Sensitivity Test Scenarios Definition Technical Memorandum
Oahu Regional Transportation Plan 2035 Project

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Acronyms Used in this Document

CBD	Central Business District
LOS	Level of Service
OahuMPO	Oahu Metropolitan Planning Organization

1 Introduction

1.1 Technical Memorandum Purpose

This report describes three special scenarios to be tested through the use of the OahuMPO travel demand model. These scenarios will consist of the following:

- Roadway projects needed to achieve LOS D or better during the A.M. peak period;
- High occupancy toll, managed lane or toll facility; and
- Cordon area congestion pricing for the Honolulu Central Business District area.

The purpose of the scenario analyses is to provide the OahuMPO with an initial assessment of Oahu transportation system performance based on the above policies. The analyses will help answer some technical questions about strategies that are of interest to policy makers and planning officials.

1.2 Technical Memorandum Overview

Chapter 2 provides details on how analysis for each of the three scenarios will be approached. The OahuMPO travel demand model will be the primary tool that will be used to evaluate all three scenarios. For each scenario, the PB team proposes a set of key assumptions that will be reflected in the travel demand model. These assumptions require concurrence from OahuMPO staff before proceeding with analyses. Selected performance measures, focused on a small set of measures consistent with the Highway Capacity Manual will be used to describe the outcomes of the model runs.

2.1 LOS D Analysis

In this scenario, the OahuMPO travel demand model will be used to estimate how much highway expansion would be needed to achieve a global operating level of service (LOS) D or better through capacity expansion alone. This would involve adding lane capacity to identified capacity constrained areas (i.e., LOS E or F) in the travel demand model. The model will then be run to determine if all major roadway facilities achieve at least LOS D conditions. If this standard is not met, then additional lane capacity would be provided at locations that will likely improve LOS, and the travel demand model will be run again. This process will be repeated until the standard is achieved.

An initial list of improvements that would bring those facilities up to LOS D or better has been identified for testing. The recommended improvements are listed in Table 2-1 and Figure 2-1 thru Figure 2-5 shows the improvements visually. The table describes the facility that will receive the treatment and the additional lanes that will be added to travel demand model highway network by direction for the AM peak period (2035 Baseline).

Table 2-1 Recommended Improvements for LOS D Analysis Scenario

1. Dillingham Blvd Kokohead Bound between Middle Street and Alakawa need 1 additional lane.
2. Farrington Highway kokohead bound between Maliona in Waianae and the H-1 on-ramp in Waipahu need 1 additional lanes.
3. Fort Barrette Between Kamaaha and Farrington mauka bound 1 additional lane.
4. Fort Weaver Road Mauka bound between Aawa and Farrington Hwy underpass 1 additional lane.
5. Ka Uka Blvd Interchange (over H-2) widened one extra lane in both directions.
6. Kahekili Hwy townbound between W. Hui Iwa and Haiku Road on additional lane.
7. Kalaeloa Makai bound between Farrington Hwy and Makai of Malakole two additional lanes.
8. Kalakaua kokohead bound between Kanunu and Kuhio need one additional lane.
9. Kalanianaole ewabound bound between Lunalilo Home road and Halemaumau add one additional lane or add HOV contraflow in this area.
10. Kalanianaole ewabound bound between Halemaumau and H-1 at Ainakoa add one additional lane.
11. Kamehameha Hwy makai bound between Whitmore in Wahiawa to H-1/H-2 merge in Waipahu widen one lane.
12. Kapolei Parkway Waianae bound between Kolowaka and new UHWO East Kapolei 1 road widen one lane (current widening project not quite enough).
13. Kunia road makai bound between Kupuna Loop and H-1 WB on ramp widen one lane.
14. Kunia road mauka bound between Farrington Highway and H-1 EB on ramp widen one lane.
15. Likelike hwy townbound in Kaneohe.
16. Makakilo Drive makai bound before H-1 interchange widen one lane, may be relieved with the back side of Makakilo Drive joining with North South Road interchange.
17. Malakole Street widen one lane, may be relieved with Hanua extension to new Kapolei interchange.

18. Moanalua Freeway kokohead bound between red hill and middle street widen by one lane.
19. Moanalua Road kokohead bound between H-1 EB offramp (near buzzes) and Honomanu widen by one lane.
20. Nimitz hwy kokohead bound between middle street and alakawa need one additional lane (may be relieved with Nimitz Flyover).
21. North King Street kokohead bound between North king street off-ramp from Moanalua to Liliha Street widen by one lane.
22. Old Waialae Road ewabound over H-1 to king street widen by one lane.
23. Pali Hwy townbound widen by one lane from Kaneohe to Downtown (vineyard).
24. Puuloa Road Mauka bound toward H-1 makai of Pukoloa Street widen by 1 lane.
25. Wilikina Drive townbound between McCormack and H-2 widen by 1 lane.
26. H-1 ewabound between H-1 / H-2 merge and Paiwa widen by 1 lane (reverse commute issue here).
27. H-1 ewabound between 5th avenue and Middle Street widen by 1 lane. (Closing some of the on-ramps in this section might help the congestion)
28. H-1 Kokohead bound between Farrington split in Kapolei to Halawa Interchange widen by one lane.
29. H-1 Kokohead bound Middle Street merge to Punahou widen by 1 lane.

Figure 2-1 Map of Recommended Improvements for LOS D Analysis Scenario – Regional View

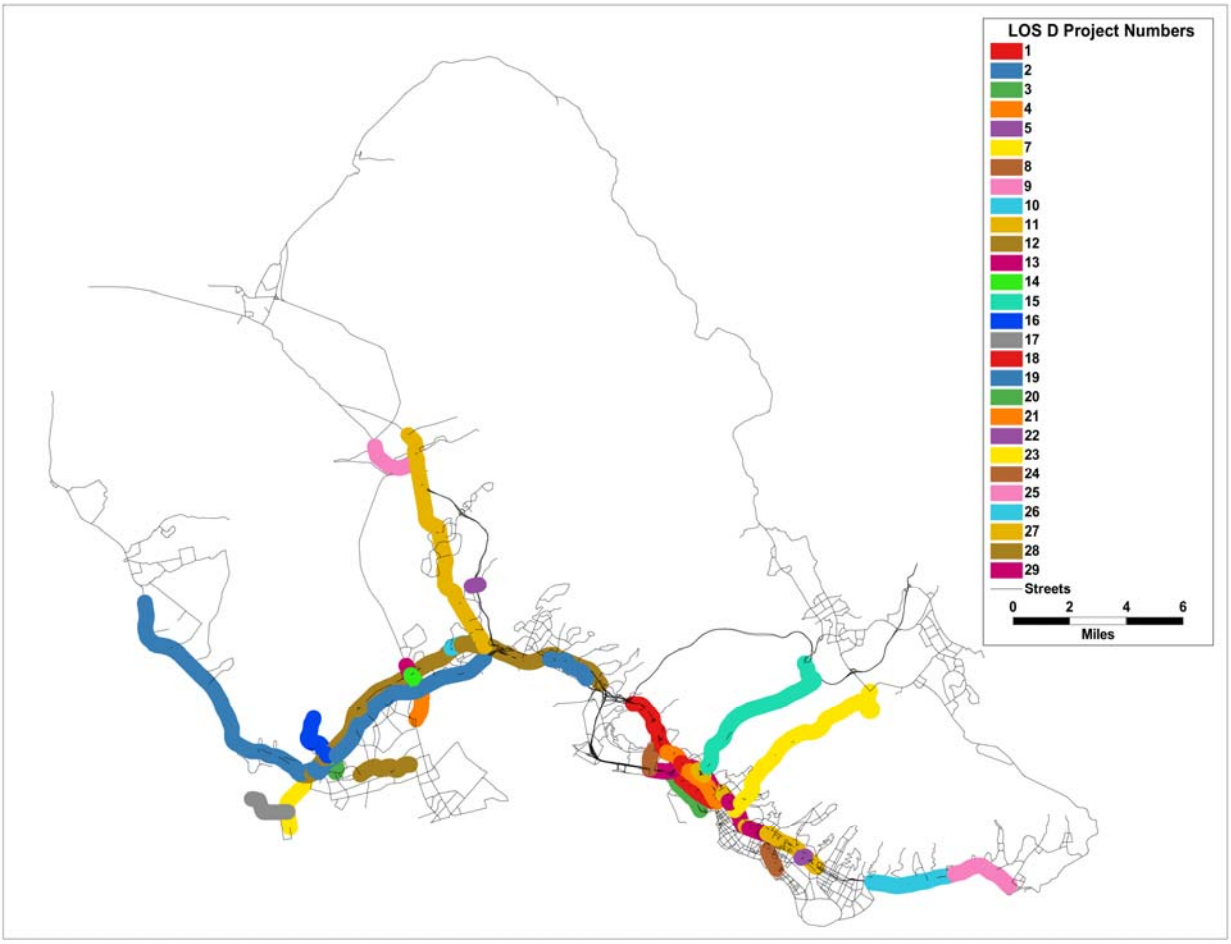


Figure 2-2 Map of Recommended Improvements between Waianae and Waipahu

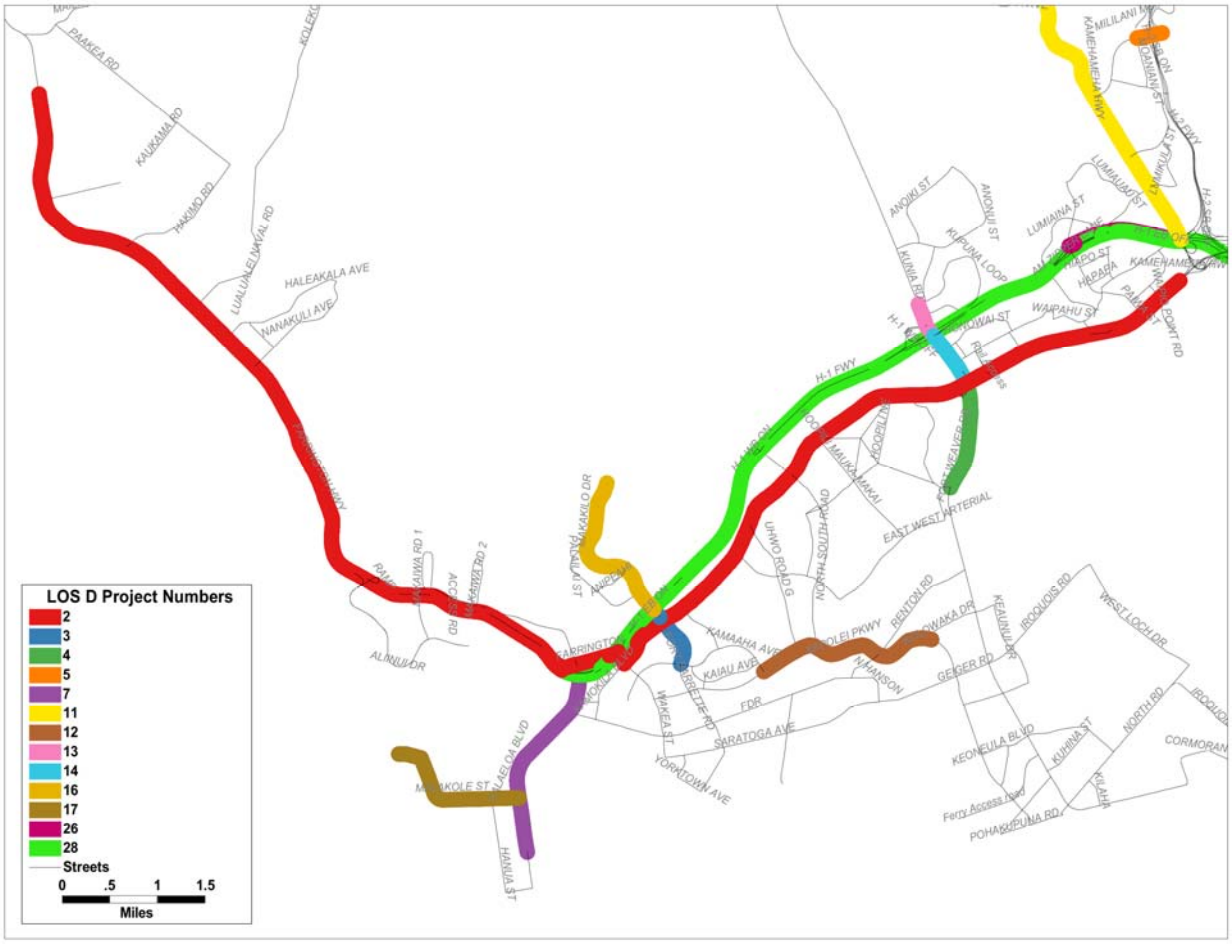


Figure 2-3. Map of Recommended Improvements between Waipahu and Aiea

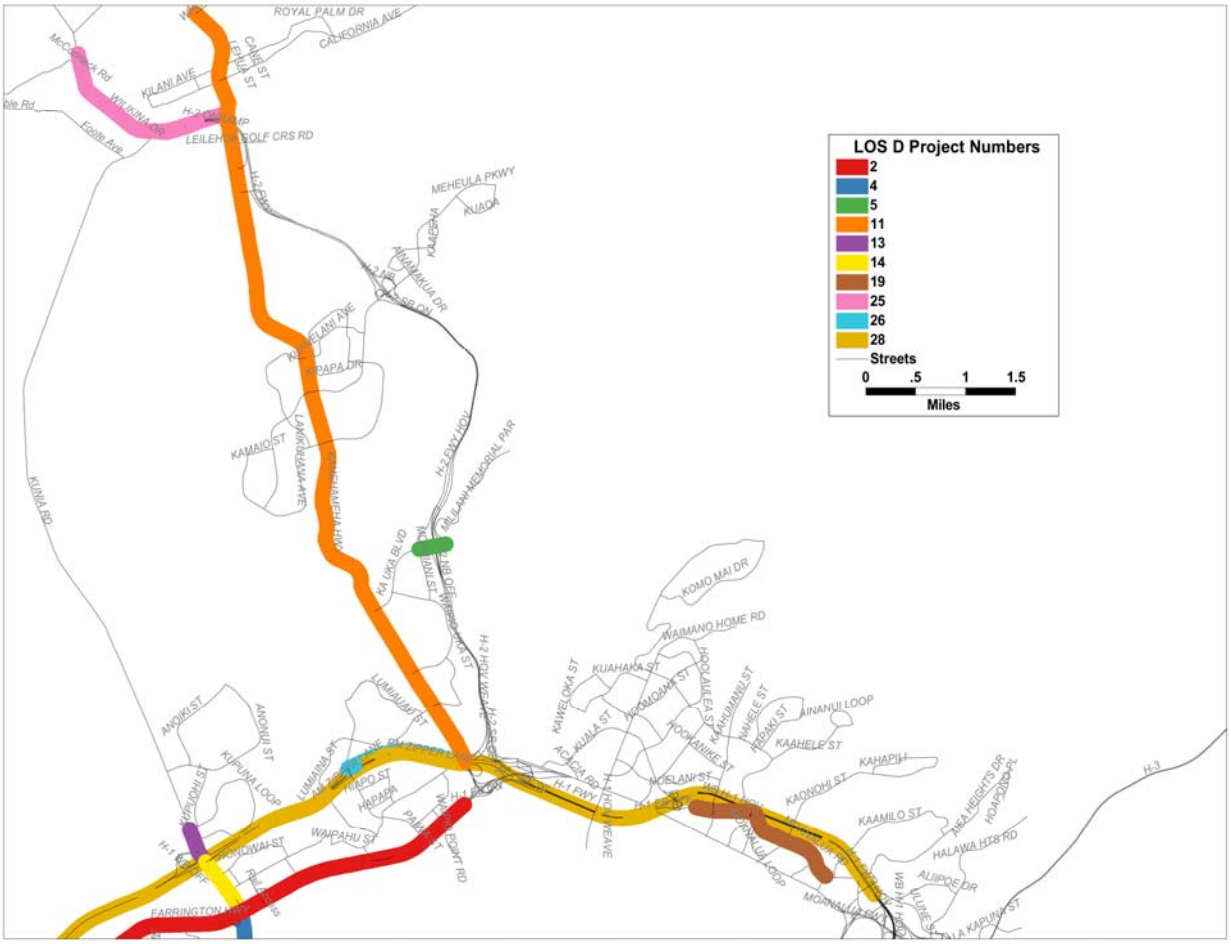


Figure 2-4. Map of Recommended Improvements between Aiea and Downtown

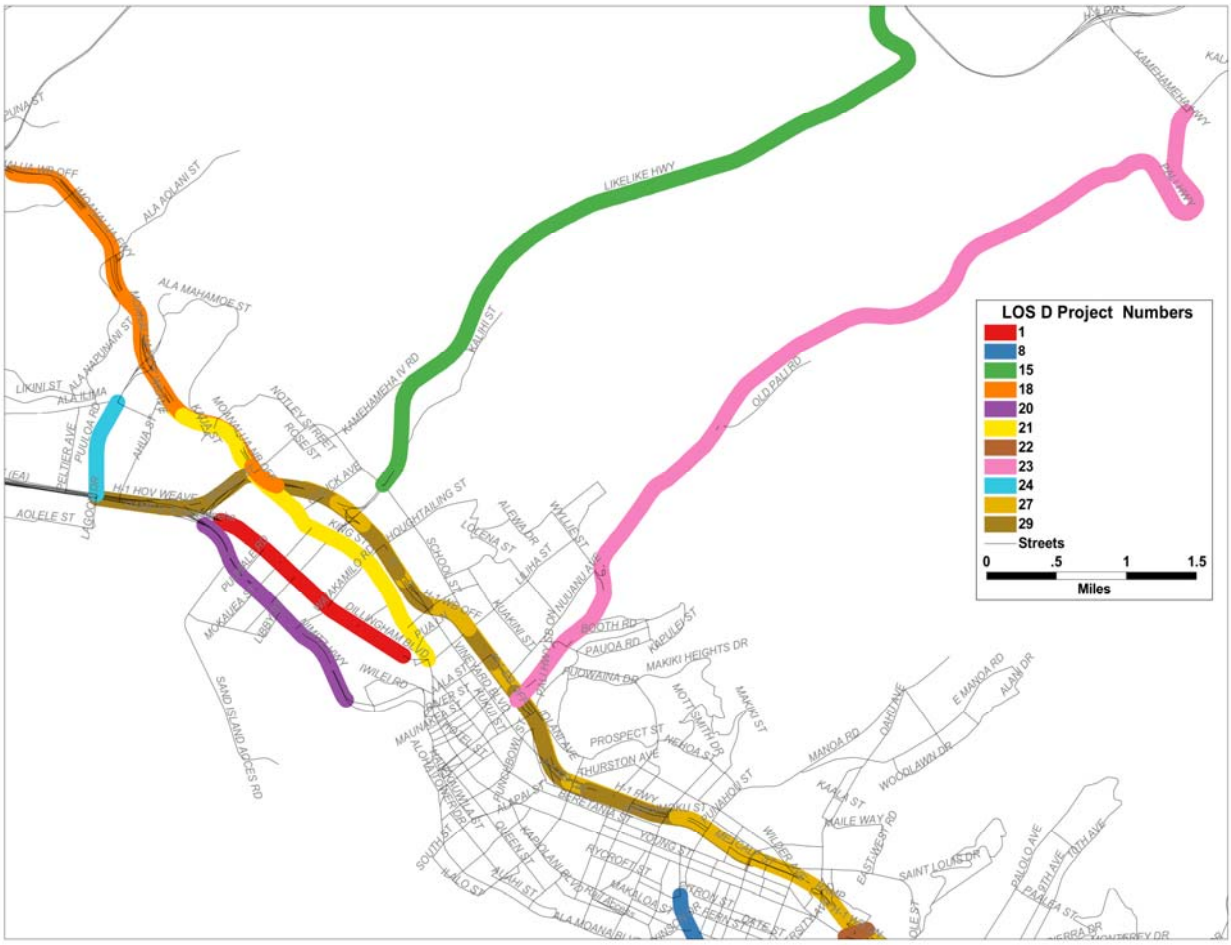
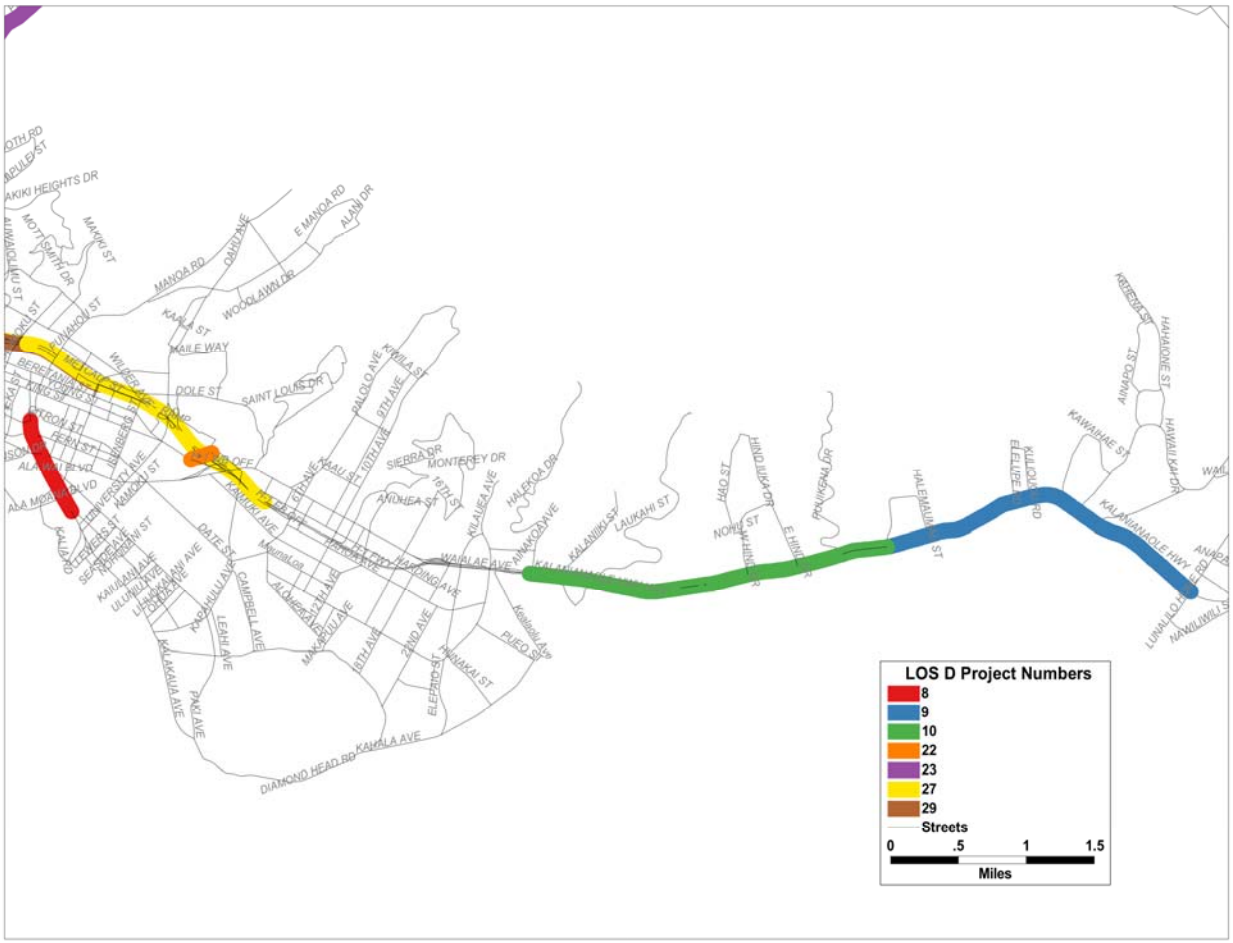

LOS D Project Numbers
1
8
15
18
20
21
22
23
24
27
29
Streets
0
.5
1
1.5
Miles
LIKELIKE HWY
KAMEHAMEHA IV RD
OLD PALI RD
KALIHI ST
ALA MAHAMOE ST
ALA AOLANI ST
AOLELE ST
HI 1 HOV WEAVE
SAND ISLAND ACCESS RD
IWILEI RD
PUUHALE RD
KAPALAMA ST
PROSPECT ST
RHURSTON AVE
HI 1 FWY
MAKIKI HEIGHTS DR
MANOA RD
WOODLAWN DR
EASTWEST RD
SAINT LOUIS DR
PAUOA RD
BOOTH RD
KAPIOLANI BLVD
KEEAUMOKU ST
ALAKEA ST
QUEEN ST
HOTEL ST
KING ST
SCHOOL ST
ALEWA DR
WILLIE ST
LOKENA ST
LIHA ST
KAPIOLANI BLVD
PUNCHBOWL ST
ALAPAI ST
YOUNG ST
RYCROFT ST
MAKILOA ST
KAPIOLANI BLVD
ALA MOANA BLVD
SOUTH ST
ALAKEA ST
ALAKEA ST
MAUNAKEA ST
ALOHA TOWER DR
PUNCHBOWL ST
KAPIOLANI BLVD
KAPIOLANI BLVD
KAPIOLANI BLVD

Figure 2-5. Map of Recommended Improvements between Downtown and Hawaii Kai



2.2 Managed Lanes

Managed lanes are highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions. The OahuMPO desires to evaluate this relatively new concept in transportation systems operations to determine and document its potential effects for future policy consideration.

For this scenario test, the candidate managed lane project would increase westbound PM peak capacity by adding a new reversible zipper lane between the Waiawa interchange and the Pearl Harbor interchange (see Figure 2-6 below). This project would increase capacity in the westbound direction by one lane during the PM peak period while not taking any lanes in the eastbound direction. The eastbound shoulder lane, currently only used during the AM peak period, would be used during the PM peak period as well. The resulting lane configuration is shown by segment in Figure 2-6, while Figure 2-7 shows the proposed arrangement for the segment between the Waiawa interchange and the Kaamilo Street overpass. Access to these zipper lanes would be provided at the end points of the facility

(i.e., at the Waiawa and Pearl Harbor interchanges). No other access or egress would be provided between those two locations.

During operational hours, transit vehicles and high-occupancy vehicles with three or more occupants (HOV 3+) would be allowed to use the AM/PM zipper lanes free of charge. In addition, vehicles with fewer than three occupants would be allowed to enter the managed lanes by paying a toll. Toll rates during the off-peak periods would be lower than during the peak periods, and would be designed to achieve a vehicle throughput that remains below a desired threshold (e.g., 1,500 vehicles per lane per hour). Various toll rates will be tested in the model in an iterative process to determine the appropriate toll rate.

Measures such as mode share, vehicle miles of travel, screenline volumes (to test for trip redistribution) and changes in district to district trip patterns will be used to describe the effects of this candidate managed lane on the regional transportation system.

Figure 2-6: Managed Lanes

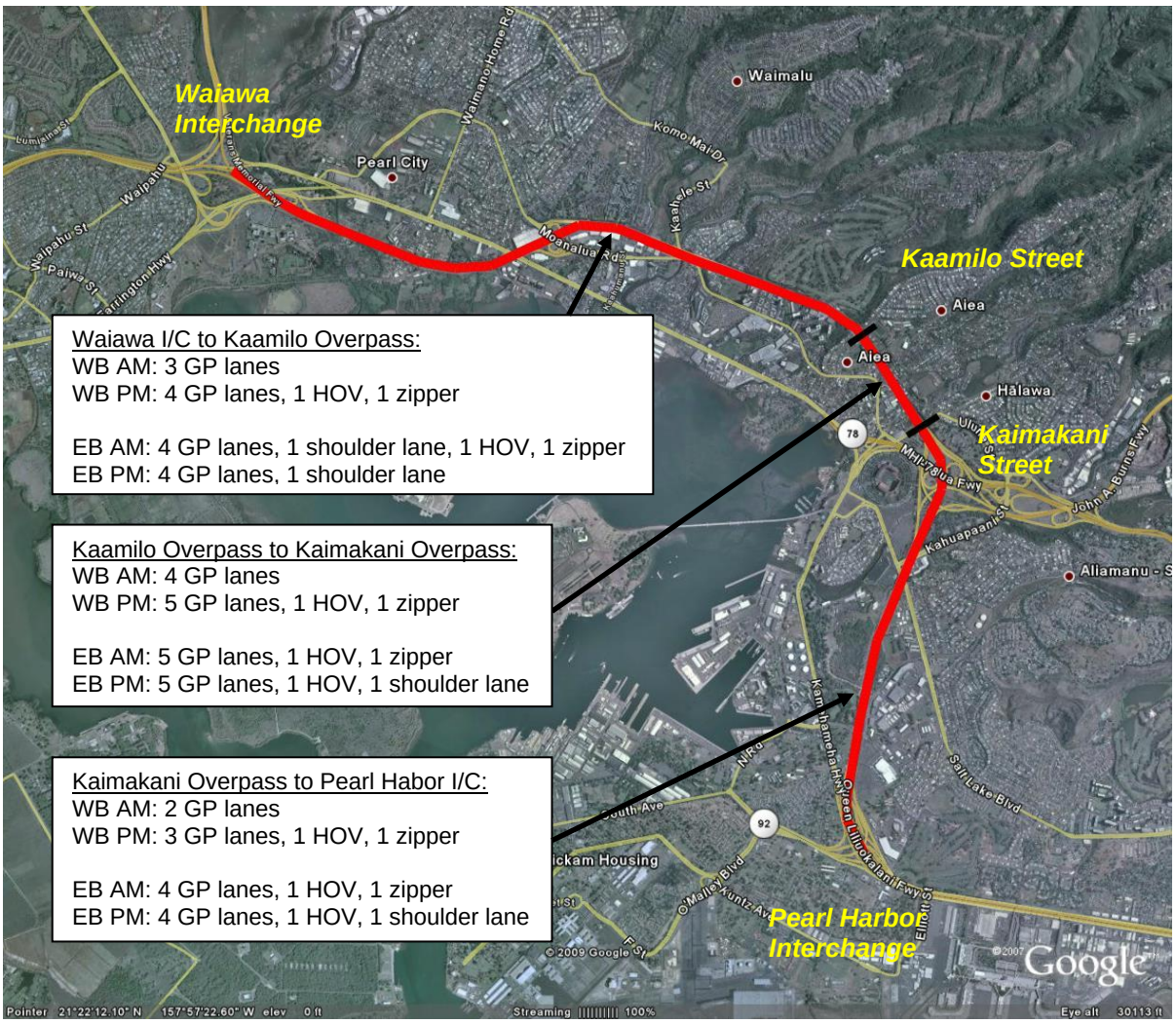
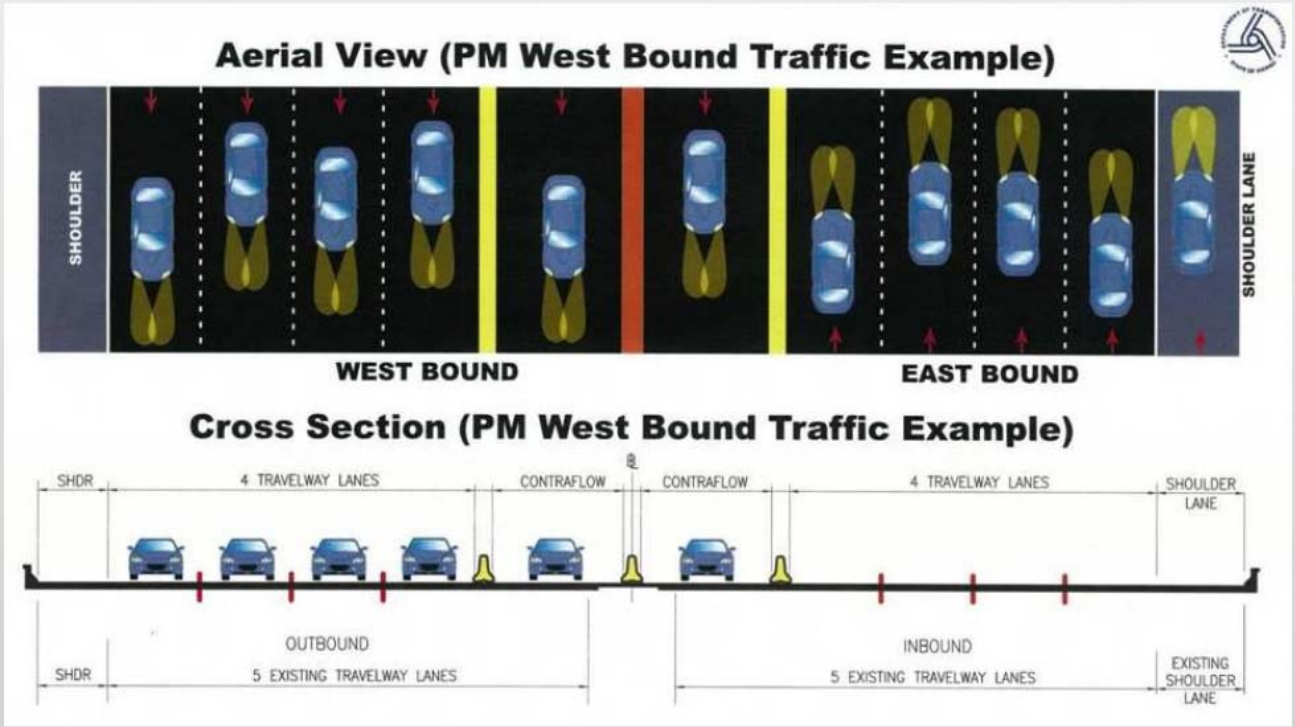


Figure 2-7: Proposed Contraflow Lane Arrangement (Waiawa I/C – Kaamilo St)



2.3 Cordon Pricing

Cordon pricing is another recent congestion management application that involves charging for access to a particular location (e.g., central business district) when crossing a boundary line.

For this scenario, the project team recommends setting a cordon line (illustrated by the purple line in Figure 2-8) that would bound the Honolulu central business district (CBD). All vehicles that enter the CBD by passing this line would be charged a toll, regardless of the time of day. Residents located within the cordon would be given a pass, enabling them to travel into and out of the area toll-free. Also, through trips made along the edge of the cordon (e.g., Ala Moana Boulevard / Nimitz Highway) would not be charged a toll. Three toll rates will be tested in the OahuMPO 2035 Baseline travel demand model to assess what would be the most appropriate:

1) $5.00[1]
2) $7.50
3) $10.00

After this initial testing, a single toll will be chosen. Measures such as mode share, vehicle miles of travel, screenline volumes (to test for trip redistribution), and changes in district to district trip patterns will then be used to describe the effects of

[1] In 2010 dollars.

cordon pricing on the CBD and surrounding transportation network and whether the strategy had any impacts on encouraging single occupancy vehicle trips to shift to transit, high-occupancy vehicle (HOV) or non-motorized travel.

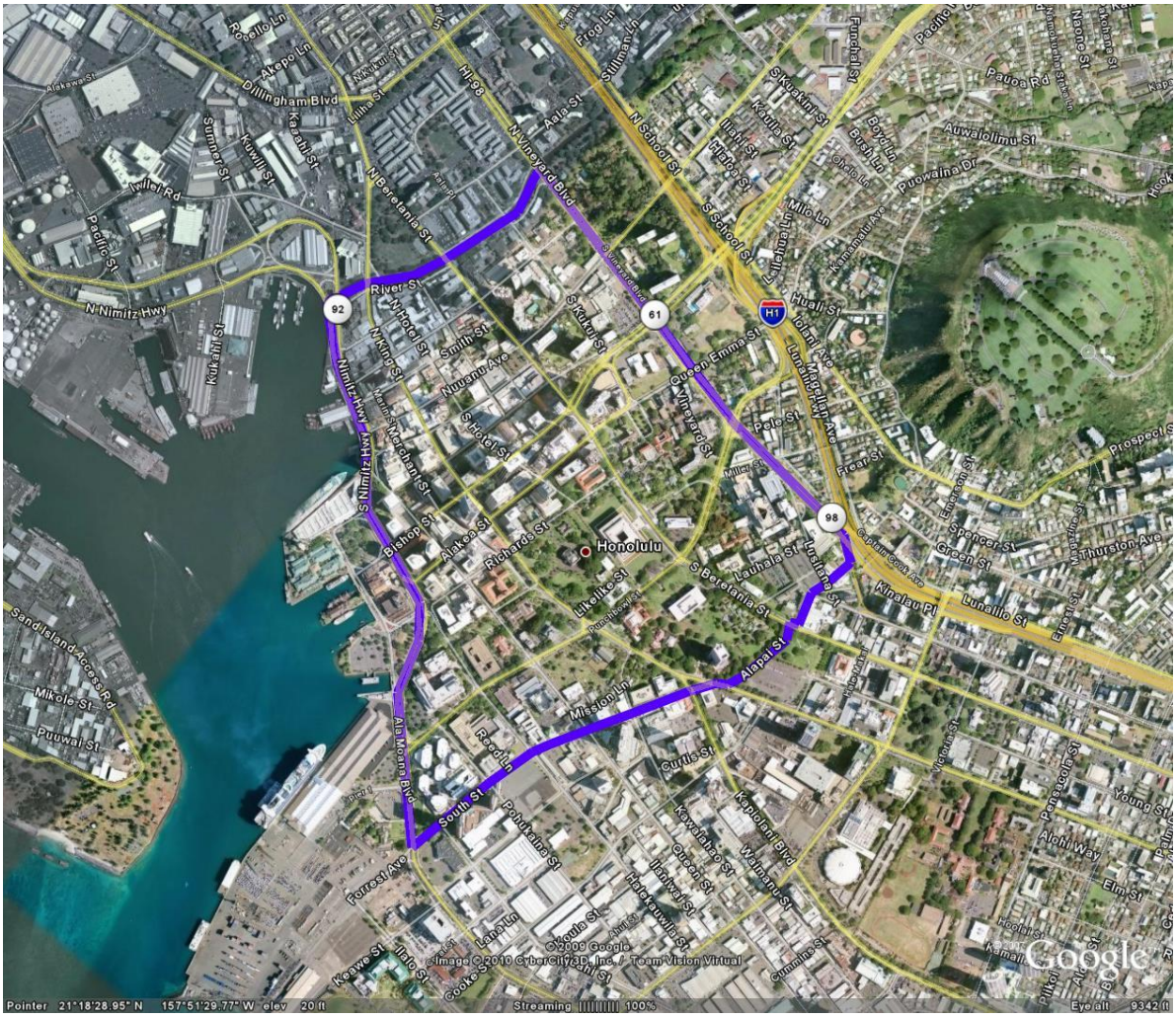



Figure 2-8: Cordon Pricing