
Task 6: Deliverable F

Application of Performance Measures and
Feasibility Assessment – FINAL

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Central Oahu Transportation Study

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ACRONYMS

CFR	Code of Federal Regulations
COSCP	<i>Central Oahu Sustainable Communities Plan</i>
COTS	Central Oahu Transportation Study
EA	Environmental Assessment
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
GHG	greenhouse gases
HDOT	Hawaii Department of Transportation
HOT	high-occupancy toll
HRS	Hawaii Revised Statutes
LCC	Leeward Community College
MOT	Maintenance of Traffic
NEPA	National Environmental Policy Act
ORTP	<i>Oahu Regional Transportation Plan</i>
PUC	Primary Urban Center
ROW	Right-of-Way
TDM	Transportation Demand Management
UH	University of Hawaii – Manoa

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OVERVIEW OF THE CENTRAL OAHU TRANSPORTATION STUDY

The Central Oahu Transportation Study (COTS) will assess the multi-modal transportation needs of the region and identify key transportation system improvements, strategies and policies that can improve regional transportation mobility and access in a sustainable way. The strategies and system improvements will be technically feasible, financially realistic, sustainable, and meet regional transportation needs.

This report comprises the deliverable for **Task 6, Deliverable F**. The full list of tasks are:

- Task 1: Coordinate and review past and on-going traffic, transit, and land use studies prepared by other agencies, establish a project management working group, and develop a stakeholder involvement process.
- Task 2: Identify Performance Measures and measures of economic sustainability to collect and establish a comprehensive baseline multi-modal transportation dataset.
- Task 3: Analyze and evaluate regional transportation, demographic, economic, and land use trends and issues.
- Task 4: Determine and assess current and future multi-modal needs and opportunities for the region through technical methodologies, user survey and stakeholder outreach. The technical forecasting of future traffic, transit, land use, and other related projections will utilize and be done in coordination with OahuMPO's current travel demand forecast model and Congestion Management Process.
- Task 5: Identify potential strategies and system improvements for key corridors in the region, including but not limited to, transit improvements with connections to the Honolulu rail transit system and H-2.
- **Task 6: Assess order-of-magnitude of impacts of the potential strategies and system improvements utilizing identified Performance Measures. This order-of-magnitude assessment will include expected project and strategy implementation timing, project delivery issues including land acquisition, environmental impacts, and estimates of operations and maintenance costs.**
- Task 7: Define the benefits and costs of the potential strategies and system improvements and compare those benefits and costs to each other.
- Task 8: Compare and prioritize those potential strategies and system improvements that meet the desired purpose mentioned above (technically feasible, financially realistic, and sustainable).
- Task 9: Develop recommendations and an implementation timeframe to set priorities for those strategies and system improvements.

Twelve deliverables document the results of the nine tasks and their subtasks. The reports include:

- A. Assessment of Previous Studies and Surveys associated with the study area and recommendations for further data collection or survey work as needed. Report A provides the assessment of the studies and surveys identified in two deliverables that have been submitted: List of Previous Studies and List of Previous Surveys.
- B. Identification of the Trends and Issues impacting the COTS area. This report will include the demographics, economics and land trends occurring in the study area as well as identify the impacts of those trends.

- B.2 Identification and definitions of Performance Measures, Sustainability Performance Measures, Baseline and Data Elements that will be used to guide and evaluate project alternatives.
- C. Data Memorandum that lists the information needed based upon Deliverables A through B.2 and documents the results of the data collection.
- D. A discussion of previous Alternatives as well as strategies for improvements will be presented in this report.
- E. The Preliminary Ranking of Identified Projects is detailed in this report. The Performance Measures identified in Report B will be applied to the alternatives. TransCAD model using the OahuMPO model runs will provide a means to compare alternatives (as applicable). The outcome of these tasks will be a ranking of alternatives and their impacts on the study area. A separate technical memorandum (Deliverable E-2) will be prepared summarizing the effectiveness of the TransCAD model as a planning tool for this study.
- F. Documents the Feasibility Assessment of the alternatives. Documentation will include identifying criteria for feasibility and sustainability assumptions; reporting on the impacts by Performance Measure; identification of environmental impacts and identified mitigations; and, assumptions for implementation all leading to a refinement of the alternative rankings.**
- G. The Financial Assessment will be documented in this report. Financial assumptions and requirements including costs will be reviewed. The benefits and costs of the alternatives will be assessed and compared including any identified trade-offs.
- H. The Final Report on Prioritization and Recommendations for Implementation will summarize and prioritize strategies; identify recommendations; identify impacts of no implementation; recommend an implementation timeframe; and, identify any impacts if implementation is not accomplished within the recommended timeframe.
- I. This report will provide a summary of the Community Input and how that input was used to inform the study.
- J. Survey Results from any new surveys will be documented in this report.

EXECUTIVE SUMMARY

This study examines, compares, and prioritizes a candidate list of projects previously identified as possibilities for Central Oahu to achieve three goals:

1. Reduce congestion
2. Improve access to rail
3. Create a multi-modal system

From an original list of 90 projects, 20 were eliminated previously because they did not perform well. Seventy projects are reviewed in this report.

Several analyses are being prepared to assist in determining for which of these alternatives should be selected for further study, possible funding, and implementation. There are five types of projects and the report presents results according to the project type. This is in part because it is not appropriate or meaningful to compare projects of different types, for example, to compare a pedestrian sidewalk to a light rail system.

This report includes two methods of analysis for comparing projects: Performance Measures and Feasibility Analysis. A third method of analysis, Benefit and Cost will be the subject of a separate report. None of these analyses taken alone should be used for final decision making. Rather, they each put emphasis on a different aspect to be considered.

Performance Measure Assessment Method

In the first method (Chapter 2), 70 projects are measured against a set of 21 Performance Measures to determine those that measure best or highest. The reader will see that not all Performance Measures apply to every type of project. Therefore, the beginning of each sub-section defines which Performance Measure(s) are being applied. These are shown in tables with the orange banner. This is followed by a Table that applies the measure for each project of that type. These are shown in tables with the blue banner.

For the decision maker who highly values certain performance measures, say for example, improved travel time during peak periods (PM 1), then they can look at the results for projects. Sources of data and units of measure are explained either in the text or in a previous report called Performance Measures.

- Transit Projects: Six Performance Measures Applied
- Bicycle Projects: Ten Performance Measures Applied
- Pedestrian Projects: Eleven Performance Measures Applied
- Roadway Projects: Twelve Performance Measures Applied
- Transportation Demand Management: Two Performance Measures Applied
- Pricing: One Performance Measure Applied

Results of Performance Measure Review

All projects perform well on one or more performance measure. Three performance measures capture some of the objectives expressed by stakeholders in this study.

- PM 1 & 2: Change from baseline conditions in AM period travel time
- PM 7: Connectivity to (Access to) Rail
- PM 11: Contributes to mode split shift away from single-occupant vehicles

Achieving the objective of reducing single-occupancy vehicle trips will require a balanced approach to implementing multi-modal projects within the COTS area. While congestion is a major driver in moving travelers to transit, bicycle, and pedestrian modes, excessive congestion and a lack of travel time reliability will degrade the quality of life for COTS area residents and visitors.

Transit project help provide travel time reliability for users over what can be expected for single occupant drivers. The at-grade light rail project would have vehicular conflicts, but that is off-set by provide more access options. The HART rail technology project and the Aerial Gondola with their own right of way have the highest reliability, but also the highest cost. Grade separated projects provide higher safety over those that share the travel lanes.

Bicycle projects are recommended with a priority on those that reduce travel time, or can be constructed as part of future development (e.g. Koa Ridge). Separated facilities provide greater safety and travel time. Designated bike routes would be the lowest priority because the roadway space is shared.

The key pedestrian projects are Complete Streets and Safe Routes to School projects which identify a comprehensive set of measures for all modes. Such projects would reduce conflicts and the potential for collision.

Roadway projects that are most effective are widening of Kamehameha Highway and the new Central Mauka Road, but these are expected to have high costs. Localized projects such as on Ka Uka Boulevard and near the H-2 Interchanges help address future growth and congestion, but do not have as great a regional impact.

TDM and pricing projects require changing travel behavior, balancing vehicle demand and increasing non-automobile modes. To be effective, both sets of projects need to be implemented on a wider basis than Central O'ahu alone.

Feasibility Assessment Method

In the second method of analysis (Chapter 3), the 70 projects are analyzed according to how easy or difficult they would be to implement. The overall heading of this method is Feasibility. Several attributes define a project's feasibility, or how difficult a project can be to implement. This affects the likely time before it can be opened and the benefits to travelers start to accrue. The feasibility attributes selected were:

- Constructability and need for traffic management during construction
- Temporary construction impacts, such as noise, dust, and impacts to business or residents.
- Whether it is necessary to acquire land, or right of way, or if the project can proceed within already available right of way.
- Degree of likely environmental impacts and whether an EA or EIS would be required
- Is the project identified in and/or consistent with an existing regional plan

Results of Feasibility Assessment

Constructability: 28 projects were rated "5" meaning that they would be relatively easy to implement. Three projects were rated "1" meaning they would take several years to accomplish and have many construction hurdles to overcome. This category also includes the level of impacts during construction (low, medium, high).

Right of Way (Land): Six projects would require additional land to implement them. The acres needed varies from 2.71 acres to 43.62 acres. In ascending order of acres required, these are: 201.7 Bike Path on Cane Haul Road between H-2 and Pearl Highlands Rail Station; 201.2 New pathway between Anania Drive and Central Oahu Regional Park; 403.8 Kamehameha Highway HOV lanes from Ka Uka to Farrington; 408.1 Ne Road connection to H-2 Interchange to Pineapple Road access to Mililani Mauka; 406.3 New road between California Avenue and Meheula Parkway; and 406.1 New road between Mililani Mauka and Pearl City.

Environmental Impact Compliance and Level of Documentation: Due to the limited expected impacts, 42 projects may be eligible for either a federal or a state exemption. Fourteen would likely require an Environmental Assessment (EA). Seven would likely require an Environmental Impact Statement (EIS). Twelve projects are the responsibility of Koa Ridge, and have not been assessed as to their environmental compliance requirements.

Consistency with Regional Plans: 21 projects are mentioned in the Central Oahu Sustainable Community Plan, a plan produced and adopted by the C&C Honolulu. Thirty projects are listed in the Oahu Regional Transportation Plan 2040, which is prepared and adopted by the OahuMPO Policy Board.

Timeframe for Projects

The results of the performance measure assessment and feasibility assessment helps determine the likely timeframe for each project. The timing of projects is dependent on several factors. These include:

- Design
- Land Acquisition
- Environmental Documentation and Mitigation
- Construction

Table ES-1 provides scores for each project based on the length of time expected relative to the above factors. Projects with the lowest score (0 or 1) are expected to require the most amount of time to implement, whereas projects with the highest score (4 or 5) would likely require the least amount of time to implement. Total scores greater than 14 would take less than a year to fully implement. Total scores between 11 and 13 would take 2 to 4 years to implement. Total scores between 5 and 10 would take 5 to 9 years implement. Scores of 1 to 4 would take 10 or more years to implement.

Table ES-1. Timeframe for Projects

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
100 TRANSIT PROJECTS						
101.0	GENERAL					
101.1	Bus Service Expansion	5	1	4	5	15
101.2	Construct Transit Center at Koa Ridge	4	0	4	5	13
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	5	1	4	5	15
102.0	HIGH CAPACITY TRANSIT					
102.2	Light Rail between Wahiawa and Pearl Highlands Rail Station	1	0	1	1	3
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	5	0	4	5	14
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	2	0	2	3	7
102.6	HART rail technology between Mililani and Pearl Highlands Rail Station	1	0	1	2	4
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station	1	0	1	2	4
200 BICYCLE PROJECTS						
201.0	BICYCLE PATHS (Off-street bicycle facility)					
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	3	1	3	5	12
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	3	0	2	5	10
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	3	1	3	5	12
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	3	1	3	5	12
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	3	1	3	5	12

Table ES-1. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	3	0	3	5	11
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	3	1	3	5	12
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	3	0	3	5	11
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)					
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	4	1	4	3	12
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	4	1	4	3	12
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	4	1	4	3	12
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	4	1	4	3	12
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)					
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	4	1	4	4	13
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	4	1	4	4	13
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	4	1	4	4	13
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	4	1	4	4	13
300	PEDESTRIAN PROJETS					
301.0	LOCATION-SPECIFIC					
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	4	1	4	4	13
302.0	GENERAL					
302.1	Safe Routes to School	3	1	4	4	12

Table ES-1. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
302.2	Pedestrian Crossing Safety	1	1	4	5	11
302.3	Mobility Hubs	1	1	4	5	11
303.0	COMPLETE STREETS					
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	3	1	4	5	13
303.2	Kipapa Dr between Hookelewaa St and Mililani Waena Elementary School	3	1	4	5	13
303.3	Complete Streets modifications on priority roads	3	1	4	5	13
400 ROADWAY PROJECTS						
401.0	KA UKA BLVD. & H-2 INTERCHANGE					
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	2	1	5	3	11
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	2	1	5	3	11
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	2	1	5	3	11
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	2	1	4	5	12
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	2	1	5	3	11
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	2	0	5	4	11
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	2	0	5	3	10
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	2	0	5	3	10

Table ES-1. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
402.0	KA UKA BOULEVARD					
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)	3	1	5	3	12
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	3	1	4	4	12
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	3	1	4	3	11
402.4	Ka Uka Blvd between H-2 and new development (new road)	1	1	5	2	9
403.0	KAMEHAMEHA HIGHWAY					
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	3	1	5	3	12
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	4	1	4	4	13
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	3	1	5	3	12
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	3	1	5	3	12
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	3	1	1	3	8
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	2	1	2	2	7
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	4	0	4	2	10
404.0	H-2 INTERCHANGES					
404.1	H-2 & Pineapple Road Interchange	2	1	5	2	10
404.2	H-2 & Meheula Pkwy (widen on-ramp)	3	1	2	3	9

Table ES-1. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
405.0	H-1 & H-2 INTERCHANGE					
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	3	1	4	3	11
406.0	CENTRAL MAUKA ROADS					
406.1	New Road between Mililani Mauka and Pearl City	1	0	1	1	3
406.3	New Road between California Ave and Meheula Pkwy	1	0	1	1	3
408.0	MILILANI ACCESS					
408.1	New H-2 Interchange at Mililani Mauka	1	0	2	2	5
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	1	1	2	2	6
500	TRANSPORTATION SYSTEM MANAGEMENT					
501.0	TRANSPORTATION DEMAND MANAGEMENT					
501.1	Free real-time online carpool matching	5	1	4	5	15
501.2	Outreach promotion and marketing of alternative transportation	5	1	4	5	15
501.3	Emergency ride home program	5	1	4	5	15
501.5	Employer based commuter/parking programs	5	1	4	5	15
501.6	Emerging and innovative strategies - Carsharing	5	1	4	5	15
501.7	Emerging and innovative strategies - Bikesharing	5	1	4	5	15
501.8	Vanpool program	5	1	4	5	15
501.9	Support of working from home	5	1	4	5	15
501.10	Support of alternate/shifted work hours	5	1	4	5	15
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)					
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	4	1	4	4	13
600	PRICING SOLUTIONS					
601.0	PRICING					
601.2	HOT lanes	5	1	4	4	14
601.3	Parking strategies	5	1	4	5	15

1.0 INTRODUCTION

The Central Oahu Transportation Study (COTS) seeks to identify potential multi-modal transportation projects that could improve current and future mobility within the study area, reduce congestion, improve safety, and ensure efficient movement of people and goods.

Previously in the study, 70 projects were identified and presented at a community meeting in November 2017.

The purpose of this report is to apply Performance Measures to each project and to document the feasibility assessment of the alternatives. Organization of this report includes the following:

- **Section 2.0:** Describes the Performance Assessment methodology and provides the Performance Assessment results.
- **Section 3.0:** Describes the Feasibility Assessment attributes with regard to construction, environmental issues, regional planning, and community impacts and presents the results
- **Section 4.0:** Identifies the likely implementation timeframe of projects (e.g., short-term, mid-term, long-term)
- **Section 5.0:** Describes the next steps in the COTS
- **Section 6.0:** References

This report (Deliverable F) applying Performance Measures and Feasibility is best understood along with the results of two other reports in this study. Each of the evaluation steps leads to better information about individual projects and at times, the elimination of projects, or combination of one or more projects. Collectively, the analyses and information from the evaluation series of reports leads to the final study report on recommendations and implementation.

- The report on mobility benefits documented in Deliverable E-1 examined 90 projects, including 17 that are to be performed by a private developer (Koa Ridge) in Central. Twenty projects were dropped or merged with others as a result of the mobility analyses.
- The projects were evaluated for their contributions to various performance measures and for their project feasibility in Deliverable F. During the performance and feasibility analyses, 70 projects were reviewed, due to twenty being dropped after the mobility analysis. At the end of this analysis, one project was dropped (HART technology) and one bicycle project was added on Kipapa Drive.
- The cost and cost benefit review was conducted on 37 projects and documented in Deliverable G. A total of 25 projects were eliminated from the cost analysis for one of these reasons:
 - All of the projects that are the responsibility of Koa Ridge would be costed by them.
 - The ten TSM projects were combined into a single project due to their relatively small cost.
 - Four pedestrian program projects which are not site specific
 - The Roosevelt Bridge rehabilitation project
 - Parking strategies were deemed too difficult to quantify the benefits.

A tracking table showing disposition of all projects can be found in **Appendix A**. The location of projects by type analyzed in this report are shown on the figures in **Appendix B**.

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2.0 PERFORMANCE MEASURES

Section 2.1 of this chapter describes the Performance Measures and how they were measured and the unit scale of measurement and then applies the Performance Measures to the set of projects by type in a table.

The methodology follows a review of best practices for measuring performance and the selection of measures for COTS projects. This is documented in Deliverable B-2 of this study.

Section 2.2 discusses results and provides recommendations.

2.1 Performance Measure Assessment

Performance Measures were applied to all projects to determine how each potential project would provide a benefit to the region. A total of 21 Performance Measures for the COTS were initially identified to be utilized during the preliminary screening phase of work. A subset of key Performance Measures was used to evaluate how well each of the project’s goals and objectives will be met. These measures include both quantitative analyses and qualitative engineering judgements. **Table 1** shows the complete list of Performance Measures divided into four categories:

- 1) Traffic and Transportation Reliability and Congestion Reduction
- 2) Multi-Modal System
- 3) Safety
- 4) Asset Management

Table 1. Performance Measures

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
CATEGORY 1: TRAFFIC AND TRANSPORTATION RELIABILITY AND CONGESTION REDUCTION				
Increase the reliability of the transportation system for users traveling by auto and transit between the Origin of Mililani Town Centre and the following regional Destinations: <ul style="list-style-type: none"> • Leeward Community College • Kapolei • Primary Urban Center (Honolulu) • University of Hawaii – Manoa 	MEASURE 1: Change from baseline conditions in AM peak period travel time between specified Origin and Destinations by auto/truck modes (except bike and walk) <ul style="list-style-type: none"> • Single-occupancy vehicle • Carpool • Transportation network company (TNC)/Taxi • Freight NOTE: Since many of the vehicle circulation issues result from focusing of traffic flows in the AM peak period, it was selected to illustrate the effect on vehicle mobility.	Quantitative	Measures the number of hours where there is a substantial difference between free flow speeds and actual conditions.	Minutes

Table 1. Performance Measures (cont.)

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
	MEASURE 2: Change from baseline conditions in AM peak period transit travel time to major destinations	Quantitative	Measures average travel time by transit.	Minutes
	MEASURE 3: Number of congested lane miles in Central Oahu.	Quantitative	Measures regional congestion relief for auto travel.	Miles
<p>Increase the reliability of the transportation system for users traveling from the following Origins within the COTS area:</p> <ul style="list-style-type: none"> • Wahiawa (California Avenue/Kamehameha Highway) • Mililani Mauka (Mililani Middle School) • Mililani (Meheula Pkwy/Lanikuhana Ave) • Waipio (Crestview Community Park) • Waikele (Fire Station) 	<p>MEASURE 4: Change from baseline conditions in total AM peak period <u>auto travel</u> time within the COTS area from the specified Origins to the following Destinations:</p> <ul style="list-style-type: none"> • Mililani Town Center • Mililani Mauka Park and Ride • Central Oahu Regional Park • Koa Ridge • Pearl Highlands Transit Station <p>NOTE: Wahiawa was not included in the study at this point. It will be added later.</p>	Quantitative	Measures reduction of time spent in congested lanes or intersections.	Minutes
CATEGORY 2: MULTI-MODAL SYSTEM				
Provide a balanced, multi-modal transportation system that allows transportation choices for all residents.	MEASURE 5: Change from baseline conditions in AM peak period travel time between origins and destinations in Measure 4 via biking and walking	Quantitative	Measures the improvement in non-auto travel time.	Minutes
	MEASURE 6: Amount of bus/rail transit service	Quantitative	Measures the number of service hours of transit per population.	Hours

Table 1. Performance Measures (cont.)

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
	MEASURE 7: Connectivity to rail transit and frequency of intermodal connections	Quantitative/ Qualitative	Methods and means for making intermodal transfer to and from rail.	Yes/No
	MEASURE 8: Amount of pedestrian infrastructure	Quantitative	Measures miles and widths of pedestrian facilities.	Miles
	MEASURE 9: Amount of bicycle infrastructure	Quantitative	Measures miles and type of bicycle facilities.	Miles
	MEASURE 10: Improvements to existing bicycle and pedestrian system.	Qualitative	Connectivity of pedestrian and bicycle facilities to other modes and to neighborhoods. Connectivity across major barriers (e.g., gulches, major arterials, freeways).	Does project enhance connectivity? (Yes/No)

Table 1. Performance Measures (cont.)

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
Provide a balanced, multi-modal transportation system that allows transportation choices for all residents.	MEASURE 11: Contributes to mode split shift away from single-occupant vehicle	Qualitative NOTE: Measure was changed from Quantitative as reported in Deliverable B-2 because it is not possible to accurately estimate specific numbers of trips by mode resulting from project implementation.	Helps to achieve the commute mode split with the following goals: <ul style="list-style-type: none"> • Single-occupant vehicle – 60% • Carpool – 12% • Bike, walk – 7% • Transit – 10% • TNC/Taxi – 8% • Work from home – 3% 	Does project increase non-auto mode use? (Yes/No)
CATEGORY 3: SAFETY & SECURITY				
Improve the safety of the transportation system for all modes	MEASURE 12: Number of annual fatalities from vehicle-vehicle collisions	Quantitative	Measures the number of vehicle related fatalities.	Number of vehicle related fatalities
	MEASURE 13: Rate of fatalities per 100 million vehicle miles	Quantitative	Rate of fatalities based on vehicle miles traveled	Fatalities/100 million vehicle miles
	MEASURE 14: Number of serious injuries by mode	Quantitative	Measures the number of vehicle related serious injuries.	Number of vehicle related serious injuries
	MEASURE 15: Rate of serious injuries per 100 million vehicle miles	Quantitative	Rate of serious injuries based on vehicle miles traveled	Serious injuries/100 million vehicle miles

Table 1. Performance Measures (cont.)

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
	MEASURE 16: Number of non-motorized fatalities and serious injuries	Quantitative	Measures the number of fatalities and serious injuries involving pedestrians and bicyclists.	Number of fatalities and serious injuries involving pedestrians and bicyclists
CATEGORY 4: ASSET MANAGEMENT				
Ensure that pavement condition, bridges, pedestrian and bicycle facilities, and transit shelters are in a state of good repair	MEASURE 17: Roadway state of good repair	Quantitative	Measures the condition and priority need for repair of pavement using the State's programs to improve and maintain the transportation system in a state of good condition.	Quality rating (poor, fair, good)
Ensure that pavement condition, bridges, pedestrian and bicycle facilities, and transit shelters are in a state of good repair	MEASURE 18: Bridges state of good repair	Quantitative	Measures the condition and priority need for repair of bridges using the State's programs to improve and maintain the transportation system in a state of good condition.	Quality rating (poor, fair, good)

Table 1. Performance Measures (cont.)

GOAL	PERFORMANCE MEASURE	TYPE OF MEASURE	EXPLANATION	SCALE OF MEASUREMENT
	MEASURE 19: Sidewalk, bikeways, and multi-use path conditions	Qualitative	Review of pavement condition of existing sidewalks, bikeways, and multi-use path conditions.	Quality rating (poor, fair, good)
	MEASURE 20: Transit shelter availability	Quantitative	Measures the number of transit shelters compared to number of transit stops.	Is shelter present? (Yes or No)
	MEASURE 21: Transit shelter conditions and amenities	Qualitative	Review of condition and amenities of existing transit shelters.	Does project improve conditions? (Yes or No)

In general, some of the Performance Measures were modified to simplify the evaluation process while still providing practical information for the reviewers, or to address changes in the study area.

2.1.1 Key Performance Measures Applied to Transit Projects and Results

Performance Measures for transit projects are shown in **Table 2**. Six key Performance Measures were applied to the transit projects. The six Performance Measures are as follows:

- **Performance Measure 2**, Change from baseline conditions in AM peak period transit travel time to major destinations
- **Performance Measure 6**, Amount of bus/rail transit service
- **Performance Measure 7**, Connectivity to rail transit and frequency of intermodal connections
- **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle
- **Performance Measure 20**, Transit shelter availability
- **Performance Measure 21**, Transit shelter conditions and amenities

Table 2. Key Performance Measures Applied to Transit Projects*

TRANSIT PROJECTS	APPLICABLE PERFORMANCE MEASURES					
TYPES OF TRANSIT PROJECTS	2	6	7	11	20	21
101.0: General – Islandwide		X	X	X	X	X
102.0: High Capacity	X	X	X	X	X	

* See **Table 1** for a full description of each Performance Measure

The transit projects are identified in two categories: General (three projects) or High Capacity (six projects). The General projects are islandwide as identified in the *Oahu Regional Transportation Plan* (ORTP). These projects are included in the baseline with five of the six measures applying. Measure 21 is applied to the General project category, which includes City Operations and Maintenance (including Stop/Shelter condition).

Bus Service Expansion is applied to the COTS area. As shown in **Table 3**, expansion provides 42 hours of added daily bus service to serve rail and current and developing communities. The 42 hours represent an increase of 11.25% over baseline bus routes serving the COTS area. Those routes currently provide about 373.4 weekday hours of service. One transit center is identified at the Koa Ridge development. Measure 21, transit shelter conditions and amenities, is pertinent to the City Operations and Maintenance project.

Performance Measure 2 shows the travel time savings for these projects based on travel to four destinations from Mililani Town Center: Leeward Community College, Kapolei, Primary Urban Center (Honolulu), and the University of Hawaii – Manoa. Travel time is an important Performance Measure for High Capacity Transit projects.

In all tables showing the results of the application of the Performance Measures, “Yes” means that the project meets the Performance Measure and “No” means that the project does not meet the Performance Measure.

Table 3. Results of Application of Key Performance Measures to Transit Projects

TRANSIT PROJECTS	APPLICABLE PERFORMANCE MEASURES					
TYPES OF TRANSIT PROJECTS	2	6	7	11	20	21
101.0 General Transit Projects						
101.1 Bus Service Expansion		42 added hours	Yes	Yes		
101.2 Build Transit Center at Koa Ridge			Yes	Yes	Yes	
101.3 City Operations and Maintenance, including Bus Stop/Shelter Conditions						Yes
102.0 High Capacity Transit Projects						
102.1 HART Rail Technology between Wahiawa and Pearl Highlands Station	LCC=-9 min Kapolei=-7 m PUC=-9 min UH=-9 min	44 added rail car hours	Yes	Yes	Shelter(s) at each stop/station	
102.2 Light Rail between Wahiawa and Leeward Community College Rail Station	LCC=-6 min Kapolei=-6 m PUC=-6 min UH=-6 min	50 added rail car hours	Yes	Yes	Shelter(s) at each stop/station	

Table 3. Results of Application of Key Performance Measures to Transit Projects (cont.)

TRANSIT PROJECTS	APPLICABLE PERFORMANCE MEASURES					
	2	6	7	11	20	21
102.3 Bus Rapid Transit between Wahiawa and Pearl Highlands Station	LCC=-7 min Kapolei=-6 m PUC=-7 min UH=-7 min	20 added service hours	Yes	Yes	Shelter(s) at each stop/station	
102.5 Park & Ride with Flyer stop in H-2 median mauka of Ka Uka Boulevard	LCC=-7 min Kapolei=-6 m PUC=-7 min UH=-7 min	14 added service hours	Yes	Yes	Shelter(s) at each stop/station	
102.6 HART Rail Technology between Mililani Mauka and Pearl Highlands Station	LCC=-9 min Kapolei=-7 m PUC=-9 min UH=-9 min	30 added rail car hours	Yes	Yes	Shelter(s) at each stop/station	
102.8 Aerial Gondola between Mililani Leeward Community College Rail Station	LCC=-9 min Kapolei=-9 m PUC=-8 min UH=-8 min	94 added gondola car hours	Yes	Yes	Shelter(s) at each stop/station	

2.1.2 Key Performance Measures Applied to Bicycle Projects and Results

The Performance Measures applied to bicycle projects are presented in

Table 4. Ten key Performance Measures were applied to the bicycle projects. These 10 Performance Measures are as follows:

- **Performance Measure 5**, Change from baseline conditions in the AM peak period travel time between origins and destinations within the COTS area
- **Performance Measure 7**, Connectivity to rail transit and frequency of intermodal connections
- **Performance Measure 8**, Amount of pedestrian infrastructure
- **Performance Measure 9**, Amount of bicycle infrastructure
- **Performance Measure 10**, Improvements to existing bicycle and pedestrian system
- **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle
- **Performance Measure 13**, Rate of fatalities per 100 million vehicle miles
- **Performance Measure 14**, Number of serious injuries by mode
- **Performance Measure 16**, Number of non-motorized fatalities and serious injuries
- **Performance Measure 19**, Sidewalk, bikeways, and multi-use path conditions

Table 4. Key Performance Measures Applied to Bicycle Projects*

BICYCLE PROJECTS	APPLICABLE PERFORMANCE MEASURES									
TYPES OF BICYCLE PROJECTS	5	7	8	9	10	11	13	14	16	19
201.0 Bicycle Paths	X	X	X	X	X	X	X	X	X	X
202.0 Bicycle Lanes	X	X		X	X	X	X	X		X
203.0 Bicycle Routes	X	X		X	X	X	X	X		X

* See **Table 1** for a full description of each Performance Measure

The quality of the proposed bicycle facility determined which measures should be applied. Since multi-use paths/trails serve both bicyclists and pedestrians, some pedestrian-only measures (e.g., Measure 8) were applied to bicycle path projects. In the case of bicycle routes, which include only signs and striping (but require cyclists to share the travel lane with vehicles), only Measures 9 through 11 and 19 applied to those types of projects.

The bicycle projects Performance Measure results are shown in **Table 5**. As shown, the new pathway between Anania Drive and Central Oahu Regional Park (201.2) and the new bike pathway along Kamehameha Highway between Wahiawa and Anania Drive (201.6) will provide the greatest increase in bicycle infrastructure by adding 2.58 miles and 3.62 miles, respectively. All bicycle path projects have the added benefit of also adding an equivalent length of pedestrian infrastructure since all of these projects are shared-use facilities. Additionally, project 201.2 will provide a more direct access between Anania Drive and Central Oahu Regional Park and will reduce pedestrian and/or bicycle travel time by approximately 18 minutes. The new bike pathway on Cane Haul Road between H-2 and the Pearl Highlands Station (201.7) will provide the second largest decrease in bicycle travel time of 11 minutes.

Table 5. Results of Application of Key Performance Measures to Bicycle Projects

BICYCLE PROJECTS	APPLICABLE PERFORMANCE MEASURES									
	5	7	8	9	10	11	13	14	16	19
201.0 Bicycle Paths										
201.1 New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	0 min	No	1.0 mi	1.0 mi	Yes	Yes	0	0	1 collision	New

BICYCLE PROJECTS	APPLICABLE PERFORMANCE MEASURES									
	5	7	8	9	10	11	13	14	16	19
201.2 New Pathway between Anania Dr and Central Oahu Regional Park	-18 mins	No	2.58 mi	2.58 mi	Yes	Yes	0	1	0 collisions	New
201.4 New Bike Pathway along Kamehameha Hwy from Ka Uka Boulevard to Waipahu Street	0 min	No	1.65 mi	1.65 mi	Yes	Yes	0	0	2 collisions	New

Table 5. Results of Application of Key Performance Measures to Bicycle Projects (cont.)

BICYCLE PROJECTS	APPLICABLE PERFORMANCE MEASURES									
	5	7	8	9	10	11	13	14	16	19
201.5 New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to LCC Station	0 min	Yes	0.84 mi	0.84 mi	Yes	Yes	0	0	0 collisions	New
201.6 New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	0 min	No	3.62 mi	3.62 mi	Yes	Yes	0	2	1 collision	New
201.7 Bike Pathway on Cane Haul Road between H-2 & Pearl Highlands station	-11 mins	Yes	1 mi	1 mi	Yes	Yes	0	0	1 collision	New
201.8 Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	0 min	No	0.31 mi	0.31 mi	Yes	Yes	0	0	0 collisions	New
201.10 Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	0 min	No	1 mi	1 mi	Yes	Yes	0	0	0 collisions	New
202.0 Bicycle Lanes										
202.3 Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	0 min	No		1.96 mi	Yes	Yes	0	0	1 collision	New
202.4 Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	0 min	No		0.14 mi	Yes	Yes	1.73 fatalities for every million vehicle miles	0	3 collisions, 1 ped fatality	New
202.6 Bicycle lanes on Kamehameha Highway from Waihona St connecting to Pearl Harbor Bike Path	0 min	Yes		1.3 mi	Yes	Yes	0	0	3 collisions	New
202.7 Bicycle lane on Kamehameha Highway between Ka Uka Blvd and Lanikahuna Ave	0 min	No		1.9 mi	Yes	Yes	0	0	0 collisions	New

Table 5. Results of Application of Key Performance Measures to Bicycle Projects (cont.)

BICYCLE PROJECTS	APPLICABLE PERFORMANCE MEASURES									
	5	7	8	9	10	11	13	14	16	19
203.0 Bicycle Routes										
203.1 Bicycle route on California Ave between Plum St and Iliahi Elementary	0 min	No		1.78 mi	Yes	Yes	0	0		New
203.3 Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	0 min	No		0.27 mi	Yes	Yes	0	0		New
203.5 Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	0 min	No		1.3 mi	Yes	Yes	0	0		New
203.6 Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Shopping Center	0 min	No		2.35 mi	Yes	Yes	0	0		New

Performance Measure 5 shows that only bicycle two projects would result in a travel time savings: New Pathway between Anania Dr and Central Oahu Regional Park (201.2) and Bike Pathway on Cane Haul Road between H-2 & Pearl Highlands station (201.7). Although it is understood that an increase in bicycle trips can have an indirect positive effect in reducing vehicle travel times, time savings benefits are only applied to commuter travel commuting on facilities that are deemed safer. In addition, there is generally an increase in use of facilities that are deemed safer, such as bicycle paths separated from the travel lanes, rather than bicycle lanes and routes.

Performance Measure 11 assesses whether or not a particular bicycle project would contribute to a mode shift. It has been determined that all bicycle projects would contribute to a mode shift away from single-occupancy vehicles. However, it is not possible to accurately estimate specific numbers of trips by mode resulting from implementation of a specific project. This is in part due to the fact that individual bicycle project do not by themselves result in a mode shift; rather, they collectively contribute to increased ridership when they expand an attractive and convenient network of bicycle facilities that also enhance safety.

Performance Measures 13, 14, and 16 for safety in bicycle projects is based on the collisions data presented in Deliverable C. Two of the new bicycle lane projects (Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway (202.4) and on Kamehameha Highway from Waihona Street connecting to Pearl Harbor Bike Path (202.6)) will provide the greatest benefit to safety at hot spot collision locations. Both projects will enhance safety along roadway segments that had three collisions in the last couple of years. The safety enhancement will be a result of providing a dedicated space for bicycle travel and increasing awareness to drivers of the presence of cyclists.

Bicycle route projects (where cyclists share the travel lanes with vehicles) raise awareness of bicyclists to drivers, but they are the least effective in terms of enhancing safety and increasing ridership because of their limited infrastructure and capacity.

2.1.3 Key Performance Measures Applied to Pedestrian Projects and Results

Pedestrian projects were evaluated against 11 Performance Measures, as illustrated in **Table 6**. Safety related Performance Measures (i.e., Performance Measures 12, 13, 14, 15, and 16) were initially developed to identify potential hot spots within the study area. These key Performance Measures are as follows:

- **Performance Measure 8**, Amount of pedestrian infrastructure
- **Performance Measure 9**, Amount of bicycle infrastructure
- **Performance Measure 10**, Improvements to existing bicycle and pedestrian system
- **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle
- **Performance Measures 12**, Number of annual fatalities from vehicle-vehicle collisions
- **Performance Measure 13**, Rate of fatalities per 100 million vehicle miles
- **Performance Measure 14**, Number of serious injuries by mode
- **Performance Measures 15**, Rate of serious injuries per 100 million vehicle miles
- **Performance Measure 16**, Number of non-motorized fatalities and serious injuries
- **Performance Measure 17**, Roadway state of good repair
- **Performance Measure 19**, Sidewalk, bikeways, and multi-use path conditions

Complete Streets projects were analyzed under the pedestrian projects “umbrella” and were assumed to include enhancements to both active transportation modes (walking and bicycling) unless otherwise specified. Selected measures that were either bicycle- or vehicle-specific (e.g., 9, 12, 13, etc.) did not apply to pedestrian projects.

Table 6. Key Performance Measures Applied to Pedestrian Projects*

PEDESTRIAN PROJECTS	APPLICABLE PERFORMANCE MEASURES										
TYPES OF PEDESTRIAN PROJECTS	8	9	10	11	12	13	14	15	16	17	19
301.0: Location-Specific	X		X	X			X		X	X	
302.0: General	X	X	X	X			X		X		X
303.0: Complete Streets	X	X	X	X	X	X	X	X	X	X	X

* See **Table 1** for a full description of each Performance Measure

The results are shown in **Table 7**. The California Avenue Complete Streets project between Kamehameha Highway and Wahiawa District Park (301.3) will provide the greatest benefit to pedestrians relating to increasing pedestrian infrastructure and enhancing pedestrian safety to potentially address the collision history in that corridor. While it is not possible to anticipate the specific reduction in collisions resulting from the implementation of any project, the features associated with this project are expected to reduce the potential for collisions and ideally the severity of any collision. It also includes the ancillary benefit of

potentially enhancing safety for other modes by lowering travel speeds and raising driver awareness of transit patrons and pedestrians (where four and six collisions occurred for each mode, respectively).

The Safe Routes to School (302.1) project is a statewide program designed to enhance safety and improve connectivity for people and students traveling to and from the schools. The Safe Routes to School process includes identification of improvements around each school studied and can include enhancements ranging from minor striping and signage to curb extensions, roundabouts, and other strategies. Program-wide results have not been calculated, but each set of improvements developed by the respective school is expected to benefit the surrounding neighborhood(s).

Similarly, the construction of mobility hubs at selected locations would benefit the surrounding areas by providing connections between multiple modes and raising the profile of non-auto travel. Typically, sidewalks and bicycle facilities are enhanced in the immediate vicinity of a mobility hub, as are major transit stops. Other enhancements can include transit signal priority, queue jump lanes at proximate intersections, and expanded stop waiting areas with amenities. Additional features include car share and bike share stations to reduce the need to own a vehicle.

Table 7. Results of Application of Key Performance Measures to Pedestrian Projects

PEDESTRIAN PROJECTS	APPLICABLE PERFORMANCE MEASURES										
TYPES OF PEDESTRIAN PROJECTS	8	9	10	11	12	13	14	15	16	17	19
301.0 Location-Specific											
301.1 Crosswalk across makai leg of Kamehameha Hwy and Avocado Street intersection	0.02 mi		Yes	Yes			N/A		0 collisions	Fair	New
302.0 General											
302.1 Safe Routes to School	0.02 mi	N/A	Yes	Yes			N/A		0 collisions		N/A
302.2 Pedestrian Crossing Safety	N/A	N/A	Yes	Yes			N/A		1 collision		N/A
302.3 Mobility Hubs	Local	Local	Yes	Yes			N/A		Local		New
303.0 Complete Streets											
303.1 California Ave between Kamehameha Hwy and Wahiawa District Park	0.40 mi	0.40 mi	Yes	Yes	1	24.95	6 Ped 4 Tr.		6 collisions, 1 fatality	Fair	
303.2 Kipapa Dr between Hookelawaa St and Mililani Waena Elementary School	0.18 mi	0.18 mi	Yes	Yes	0		0		1 collision	N/A	
303.3 Complete Streets modifications on priority roads			Yes	Yes	N/A		N/A			N/A	

2.1.4 Key Performance Measures Applied to Roadway Projects and Results

The key Performance Measures for roadway projects had the widest range of application of all of the project types and includes 15 of the 21 Performance Measures. These Performance Measures include the following:

- **Performance Measure 1**, Change from baseline conditions in AM peak period travel time between specified Origin and Destinations by auto/truck modes (except bike and walk)
- **Performance Measure 2**, Change from baseline conditions in the AM peak period transit travel time to major destinations
- **Performance Measure 3**, Number of congested lane miles in Central Oahu
- **Performance Measure 4**, Change from baseline conditions in total AM peak period auto travel time between origins and destinations within the COTS area
- **Performance Measure 5**, Change from baseline conditions in the AM peak period travel time between origins and destinations within the COTS area via biking and walking
- **Performance Measure 10**, Improvements to existing bicycle and pedestrian system
- **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle
- **Performance Measures 12**, Number of annual fatalities from vehicle-vehicle collisions
- **Performance Measure 16**, Number of non-motorized fatalities and serious injuries
- **Performance Measure 17**, Roadway state of good repair
- **Performance Measures 18**, Bridges state of good repair
- **Performance Measure 19**, Sidewalk, bikeways, and multi-use path conditions

The results of applying the measures are shown in **Table 8**. There are differences in the application of the Performance Measures because of the wide variety of roadway project types. These are: small roadway widening, intersections, ramps and new roadway connections, and a freeway widening.

Table 8. Key Performance Measures Applied to Roadway Projects*

ROADWAY PROJECTS	APPLICABLE PERFORMANCE MEASURES											
TYPES OF ROADWAY PROJECTS	1	2	3	4	5	10	11	12	16	17	18	19
401.0: Ka Uka Blvd & H-2 Interchange	X	X		X			X	X	X	X		
402.0: Ka Uka Blvd	X	X		X			X	X	X	X		X
403.0: Kamehameha Hwy	X	X	X	X			X	X	X	X	X	X
404.0: H-2 Interchanges	X	X	X	X			X			X		
405.0: H-1 & H-2 Interchange	X	X	X	X			X			X		
406.0: Central Mauka Roads	X	X	X	X		X	X					
408.0: Mililani Access	X	X	X	X	X	X	X					

* See **Table 1** for a full description of each Performance Measure

Table 9 presents the results of the application of the Performance Measures to roadway projects. The results show that the Central Mauka Road between Mililani Mauka and Pearl City (406.1) would provide the greatest benefit towards vehicle travel time and transit travel time reduction within the COTS area. This project is estimated to decrease intra-regional vehicular travel time by approximately 39 minutes total during the AM peak period. Given the new roadway and connectivity, it is also estimated to decrease transit travel time by roughly five to 10 minutes during the AM peak period.

The Kamehameha Highway HOV lanes (403.8) will provide the second greatest benefit towards vehicle travel in the COTS study area. It is anticipated to reduce regional travel by eight minutes during the AM peak period, and slightly decrease travel to the Leeward Community College by one minute in the AM peak period. Similar to other projects, however, they will have reduced AM peak period benefit if town-bound capacity is not enhanced.

Most of the other roadway projects are not expected to substantially benefit regional vehicle delay. While some smaller roadway projects could improve traffic flow and reduce travel time at a specific location (e.g. 402.1 Ka Uka Boulevard lane addition between Moaniani Street and Commercial Driveway Spine Road), they are not going to significantly affect region wide travel. In addition, most of the Ka Uka Boulevard interchange improvements are needed to provide additional capacity to support buildout of the Koa Ridge development; however, they do not provide an extensive amount of surplus capacity to enhance traffic operations for existing traffic or from other area growth.

The Paiwa Street extension (Project 407.1) through Central Oahu Regional Park appears to result in some significant changes to area wide circulation. The provision of another “direct” connection between Kamehameha Highway and H-1 seems to substantially change travel patterns and increases AM peak period travel times, which is somewhat counterintuitive. One explanation is that the new connection provides another mauka-makai connection (in addition to Kamehameha Highway and H-2) and would serve some latent demand from the mauka part of the COTS area and the North Shore that is not able to travel during the AM peak period without it.

Some of the larger scale improvements, such as the elimination of the middle merge at the H-1/H-2 interchange (Project 405.1), will help during the off-peak period and shoulders of the peak period, but will not be effective during the peak periods until additional town-bound capacity is provided on the H-1 freeway mainline.

Performance Measure 17 shows the measure of the current pavement condition of existing roadways. Data was taken from the Hawaii Department of Transportation (HDOT) *Highway Condition Database* (2016a). As shown in **Table 9**, the majority of the existing roadways have a “fair” pavement condition. However, the intersection of Kamehameha Highway and Lumiaina Street (403.1) has a “poor” pavement condition, as well as some areas along Kamehameha Highway between Ka Uka Boulevard and Farrington Highway (403.8) and the H-1/H-2 southbound/eastbound interchange (405.1).

Performance Measure 18 shows the measure of bridge conditions. The data was taken from HDOT’s *Bridge Condition Database* (2016b). There is only one bridge within the COTS area, so Performance Measure 18 was only applied to one project. Roosevelt Bridge over Kipapa Gulch (403.7) has a bridge rating of “poor”. HDOT is currently rehabilitating this bridge as well as considering reconfiguring the lanes to provide a bicycle lane.

Performance Measure 19 assesses the current conditions of bicycle and pedestrian facilities, which was determined by SSFM through the completion of a bicycle and pedestrian facilities inventory conducted in August 2017. Existing facilities along Ka Uka Boulevard were identified as being in “fair” condition,

whereas the intersection of Kamehameha Highway and Lumiaina Street was identified as being in “good” condition with respect to bicycle and pedestrian facilities.

Table 9. Results of Application of Key Performance Measures to Roadway Projects

ROADWAY PROJECTS	APPLICABLE PERFORMANCE MEASURES											
TYPES OF ROADWAY PROJECTS	1	2	3	4	5	10	11	12	16	17	18	19
401.0 Ka Uka Boulevard and H-2 Interchange												
401.1 Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	0 mins		- 2 min			No	0	1 collision	Fair		
401.2 Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair		
401.3 Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair/ Good		
401.4 Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair/ Good		
401.5 Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair		
401.6 Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	1	1 collision	Fair/ Good		
401.7 Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair		
401.8 Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		- 2 min			No	0	1 collision	Fair		

Table 9. Results of Application of Key Performance Measures to Roadway Projects (cont.)

ROADWAY PROJECTS	APPLICABLE PERFORMANCE MEASURES											
TYPES OF ROADWAY PROJECTS	1	2	3	4	5	10	11	12	16	17	18	19
402.0 Ka Uka Boulevard												
402.1 Ka Uka Blvd between Moaniani St and Commercial Driveway/ Spine Rd (lane addition)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	-1 min		-2 min			No	0	1 collision	Fair		Fair
402.2 Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	-1 min		-2 min			No	0	1 collision	Fair		Fair
402.3 Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	-1 min		-2 min			No	0	1 collision	Fair		Fair
402.4 Ka Uka Blvd between H-2 and new development (new road)	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	< -1 min		0 min			No	0	1 collision	N/A		N/A
403.0 Kamehameha Highway												
403.1 Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)		-1 min					No	0	0 collisions	Poor		Good
403.2 Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)		-1 min					No	0	1 collision	Fair		N/A
403.3 Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)		-1 min					No	0	0 collisions	Fair		N/A
403.4 Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)		0 min					No	0	0 collisions	Fair		N/A
403.5 Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	LCC = -2 mins Kapolei = -1 mins PUC = -1 mins UH = -1 mins	-2 min	AM = 47 miles PM = 65 miles	-12 min			No	0	0 collisions	Fair/Good		N/A
403.7 Kamehameha Hwy Roosevelt Bridge (rehabilitation)										Fair	Poor	N/A

Table 9. Results of Application of Key Performance Measures to Roadway Projects (cont.)

ROADWAY PROJECTS	APPLICABLE PERFORMANCE MEASURES											
TYPES OF ROADWAY PROJECTS	1	2	3	4	5	10	11	12	16	17	18	19
403.8 Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	LCC = -1 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	-3 min	AM = 53 miles PM = 62 miles	-6 min			Yes			Fair/Poor		N/A
404.0 H-2 Interchanges												
404.1 H-2 & Pineapple Road Interchange		-2 mins					No			N/A		
404.2 H-2 & Meheula Pkwy (widen on-ramp)	LCC = 0 mins Kapolei = +1 mins PUC = +1 mins UH = +1 mins	-1 min	AM = 57 miles PM = 64 miles	-2 min			No			Fair/Good		
405.0 H-1 and H-2 Interchanges												
405.1 Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	LCC = 0 mins Kapolei = +1 mins PUC = +1 mins UH = +1 mins	-1 min	N/A				No			Fair/Poor		
406.0 Central Mauka Roads												
406.1 New Road between Mililani Mauka and Pearl City	LCC = -4 mins Kapolei = -3 mins PUC = -6 mins UH = -6 mins	-5 to -10 mins	AM = 52 miles PM = 64 miles	-39 min			No					
406.3 New Road between California Ave and Meheula Pkwy	LCC = 0 mins Kapolei = 0 mins PUC = 0 mins UH = 0 mins	-5 mins	AM = 56 miles PM = 65 miles	-1 min		No	No					
408.0 Mililani Access												
408.1 New road connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka	LCC = -1 mins Kapolei = -2 mins PUC = -2 mins UH = -2 mins	-5 mins	AM = 58 miles PM = 65 miles				No					
408.4 New flyer stops at H-2 with pedestrian pathway to Park & Ride					-8 mins	Yes	Yes					

2.1.5 Key Performance Measures Applied to Transportation Demand Management Projects and Results

Projects with a primary emphasis on transportation demand management (TDM) can have wide-ranging benefits and contribute to the use of non-automobile modes, but are more challenging to measure from a performance perspective, especially at the regional level. There are only two Performance Measures applied to TDM projects, which include the following:

- **Performance Measure 7**, Connectivity to rail transit and frequency of intermodal connections
- **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle

The applicable Performance Measures for TDM projects are shown in **Table 10**.

Table 10. Key Performance Measures Applied to TDM Projects*

TRANSPORTATION DEMAND MANAGEMENT (TDM) PROJECTS	APPLICABLE PERFORMANCE MEASURES	
TYPES OF TDM PROJECTS	7	11
501.0: Transportation Demand Management	X	X
502.0: Intelligent Transportation Systems	X	X

* See **Table 1** for a full description of each Performance Measure

The implementation of TDM measures are an effective way to reduce auto travel demand by incentivizing the use of active modes and transit, and by discouraging driving alone. It is important to note that TDM measures can typically only be applied to new development or to redevelopment projects and not usually to existing land uses. Adherence to such measures requires monitoring, enforcement, and penalties for lack of conformance. In addition, TDM is most effective when implemented on a broader scale (i.e., at the regional level) so as to result in a travel behavior change across the greatest proportion of the population. Application on an isolated development-by-development basis is less effective and takes much longer to effect change. Lastly, selective implementation of measures also results in limited participation, whereas providing a comprehensive suite of measures increases the number of options for participants and maximizes effectiveness.

The results are shown in **Table 11**. All of the potential TDM projects rate favorably when assessed against the applicable Performance Measures. The only exception is Project 501.9, Support of Working from Home, which would not contribute to increasing connectivity to rail transit or the frequency of intermodal connections.

The effectiveness of specific TDM measures is difficult to quantify at a regional level since it depends on the extent of participation, the mobility infrastructure network to serve non-auto trips, and place-type/density/diversity of land uses. In general, TDM studies at the regional level are focused more on policy than determining the specific analytical results and are therefore qualitative in nature.

Table 11. Results of Application of Key Performance Measures to TDM Projects

TRANSPORTATION DEMAND MANAGEMENT (TDM) PROJECTS	APPLICABLE PERFORMANCE MEASURES	
TYPES OF TDM PROJECTS	7	11
501.0 Transportation Demand Management (TDM)		
501.1 Free real-time online carpool matching	Yes	Yes
501.2 Outreach promotion and marketing of alternative transportation	Yes	Yes
501.3 Emergency ride home program	Yes	Yes
501.5 Employer based commuter/parking programs	Yes	Yes
501.6 Emerging and innovative strategies – Carsharing	Yes	Yes
501.7 Emerging and innovative strategies – Bikesharing	Yes	Yes
501.8 Vanpool program	Yes	Yes
501.9 Support of working from home	No	Yes
501.10 Support of alternate/shifted work hours	Yes	Yes
502.0 Intelligent Transportation Systems (ITS)		
502.1 ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	Yes	Yes

2.1.6 Key Performance Measures Applied to Pricing Projects and Results

Projects with pricing as their primary element can result in multiple benefits to managing congestion, but are also more complex to study and identify specific Performance Measures. For this study, pricing projects were evaluated qualitatively, and their ability to manage automobile travel and increase vehicle occupancy was assessed using **Performance Measure 11**, Contributes to mode split shift away from single-occupant vehicle.

Pricing projects, such as high-occupancy toll (HOT) or express lanes on the freeway, have been studied as part of previous studies including the ORTP completed by OahuMPO and the H-1 Corridor Study completed by the Highways Division of HDOT. This type of project has the ability to achieve the following:

- Manage congestion by incentivizing shared rides and off-peak travel
- Price access to select facilities and use available capacity for single-occupant vehicles
- Generate additional revenue to expand and maintain the highway system
- Dis-incentivize non-essential travel

In the case of the COTS area, the most likely candidates for pricing projects include tolling the existing zipper lane that can be accessed via H-1 or H-2; however, express lanes are only effective and equitable

when they are part of a system. By simply tolling the entrance to the zipper lane from H-2 serving Central Oahu would not allow sufficient or effective management of the lane. Tolling would also have to be implemented at the entrance from H-1 (near Managers Drive), as well as along the entire length of the facility where access is provided. The specific regional transportation operational benefits and potential for implementation should be evaluated after segments are identified for express lane implementation at a later project development stage, but this option would be beneficial overall to providing an option for Central Oahu travelers.¹

Parking pricing is an extremely effective method of changing travel behavior and moving individuals to active and transit modes in lieu of single-occupant vehicle trips. However, reasonable alternatives need to be available once parking is priced to manage demand and incentivize use of other modes. This means that a network of bicycle-friendly and pedestrian-friendly facilities and convenient access to reliable transit need to be provided. Also, the supply has to be priced and managed such that a free and abundant supply is not located nearby where the demand can simply divert. Provided the aforementioned criteria are met, both HOT lanes and parking pricing strategies will be effective in helping to achieve the COTS study goal of minimizing single-occupancy vehicle trips as shown in **Table 12**.

Table 12. Results of the Application of Key Performance Measures to Pricing Projects

PRICING PROJECTS	APPLICABLE PERFORMANCE MEASURES
TYPES OF PRICING PROJECTS	11
601.2 HOT lanes	Yes
601.3 Parking Strategies	Yes

2.2 Project Recommendations for Further Study

Achieving the goal of reducing single-occupancy vehicle trips will require a balanced approach in implementing a variety of modal projects within the COTS area. While congestion is a major driver in moving travelers to transit, bicycle, and pedestrian modes, excessive congestion and a lack of travel time reliability will degrade the quality of life for COTS area residents, employees, customers, and visitors. To that end, general recommendations based strictly on Performance Measures are presented for each mode in the following sections. Other considerations in terms of project feasibility are discussed in **Section 3.0**.

2.2.1 Transit Projects

All high capacity transit projects will provide travel time reliability for users over what can be expected for single-occupant vehicle drivers. The at grade light rail project 102.2 will have more conflicts with traffic lights, but that is off-set with more access options for users. The HART rail technology projects along with the Aerial Gondola will have the highest reliability along with higher construction costs and fewer access options. Project 102.5 adds additional park-and-ride capacity for intending rail users with connections via bus and potentially rail.

¹ For more detailed information on HOT lane benefits, issues, and examples, visit: https://ops.fhwa.dot.gov/publications/fhwahop09015/cp_prim7_04.htm.

Grade separated or mostly grade separated projects provide a safer travel route over those projects that are in general purpose traffic. Enhanced bus without transit priority treatments subject passengers to general purpose traffic congestion.

All transit projects except for project 102.1 are recommended for further consideration based on travel time savings. The HART rail project between Wahiawa and the Pearl Highlands Station would terminate on the northern end at the Park-and-Ride lot south of Wahiawa at the Hawaii National Guard Facility, which is a shared lot with the National Guard. The Park-and-Ride location is approximately 2.25 miles from the Mililani Mauka Station. Initial review indicated that ridership growth would be accommodated at the Mililani Mauka and Koa Ridge Stations, which are included in project 102.6 (HART Rail Technology between Mililani Mauka and Pearl Highlands Station). Given that ridership is not expected to increase substantially with a terminal closer to Wahiawa and that factors may prohibit use of the National Guard facility for a rail terminus, it is recommended that the extended rail line proposed in project 102.1 be dropped from further analysis.

2.2.2 Bicycle Projects

All bicycle path/shared-use path projects are recommended with a priority on those that reduce bicycle travel time, can be constructed as part of future development projects (e.g., Koa Ridge), and provide substantive additions to the bicycle network in terms of lane-miles. These facilities attract the greatest number of riders and typically provide the highest level of safety of all bike facility types as long as they are designed appropriately.

Similarly, all of the bike lane projects would enhance the cycling network within the COTS area and potentially help to reduce collision potential if designed appropriately. Expanding the network of bicycle-dedicated facilities is a key tool in increasing overall numbers of cyclists and to increasing driver awareness of bicycles on the road. In two cases, the potential bicycle lane projects identified in the COTS address locations with multiple collisions.

New bicycle routes should be the lowest priority of bicycle projects based solely on performance. Bicycle routes provide the lowest level of safety enhancement and do not provide a dedicated ROW for cyclists. Other considerations, such as ease of implementation, may elevate one or more of these projects.

2.2.3 Pedestrian Projects

The most effective projects under consideration to enhance pedestrian travel are Complete Streets and Safe Routes to School projects. The California Avenue improvement project in Wahiawa has the greatest likelihood of enhancing safety and reducing collision potential, and is a clear choice for a priority pedestrian project based on Performance Measures. COTS area schools should all be provided the same opportunity to develop similar projects to facilitate walking and biking to and from school. In addition, Mobility Hubs would aid in reducing single-occupancy vehicle commute trips and elevate walking as a more viable mode from a travel culture perspective.

2.2.4 Roadway Projects

Based solely on Performance Measures associated with commuting, one of most effective roadway projects in terms of reducing congestion in the COTS area is the widening of Kamehameha Highway in Central Oahu across Roosevelt Bridge (Project 403.5). In terms of the most effective new access to the study area or between communities, provision of a new Central Mauka road (Project 406.1) would provide an alternative to H-2 and Kamehameha Highway in terms of traveling to and from the Primary Urban Center of Honolulu. Other proposed connections do provide some benefit but to a much lesser degree.

Projects on Ka Uka Boulevard at and near the H-2 interchange, as well as the new Pineapple Road interchange, are important in terms of addressing future growth and addressing localized congestion but have less overall regional benefit. Other connections, such as linking Mehula Parkway to the Pineapple Road interchange, would have similar localized benefits but not address the greater regional issue of downstream congestion on the H-1 freeway.

2.2.5 TDM and Pricing Projects

Both TDM programs and pricing projects are an effective means of changing travel behavior, better balancing vehicle demand, and increasing the use of non-auto modes for commute trips, as well as shopping, school, recreation trips, and others. Both sets of projects need to be implemented on a system-wide basis to be effective. In the case of pricing projects like HOT lanes, the “system” is the greater regional roadway network including segments of the H-1 freeway (and possibly sections of Kamehameha Highway) outside the COTS area. Thus, implementation will require coordination among OahuMPO, HDOT, and the State legislature to allow for road pricing, identify the extent of the project, and assemble funding. For parking pricing strategies, policies and ordinances established at the City and County of Honolulu level will be needed, as well as potential subsidies to stimulate initial demand.

2.2.6 Summary of Projects Recommended for Further Study

Out of the 70 projects for which the Performance Measures were applied, all except one are recommended for moving forward in the COTS. The project that is not recommended to move forward in the COTS is project 102.1 (HART Rail Technology between Wahiawa and Pearl Highlands Station). All of the high capacity transit projects provide a similar range of travel time savings, thus other factors, including cost per projected passenger and constructability, were used to identify the transit project(s) that provide the most benefits to Central Oahu, and are feasible to implement. It is recommended that the TDM projects be combined as a single project in the next analysis.

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3.0 FEASIBILITY ASSESSMENT

This chapter reviews several attributes that influence how difficult or easy it would be to construct or implement the project. **Table 13** identifies the Feasibility Analysis Criteria.

Table 13. Feasibility Analysis Criteria

CATEGORY	FEASIBILITY CRITERIA
CONSTRUCTION	Constructability and Maintenance of Traffic
	Temporary construction impacts
LAND REQUIREMENTS	Right-of-Way Needed and Takings
ENVIRONMENT	Environmental issues and mitigations
	Type of documentation required (i.e., Catex, EA, EIS)
	Reduce greenhouse gases
REGIONAL PLANNING	Consistency with <i>Central Oahu Sustainable Communities Plan</i>
	Consistency with <i>Oahu Regional Transportation Plan 2040</i>

This chapter analyzes construction feasibility, land requirements, environmental feasibility, and consistency with regional planning. Report B-2 listed two other feasibility criteria: Financial and Community Preferences. Financial feasibility will be addressed in the Benefit Cost Analysis, Deliverable G, and in the Final Report, Deliverable H. Community reaction will be assessed later in the study.

3.1 Construction

The project development process needs to account for construction requirements that are practicable to build or avoid unacceptable impacts to the community. Existing conditions, including utilities, right-of-way, and general configuration of the project, are subject to change prior to development and construction.

3.1.1 Constructability and Maintenance of Traffic

Constructability looks at the level of construction complexity. Some of the projects analyzed in the COTS are complex in nature and include new structures, ramp connections, significant cut and fill, and work around existing residential and commercial areas. These projects involve major mobilization and construction efforts. They also typically result in the greatest benefits to roadway operations and regional circulation. Other projects such as signal timing optimization and minor ramp modifications can be designed and implemented in a much shorter time frame, but the benefits to congestion relief and roadway operations are in operations rather than capacity enhancement.

Maintenance of traffic (MOT) examines construction activities that may cause motorists to experience delay during of construction. Small-scale projects may only require a minimum number or no roadway closures to complete. Larger-scale project may require multiple lane closures over extended periods of time or detours. MOT during these types of projects requires significant coordination, substantial resources, and extensive public outreach.

Construction phasing and traffic control to minimize traffic and access problems may be conducted during off-peak hours. Construction work to widen bridges or on shoulders could take place at any time.

An MOT Plan by the contractor will be required for any projects that have multiple or long-term closures or diversions of traffic.

Constructability and MOT Score

For developing the constructability and MOT score, projects were scored 1 through 5, with 1 representing the most difficult projects to construct and/or maintain traffic during implementation while 5 represents the easiest projects to construct. These were estimated by design engineers based on their professional experience in Hawaii. A description of the impacts and types of projects associated with each ranking is provided in **Table 14**.

Table 14. Constructability and MOT Impacts Scoring

Description of Impacts	Score
Large-scale projects with extensive lane closures and frequent MOT diversion during construction	1
High construction complexity with frequent and/or extended MOT lane closures	2
Moderate construction complexity and MOT impacts	3
Limited lane closures required	4
Easiest to construct with fewest lane closures and least MOT impacts	5

The constructability/MOT score applied to all projects is provided in **Table 15**.

Table 15. Constructability/MOT Score for All Projects

Project Number	Project Description	General Location	Constructability/MOT Score
100 TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	Central Oahu	5
101.2	Construct Transit Center at Koa Ridge	Koa Ridge	5
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	Central Oahu	5
102.0	HIGH CAPACITY TRANSIT		
102.2	Light Rail between Wahiawa and Leeward Community College Rail Station	Central Oahu	1
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	Central Oahu	5
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	Central Oahu	3
102.6	HART rail technology between Mililani Mauka and Pearl Highlands Rail Station	Central Oahu	2
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station	Central Oahu	2

Table 15. Constructability/MOT Score for All Projects (cont.)

Project Number	Project Description	General Location	Constructability/MOT Score
200 BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	Central Oahu Regional Park	5
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	Kipapa Gulch	5
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	Waipio	5
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	Leeward Community College	5
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	Wahiawa	5
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	Pearl Highlands	5
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	Mililani	5
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	Mililani	5
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	Mililani Mauka	3
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	Mililani	3
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	Waipio	3
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	Mililani	3
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	Wahiawa	4
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	Waipio Acres	4
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	Mililani	4
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	Mililani	4

Table 15. Constructability/MOT Score for All Projects (cont.)

Project Number	Project Description	General Location	Constructability/MOT Score
300 PEDESTRIAN PROEJCTS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	Wahiawa at Olive Ave	4
302.0	GENERAL		
302.1	Safe Routes to School	Central Oahu	4
302.2	Pedestrian Crossing Safety	Central Oahu	5
302.3	Mobility Hubs	COTS area transit centers	5
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	Wahiawa	5
303.2	Kipapa Dr between Hookelewa St and Mililani Waena Elementary School	Mililani	5
303.3	Complete Streets modifications on priority roads	Central Oahu	5
400 ROADWAY PROJECTS			
401.0	KA UKA BLVD. & H-2 INTERCHANGE		
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	Waipio Interchange	3
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	Waipio Interchange	3
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	Waipio Interchange	3
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	Waipio Interchange	5
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	Waipio Interchange	3
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	Waipio Interchange	4
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	3
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	3
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)	Waipio	3

Table 15. Constructability/MOT Score for All Projects (cont.)

Project Number	Project Description	General Location	Constructability/MOT Score
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	Waipio	4
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	Waipio	3
402.4	Ka Uka Blvd between H-2 and new development (new road)	Waipio	2
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	Waipio	3
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	Waipio	4
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	Waipio	3
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	Waipio	3
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	Waipio to Mililani	3
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	Kipapa Gulch	2
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Central Oahu	2
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange	New Interchange	2
404.2	H-2 & Meheula Pkwy (widen on-ramp)	Mililani Mauka	3
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	Waiawa Interchange	3
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City	Central Oahu	1
406.3	New Road between California Ave and Meheula Pkwy	Wahiawa	1
408.0	MILILANI ACCESS		
408.1	New Road Connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka	Mililani Mauka	2
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	Mililani Mauka	2

Table 15. Constructability/MOT Score for All Projects (cont.)

Project Number	Project Description	General Location	Constructability/MOT Score
500 TRANSPORTATION SYSTEM MANAGEMENT			
501.0 TRANSPORTATION DEMAND MANAGEMENT			
501.1	Free real-time online carpool matching	Central Oahu	5
501.2	Outreach promotion and marketing of alternative transportation	Central Oahu	5
501.3	Emergency ride home program	Central Oahu	5
501.5	Employer based commuter/parking programs	Central Oahu	5
501.6	Emerging and innovative strategies - Carsharing	Central Oahu	5
501.7	Emerging and innovative strategies - Bikesharing	Central Oahu	5
501.8	Vanpool program	Central Oahu	5
501.9	Support of working from home	Central Oahu	5
501.10	Support of alternate/shifted work hours	Central Oahu	5
502.0 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)			
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	Central Oahu	4
600 PRICING SOLUTIONS			
601.0 PRICING			
601.2	HOT lanes	Central Oahu	4
601.3	Parking strategies	Central Oahu	5

[Top Constructability/MOT Projects](#)

The projects that can be constructed with the least amount of complexity and limited impact to ongoing traffic operations (i.e., score of 5) are presented in **Table 16**.

Table 16. Least Difficult Projects to Construct

Project Number	Project Description	Constructability/MOT Score
101.1	Bus Service Expansion	5
101.2	Construct Transit Center at Koa Ridge	5
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	5
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	5
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	5

Table 16. Least Difficult Projects to Construct (cont.)

Project Number	Project Description	Constructability/MOT Score
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	5
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	5
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	5
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	5
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	5
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	5
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	5
302.2	Pedestrian Crossing Safety	5
302.3	Mobility Hubs	5
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	5
303.2	Kipapa Dr between Hookelewa St and Mililani Waena Elementary School	5
303.3	Complete Streets modifications on priority roads	5
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	5
501.1	Free real-time online carpool matching	5
501.2	Outreach promotion and marketing of alternative transportation	5
501.3	Emergency ride home program	5
501.5	Employer based commuter/parking programs	5
501.6	Emerging and innovative strategies - Carsharing	5
501.7	Emerging and innovative strategies - Bikesharing	5
501.8	Vanpool program	5
501.9	Support of working from home	5
501.10	Support of alternate/shifted work hours	5
601.3	Parking strategies	5

The projects that would be the most difficult to construct (i.e., score of 1), are presented in **Table 17**.

Table 17. Most Difficult Projects to Construct

Project Number	Project Description	Constructability/MOT Score
102.2	Light Rail between Wahiawa and Leeward Community College Rail Station	1
406.1	New Road between Mililani Mauka and Pearl City	1
406.3	New Road between California Ave and Meheula Pkwy	1

3.1.2 Temporary Construction Impacts

Each of the proposed projects will have some degree of temporary impact during construction. Temporary construction impacts may include the following:

- **Construction Equipment Noise:** Increases noise generated from construction equipment and pile driving (where necessary) at and near the construction site is expected. Local noise ordinances must be strictly following and efforts made to minimize noise and disturbances to nearby residences and businesses. At times, it may be necessary to notify local residents and businesses of upcoming pile driving and other significant noise generating operations. Certain situations may also require that noise-reducing attachments be employed by the contractor to mitigate the noise generated by certain equipment.
- **Fugitive Dust Control:** Fugitive dust caused by earth-moving equipment is a concern during all construction projects. Significant efforts must be made to control fugitive dust. A Stormwater Pollution Prevention Plan will be required that must address dust control measures that the contractor will employ to control dust. These measures may include, but are not limited to, temporary covers on stockpiles, street sweeping, rock construction entrances, and watering the work area.
- **Nighttime Construction:** Some project activities will have to occur overnight, such as falsework erection for bridges that will require full closure of roadways. Nighttime construction with or without full closures of a roadway brings challenges both to the construction crew and the travelling public. Construction crews have to abide by noise ordinances and work with limited visibility, limited work shift, and proximity to traffic at night. The travelling public will have the challenges of construction and detour signs with limited visibility, maneuvering through the detour, additional travel time, and general unfamiliarity of the detour route compared with their routing travel route.
- **Impacts to Businesses and Residents:** Many of the projects listed will impact businesses and residents in the vicinity of the projects. The impact may be due to roadway closures, construction noise, dust, traffic congestion, or other things. Additional impacts to local businesses could be due to closed roadways, driveways, sidewalks, and crosswalks. It is important that all driveways and sidewalks stay open on local streets during construction to avoid impacts to businesses due to lack of access.
- **Additional Traffic on Local Streets:** When long-term and/or short-term closures with detours are in place, additional traffic is anticipated on certain local streets. Timing on existing signals at some of the intersections on these streets will have to be adjusted to keep traffic moving without significant delays.

The level of temporary construction impacts is in large part dependent on location of the project. **Table 18** provides an anticipated level of temporary construction impacts rated as Low, Medium, of High.

Table 18. Level of Temporary Construction Impacts

Project Number	Project Description	General Location	Level of Impact
100 TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	Central Oahu	Low
101.2	Construct Transit Center at Koa Rodge	Koa Ridge	Low
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	Central Oahu	Low
102.0	HIGH CAPACITY TRANSIT		
102.2	Light Rail between Wahiawa and Leeward Community College Rail Station	Central Oahu	High
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	Central Oahu	Low
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	Central Oahu	Low
102.6	HART rail technology between Mililani Mauka and Pearl Highlands Rail Station	Central Oahu	High
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station	Central Oahu	High
200 BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	Central Oahu Regional Park	Medium
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	Kipapa Gulch	Medium
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	Waipio	Medium
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	Leeward Community College	Medium
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	Wahiawa	Medium
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	Pearl Highlands	Medium
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	Mililani	Medium
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	Mililani	Medium

Table 18. Level of Temporary Construction Impacts (cont.)

Project Number	Project Description	General Location	Level of Impact
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	Mililani Mauka	Low
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	Mililani	Low
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	Waipio	Low
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	Mililani	Low
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	Wahiawa	Low
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	Waipio Acres	Low
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	Mililani	Low
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	Mililani	Low
300 PEDESTRIAN PROJETS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	Wahiawa at Olive Ave	Low
302.0	GENERAL		
302.1	Safe Routes to School	Central Oahu	Low
302.2	Pedestrian Crossing Safety	Central Oahu	Low
302.3	Mobility Hubs	COTS area transit centers	Low
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	Wahiawa	Low
303.2	Kipapa Dr between Hookelewa St and Mililani Waena Elementary School	Mililani	Low
303.3	Complete Streets modifications on priority roads	Central Oahu	Low
400 ROADWAY PROJECTS			
401.0	KA UKA BLVD. & H-2 INTERCHANGE		
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	Waipio Interchange	Medium
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	Waipio Interchange	Medium

Table 18. Level of Temporary Construction Impacts (cont.)

Project Number	Project Description	General Location	Level of Impact
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	Waipio Interchange	Medium
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	Waipio Interchange	Medium
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	Waipio Interchange	Medium
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	Waipio Interchange	Medium
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	Medium
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	Medium
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)	Waipio	Medium
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	Waipio	Medium
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	Waipio	Medium
402.4	Ka Uka Blvd between H-2 and new development (new road)	Waipio	Medium
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	Waipio	Medium
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	Waipio	Medium
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	Waipio	Medium
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	Waipio	High
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	Waipio to Mililani	High
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	Kipapa Gulch	High
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Central Oahu	High

Table 18. Level of Temporary Construction Impacts (cont.)

Project Number	Project Description	General Location	Level of Impact
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange	New Interchange	Low
404.2	H-2 & Meheula Pkwy (widen on-ramp)	Mililani Mauka	Medium
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	Waiawa Interchange	Medium
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City	Central Oahu	Low
406.3	New Road between California Ave and Meheula Pkwy	Wahiawa	Low
408.0	MILILANI ACCESS		
408.1	New Road Connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka	Mililani Mauka	Low
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	Mililani Mauka	High
500 TRANSPORTATION SYSTEM MANAGEMENT			
501.0	TRANSPORTATION DEMAND MANAGEMENT		
501.1	Free real-time online carpool matching	Central Oahu	Low
501.2	Outreach promotion and marketing of alternative transportation	Central Oahu	Low
501.3	Emergency ride home program	Central Oahu	Low
501.5	Employer based commuter/parking programs	Central Oahu	Low
501.6	Emerging and innovative strategies - Carsharing	Central Oahu	Low
501.7	Emerging and innovative strategies - Bikesharing	Central Oahu	Low
501.8	Vanpool program	Central Oahu	Low
501.9	Support of working from home	Central Oahu	Low
501.10	Support of alternate/shifted work hours	Central Oahu	Low
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)		
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	Central Oahu	Low
600 PRICING SOLUTIONS			
601.0	PRICING		
601.2	HOT lanes	Central Oahu	Low
601.3	Parking strategies	Central Oahu	Low

3.2 Land Requirements (Right-of-Way)

Each of the potential projects was evaluated to estimate the amount of land or Right-of-Way (ROW) that would be required. This is expressed in acres. Most projects do not require any additional ROW beyond what already exists. There are six projects that would require ROW. None of these six projects are expected to impact structures; therefore, there would be no relocations. The amount of ROW required for each project is presented least to highest in **Table 19** Error! Reference source not found..

Table 19. Right-of-Way Impacts Ordered by Total Acreage (Least to Highest)

Project Number	Project Description	General Location	Right-of-Way Requirements (acres)
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	Pearl Highlands	2.71
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	Kipapa Gulch	3.97
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Central Oahu	3.97
408.1	New Road Connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka	Mililani Mauka	16.07
406.3	New Road between California Ave and Meheula Pkwy	Wahiawa	18.18
406.1	New Road between Mililani Mauka and Pearl City	Central Oahu	43.62

3.3 Environment

3.3.1 Likely Impacts and Type of Environmental Document Required

Based on the likelihood of their impacts, projects may have to follow one of three types of environmental documentation. Under the National Environmental Policy Act (NEPA), these include (1) categorical exclusions, (2) environmental assessments (EA), and (3) environmental impact statements (EIS). Under Hawaii Revised Statutes (HRS) Chapter 343, projects may be (1) exempt or may require an (2) EA or (3) EIS.

A project would be required to comply with NEPA if there would be the use federal funds, the use of federal lands, or if there is a federal permit requirement. A project would be required to comply with HRS Chapter 343 if any of the following occur: use of state or county funds or state or county lands, the use of any land classified as Conservation District, or use within any historic site as designated in the National Register or Hawaii Register. It is expected that all projects pursued as a result of the COTS would be required to comply with HRS Chapter 343 and many would have to comply with NEPA.

Categorical Exclusions under NEPA

Certain projects may qualify for a categorical exclusion from environmental impact analysis requirements under NEPA if they fall into a specific class of projects. Categorical exclusions are applicable to project that do not individually or cumulatively have a significant effect on the human environment and are therefore exempt from preparing an Environmental Assessment or Environmental Impact Statement.

23 CFR 771.117(c) lists specific actions which meet the criteria for categorical exclusions in the Council on Environmental Quality regulations (40 CFR 1508.4) and 23 CFR 771.117(a) and normally do not require

any further NEPA approvals by the FHWA. This list includes the following actions that may apply to some of the potential projects in this study:

- Construction of bicycle and pedestrian lanes, paths, and facilities
- Activities included in the State’s Highway Safety Plan
- Landscaping
- Installation of fencing, signs, pavement markings, small passenger shelters, and traffic signals where no substantial land acquisition or traffic disruption will occur
- Ridesharing activities
- Bus and rail car rehabilitation

[Categorical Exemptions under HRS Chapter 343](#)

Certain projects may be exempt from environmental impact analysis requirements under HRS 343 if they qualify as an activity on the authorized Comprehensive List of Exemptions for HDOT (last amended, November 15, 2000). These include the following types of projects relevant to this study:

- Upgrade or replace existing roadways, bike paths and bike lanes, road intersections, roadway markings and stripings, roadway shoulders and curves, and walkways.
- Reconstructing an existing highway for safety purposes by widening less than one lane width, adding shoulders, adding auxiliary lanes for localized purposes (e.g., passing, deceleration for turns, etc.), and correcting substandard curves and intersections
- Reconstructing existing stream crossings, except bridges
- Restriping of existing roadways to provide an additional lane for use during peak hours
- Closure or metering of highway ramps
- Installation of traffic signals, pavement marks, and striping for traffic safety and control
- Installation of directional, informational, and regulatory signs
- Construction of bus shelters
- Striping of existing paved roadways or paved shoulders to create a bike lane when no additional construction is required.

[Environmental Assessment and Environmental Impact Statement](#)

An EA is completed if the applicant anticipates a “Finding of No Significant Impact” (FONSI) or if impacts can be mitigated to less than significant. If significant impacts are expected or identified in the EA, then an EIS must be prepared. Completion of an EA or EIS requires a longer project development timeline. An EA timeline is typically one to two years. An EIS timeframe is two to five years or longer depending on the complexity of the project.

3.3.2 Likely Level of Environmental Documentation Applied to Projects

The following two tables present the projects in relation to the level of Environmental Planning, Study, and Impacts that may be anticipated. **Table 20** lists the 43 projects that would likely qualify for a categorical exclusion under NEPA or an exemption under HRS Chapter 343, which would result in a shorter project development time frame. Immediately following is **Table 21** which lists projects which are likely to require an EA or EIS.

Table 20. Projects that May Qualify for a Categorical Exclusion under NEPA or an Exemption under HRS Chapter 343

Project Number	Project Description	NEPA Categorical Exclusion	HRS Chapter 343 Exempt
100 TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	X	X
101.2	Construct Transit Center at Koa Ridge	X	X
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	X	X
102.0	HIGH CAPACITY TRANSIT		
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	X	X
200 BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	X	
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	X	
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	X	
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	X	
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	X	
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	X	
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	X	
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	X	X
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	X	X
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	X	X
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	X	X
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	X	X

Table 20. Projects that May Qualify for a Categorical Exclusion under NEPA or an Exemption under HRS Chapter 343 (cont.)

Project Number	Project Description	NEPA Categorical Exclusion	HRS Chapter 343 Exempt
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	X	X
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	X	X
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	X	X
300 PEDESTRIAN PROJETS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	X	X
302.0	GENERAL		
302.1	Safe Routes to School	X	X
302.2	Pedestrian Crossing Safety	X	X
302.3	Mobility Hubs	X	X
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	X	X
303.2	Kipapa Dr between Hookelewaa St and Mililani Waena Elementary School	X	X
303.3	Complete Streets modifications on priority roads	X	X
400 ROADWAY PROJECTS			
402.0	KA UKA BOULEVARD		
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	X	X
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	X	X
403.0	KAMEHAMEHA HIGHWAY		
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	X	X
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	X	X
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	X	X

Table 20. Projects that May Qualify for a Categorical Exclusion under NEPA or an Exemption under HRS Chapter 343 (cont.)

Project Number	Project Description	NEPA Categorical Exclusion	HRS Chapter 343 Exempt
500 TRANSPORTATION SYSTEM MANAGEMENT			
501.0	TRANSPORTATION DEMAND MANAGEMENT		
501.1	Free real-time online carpool matching	X	X
501.2	Outreach promotion and marketing of alternative transportation	X	X
501.3	Emergency ride home program	X	X
501.5	Employer based commuter/parking programs	X	X
501.6	Emerging and innovative strategies - Carsharing	X	X
501.7	Emerging and innovative strategies - Bikesharing	X	X
501.8	Vanpool program	X	X
501.9	Support of working from home	X	X
501.10	Support of alternate/shifted work hours	X	X
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)		
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	X	X
600 PRICING SOLUTIONS			
601.0	PRICING		
601.2	HOT lanes	X	X
601.3	Parking strategies	X	X

Table 21 lists the 34 projects that are anticipated to require an EA or an EIS for NEPA and State HRS 343. Seven (7) of the bicycle projects would require an EA or an EIS under HRS 343 but would likely qualify for a categorical exclusion under NEPA and are also included in **Table 20**. Twelve (12) of these were included as part of the Proposed Action in the *Koa Ridge Makai and Waiawa Development EIS* and are designated as “KR” in the table.

Table 21. Projects that Would Likely Require an EA or an EIS

Project Number	Project Description	EA	EIS
100 TRANSIT PROJECTS			
102.0 HIGH CAPACITY TRANSIT			
102.1	HART Rail Technology between Wahiawa and Pearl Highlands Station		X
102.2	Light Rail between Wahiawa and Leeward Community Collecte Rail Station		X
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	X	
102.6	HART rail technology between Mililani and Pearl Highlands Rail Station		X
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station		X
200 BICYCLE PROJECTS			
201.0 BICYCLE PATHS (Off-street bicycle facility)			
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	HRS 343 only	
201.2	New Pathway between Anania Dr and Central Oahu Regional Park		X
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	HRS 343 only	
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	HRS 343 only	
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	HRS 343 only	
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	HRS 343 only	
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	HRS 343 only	
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	HRS 343 only	
400 ROADWAY PROJECTS			
401.0 KA UKA BLVD. & H-2 INTERCHANGE			
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)		KR
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)		KR

Table 21. Projects that Would Likely Require an EA or an EIS (cont.)

Project Number	Project Description	EA	EIS
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)		KR
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St. (freeway ramp signal modifications)		KR
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)		KR
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)		KR
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)		KR
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)		KR
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)		KR
402.4	Ka Uka Blvd between H-2 and new development (new road)		KR
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)		KR
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)		KR
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)		KR
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)		X
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	X	
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange		KR
404.2	H-2 & Meheula Pkwy (widen on-ramp)	X	
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City		X
406.3	New Road between California Ave and Meheula Pkwy		X

Table 21. Projects that Would Likely Require an EA or an EIS (cont.)

Project Number	Project Description	EA	EIS
408.0	MILILANI ACCESS		
408.1	New Road Access to H-2 Interchange at Pineapple Road for access to Mililani Mauka	X	
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	X	

3.3.3 Reduce Greenhouse Gas (GHG) Emissions

The transportation sector is the largest contributor to greenhouse gas (GHG) emissions in the U.S. The amount of GHG emitted is relative to a number of reasons, including vehicle miles of travel and roadway congestion. The projects in this study that were tested using the OahuMPO model included new roadway segments and connections. The model was expected to be reasonably sensitive to these projects and they could be input with limited effort based on a conceptual design. Transit projects including bus, rail, and gondola are capable of being tested in the model. However, these projects are more complex in terms of station location, service area, and other factors that require more detailed studies before they are input to the regional model. The GHG evaluation was conducted based on project type and not on specific model results.

The following sections provide a GHG score based on a project’s expected GHG reduction potential.

GHG Score

For developing the GHG score, projects were scored 1 through 4, with 1 representing projects that expected to either increase GHG emissions or provide the least reduction, while 4 represents the projects that support the greatest reductions in GHG. A description of the impacts and types of projects associated with each ranking is provided in **Table 22**.

Table 22. GHG Scoring Criteria

Description of Impacts	Score
Increases vehicle miles of travel (VMT) by private autos leading to potential increases in GHG or no substantive reduction	1
Provides a low reduction in GHG	2
Provides a moderate reduction in GHG	3
Contributes substantially to GHG reduction	4

GHG Project Evaluation

The GHG scoring provided in **Table 23**, which is a qualitative assessment based on the expected level of increase or decrease of GHG emissions. GHG emissions may be calculated using output from the OahuMPO model for those projects that can be modeled. This project-by-project analysis of GHG emissions will be completed during future detailed planning, design and environmental review studies for each improvement. Emissions will be based on the anticipated vehicle speeds from the model for the freeway and roadway segments within the COTS area and based on the distribution of traffic volumes

over five mile per hour increments. The amount of GHG emissions produced for each increment will be estimated using rates published by the California Air Resources Board.

Table 23. GHG Score for All Projects

Project Number	Project Description	General Location	GHG Score
100 TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	Central Oahu	3
101.2	Construct Transit Center at Koa Ridge	Koa Ridge	3
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	Central Oahu	2
102.0			
102.2	Light Rail between Wahiawa and Leeward Community College Rail Station	Central Oahu	4
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	Central Oahu	3
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	Central Oahu	2
102.6	HART rail technology between Mililani and Pearl Highlands Rail Station	Central Oahu	4
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station	Central Oahu	4
200 BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	Central Oahu Regional Park	3
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	Kipapa Gulch	3
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	Waipio	3
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	Leeward Community College	3
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	Wahiawa	3
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	Pearl Highlands	3
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	Mililani	3
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	Mililani	3
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	Mililani Mauka	3

Table 23. GHG Score for All Projects (cont.)

Project Number	Project Description	General Location	GHG Score
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	Mililani	3
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	Waipio	3
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	Mililani	3
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	Wahiawa	2
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	Waipio Acres	2
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	Mililani	2
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	Mililani	2
300 PEDESTRIAN PROEJCTS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	Wahiawa at Olive Ave	2
302.0	GENERAL		
302.1	Safe Routes to School	Central Oahu	2
302.2	Pedestrian Crossing Safety	Central Oahu	2
302.3	Mobility Hubs	COTS area transit centers	3
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	Wahiawa	2
303.2	Kipapa Dr between Hookelewa St and Mililani Waena Elementary School	Mililani	2
303.3	Complete Streets modifications on priority roads	Central Oahu	2
400 ROADWAY PROJECTS			
401.0	KA UKA BLVD. & H-2 INTERCHANGE		
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	Waipio Interchange	2
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	Waipio Interchange	2
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	Waipio Interchange	2

Table 23. GHG Score for All Projects (cont.)

Project Number	Project Description	General Location	GHG Score
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	Waipio Interchange	2
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	Waipio Interchange	2
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	Waipio Interchange	2
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	2
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Waipio Interchange	2
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)	Waipio	2
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	Waipio	2
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	Waipio	2
402.4	Ka Uka Blvd between H-2 and new development (new road)	Waipio	1
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	Waipio	2
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	Waipio	2
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	Waipio	2
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	Waipio	2
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	Waipio to Mililani	2
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	Kipapa Gulch	1
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Central Oahu	3
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange	New Interchange	2

Table 23. GHG Score for All Projects (cont.)

Project Number	Project Description	General Location	GHG Score
404.2	H-2 & Meheula Pkwy (widen on-ramp)	Mililani Mauka	1
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	Waiawa Interchange	2
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City	Central Oahu	1
406.3	New Road between California Ave and Meheula Pkwy	Wahiawa	1
408.0	MILILANI ACCESS		
408.1	New Road Access to H-2 Interchange at Pineapple Road for access to Mililani Mauka	Mililani Mauka	2
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	Mililani Mauka	2
500 TRANSPORTATION SYSTEM MANAGEMENT			
501.0	TRANSPORTATION DEMAND MANAGEMENT		
501.1	Free real-time online carpool matching	Central Oahu	3
501.2	Outreach promotion and marketing of alternative transportation	Central Oahu	3
501.3	Emergency ride home program	Central Oahu	3
501.5	Employer based commuter/parking programs	Central Oahu	3
501.6	Emerging and innovative strategies - Carsharing	Central Oahu	3
501.7	Emerging and innovative strategies - Bikesharing	Central Oahu	3
501.8	Vanpool program	Central Oahu	3
501.9	Support of working from home	Central Oahu	3
501.10	Support of alternate/shifted work hours	Central Oahu	3
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)		
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	Central Oahu	2
600 PRICING SOLUTIONS			
601.0	PRICING		
601.2	HOT lanes	Central Oahu	3
601.3	Parking strategies	Central Oahu	3

3.4 Conformity to Regional Planning

There are two planning documents applicable to the COTS area: the *Central Oahu Sustainable Communities Plan* (COSCP) and the *Oahu Regional Transportation Plan 2040* (ORTP 2040). The following sections provide a brief summary of each plan and identify the COTS potential projects that are included in each plan.

3.4.1 Consistency with *Central Oahu Sustainable Communities Plan* and *Oahu Regional Transportation Plan 2040*

The COSCP provides a framework to support sustaining Central Oahu's unique character, lifestyle, and economic opportunities by focusing future residential development on master planned suburban communities within an Urban Community Boundary and on redevelopment around two transit centers in Waipahu. This document supports the General Plan, which calls for development to be encouraged in Central Oahu to relieve development pressures on East Honolulu, the Windward Side, the North Shore, and Waianae. A project is considered consistent with the COSCP if it is listed in the plan. Twenty-two projects are listed in the COSCP.

The COSCP includes an assessment of the existing conditions and plans and proposals for Central Oahu's roadways, transit system, and bikeways. It identifies general transportation system policies, including the following:

- Ensure adequate access and services for new residential and commercial development in Central Oahu.
- Ensure the transportation system functions by providing adequate access and capacity within and through Central Oahu.
- Reduce the reliance on private passenger vehicles by creating a multi-modal system.

The objective of the ORTP 2040 is to guide the development of transportation on Oahu through the year 2040. The ORTP 2040 presents a vision of an improved transportation system to serve the needs of Oahu's population as well as specific projects that would achieve that vision. A project is considered consistent with the ORTP 2040 if it is included in the list of projects. Thirty COTS projects are included in the ORTP 2040.

3.4.2 Summary of Project Consistency with Regional Plans

Table 24 identifies the potential project's consistency with the COSCP and/or the ORTP 2040. Of the 71 projects moving forward in this phase of the study, 34 are consistent with either the COSCP or the ORTP 2040, or both. Projects that are not identified in the COSCP and/or the ORTP 2040 have been included in consideration of the goals and policies identified in these planning documents. Each project addresses at least one of the planning goals/policies in the COSCP and ORTP 2040.

Table 24. Project Consistency with Regional Plans

Project Number	Project Description	COSCP	ORTP 2040
100 TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	X	X
101.2	Construct Transit Center at Koa Ridge	X	X
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	X	X
102.0	HIGH CAPACITY TRANSIT		
102.2	Light Rail between Wahiawa and Leeward Community College Rail Station		
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	X	
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd		
102.6	HART rail technology between Mililani and Pearl Highlands Rail Station		
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station		
200 BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	X	X
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	X	X
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street		
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station		
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr		
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station		
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange		
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St		
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	X	X
202.4	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	X	X

Table 24. Project Consistency with Regional Plans (cont.)

Project Number	Project Description	COSCP	ORTP 2040
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path		
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave		
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	X	
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St		
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path		X
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	X	
300 PEDESTRIAN PROEJCTS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection		X
302.0	GENERAL		
302.1	Safe Routes to School		X
302.2	Pedestrian Crossing Safety		X
302.3	Mobility Hubs		
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park		
303.2	Kipapa Dr between Hookelewaa St and Mililani Waena Elementary School		
303.3	Complete Streets modifications on priority roads		
400 ROADWAY PROJECTS			
401.0	KA UKA BLVD. & H-2 INTERCHANGE		
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	X	X
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	X	X
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	X	X
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	X	X

Table 24. Project Consistency with Regional Plans (cont.)

Project Number	Project Description	COSCP	ORTP 2040
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	X	X
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	X	X
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	X	X
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	X	X
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)		
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)		
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)		
402.4	Ka Uka Blvd between H-2 and new development (new road)		
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)		
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)		
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)		
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)		
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	X	X
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)		
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)		
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange	X	X
404.2	H-2 & Meheula Pkwy (widen on-ramp)		

Table 24. Project Consistency with Regional Plans (cont.)

Project Number	Project Description	COSCP	ORTP 2040
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	X	X
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City		
406.3	New Road between California Ave and Meheula Pkwy		
408.0	MILILANI ACCESS		
408.1	New Road Access to H-2 Interchange at Pineapple Road for access to Mililani Mauka		
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride		
500 TRANSPORTATION SYSTEM MANAGEMENT			
501.0	TRANSPORTATION DEMAND MANAGEMENT		
501.1	Free real-time online carpool matching		X
501.2	Outreach promotion and marketing of alternative transportation		X
501.3	Emergency ride home program		X
501.5	Employer based commuter/parking programs		X
501.6	Emerging and innovative strategies - Carsharing		X
501.7	Emerging and innovative strategies - Bikesharing		
501.8	Vanpool program		X
501.9	Support of working from home		
501.10	Support of alternate/shifted work hours		
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)		
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)		X
600 PRICING SOLUTIONS			
601.0	PRICING		
601.2	HOT lanes		
601.3	Parking strategies		

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4.0 TIMEFRAME FOR PROJECTS

The results of previous sections helps determine the likely timeframe for each project. Each stage in project development contributes to the length of time involved. The benefits from the project do not begin until all steps are completed

- Design
- Land Acquisition
- Environmental
- Construction

As examples, new roadways or transit projects (e.g., rail, aerial gondola) would have the most lengthy design period, as well as require land acquisition for ROW, in some cases. These projects would also require a more lengthy process for environmental documentation and for construction. Projects that involve no or a minimal amount of construction would likely have the least lengthy process for completion.

Table 25 scores each project based on the length of time expected for design, land acquisition, environmental documentation and mitigation, and construction. Projects with the highest score are expected to require the least amount of time to implement, whereas projects with the lowest score would likely require the most time to implement.

4.1 Scoring Criteria Applied

Design: Projects were scored 1 through 5, with 1 representing the most complex design projects while 5 represents the least complex design projects. New roadways or transit projects (e.g., rail, aerial gondola) would have the most lengthy design period and would score a 1.

Land Acquisition: Projects were scored a 0 or a 1 depending if land acquisition for ROW is required. Projects that do not require land acquisition were scored a 1, while those that require land acquisition were scored a 0.

Environmental: The type of documentation required impacts the timing of projects. The expected environmental documentation requirements for all of the COTS projects were identified in **Table 20** and **Table 21** in **Section 3.3.1**. Projects were scored a 5 if no further environmental documentation is required. Projects were scored a 4 if eligible for both a Categorical Exclusion under NEPA and an Exemption under HRS Chapter 343. Projects were scored a 3 if they are not exempt from the requirements of HRS Chapter 343 but would only require a Categorical Exclusion under NEPA. Projects were scored a 2 if they would require an EA and a 1 if they would require an EIS because this adds the largest amount of time, typically two to three years.

Constructability: As discussed in **Section 3.1.1**, construction complexity and the MOT during construction are important considerations in terms of planning for substantive transportation improvement projects. Projects that are more complex in terms of constructability and MOT generally require a longer construction period and are scored with a 1. Those that require little or no time to implement are scored with a 5.

Table 25. Timeframe for Projects

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
100 TRANSIT PROJECTS						
101.0	GENERAL					
101.1	Bus Service Expansion	5	1	4	5	15
101.2	Construct Transit Center at Koa Ridge	4	0	4	5	13
101.3	City Operations & Maintenance, including Bus Stop/Shelter Conditions	5	1	4	5	15
102.0	HIGH CAPACITY TRANSIT					
102.2	Light Rail between Wahiawa and Pearl Highlands Rail Station	1	0	1	1	3
102.3	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station	5	0	4	5	14
102.5	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd	2	0	2	3	7
102.6	HART rail technology between Mililani and Pearl Highlands Rail Station	1	0	1	2	4
102.8	Aerial Gondola between Mililani Transit Center and Leeward Community College Rail Station	1	0	1	2	4
200 BICYCLE PROJECTS						
201.0	BICYCLE PATHS (Off-street bicycle facility)					
201.1	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	3	1	3	5	12
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	3	0	2	5	10
201.4	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street	3	1	3	5	12
201.5	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station	3	1	3	5	12
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	3	1	3	5	12

Table 23. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
201.7	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station	3	0	3	5	11
201.8	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	3	1	3	5	12
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	3	0	3	5	11
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)					
202.3	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	4	1	4	3	12
202.4	Bicycle lanes on Kuaahelani Avenue between Hokuahiahi Park and Meheula Parkway	4	1	4	3	12
202.6	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path	4	1	4	3	12
202.7	Bicycle lanes on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave	4	1	4	3	12
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)					
203.1	Bicycle route on California Ave between Plum St and Iliahi Elementary	4	1	4	4	13
203.3	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	4	1	4	4	13
203.5	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	4	1	4	4	13
203.6	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	4	1	4	4	13
300	PEDESTRIAN PROJETS					
301.0	LOCATION-SPECIFIC					
301.1	Crosswalk across makai leg of Kamehameha Hwy and Avocado St intersection	4	1	4	4	13
302.0	GENERAL					
302.1	Safe Routes to School	3	1	4	4	12
302.2	Pedestrian Crossing Safety	1	1	4	5	11

Table 23. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
302.3	Mobility Hubs	1	1	4	5	11
303.0	COMPLETE STREETS					
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	3	1	4	5	13
303.2	Kipapa Dr between Hookelewaa St and Mililani Waena Elementary School	3	1	4	5	13
303.3	Complete Streets modifications on priority roads	3	1	4	5	13
400	ROADWAY PROJECTS					
401.0	KA UKA BLVD. & H-2 INTERCHANGE					
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	2	1	5	3	11
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	2	1	5	3	11
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	2	1	5	3	11
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	2	1	4	5	12
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	2	1	5	3	11
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	2	0	5	4	11
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	2	0	5	3	10
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	2	0	5	3	10

Table 23. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
402.0	KA UKA BOULEVARD					
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/Spine Rd (lane addition)	3	1	5	3	12
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	3	1	4	4	12
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	3	1	4	3	11
402.4	Ka Uka Blvd between H-2 and new development (new road)	1	1	5	2	9
403.0	KAMEHAMEHA HIGHWAY					
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	3	1	5	3	12
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	4	1	4	4	13
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	3	1	5	3	12
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	3	1	5	3	12
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	3	1	1	3	8
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	2	1	2	2	7
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	4	0	4	2	10
404.0	H-2 INTERCHANGES					
404.1	H-2 & Pineapple Road Interchange	2	1	5	2	10
404.2	H-2 & Meheula Pkwy (widen on-ramp)	3	1	2	3	9

Table 23. Timeframe for Projects (cont.)

Project Number	Project Description	Design	Land Acquisition	Environmental	Construction	TOTAL SCORE
405.0	H-1 & H-2 INTERCHANGE					
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	3	1	4	3	11
406.0	CENTRAL MAUKA ROADS					
406.1	New Road between Mililani Mauka and Pearl City	1	0	1	1	3
406.3	New Road between California Ave and Meheula Pkwy	1	0	1	1	3
408.0	MILILANI ACCESS					
408.1	New H-2 Interchange at Mililani Mauka	1	0	2	2	5
408.4	New flyer stops at H-2 with pedestrian pathway to Park and Ride	1	1	2	2	6
500 TRANSPORTATION SYSTEM MANAGEMENT						
501.0	TRANSPORTATION DEMAND MANAGEMENT					
501.1	Free real-time online carpool matching	5	1	4	5	15
501.2	Outreach promotion and marketing of alternative transportation	5	1	4	5	15
501.3	Emergency ride home program	5	1	4	5	15
501.5	Employer based commuter/parking programs	5	1	4	5	15
501.6	Emerging and innovative strategies - Carsharing	5	1	4	5	15
501.7	Emerging and innovative strategies - Bikes sharing	5	1	4	5	15
501.8	Vanpool program	5	1	4	5	15
501.9	Support of working from home	5	1	4	5	15
501.10	Support of alternate/shifted work hours	5	1	4	5	15
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)					
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	4	1	4	4	13
600 PRICING SOLUTIONS						
601.0	PRICING					
601.2	HOT lanes	5	1	4	4	14
601.3	Parking strategies	5	1	4	5	15

5.0 NEXT STEPS

As described earlier in this report, there are many methods for analyzing projects. This report has provided two: Performance Measures and Feasibility.

The next step in this study, a third method of analysis, will be performed looking at cost and financial issues. These will be documented in a report (Deliverable G).

- Value of Benefits
- Cost of a project, including Construction, Land Cost, and Operations and Maintenance (O&M) costs per year
- Comparison of the Benefits to the Costs

After the three analyzes (i.e., performance, feasibility, and cost) have been reviewed by others and revised as necessary, packages of projects will be assembled according to their contribution to the three goals of reduced congestion, access to rail, and creating a multi-modal transportation system. At that point, public input and comment will be sought. Public acceptability and preferences will be considered along with the technical analyses in order to make recommendations on what to do moving forward. These will be reported in the Final Report (Deliverable H).

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APPENDIX A

Project Tracking Matrix

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Appendix A
Central Oahu Transportation Study
Tracking Potential Projects

Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
TRANSIT PROJECTS			
101.0	GENERAL		
101.1	Bus Service Expansion	Bus Service Expansion	Bus Service Expansion
101.2	Construct Transit Centers	Build Transit Center at Koa Ridge	<i>No quantifiable benefits</i>
101.3	City Operations & Maintenance	City Operations and Maintenance, including Bus Stop/ Shelter Conditions	<i>No quantifiable benefits</i>
101.4	Human Services Transportation Coordination Program	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
102.0	HIGH CAPACITY TRANSIT		
102.1	HART rail technology between Wahiawa and H-1	HART Rail Technology between Wahiawa and Pearl Highlands Station	<i>Screened out in Deliverable F, Application of Performance Measures and Feasibility Assessment</i>
102.2	Light Rail between Wahiawa and H-1	Light Rail between Wahiawa and Leeward Community College Rail Station	Light Rail between Wahiawa and Leeward Community College Rail Station
102.3	Bus Rapid Transit between Wahiawa and H-1	Bus Rapid Transit between Wahiawa and Pearl Highlands Station	Bus Rapid Transit between Wahiawa and Pearl Highlands Rail Station
102.4	Flyer Stops between Wahiawa and H-1	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
102.5	P & R with Flyer Stop in median mauka of Ka Uka Blvd	Park & Ride with Flyer stop in H-2 median mauka of Ka Uka Boulevard	Park and Ride with Flyer Stop in median mauka of Ka Uka Blvd
102.6	HART rail technology between Mililani & H-1	HART Rail Technology between Mililani Mauka and Pearl Highlands Station	HART rail technology between Mililani and Leeward Community College
102.7	Aerial Gondola between Waipio & Wahiawa	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
102.8	Aerial Gondola between Waipio & Pearl Highlands station	Aerial Gondola between Waipio and Mililani Leeward Community College Rail Station	Aerial Gondola between Waipio and Leeward Community College
BICYCLE PROJECTS			
201.0	BICYCLE PATHS (Off-street bicycle facility)		
201.1	New Pathway between Paiwa St and Kamehameha Hwy	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy	New Pathway on Waipahu St between Paiwa St and Kamehameha Hwy
201.2	New Pathway between Anania Dr and Central Oahu Regional Park	New Pathway between Anania Dr and Central Oahu Regional Park	New Pathway between Anania Dr and Central Oahu Regional Park
201.3	New Direct Kipapa Gulch Bike Bridge and Pathway	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
201.4	New Bike Pathway along Kamehameha Hwy.	New Bike Pathway along Kamehameha Hwy from Ka Uka Boulevard to Waipahu Street	New Bike Pathway along Kamehameha Hwy. from Ka Uka Boulevard to Waipahu Street
201.5	New Ped/Bike Path connecting Kam. Hwy at Waipahu Street to PH station via LCC	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to LCC Station	New Ped/Bike Path connecting Kamehameha Hwy at Waipahu Street to Leeward Community College Rail Station
201.6	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr	New Bike Pathway along Kamehameha Hwy. between Wahiawa and Anania Dr
201.7	Bike Pathway on Cane Haul Road between H-2 & Pearl Highlands station	Bike Pathway on Cane Haul Road between H-2 & Pearl Highlands station	Bike Pathway on Cane Haul Road between H-2 and Pearl Highlands Rail Station
201.8	Bicycle infrastructure around H-2 & Meheula	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange	Bicycle pathway infrastructure through the H-2/Meheula Parkway Interchange
201.9	Bike pathway along California Ave. between. Kilea Pl. and Nonohe St	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
201.10	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St	Bike Pathway in Central Oahu Regional Park between Kamehameha Hwy and Paiwa St
202.0	BICYCLE LANES (On-street bicycle facility delineated from vehicle traffic)		
202.1	Ainamakua Dr between Mililani Park & Ride and Kualapa St	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
202.2	Meheula Parkway between Mililani H-2 Interchange and Mililani H-2 Interchange	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
202.3	Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St	Bicycle lanes on Meheula Parkway between Mililani H-2 Interchange and Kapanoe St
202.4	Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway	Bicycle lanes on Kuahelani Avenue between Hokuahiahi Park and Meheula Parkway
202.5	Kamehameha Highway between H-1 and H-2	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
202.6	Waihona Street and Kamehameha Highway between Cane Haul Road bike path and Arizona Memorial	Bicycle lanes on Kamehameha Highway from Waihona St connecting to Pearl Harbor Bike Path	Bicycle lanes on Kamehameha Highway from Waihona St. connecting to Pearl Harbor Bike Path
202.7	<i>Project Added in Deliverable F, Application of Performance Measures and Feasibility Assessment</i>	Bicycle lane on Kamehameha Highway between Ka Uka Blvd and Lanikahuna Ave	Bicycle lane on Kamehameha Highway from Ka Uka Blvd to Lanikahuna Ave
203.0	BICYCLE ROUTES (On-street bicycle facility with street signs and/or sharrows)		
203.1	California Ave between Plum St and Iliahi Elementary	Bicycle route on California Ave between Plum St and Iliahi Elementary	Bicycle route on California Ave between Plum St and Iliahi Elementary

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
203.2	Kunia Rd btwen Anonui St and Wilikina Dr	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
203.3	Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St	Bicycle route on Leilehua Golf Course Rd between Kamehameha Hwy and Wikao St
203.4	Kamehameha Highway between Haleiwa Bypass and Kuahelani Ave	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
203.5	Anania Dr between Meheula Pkwy and Kipapa Gulch Path	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path	Bicycle route on Anania Dr between Meheula Pkwy and Kipapa Gulch Path
203.6	Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Shopping Center	Bicycle route on Lanikuhana Ave from South end of Meheula Pkwy to Mililani Town Center
203.7	Kamehameha Hwy between Waipio Uka St and Waipahu St	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
303.0	COMPLETE STREETS (BICYCLE)		
303.2	<i>Project Added in Deliverable G, Benefit Cost Analysis</i>	<i>Project Added in Deliverable G, Benefit Cost Analysis</i>	Kipapa Dr between Hookelawaa St and Mililani Waena Elementary School
PEDESTRIAN PROJETS			
301.0	LOCATION-SPECIFIC		
301.1	Crosswalk across Kamehameha Hwy between Avocado St and Kilani St	Crosswalk across makai leg of Kamehameha Hwy and Avocado Street intersection	Crosswalk across makai leg of Kamehameha Hwy and Avocado Street intersection
301.2	Shared use path on Kamehameha Hwy between Lanikuhana Ave and Meheula Pkwy	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
302.0	GENERAL		
302.1	Safe Routes to School	Safe Routes to School	<i>No quantifiable benefits</i>
302.2	Pedestrian Crossing Safety	Pedestrian Crossing Safety	<i>No quantifiable benefits</i>
302.3	Mobility Hubs	Mobility Hubs	<i>No quantifiable benefits</i>
303.0	COMPLETE STREETS		
303.1	California Ave between Kamehameha Hwy and Wahiawa District Park	California Ave between Kamehameha Hwy and Wahiawa District Park	California Ave between Kamehameha Hwy and Wahiawa District Park
303.2	Kipapa Dr between Hookelawaa St and Mililani Waena Elementary School	Kipapa Dr between Hookelawaa St and Mililani Waena Elementary School	Kipapa Dr between Hookelawaa St and Mililani Waena Elementary School
303.3	Complete Streets modifications on priority roads	Complete Streets modifications on priority roads	<i>No quantifiable benefits</i>
ROADWAY PROJECTS			
401.0	KA UKA BLVD. & H-2 INTERCHANGE		
401.1	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (freeway ramp widening & signal modification)	<i>Koa Ridge project</i>
401.2	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (freeway ramp approach widening)	<i>Koa Ridge project</i>
401.3	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St. (freeway ramp approach widening)	<i>Koa Ridge project</i>
401.4	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	Ka Uka Blvd & H-2 Northbound Off-Ramp to Limuana St (freeway ramp signal modification)	<i>Koa Ridge project</i>
401.5	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	Ka Uka Blvd & H-2 Southbound Off-Ramp to Ka Uka Blvd / Moaniani St (freeway ramp widening & signal modification)	<i>Koa Ridge project</i>

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
401.6	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	Ka Uka Blvd & H-2 Northbound Off-Ramp to Ka Uka Blvd (freeway ramp relocation & widening)	<i>Koa Ridge project</i>
401.7	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Ka Uka Blvd & H-2 Northbound On-Ramp to H-2 (new freeway ramp & overpass widening)	<i>Koa Ridge project</i>
401.8	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	Ka Uka Blvd & H-2 Southbound On-Ramp to H-2 (new freeway ramp & overpass widening)	<i>Koa Ridge project</i>
401.9	Ka Uka Blvd & H-2 Flyover Ramp	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
402.0	KA UKA BOULEVARD		
402.1	Ka Uka Blvd between Moaniani St and Commercial Driveway/ Spine Rd (lane addition)	Ka Uka Blvd between Moaniani St and Commercial Driveway/ Spine Rd (lane addition)	<i>Koa Ridge project</i>
402.2	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	Ka Uka Blvd Intersection with Commercial Driveway/ Spine Rd (intersection lane & signal modification)	<i>Koa Ridge project</i>
402.3	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	Ka Uka Blvd Intersection with Commercial Driveway/Spine Rd (intersection widening & modification)	<i>Koa Ridge project</i>
402.4	Ka Uka Blvd between H-2 and new development (new road)	Ka Uka Blvd between H-2 and new development (new road)	<i>Koa Ridge project</i>
403.0	KAMEHAMEHA HIGHWAY		
403.1	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	Kamehameha Hwy & Lumiaina St Intersection (intersection widening & signal modification)	<i>Koa Ridge project</i>

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
403.2	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	Kamehameha Hwy & Waipahu St Intersection (intersection restriping & signal modification)	<i>Koa Ridge project</i>
403.3	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	Kamehameha Hwy & Ka Uka Blvd Intersection (intersection widening)	<i>Koa Ridge project</i>
403.4	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	Kamehameha Hwy between Ka Uka Blvd and North of Ka Uka Blvd. (add NB lane)	<i>Koa Ridge project</i>
403.5	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)	Kamehameha Hwy between Ka Uka Blvd and Lanikuhana (widen from 3 to 4 lanes)
403.6	Kamehameha Hwy between H-2 and Kilani Ave (unknown)	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
403.7	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	Kamehameha Hwy Roosevelt Bridge (rehabilitation)	<i>Unable to assess benefits for structural improvement project</i>
403.8	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)	Kamehameha Hwy HOV lanes (Ka Uka Boulevard to Farrington Hwy)
404.0	H-2 INTERCHANGES		
404.1	H-2 & Pineapple Road Interchange	H-2 & Pineapple Road Interchange	<i>Koa Ridge project</i>
404.2	H-2 & Meheula Pkwy (widen on-ramp)	H-2 & Meheula Pkwy (widen on-ramp)	H-2 & Meheula Pkwy (widen on-ramp)
404.3	H-2 & Kamehameha Hwy (widen on-ramp)	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
405.0	H-1 & H-2 INTERCHANGE		
405.1	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements	Waiawa H-1/H-2 Interchange Eastbound/Southbound Merge Improvements

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
406.0	CENTRAL MAUKA ROADS		
406.1	New Road between Mililani Mauka and Pearl City	New Road between Mililani Mauka and Pearl City	New Road between Mililani Mauka and Pearl City
406.2	New Road between Whitmore Ave (SR 804) and California Ave	<i>Deleted because outside of Study Area</i>	<i>N/A</i>
406.3	New Road between California Ave and Meheula Pkwy	New Road between California Ave and Meheula Pkwy	New Road between California Ave and Meheula Pkwy
407.0	PAIWA EXTENSION		
407.1	Extend Paiwa St from north of Lumiaua St to Kamehameha Hwy/Ka Uka Blvd intersection	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
408.0	MILILANI ACCESS		
408.1	New H-2 Interchange at Mililani Mauka	New road connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka	New road connection to H-2 Interchange at Pineapple Road for access to Mililani Mauka
408.2	New road from Wikao St to P & R	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
408.3	New road between H-2 and P & R	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	<i>N/A</i>
408.4	New flyer stops at H-2 with pedestrian pathway to P & R	New flyer stops at H-2 with pedestrian pathway to Park & Ride	New flyer stops at H-2 with pedestrian pathway to Park & Ride
TRANSPORTATION SYSTEM MANAGEMENT			
501.0	TRANSPORTATION DEMAND MANAGEMENT		
501.1	Free real-time online carpool matching	Free real-time online carpool matching	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>

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Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
501.2	Outreach promotion and marketing of alternative transportation	Outreach promotion and marketing of alternative transportation	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.3	Emergency ride home program	Emergency ride home program	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.4	Major special events (e.g., Mililani Holiday Parade)	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
501.5	Employer based commuter/parking programs	Employer based commuter/parking programs	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.6	Carsharing	Emerging and innovative strategies – Carsharing	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.7	Bikesharing	Emerging and innovative strategies – Bikesharing	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.8	Vanpool program	Vanpool program	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.9	Work from home	Support of working from home	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>
501.10	Alternate/shifted work hours	Support of alternate/shifted work hours	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>

Appendix A
Central Oahu Transportation Study
Tracking Potential Projects

Project Number	Deliverable D and Deliverable E-1 Project Description	Deliverable F Project Description	Deliverable G Project Description
501.1 through 501.10	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>	<i>TDM Projects packaged into one project for inclusion in Deliverable G, Benefit Cost Analysis</i>	TDM Package
502.0	INTELLIGENT TRANSPORTATION SYSTEMS (ITS)		
502.1	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)	ITS (Real-time traffic info, dynamic signage, adaptive signals, etc.)
PRICING SOLUTIONS			
601.0	PRICING		
601.1	Congestion pricing on H-1 or H-2	<i>Screened out in Deliverable E-1, Project Evaluation and Preliminary Ranking Memorandum</i>	N/A
601.2	HOT lanes	HOT lanes	HOT lanes
601.3	Parking strategies	Parking strategies	<i>No quantifiable benefits</i>

PROJECT SUMMARY

- **Deliverable D and Deliverable E-1: 90 Projects**
 - Transit: 12 projects
 - Bicycle: 23 projects
 - Pedestrian: 8 projects
 - Roadway: 33 projects
 - Transportation System Management: 11 projects
 - Pricing: 3 projects

- **Deliverable F: 70 Projects**
 - Transit: 9 projects
 - Bicycle: 15 projects plus 1 new project = 16 projects
 - Pedestrian: 7 projects
 - Roadway: 26 projects
 - Transportation System Management: 10 projects
 - Pricing: 2 projects

- **Deliverable G: 37 Projects**
 - Transit: 6 projects
 - Bicycle: 16 projects plus 1 new project = 17 projects
 - Pedestrian: 3 projects
 - Roadway: 8 projects
 - Transportation System Management: 2 projects
 - Pricing: 1 projects

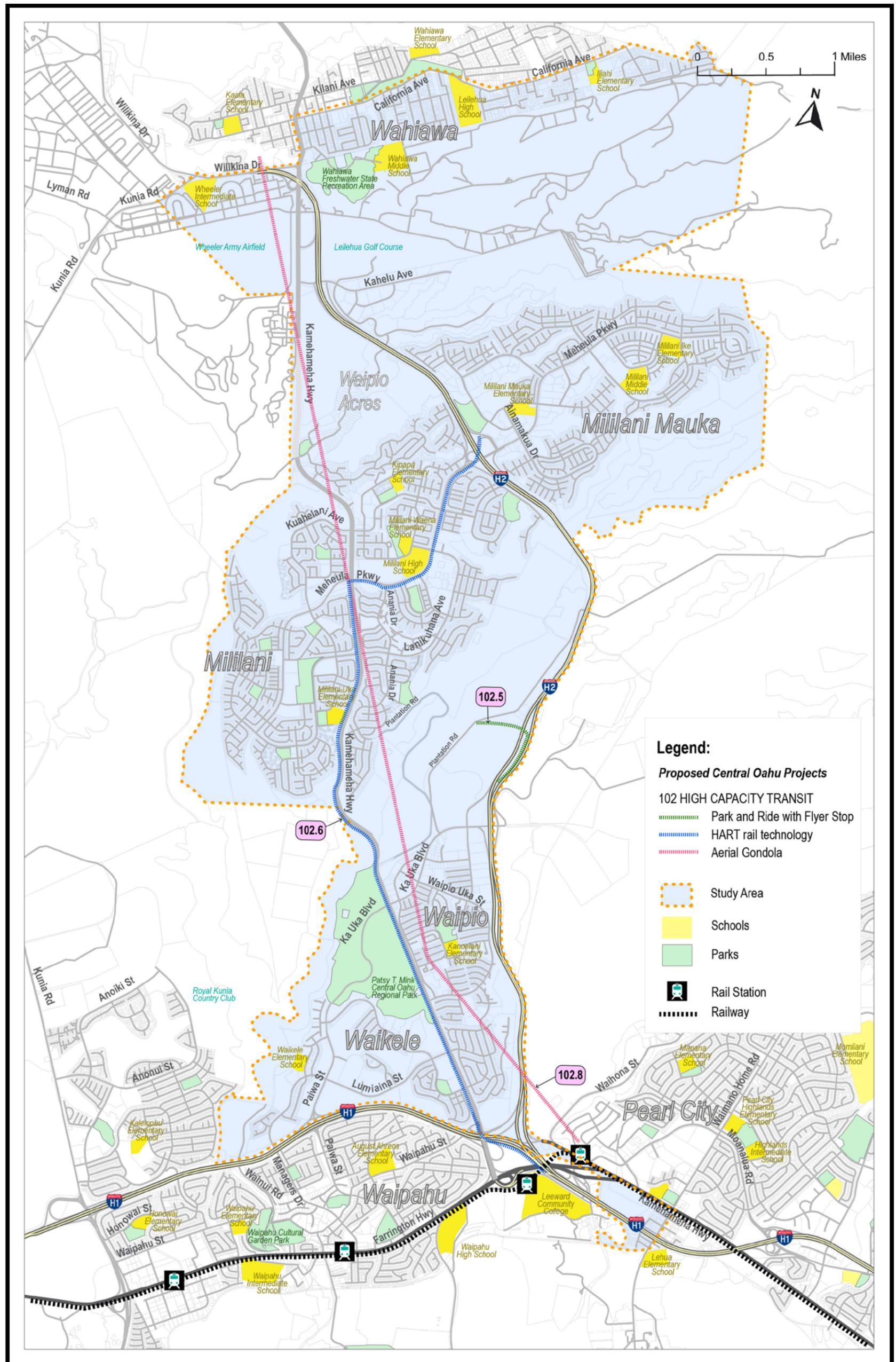
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APPENDIX B

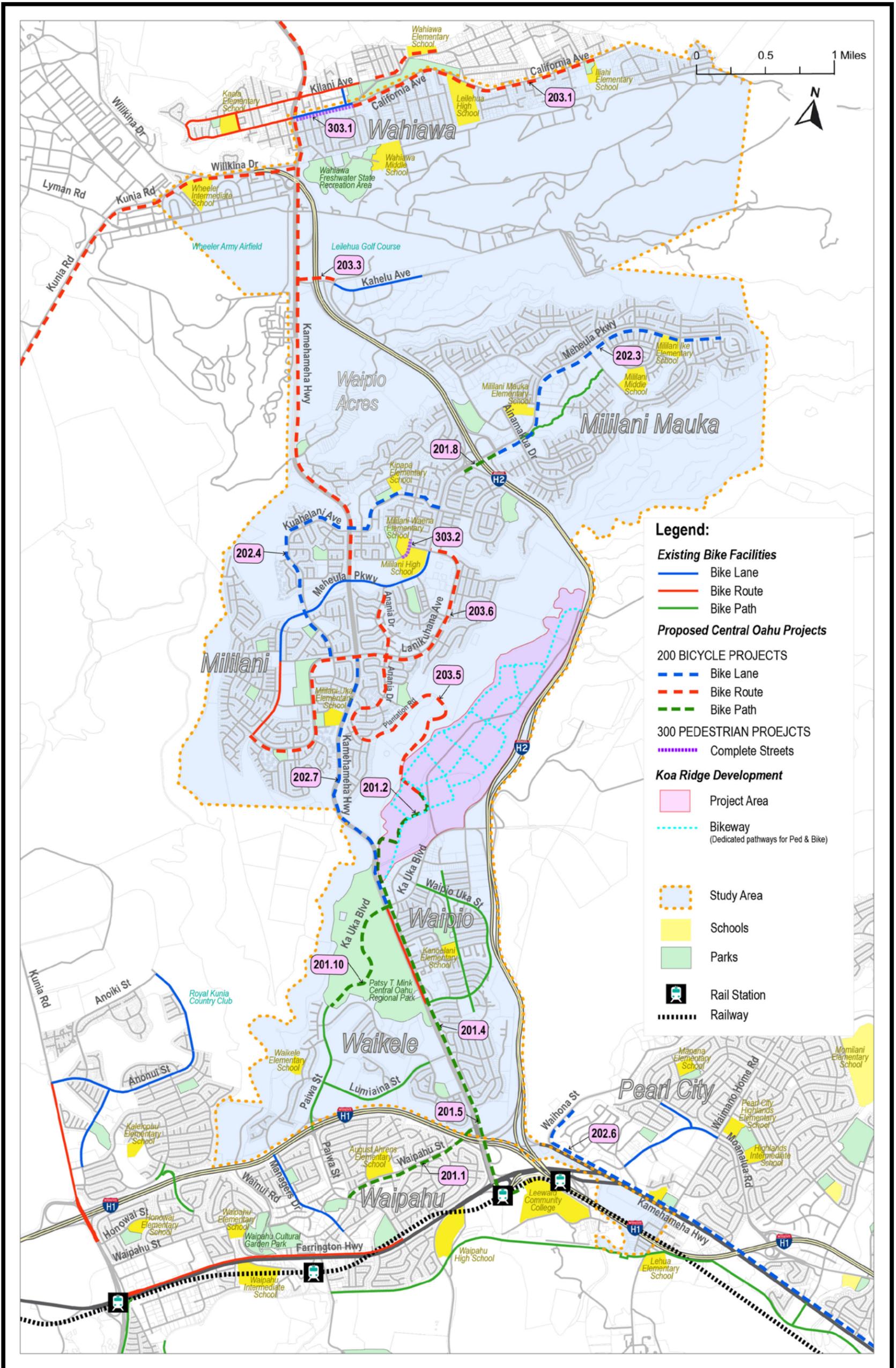
Project Location Maps

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Transit Projects – Location Map



Bicycle and Pedestrian Projects – Location Map



Roadway Projects – Location Map

