.2	C	26.2	C
Overall Intersection	12.3	B	12.3	B	12.1	B	12.1	B

Table 4.6-6
Farrington Highway Two-way Traffic Counts

			Early Morning Peak Hour (6:00 am - 7:00 am)					Mid-Morning Peak Hour (10:00 am - 11:00 am)				
			Hawai'i DOT Traffic Counts			Percentage Increase Due to	Percentage Increase Due to	Hawai'i DOT Traffic Counts			Percentage Increase Due to	Percentage Increase Due to
Station	Location	Date	Northbound	Southbound	Total	Alternatives 1 & 2	Alternative 3	Northbound	Southbound	Total	Alternatives 1 & 2	Alternative 3
A	Mākaha Bridge #5A 'Ōhikilolo Stream Bridge	January 17-18, 2002	35	7	42	59.5%	71.4%	47	45	92	27.2%	32.6%
B	South of Water Street	January 29-30, 2002	77	28	105	23.8%	28.6%	88	113	201	12.4%	14.9%
C	Approximately 420 Feet Northwest of Māi'u'u Road	February 5, 2002	300	557	857	2.9%	3.5%	480	538	1,018	2.5%	2.9%
D	Maili'ili'i Stream Bridge	January 17-18, 2002	511	940	1,451	1.7%	2.1%	944	972	1,916	1.3%	1.6%
E	South of Hakimo Road	October 29-30, 2002	604	1,640	2,244	1.1%	1.3%	703	909	1,612	1.6%	1.9%
F	South of Lualualei Naval Road	January 17-18, 2002	596	1,586	2,182	1.1%	1.4%	842	1,179	2,021	1.2%	1.5%
G	South of Haleakalā Avenue	October 29-30, 2002	771	1,830	2,601	1.0%	1.2%	698	937	1,635	1.5%	1.8%
H	South of Nānākuli Avenue	October 29-30, 2002	864	1,948	2,812	0.9%	1.1%	761	1,037	1,798	1.4%	1.7%
I	Keananoio Bridge	January 17-18, 2002	624	1,733	2,357	1.1%	1.3%	753	1,077	1,830	1.4%	1.6%
--	Volume Increase Due to Existing Condition Alternative 1 and Alternative 2		25	0	25	--	--	0	25	25	--	--
--	Volume Increase Due to Alternative 3		30	0	30	--	--	0	30	30	--	--

This page intentionally left blank

The Hawai‘i DOT Farrington Highway two-way traffic counts are presented in Table 4.6-6, which is a comparison of the traffic volumes and percentage increase for the additional traffic volumes due to the various alternatives. As noted previously, Mākaha Valley Road is the first signalized intersection south of MMR. Station A and Station B are between MMR and Mākaha Valley Road. Stations C through I are south of Mākaha Valley Road. Since Farrington Highway traffic volumes are low at Station A and Station B (below 210 vehicles per hour in both directions), the percentage increase for the traffic volumes due to the MMR alternatives ranges from 12.4 percent to 71.4 percent. However, the net percentage difference for the increase in traffic volumes attributable to the various alternatives for the town of Wai‘anae and beyond (Stations C to Stations I) would be less than 3.5 percent.

School-related vehicles and pedestrians on Farrington Highway in the Wai‘anae area result in higher traffic volumes and traffic congestion during the peak school transport periods (7:00 AM to 8:30 AM and 12:30 PM to 3:00 PM); however, these time periods do not correspond to the peak times when MMR transport activity is scheduled during a five-day CALFEX.

Pōhakuloa Training Area Traffic Volumes

Under this alternative, there would be no additional units deployed to PTA per year to conduct CALFEX and convoy exercises. Soldiers would continue to be transported via aircraft or marine vessel from SBMR to PTA. Soldiers would be transported by trucks and other military vehicles from Kawaihae Harbor to PTA via convoys on public roadways (Figure 4.6-5). There would be up to 30 trucks and military vehicles per convoy. The Army would use the PTA Trail to access PTA from Kawaihae Harbor upon trail construction completion and approvals. Until then, the Army would use public highways and roadways.

Vehicle convoys move personnel and equipment between installations. A convoy is normally defined as six or more military vehicles moving simultaneously from one point to another under a single commander, ten or more vehicles per hour going to the same destination over the same route, or any one vehicle requiring a special haul permit. Per command guidance, USARHAW convoys normally maintain a gap of at least 30 minutes between serials (a group of military vehicles moving together), 330 feet (100 meters) between vehicles on highways, and 7.5 to 15 feet (25 to 50 meters) while in town traffic. Per state regulation, military convoys are not authorized movement on state highways between 6:00 AM and 8:30 AM and 3:00 PM and 6:00 PM, Monday through Friday. Movements on Saturday, Sunday, and holidays are by special request only.

Figure 4.6-5 Mākua Implementation Plan Management Units

Convoys traveling from Kawaihae Harbor to PTA must get clearance, and vehicles operating on Saddle Road within the boundaries of PTA must not exceed 25 miles (40 kilometers) per hour. PTA Trail use would cross state highways at three locations: Kawaihae Road north of Queen Ka'ahumanu Highway, at Kawaihae Road east of Queen Ka'ahumanu Highway, and at Māmalahoa Highway south of Saddle Road. Convoy traffic would yield to public traffic at crossings to minimize impacts on traffic operations. Advance notification to the public would be provided in the event of large-scale convoy transport. Convoy traffic impacts would normally be light congestion, occasional backups on critical approaches.

All trail crossings would be signed in compliance with federal, state, and local standards. All signs and the installation of these signs would have to be approved by appropriate agencies. Additional warning signs and safety measures may be required by the local agencies during periods of intensified trail use. The trails would be signed and gated to prohibit public access, to prevent conflicts between military traffic and public traffic, and to avoid safety problems.

Although the public would normally not use the PTA Trail or other military vehicle trails, these trails would be made available for public use during state and national emergencies.

No Action Alternative

Less than Significant Impacts

Consistency with state regulations and policies. Under this alternative, there would be very limited military vehicle traffic to and from MMR. There would be no ammunition transport. This alternative would be substantially consistent with State of Hawai'i regulations and policies. The Army would coordinate, as appropriate, with Hawai'i DOT to avoid or minimize traffic impacts.

Farrington Highway/primary MMR south access road intersection. Under No Action, the roadway traffic conditions at the Farrington Highway/MMR primary access road intersection would be LOS A; because very limited military vehicle trips would be added under this alternative, traffic impacts would be less than significant at this location.

Farrington Highway/secondary MMR north access road intersection. The No Action LOS conditions at the Farrington Highway/MMR secondary access road intersection are at LOS A. Because very limited military vehicle trips would be added under this alternative, there would be less than significant traffic impacts at this location.

Farrington Highway/Mākaha Valley Road intersection. The No Action LOS conditions at the Farrington Highway/Mākaha Valley Road intersection are at LOS D or better for all approaches. Because very limited military vehicle trips would be added under this alternative, there would be less than significant impacts at this location.

Farrington Highway and Town of Wai'anae. Farrington Highway traffic volumes would in general remain the same between MMR and Mākaha Valley Road under No Action conditions.

Alternative 1 (Reduced Capacity Use with Some Weapons Restrictions)

Significant Impacts Mitigable to Less than Significant

Impact 1: Consistency with state regulations and policies. The Army's military convoys and ammunition transportation would not be consistent with the Hawai'i DOT policies and state regulations. For ammunition transported through the Wai'anae area, there would be no advance notification to allow the police and fire departments to undertake preventative measures to protect the public in event of an accidental explosion.

If convoys contain a PLS that exceeds the limit for an overweight vehicle, they would not be consistent with Hawai'i DOT policies, which limit such convoys to an oversize or overweight vehicle and an escort.

Regulatory and administrative mitigation 1. No regulatory and administrative mitigation measures have been identified.

Additional mitigation 1a. The Army would limit convoys containing oversize or overweight vehicles to two vehicles. The Army would coordinate with Hawai'i DOT to establish the number of allowable vehicles in each convoy.

Additional mitigation 1b. The Army would notify police and fire departments in writing at least 48 hours in advance of any ammunition transport, as required by Hawai'i DOT regulations. The notice would identify the amount and type of explosives to be transported, as well as travel route and time of delivery. Also, notifying Hawai'i DOT would provide the Army with information about travel lane closures for construction, maintenance, or other activities that could hamper ammunition delivery. If Farrington Highway needs to be closed in an emergency, the proposed Wai'anae Coast Emergency Access Road, while not contiguous, is an alternative route in selected areas along the Wai'anae coast.

Less than Significant Impacts

Farrington Highway/primary MMR south access road intersection. Under Alternative 1, vehicle trips would increase, but the roadway traffic conditions at the Farrington Highway/MMR primary access road intersection would be LOS A; therefore, no significant traffic impacts would occur at this location.

Farrington Highway/secondary MMR north access road intersection. Because the increased vehicle trips under this alternative would result in LOS A conditions at the Farrington Highway/MMR secondary access road intersection, there would be no significant traffic impacts at this location.

Farrington Highway/Mākaha Valley Road intersection. Under Alternative 1, increased vehicle trips would result in conditions at the Farrington Highway/Mākaha Valley Road intersection of LOS D or better for all approaches; therefore, no significant impacts would occur at this location.

Farrington Highway and Town of Waiʻanae. The increase in Farrington Highway traffic volumes due to MMR trips would range from 12.4 percent to 59.5 percent between MMR and Mākaha Valley Road under Alternative 1 conditions. However, MMR trips under Alternative 1 would account for less than 2.9 percent of the traffic volumes in the town of Waiʻanae and the other communities along the Waiʻanae coast, which would be within normal daily fluctuations in hourly traffic volumes.

Alternative 2 (Full Capacity Use with Some Weapons Restrictions)

Significant Impacts Mitigable to Less than Significant

Impact 1: Consistency with state regulations and policies. Impacts and mitigation measures would be similar to those described for Alternative 1.

Less than Significant Impacts

Farrington Highway/primary MMR south access road intersection. Alternative 2 would have impacts similar to those described for Alternative 1. For Alternative 2, the LOS conditions at the Farrington Highway/MMR primary access road intersection would be LOS A, and there would be no significant traffic impacts at this location.

Farrington Highway/secondary MMR north access road intersection. Alternative 2 would have impacts similar to those described for Alternative 1. For Alternative 2, the LOS conditions at the Farrington Highway/MMR secondary access road intersection would be LOS A, and there would be no significant traffic impacts at this location.

Farrington Highway/Mākaha Valley Road intersection. Alternative 2 would have impacts similar to those described for Alternative 1. For Alternative 2, the LOS conditions at the Farrington Highway/Mākaha Valley Road intersection would be LOS D or better for all approaches, and there would be no significant traffic impacts at this location.

Farrington Highway and Town of Wai'anae. Alternative 2 would have impacts similar to those described for Alternative 1. The increase in Farrington Highway traffic volumes due to MMR trips would range from 12.4 percent to 59.5 percent between MMR and Mākaha Valley Road for Alternative 2. However, MMR trips under Alternative 2 would account for less than 2.9 percent of the traffic volume in the town of Wai'anae and other communities along the Wai'anae coast, which would be within normal daily fluctuations in hourly traffic volumes.

Alternative 3 (Full Capacity Use with Fewer Weapons Restrictions)

Alternative 3 would require five additional HMMWVs to transport inert TOW missiles to and from MMR, but the impacts on intersections are similar to those of Alternatives 1 and 2.

Significant Impacts Mitigable to Less than Significant

Impact 1: Consistency with state regulations and policies. Impacts and mitigation measures would be similar to those described for Alternative 1.

Less than Significant Impacts

Farrington Highway/primary MMR south access road intersection. Alternative 3 would have impacts similar to those described for Alternative 1. For Alternative 3, the LOS conditions at the Farrington Highway/MMR primary access road intersection would be LOS A, and there would be no significant traffic impact at this location.

Farrington Highway/secondary MMR north access road intersection. Alternative 3 would have impacts similar to those described for Alternative 1. For Alternative 3, the LOS conditions at the Farrington Highway/MMR secondary access road intersection would be LOS A, and there would be no significant traffic impacts at this location.

Farrington Highway/Mākaha Valley Road intersection. Alternative 3 would have impacts similar to those described for Alternative 1. For Alternative 3, the LOS conditions at the Farrington Highway/Mākaha Valley Road intersection would be LOS D or better for all approaches, and there would be no significant traffic impacts at this location.

Farrington Highway and Town of Wai‘anae. Alternative 3 would have impacts similar to those described for Alternative 1. The increase in Farrington Highway traffic volumes due to MMR trips would range from 14.9 percent to 71.4 percent between MMR and Mākaha Valley Road for Alternative 3. However, MMR trips under Alternative 3 would account for less than 3.5 percent of the traffic volumes in the town of Wai‘anae and other communities along the Wai‘anae coast, which would be within normal daily fluctuations in hourly traffic volumes.

Alternative 4 (Full Capacity Use with Fewer Weapons Restrictions), Pōhakuloa Training Area

Under this alternative, movement of Army units to PTA from SBMR is described in Section 2.4.3. The 2004 SBCT EIS provides a comprehensive discussion and evaluation based on traffic impacts from SBCT Transformation in Hawai‘i.

Less than Significant Impacts

Consistency with state regulations and policies. The Army’s military convoys and ammunition transportation are, to a great degree, consistent with the Hawai‘i DOT policies and state regulations, especially for future highway improvement projects. As such, impacts would be less than significant.

Intersection operations. Until the Army could use the PTA Trail, troops and equipment would be transported via convoys on public roadways to access PTA from Kawaihae Harbor. Military trucks and/or Stryker vehicles would use state and county two-lane roads to and from PTA. Convoys would include no more than 30 vehicles at one time. If multiple convoys would be required, they would be spaced out in 15-minute intervals.

With use of the PTA Trail, military vehicles would cross state highways at Kawaihae Road north of Queen Ka‘ahumanu Highway, at Kawaihae Road east of Queen Ka‘ahumanu Highway, and at Māmalahoa Highway north of Saddle Road. PTA Trail would continue through WPAA to PTA. The portion of Saddle Road that passes through PTA would be realigned to a location north of the installation. Under Alternative 4, the Army would coordinate with Hawai‘i DOT to minimize impacts on traffic crossings on the new Saddle Road from the PTA military vehicle trail.

Using recent traffic counts taken in May 2000 from Hawai‘i DOT, an LOS analysis was performed for the crossings using the following assumptions:

- The number of vehicles used for calculations was less than maximum (four convoys of 24 vehicles sequenced at 15-minute intervals);
- The convoys would stop for traffic along the state highways, so there would be a two-way stop sign-controlled intersection; and
- The convoys would be scheduled for non-peak hours; however, analysis was calculated for convoy approach of the state highways during the peak hour of traffic.

According to the LOS analysis, the state highway crossings would operate at LOS C under "worst-case" conditions (Figure 4.6-6). Table 4.6-7 summarizes the LOS analysis. Very few delays would be experienced by highway traffic. This is because the convoys would yield to traffic along the state highways, so there would be no impact on the LOS on public highways, and no mitigation would be required.

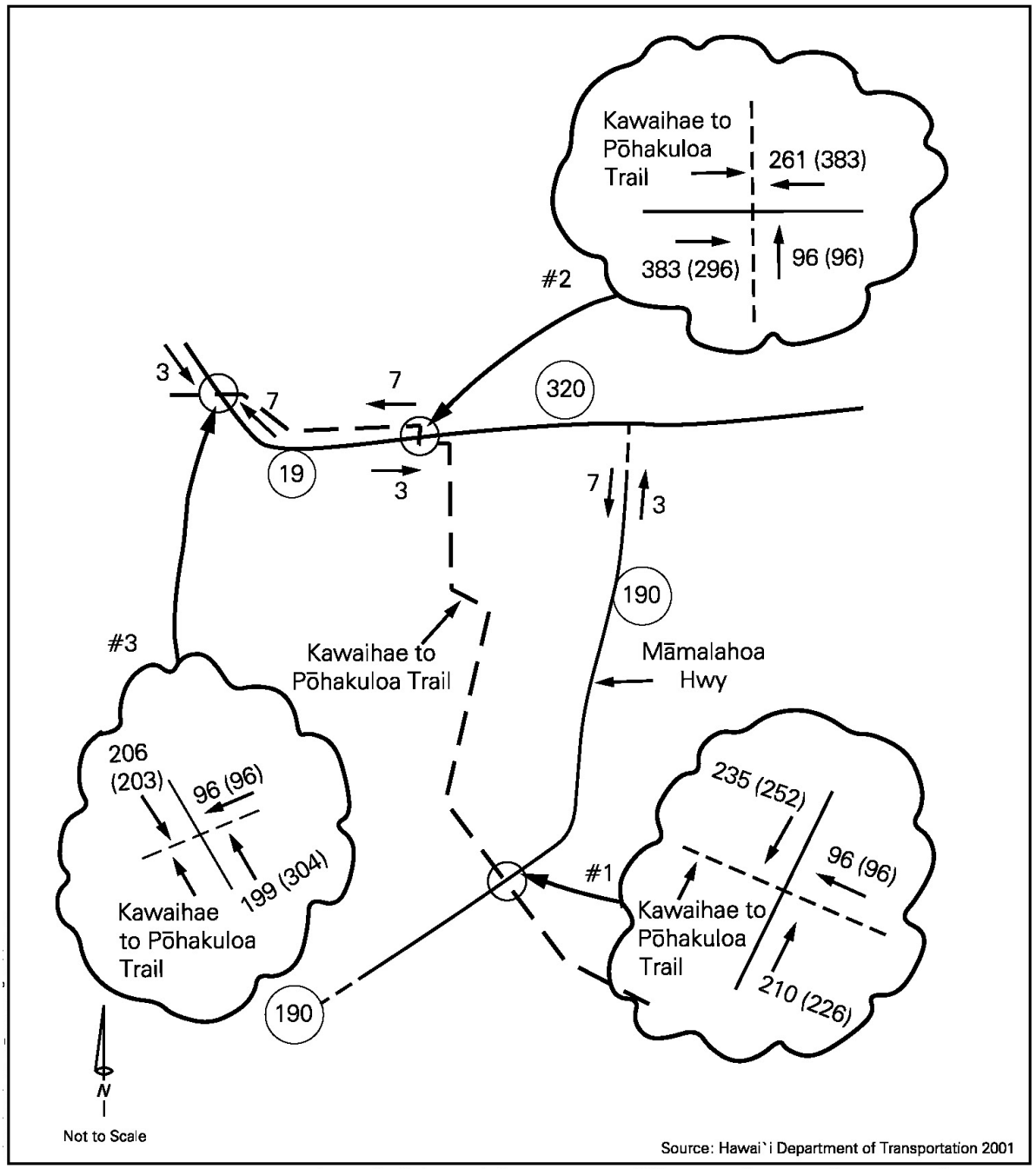
Table 4.6-7
Levels-of-Service Analysis for PTA

	AM Peak Hour		PM PeakHour	
	Delay[1]	**LOS[2]**	**Delay[1]**	**LOS[2]**
Trail at Kawaihae Road, North of Queen Ka'ahumanu Highway	15.2	C	17.6	C
Trail at Kawaihae Road, East of Queen Ka'ahumanu Highway	22.8	C	24.1	C
Trail at Māmalahoa Highway	16.1	C	16.9	C

[1]Delay is in seconds per vehicle.
[2]LOS calculated using the operations method described in the *Highway Capacity Manual* (TransportationResearch Board 2002); LOS is based on delay.

Based on the LOS results for existing two-lane highway crossings, the LRLTP (HDOT 1998) recommended the following:

- Widen Waikoloa Road and Queen Ka'ahumanu Highway from two to four lanes;
- Realign the western section of Saddle Road to the intersection with Māmalahoa Highway at Waikoloa Road; and
- Construct a new roadway parallel to and east of Queen Ka'ahumanu Highway, between Waikoloa Road and Kawaihae Road.



The State Highway Crossing would operate at LDSC (average traffic delays 25.1 to 35.0 seconds). Convoys would yield to traffic along state highways.

Peak Hour Volumes Worst Case Scenario on Pōhakuloa Training Area

Island of Hawai'i, Hawai'i

Figure 4.6-6 Peak Hour Volumes Worst Case Scenario on PTA

All of these improvements may affect operations of the military vehicle trail crossing by creating a wider roadway to be crossed and a new crossing. The proposed schedule for these improvements is not available, but the Saddle Road improvement was designated as "critical."

Roadway segment operations. Until the Army could use the PTA Trail, military vehicles would use public roadways to access PTA. Because convoys would operate with a maximum of 30 vehicles per convoy, with each convoy spaced at 15- to 30-minute intervals, the short-term elevated use of the roadways would operate at LOS C under "worst-case" conditions. While there would be noticeable delays, the traffic impacts would be less than significant.

Under this alternative, there would be no additional units deployed to PTA per year to conduct CALFEX and convoy exercises. Use of the PTA Trail would result in Army traffic having almost no impact on public roadway traffic and no mitigation being required.

Use of the PTA Trail would also have beneficial impacts on roadway segment and intersection operations, with fewer military vehicles on public roadways.

Construction traffic. The construction of the proposed CALFEX and convoy range would generate additional traffic from worker vehicles and trucks, but the construction traffic would be temporary and less than significant. No mitigation would be required.