UNIVERSITY OF HAWAI'I AT MANOA

CAMPUS TRANSPORTATION DEMAND MANAGEMENT PLAN

DRAFT

January 2012
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1 EXECUTIVE SUMMARY

TO BE COMPLETED AFTER RECEIVING COMMENTS/REVISIONS ON THE DRAFT REPORT
2 INTRODUCTION

The purpose of the University of Hawai’i at Manoa’s Campus Transportation Demand Management (TDM) Plan is to identify the key issues related to campus access and determine a course of action for prioritizing a diverse range of demand management strategies appropriate to the diverse mobility needs of the campus. This plan was developed between May 2011 and January 2012 including an intensive assessment of the campus access environment, gathering input on mobility-related challenges, opportunities, and comments related to various preliminary TDM strategies. The campus outreach process was conducted using a variety of traditional and innovative outlets, including modal focus groups, stakeholder interviews, a robust Campus Transportation Survey, open houses, and an interactive Google mapping exercise. Appendix B summarizes the affiliates that took part in the Campus Transportation Advisory Committee and modal focus groups.

To supplement the public outreach, an extensive Existing Condition report was developed to document a variety of benchmarks as well as key transportation services and operational and behavioral travel traits of the campus’ population. The Campus TDM Plan offers the University immediate solutions as well as near-, mid-, and long-term strategies to address affiliates growing interest in flexible alternative transportation options. To supplement these recommendations the Plan provides the University highly contextual implementation considerations allowing their Auxiliary Services department to hit the ground running. Perhaps most critical, this Plan proposes a policy framework that will ensure future mobility-related investments and policies to implement a balanced access to the Manoa campus.

WHY DEVELOP A TDM PLAN?

Important to the context of this plan is an overall statement of the University of Hawai’i at Manoa’s (UH Manoa) policy regarding campus access:

UH Manoa views itself as having a fiduciary responsibility to expand access to education.

This means the university’s primary business is education and ensuring people of all incomes, cultures, and situations have access to those educational opportunities.

UH Manoa is a central employment and commuter destination on Oahu with a daytime population that swells to 30,000 affiliates.¹ The majority of students, faculty, and staff that access the campus commute from outside the Manoa Valley. Analysis from the campus transportation survey found that roughly one-third of affiliates commute to the Manoa campus from communities on the western half of Oahu.

¹ An affiliate is a commonly used term in University planning that aggregates the campus population into a single travel group including undergraduate students, graduate students, professional degree students, faculty, staff, and visitors.
These realities contribute to the island’s growing congestion and steady demand for campus access and parking. However, the University is not in a financial position to build more parking to accommodate single occupant vehicle access. Similarly many of the University’s affiliates that access the campus on a near-daily basis cannot afford to own and maintain a private vehicle. These constraints require UH Manoa to develop an innovative approach to access campus. The University is seeking to manage transportation demand for the following reasons:

- To enhance access to education, first and foremost;
- To extend the campus’ current limited and constrained supply of parking;
- To limit the regional and neighborhood impacts of vehicle trips traveling to and from the UH Manoa campus;
- To increase the number of viable and affordable options for accessing campus; and
- To establish that TDM efforts will satisfy required parking capacity for future development permitting.

THE CAMPUS TDM PLAN PROCESS

Developing a plan to manage and enhance the way people access UH Manoa requires an iterative and data-driven process to determine challenges and opportunities and test these ideas as a proposed solution is recommended. First, it is important to establish the goals and scope of the plan. In this case, the Campus TDM Plan serves a strategic plan for investing in alternative transportation and managing existing parking supply to effectively maintain current demand. This is a new effort for the University as this is the first time the University has employed a comprehensive approach to understand and manage campus access. General steps in the Plan’s process included:

- **Inventory** – evaluating current trends, statistical or observed, from existing data, site reconnaissance, interviews, and a robust campus transportation survey.
- **Analysis** – analyzing definable trends from the data. Parking demand, transit market demand, and active transportation models were used as analytical tools.
- **Oversight and consultation** – receiving input from a project advisory committee, UH staff, stakeholders, and public outreach events.
- **Planning** – developing policies and strategies based on the previous three steps.
- **Validation and Documentation** – testing recommendations and drafting an action oriented policy document.

After the Plan is officially adopted by the Board of Regents, the following steps will be taken by staff within Auxiliary Services:

- **Implementation** – facilitating plan implementation by Auxiliary Services and its TDM Coordinator respecting planned and granted incremental investments that in balance with expected revenues available for this program.
- **Evaluation** – assessing the plan’s progress and ability to achieve agreed upon goals.
- **Adjustment** – adjusting the plan approach to account for opportunities to fine tune performance and strategies that are not effective.
- **Maintenance** – evaluating trends through new surveys and analysis at defined intervals, continuing to adjust the plan, including new strategies, as needed.
Plan Structure

This Plan is organized into 11 chapters. Chapter 3 presents the overarching policy direction for access to the UH Manoa campus. Chapters 4 through 8 establish the multimodal access strategies that will be prioritized using qualitative analysis. Each of the mode-specific chapters follow a similar format including a summary of existing conditions, a high-level assessment of key gaps, challenges and unmet opportunities, detailed descriptions of proposed actions and implementation considerations, and a qualitative evaluation of each strategy.

After the strategy discussion, Chapter 9 develops a list of priority opportunities under the direct control of external agencies such as TheBus and The City and County of Honolulu Department of Transportation Services. Chapter 10 details the evaluation and prioritization process and runs each of the UH Manoa controlled access strategies through the evaluation. The Plan concludes with a discussion of key implementation considerations in Chapter 11. This includes provisions for partner opportunities, the role of the campus’ new TDM Coordinator, what benchmarks and data should be monitored to ensure the strategies are successfully rolled out. Appendix A offers a summary of the parking demand and revenue projection, which frames the funding picture for alternative transportation programming over the next 5 years.

CAMPUS SNAPSHOT

With a daytime population of roughly 30,000 students, faculty, staff, and visitors, the University of Hawai‘i at Manoa is a major contributor to regional and Manoa Valley vehicle travel demand. Consequently, the University’s seemingly unending demand for travel on a daily basis spreads its associated negative impacts along the island’s most congested corridors and in the McCully-Mo‘ili‘ili and Manoa Valley neighborhoods. However, while daily travel demand to the Manoa Valley is largely the result of UH affiliate travel, anecdotal evidence suggests that peak hour travel to the Manoa Valley is shared between the area’s several major institutions. This implies that greater congestion relief will require multi-partner solutions to a challenge that spans across institutional and neighborhood limits.

Campus Character and Population

The University of Hawai‘i at Manoa is nestled in the Manoa Valley roughly a mile and a half from downtown Honolulu and local beaches. The campus is bounded by the neighborhoods of Manoa, Makiki, Palolo, and McCully-Mo‘ili‘ili, which house a large portion of the campus travel market. Access to campus from these major neighborhood destinations is centered on a handful of major and minor arterials, including University Avenue, Dole Street, Metcalf, and the King/Beretania couplet.

Several unique site characteristics impact campus travel behavior and the quality of campus access. First and foremost, Oahu’s linear corridor development pattern, driven by physical and topographical constraints, promotes longer commute patterns to downtown Honolulu and greatly influences mode choice. This is reinforced by the island’s well-established automobile-oriented transportation culture. In addition, anecdotal evidence suggests that University affiliates that originate from Hawai‘i exhibit the tendency to drive not only themselves to campus, but also to chain trips while driving to campus. This typically includes dropping off siblings, parents, and
elder family members at work, school, shopping, and a variety of social and senior-oriented activities.

UH Manoa’s campus population during the 2010-2011 academic year was 28,383 affiliates. The campus population has a flat growth trend over the past six years (as illustrated in Figure 2-1) and is expected to remain relatively constant in the near future. UH Manoa is also located in close proximity to eight primary schools and colleges. This co-location of eight schools in an area with limited street connectivity creates significant demand for travel along a relatively small number of corridors every day. These contextual circumstances create a perfect storm that contributes to the island’s growing congestion, air quality issues, and imbalance of transportation modes. That being said the relative level of centeredness presents unique opportunities to invest in alternative transportation for a large segment of trips.

Figure 2-1  UH Manoa Campus Population, 2005 - 2011

![UH Manoa Campus Population Chart]

Source: UH Manoa Office of the Vice Chancellor for Academic Affairs, Manoa Institutional Research

Figure 2-2 demonstrates the spatial distribution of affiliates living within each zip code. The width of the orange line represents the estimated number of affiliates traveling along highways and major arterials from home to campus based on the number of affiliates residing in the zip code of origin. The majority of affiliates live in inner Honolulu with convenient access to connections toward campus. Roughly 17% of all affiliates live within one “network” mile of campus (within a
pedestrian catchment area), while 36% live within three “network” miles from campus (within a bicycle catchment area).2

Due to the current economic climate, no new student or faculty housing development is anticipated in the near or intermediate term, although the University is pursuing the ability to expand resident faculty housing if suitable sites and funding can be identified. The resident student dormitories will be incrementally renovated, but this will not impact the total number of residential facilities. This is important as it bounds the number of affiliates living on campus and likely ensures the commuter population remains relatively unchanged.

**Figure 2-2   UH Manoa Affiliate Distribution and Travel Shed**

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**Campus Travel Behavior**

In order to gauge the how affiliates access campus and why they choose one mode over another, a campus transportation survey was developed and administered. The following presents key findings form that survey.

One-third of University affiliates access campus by driving alone. This is influenced, in part, by the island’s long held cultural practice of using the car for trip chaining and family-oriented trip-

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2 Network analysis accounts for natural barriers and grid connectivity issues that may impact actual access. This is in contrast to crow-fly distance analysis.
making purposes. This is validated by the 37\% of campus transportation survey respondents that make at least one stop before arriving at their final destination. This typically includes dropping off siblings, parents, and elder family members to work, school, shopping, and a variety of social and senior-oriented activities. Alternatively, about 60\% of University affiliates utilize transportation modes which do not utilize a single occupant vehicle when accessing campus (transit, Rainbow Shuttle, walking, bicycling, and carpooling). Figure 2-3 displays the mode share for all affiliates accessing campus.

When the same mode share analysis is conducted for affiliates that commute from off-campus locations, the most significant shift in mode share is exhibited by pedestrians (from 25\% to 7\%), drive alone commuters (33\% to 43\%), and those using TheBus (17\% to 21\%). Trips that were being made by walking are essentially shifted to transit and single occupant vehicles.

![Figure 2-3: Campus Mode Share—Primary Access Mode for All Affiliates](image)

Source: UH Manoa Campus Transportation Survey (2011)
Universe: All respondents

To fine tune the campus access picture even further, the Campus Transportation Survey found that many affiliates are not fixed to one mode of transportation. Transit is the most popular “second choice” access mode accounting for 23\% of those that may use a second access mode on any given week. To increase alternative mode share, affiliates voiced the need to make campus access by transit, carpool, bicycling and walking more flexible to accommodate strict academic, professional and personal schedules and obligations.

In addition, affiliates clearly arrive to and depart from campus at peak periods. Roughly 54\% of affiliates arrive on campus between 8:00 AM and 10:00 AM, while about 34\% leave campus between 2:00 PM and 4:00 PM.
KEY ISSUES

The Existing Conditions Report, Campus Transportation Survey, and discussions with stakeholders and focus group participants formed the basis for the key issues. Affiliates provided behavioral and attitudinal information related to their commute experiences and why they choose one mode of access over another. The following is a list of the most commonly held concerns regarding campus access.

Driving is an increasingly less attractive mobility choice in Honolulu

Conditions for drive alone commuters continue to degrade as demand for automobile travel along constrained arterial corridors and highways outpace the roadway network’s ability to accommodate them. Because congestion is continually getting worse, participants that drive alone are forced to leave earlier to minimize travel time. As a result, many participants expressed interest in using alternative modes of transportation.

Opportunities to employ price controls and technology to further maximize existing parking supply and utilization

Several focus group participants and Survey respondents believe that increasing parking prices is the only way to broadly impact how people access the campus. Likewise, an investigation into various parking services revealed that price could be increased to maximize the effective supply of the campus’ slowly depleting parking supply.

Affiliates are generally unaware of the University’s transportation services

The participants of each modal focus group found it difficult to identify a centralized transportation information clearinghouse and the majority of participants are unaware of the campus’ transportation information resources. The most pressing need stemming from this lack of knowledge is a redesign and rebranding of the University’s ride-matching service. The existing UH Rideshare program does not effectively market its ride-matching service, and those that have used the service do not find its interface to be user-friendly. Of the survey respondents that carpool to campus, none used the ride-matching service when forming their carpool and 48% had never heard of the service. There is potential demand to increase the size of carpools (80% of carpool respondents participate in a 2-person carpool), therefore finding an effective ride-matching program, preferably tied to social media applications, is a major opportunity to improve the status quo.

During the Campus Transportation Survey, Most people use Google as their preferred method for determining route choice even though it might take bicyclists and pedestrians on undesirable routes. Even so, the current state of mobility-related information is basic, static, and fragmented from typical methods of aggregating information in useful forms. Even TheBus’ route information is less dynamic than emerging trip planner and transit tracker technologies being employed by transit agencies.

Transit has significant potential to shift trips from existing non-transit trips, but service quality lags the potential demand.

The University population exhibits a substantial unmet demand for transit. Analysis conducted for the Existing Conditions Report found that that 20.9% of non-bus riders who are interested in riding the bus are projected to begin taking transit in the future, which generates an estimate of
3,737 net new riders when applied to the campus population of non-bus riders. In order to tap into this largely captive market, transit must be flexible and convenient. Sixty percent of survey respondents stated they need flexibility to make a variety of trips every day. Transit must be able to accommodate those with inflexible schedules to increase ridership. For example, short service span issues for leeward bound express bus trips is not going to encourage affiliates with inflexible schedules.

Even for those frequent TheBus users they expressed concern over service quality especially with respect to crush loads in the PM peak campus egress. Over half of frequent transit users (53 percent) stated they would increase transit use if transit vehicles had more passenger capacity. Likewise, participants from the transit focus group overwhelmingly agreed that transfer connections to campus from long-haul and express routes need significant improvement.

**The bicycle and pedestrian environment in and around the campus is perceived as unsafe and uncomfortable**

Participants across most focus groups do not feel UH Manoa and the City have invested enough in bicycle and pedestrian infrastructure to begin walking or bicycling to campus. To generate demand for active transportation trips, affiliates need low stress bikeway connections that limit or mitigate intersection conflicts with motorists. In the past five years, seven pedestrian collisions and ten bicycle collisions were reported, and a large segment of pedestrians believe motorists do not respect the rights of pedestrians. Fifty-four percent of all comments made during the Campus Transportation Survey’s Google mapping exercise were related to bicycle and pedestrian conflicts and specific on- and off-campus improvements. UH affiliates clearly see value in making high visibility bicycle and pedestrian network improvements and supplementing these efforts with high quality end-of-trip facilities.

**The University does not diligently monitor transportation performance except for parking demand**

One critical finding from the Existing Conditions Report was the relative lack of data tied to existing transportation programs other than parking. In order to track the progress of initiatives and to ensure programs are effectively marketed and deployed, the University needs to develop a specific monitoring program to track the performance metrics of alternative transportation programs.
3 THE MANOA CAMPUS ACCESS POLICY

OVERARCHING POLICY DIRECTION: ACCESS TO EDUCATION

University transportation departments often struggle to maintain a balance between the various needs of commuting affiliates. Affiliates choose to access campus for a variety of motives including financial, environmental, social, and even philosophical/political in nature. An important distinction for the University of Hawai‘i is that the Manoa campus administration does not operate as a mobility agency, nor does it seek to increase the number of drive alone affiliates to the campus. Rather:

_UH Manoa views itself as having a fiduciary responsibility to expand access to education._

For the UH Manoa administration, transportation decisions must facilitate student access to classrooms and services as well as faculty access to world class research facilities. The role of this Campus Transportation Demand Management Plan is to provide an implementable plan that increases the number of viable and economical access options for all affiliates—especially for those affiliates that are financially constrained. The University administration recognizes that access to the Manoa campus is not a singular approach and must balance the needs of various modes of transportation. Similarly, UH Manoa will take an active stance at enhancing and promoting alternative transportation options in place of automobile access—particularly walking, bicycling, transit and shuttle ridership, and ridesharing.

CAMPUS TDM PLAN GOALS

Using access to education as an overarching policy direction, University stakeholders and staff crafted a series of goals to guide the Plan and its proposed solutions. The campus access strategies contained within the Campus Transportation Demand Management Plan will satisfy at least one, if not many, of the following eight goals:

**Goal 1:** Encourage world class faculty and students to continue accessing the campus by providing first class campus access.

**Goal 2:** Manage campus access with current and possibly reduced parking capacity.

**Goal 3:** Produce a more sustainable future for the campus.

**Goal 4:** Make a more livable environment within the campus that encourages higher quality of life.

**Goal 5:** Develop a fiscally sound approach to transportation that meets access requirements.

**Goal 6:** Ensure effective communications and visible marketing of campus transportation options.
Goal 7: Ensure campus access is equitable by investing equitably in all modes of transportation.

Goal 8: Foster connections between the broader University of Hawai‘i system and local community colleges.

ACCESS AND CIRCULATION HIERARCHY

By establishing that access to education is the primary role of the University, UH Manoa clearly recognizes the need to develop a mobility strategy with a multimodal lens. The University should take active steps to invest in transit, shuttle, bicycle, and pedestrian infrastructure and programs, while managing the existing parking supply for ridesharing, carsharing, single occupant, and electric vehicles. Since the development of their Long-Range Development Plan, UH Manoa has never formally prioritized how University affiliates access or move within campus. This lack of strategic direction is characterized by the campus’ current focus on dispersed parking supply throughout Upper and Lower Campus and limited restriction of automobile access. The University should develop access principles that prioritize campus access investments inside and outside the University’s boundaries as the Campus TDM Plan is implemented.

Figure 3-1 illustrates that cost-effective access modes such as walking, bicycling, transit, and feeder/shuttle routes yield far greater environmental, social, neighborhood livability, safety, UH Manoa affiliate health, and congestion mitigation benefits than a mono-modal and automobile oriented access approach. This mobility framework also supports the goals and strategies set forth in the University’s forthcoming Landscape Master Plan by aiding placemaking efforts. A multimodal access hierarchy such as this will provide overarching direction on the decision-making process for the University’s mobility and campus circulation investments. We recommend that UH Manoa invests in transportation demand management strategies based on the general access priorities represented in this graphic. There should be strong and defensible policy reasoning to deviate from the investment principles implied by the hierarchy.
The University’s Campus Access Policy is broken into two components: Access and Circulation. These policy areas should be viewed as mutually supportive and intertwined mobility approaches as facilitating and encouraging use of sustainable transportation modes on campus is a reflection of the University’s overarching campus access strategy of providing balanced, efficient, and diverse options for transportation to and from campus. Principles for campus circulation and multimodal access policies are established below.

**Principles for Campus Circulation**

UH Manoa needs to connect the dots between spatial planning efforts and the campus access policy. The University faces a host of internal campus issues related to affiliate movement that needs to be addressed including permeability, legibility, and conflicts between vehicles, bicyclists, pedestrians, and skateboarders. If automobile use was decreased in upper campus that would have the dual effect of supporting non-motorized modes as the modes of greater priority for campus circulation this improving the campus environment and support continued parking demand for lower campus garage. In order to supplement the University’s commitment to balanced access to campus, the following internal campus circulation principles highlight how campus corridors are prioritized for various modes of transportation. The proposed circulation hierarchy is based upon several principles:

- Pedestrians are the predominant mode on campus, and they should be accommodated with safe, spacious, and direct facilities.
- In some locations on campus, pedestrian volumes are so high and rights of way so constrained that vehicle access should be restricted. These “Share Zones”—including
locations such as the Legacy Path and Correa Road—may imply the need to severely limit motor vehicle speeds or restrict general vehicle traffic altogether.

- Access to campus buildings must be provided for delivery services and emergency personnel, but intrusion of service vehicles into the pedestrian zones should be minimized, it should also be predictable.
- Through traffic should be kept toward the edges of campus to the extent practicable. The University should investigate the potential application of time-restricted vehicle access to internal campus roadways.
- The university should designate dedicated passenger drop-off locations to limit conflicts with pedestrians, bicyclists and transit vehicles. Subsequently, Sinclair Circle should be designated as a transit-only facility.
- Bicycles should be separated from pedestrians to the extent practicable, and the impacts of bicycles in the pedestrian zones should be minimized by provision of ample secure bicycle parking and through circulation around the edges of the Share Zones.
- Bicycles should be afforded dedicated bikeways through campus to symbolize the mode as an integral part of the campus’ culture.
- Rainbow Shuttle, bicycles and service vehicles may share the same routes, but pedestrians should be provided separate sidewalks or paths along these routes.
- Skateboarding is a prominent feature of Oahu’s culture and should remain a symbol of affiliate independence. However, steps should be taken to ensure skateboarders also respect the space and needs of pedestrians.

**Coordination with the Landscape Master Plan**

UH Manoa’s forthcoming Landscape Master Plan (LMP) is an effort to strategically improve the spatial, functional, and aesthetic relationship University affiliates share with the UH Manoa campus environment. The Landscape Master Plan recognizes that a prominent feature of the campus today is roadway infrastructure, parking, and vehicular access to the detriment of the pedestrian realm and other low impact facilities like bicycle routes and transit zones. Affiliates must navigate the patchwork of sidewalks, paths, parking lots, and informal service delivery spaces to access classrooms, workplaces, and campus resources like Campus Center and Lower Campus recreational facilities. Given these challenges, the LMP effort shares many of the goals found in the Campus TDM Plan, including:

- Promoting human health and well being;
- Encouraging walking, bicycle and transit use;
- Achieves environmental benefits; and
- Achieving functional efficiency and convenience.

The Campus TDM Plan’s Campus Access Policy supports the preferred concepts detailed in the draft Landscape Master Plan in the following ways:

1. **Establishing an internal circulation hierarchy.**

   By establishing dedicated spaces for pedestrians, bicyclists, delivery vehicles, and emergency vehicles, these two plans set a precedent to enable the free and comfortable movement of pedestrians.
2. **Developing an east-west and north-south bikeway through campus.**

Dedicated bikeways are recommended along Campus Road from University Avenue to Maile Way, along a new bikeway facility from Sinclair Circle to Correa Road, and along a north-south axis between Hamilton Library and Holmes Hall. A key component of this preferred concept is the elimination of vehicle access to Campus Road. This will provide additional environmental benefits for bicyclists and pedestrians alike at Varney Circle as vehicles will have less of an incentive to access the campus’ most prominent point of reference and pedestrian activity node. Additional bike routes will support this backbone of dedicated bikeways. One critical remaining issue is the unmitigated gaps in the bikeway backbone network where the bikeways interface with the Legacy Path and the McCarthy Mall. This will require bicyclists to dismount in the designated Share Zones. UH Manoa should consider providing uninterrupted and direct bikeway connections along these east-west and north-south corridors. This would also require dedicating Correa Road as a bikeway and managing vehicular access to ensure priority for non-motorized modes. See Chapter 7 for strategy support.
The draft Landscape Master Plan proposes a conceptual framework for a future bikeway network.

Source: Sasaki/University of Hawai‘i at Manoa

3. Clearly defining and facilitating desire lines for pedestrian travel.

The Campus TDM Plan supports the LMP’s development of clearly defined primary and secondary pedestrian routes, such as Correa Road and Campus Road. Part of this strategy is to formalize current ad hoc pedestrian routes running through service roads and interstitial spaces (e.g., behind Kuykendall Hall), which is critical to make the campus pedestrian environment more legible and dignified.
4. **Strategically removing Upper Campus parking to enhance the quality of the pedestrian environment.**

The preferred LMP concept includes provisions for on-street parking removal at Varney Circle, specifically. This Plan supports this recommendation and proposes further Upper Campus parking lot removal to improve the pedestrian environment. See Chapter 4 for more information.

5. **Determining appropriate pedestrian safety countermeasures at major and minor junctures.**

The proposed raised crossings along Correa Road are an example of the LMP’s intent to improve pedestrian crossing on-campus. However, there are many more issues to be addressed. A more comprehensive investigation of pedestrian crossing issues, pedestrian behavior and potential crossing countermeasures should be conducted to ensure pedestrians are safe and comfortable, while traffic speeds and volumes are managed. See Chapter 7 for more strategy support.

6. **Identifying accessible and visible locations for bicycle parking.**

The Campus TDM Plan supports the LMP’s conceptual network of bicycle parking by proposing locations for long-term bicycle parking, general design guidelines and thresholds for meeting bicycle parking demand. See Chapter 7 for more information.

7. **Limiting vehicular access to internal parking lots.**

The Campus TDM Plan supports the LMP’s development of clearly defined primary and secondary pedestrian routes, such as Correa Road and Campus Road. Part of this strategy is to formalize current ad hoc pedestrian routes running through service roads and interstitial spaces (e.g., behind Kuykendall Hall), which is critical to making the campus pedestrian environment more legible and dignified. See Chapter 4 for more information.

8. **Designating preferred access routes for delivery and emergency vehicles.**

As noted in the Campus Access Policy, UH Manoa must plan for and strategically route delivery and emergency vehicle access. The Campus TDM Plan and the LMP support each other by providing policy support and recommended routing for service vehicles, in particular. Emergency vehicle access needs to be accommodated by ensuring that landscape features remain passable.

Although this Campus TDM Plan integrates with the major mobility-related recommendations found in the draft LMP, we recommend taking the LMP a step further by conducting a campus circulation study and alternatives analysis in conjunction with the LMP. The landscape and spatial planning efforts must be coordinated with an evaluation of viable internal mobility alternatives in order to fully realize the concepts developed in the draft LMP. We also strongly recommend that a Campus Wayfinding Plan be one of the expected outcomes of the circulation study.
ACCESS ENHANCEMENT POLICIES

The following section establishes access policies that enable the University to implement the TDM and campus enhancement strategies recommended in the Campus TDM Plan. Each policy is followed by provisions and reasoning for establishing these types of policies. Essentially this section is framed as a recommended policy for adoption by the University Board of Regents.

Multimodal access policies

Below are high-level policies in support for multimodal access to UH Manoa. These policies are recommended for adoption by the University of Hawai’i administration and all departments therein that impact affiliate mobility and access to campus.

The University of Hawai’i at Manoa will ensure that University affiliates are provided multiple viable and affordable mobility options that make the educational opportunities more accessible. The University realizes that it must equitably invest in campus access across multiple modes to ensure affiliates of all backgrounds may access the educational programs available on campus. Auxiliary Services currently spends a disproportionate amount of effort and funds on parking facility maintenance and operation. To implement this multimodal access policy, the University will need to increase the level of funding for TDM initiatives and multimodal transportation capital improvements.

The University of Hawai’i at Manoa will work to revise the existing employee access policy establishing entitlement to parking. The current employee vehicle access policy is set forth in Article VIII, Section G of the 2009-2015 Faculty Contract between the University of Hawai’i Professional Assembly (UHPA) and the University of Hawaii Board of Regents. The University will establish that by offering a free employee transit pass, faculty and staff are not entitled to a parking space because having a transit pass facilitates campus access. Implementing this policy will require engaging the UHPA, UH system’s employee union.

The University of Hawai’i at Manoa will strategically manage vehicle volumes entering into the campus’ internal roadway network. UH Manoa will consider establishing time-restricted use of campus streets for vehicles and delivery service and limit the number of access points for motorized traffic. In order to enforce this type of access management policy, access management must coincide with reducing Upper Campus parking supply, while maintaining and more efficiently using existing Lower Campus parking supply. Implementation of this policy will likely be a long-term development.

The University of Hawai’i at Manoa will prioritize future building siting by sacrificing Upper Campus surface parking lots. Although UH Manoa has limited plans to develop new educational facilities or residential units in the foreseeable future, this Plan establishes a policy to ensure that as development opportunities arise, the developments are planned in and completed in accordance with the campus access principles set forth in this Plan. New buildings should general be situated such that they ensure access to transportation services such as TheBus, bike parking, and the primary pedestrian pathways.

The University of Hawai’i at Manoa will sign a Memorandum of Understanding with the City and County of Honolulu to jointly plan, partner, and fund multimodal access improvements along primary access corridors. The scope of this formal partnership should include transit capital and level of service improvements, pedestrian sidewalk, crossing, and signalization enhancements, bicycle network completion throughout the Manoa
Valley and adjacent neighborhoods to the south, and wayfinding signage. Chapter 9 provides more detail into the types of projects that University will require collaboration with local transportation agency partners.

The University of Hawai‘i at Manoa will strive to provide active transportation end-of trip facilities at all major campus buildings. Providing end-of-trip facilities for those accessing campus by active modes (bicycling and walking), is an important strategy for eliminating the security and aesthetic barriers of active transportation and fostering a culture on campus that promote active transportation to campus. End-of-trip facilities include short-term bicycle parking, long-term bicycle parking, showers, locker rooms, and changing facilities. This policy will be integrated into UH Manoa’s Landscape Master Plan.

- **Short-term bicycle parking supply** will be expanded and existing short-term bicycle parking will be retrofitted with secure, convenient, and covered bicycle racks. All bike racks will provide two points of contact to the bicycle’s frame to ensure optimum security. In the future, Auxiliary Services will procure U-racks as the preferred bicycle rack type.

- **The supply of long-term bicycle parking** on campus will be increased to encourage bicycle commuting for those on campus more than 2 hours per day. The University will also investigate new ways to provide long-term parking such as constructing bike cages in underused portions of Parking Structure and finding space within select buildings to build bicycle lockers.

- **Showers, locker rooms, and changing facilities** will be constructed in all new campus facilities as well as retrofitted existing buildings as building modernization plans are completed. The Facilities Planning Board will be instrumental in ensuring construction plan oversight, while the Facilities Department will play a key role in guaranteeing this policy is a visible component of construction contracts.

The University of Hawai‘i at Manoa will develop and enforce “Quiet Zones” in building plazas and passive building spaces. In these Quiet Zones, affiliates operating skateboards, scooters, motorized bicycles, or any other wheeled devices with unreasonably high noise pollution will be asked to dismount.

**Parking policies**

As a supplement to the multimodal access policies, the following section presents high-level policies in support for efficient management of UH Manoa’s parking system. These policies are recommended for adoption by the University of Hawai‘i administration and should be implemented by Auxiliary Services.

The University of Hawai‘i at Manoa will manage parking facilities in such a way that motorists pay the full cost of parking. Operating parking at UH Manoa is a costly venture for Auxiliary Services. UH Manoa should ensure parking pricing on campus correlates with the campus’ demand for motor vehicle access. At the same time, UH Manoa should offer high quality and competitive alternatives to automobile and parking access.

The University of Hawai‘i at Manoa will extend existing parking supply by instituting a range of parking efficiency measures and technology, parking management strategies, and demand management strategies. This is a departure from the UH Manoa’s Long Range Development Plan, which does not rule out construction of new parking facilities. The Campus TDM Plan recognizes that parking construction costs and the cost to operate parking is not a sustainable campus access investment for the University. The
University realizes that it must develop and implement strategies that facilitate access for people, not vehicles. The Facilities Planning Board needs to act as the “champion” for alternative access strategies by maintaining a hardline stance on parking facility development.

The University of Hawai‘i at Manoa will strategically phase out parking lots in Upper Campus. This policy will help ensure UH Manoa achieves its goals for campus access and enhancing the campus environment (as stated in the forthcoming Landscape Master Plan).

**CAMPUS ENHANCEMENT STRATEGIES**

The following are capital improvement and operational strategies with little to no support for vehicle trip reduction, but are geared to improve the quality of internal campus circulation. These strategies are not intended to manage transportation demand, although implementing these strategies supports the University’s broader campus access goals and help to achieve a new culture of alternative transportation commuting. Each strategy acts as an implementation action for the campus circulation policies highlighted above.

**CE1  Develop a coordinated multimodal wayfinding program**

**Target travel market:** Bicycle and pedestrian commuters and campus facility access.

**Description:** Bicycle and pedestrian access to campus could be enhanced and supported by an extensive wayfinding system that extends beyond the campus boundaries. In certain cases, navigational tools, such as wayfinding, can increase use of non-motorized modes and reduce automobile travel for short trips; although this strategy is primarily intended to improve on-campus bicycle and pedestrian circulation and safely direct affiliates to and from campus.³ For bicyclists, wayfinding should direct users to streets with bicycle facilities or bicycle-friendly streets, bicycle parking, major destinations, and transit connections. Wayfinding would also redirect cyclists that intend to circumvent the Share Zones but are unaware of their route options. For pedestrians, internal campus walking circulation and external access route choice could be made more direct and legible with a visible, simple, clear, and attractive system of wayfinding signs. Extending this system beyond the campus boundaries could serve to improve the attractiveness of walking to campus by directing pedestrians to pedestrian-friendly streets with sidewalks in both directions. On campus, this new wayfinding system should better connect visitors and affiliates to transit (including Rainbow Shuttle), major campus destinations, and other important campus facilities.

**Implementation considerations:** The University is currently developing wayfinding guidelines for building identification, internal pedestrian and vehicle circulation, and parking access signage. The University should amend the current proposed wayfinding sign plan and design guidelines to integrated the bicycle wayfinding design considerations stated above. In order to install signage on City/County-owned streets, UH Manoa would need to secure permission from Department of Transportation Services early in the process.

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CE2 Install bicycle wheel troughs at stairways

**Target travel market:** Bicycle commuters.

**Description:** Although the newly implemented Share Zones improve pedestrian safety in areas of high pedestrian demand, bicyclists may find it difficult to travel up and down stairs while walking their bicycle. Installing wheel troughs at key stairway locations will enhance access and reduce the burden of carrying a bicycle up and down stairs.

**Implementation considerations:** Wheel channels can be installed with minimal effort by affixing metal troughs to the stairway. They can also be more costly, yet more seamless by installing the channels into the stairway design (as shown below). The University could focus stairway investments on the stairs near Parking Structure which will effectively improve bicycle connectivity between Lower and Upper Campus, as well as facilitate the connection to/from Diamond Head communities. This is not a strategy intended to induce mode shift but to improve bicycle access.

![An example of a wheel trough or channel.](source)

CE3 Develop and implement a pedestrian improvement plan

**Target travel market:** On-campus pedestrian access for all affiliates.

**Description:** Some campus pedestrian pathways lack comfortable space for greater pedestrian volumes and crossings do not ensure acceptable yield compliance by motorists. Although the 2002 UH Manoa Campus Walkways Study provides a general framework and guiding principles for campus walkways, UH Manoa should develop a detailed action plan to investigate improvements in the following three areas:

- Identify where pavement treatments (textured paving, pavement markings) could be used to better organize pedestrian movements
- Identify locations where existing sidewalks should be widened and streets where sidewalks are not available on both sides of the street
- Target junctures that need countermeasure to improve the visibility and safety of pedestrian crossings

**Implementation considerations:** As part of this improvement plan, specific facilities should be identified and prioritized throughout the campus in order to phase improvements according to anticipated funding levels and planned/programmed street reconstruction and utility work. This effort should coordinate with the University’s forthcoming Landscape Master Plan’s recommendations. Implementation, although costly, will vastly improve pedestrian conditions and campus safety.

**CE4  Create a walking/pedestrian support group or advisory committee**

**Target travel market:** Pedestrians.

**Description:** The University should establish a campus pedestrian committee directly tasked to advocate and develop policy for pedestrian safety and access issues. This committee could act as a watch dog group for pedestrian issues outside of the campus that might impact walking access in the immediate vicinity of campus. It could also provide guidance and oversight for on-campus projects and policies. This is particularly important as building’s are retrofitted to improve ingress, egress and light penetration.

**Implementation considerations:** The University currently assembles a bicycle advisory committee, which could have its scope expanded to include all vulnerable campus affiliates, including pedestrians and person with mobility and visibility constraints. Groups of this nature typically meet on a bi-weekly basis or as needed given current events. This group would operate on a volunteer basis.

**CE5  Develop an alternative access plan for non-University traffic**

**Target travel market:** Non-University bound auto trips.

**Description:** In order to improve the bicycle and pedestrian environment on campus, UH Manoa should consider restricting St. Francis traffic from accessing the elementary school using East-West Road. This would reduce northbound left turn and right turn movements onto East-West Road from Dole Street, which could mitigate conflicts with crossing pedestrians and cyclists traveling north- and southbound through the Dole Street/East-West Road intersection. This would also reduce the incidences of speeding along East-West Road—an issue identified during the TDM Plan’s focus group meetings.

**Implementation considerations:** This measure would require extensive discussion between St. Francis School, the Manoa Neighborhood Board, and the City and County of Honolulu.

**CE6  Diligently enforce the Share Zone**

**Target travel market:** Bicyclists, skateboarders, and other wheeled non-motorized modes.

**Description:** The Share Zone was developed as part of the Move with Aloha program seek to improve pedestrian environment in highly congested pedestrian environments on campus. In order to reinforce these spaces as dismount zones for bicyclist and skateboarders, the University should increase enforcement of the Share Zones especially during periods where pedestrian volumes are greatest.

**Implementation considerations:** Enforcement of the Share Zone should be coupled with bicycle circulation improvements such as clearly defining alternative routing (Strategy C1),
installing wheel troughs (Strategy C2), developing bicycle elevator in Lower Campus (Strategy C7), and planning for future campus bikeway development (Strategy CE8). UH Manoa must maintain the pedestrian realm without inconveniencing the most efficient campus circulation mode to the point of mode shift.

**CE7  Construct a high capacity freight elevator in parking structure**

**Target Travel Market:** Bicycle commuters

**Description:** Currently, bicycle commuters traveling into campus from the south do not have a good way to access campus. Their two options are to either climb a very steep hill on Beretania, or to carry their bike up several flights of stairs in the lower campus parking garage. Bicycles are not allowed in the garage’s passenger elevator. By removing this barrier by installing a freight elevator specifically for people with bicycles, commuters will have more direct and convenient access to campus. Additionally, wheel troughs should be installed along the stairwell in the parking garage so that commuters can more easily walk their bikes up and down. Wheel troughs function as a narrow ramp along the side of a staircase, eliminating the need to carry ones bike.

**Implementation Considerations:** This freight elevator could be constructed when the parking structure undergoes renovations, but it should be noted that a freight elevator intended for bicycles will need to be larger than the current footprint of the elevator, and thus will be more costly. In order to tie in the elevator as a link to campus, wayfinding systems and signage should direct cyclists to the bike elevator.

**CE8  Develop and implement a campus bikeway improvement plan**

**Target travel market:** Bicycle commuters; internal bicycle trip making.

**Description:** The UH Manoa campus currently lacks dedicated facilities for bicycle travel. Bike lanes, bike paths or multi-use trails, and other priority use facilities actively encourage bicycle use outside of campus and signal to users that bicycling is an integral component to the University’s campus access strategy. Transforming the campus to a bicycle haven will require a more detailed planning effort in the form of a bicycle master plan. Mainland campuses like UC Davis, CU Boulder, and UC Santa Barbara have invested heavily in on-campus bicycle infrastructure, and seen substantial internal bicycle trip-making and high bicycle mode share. In addition, expanding the bicycle network can be used as a marketing tool for prospective students.

**Implementation considerations:** Although the campus’ Landscape Master Plan will develop a conceptual bikeway network, the University should conduct a separate study that looks critically at implementing the conceptual bicycle network and selecting appropriate facilities.
4 AUTOMOBILE ACCESS AND PARKING MANAGEMENT

EXISTING CONDITIONS

**Drive alone mode share:** 33%

**Carpool mode share:** 6%

**Get dropped off mode share:** 4%

**Motorcycle/moped mode share:** 3%

Automobiles are a cost-prohibitive transportation mode for many affiliates. Of students who do not use a car to access campus, more than half state that their reason for not driving is the high cost of driving alone, as shown in Figure 4-1.

**Figure 4-1** Popular reasons for not driving alone to campus

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to reduce my impact on the environment</td>
<td>54.0%</td>
</tr>
<tr>
<td>I enjoy walking or bicycling to campus</td>
<td>38.3%</td>
</tr>
<tr>
<td>I don’t have a car</td>
<td>32.5%</td>
</tr>
<tr>
<td>I live on campus</td>
<td>38.2%</td>
</tr>
<tr>
<td>I get dropped off at campus</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

N=619
Universe: Respondents that do not drive alone to campus  
Source: UH Manoa Campus Transportation Survey (2011)

On-campus commuter parking supply has peaked and will steadily decline.
As of 2011, there are a total of 5,497 parking spaces campus-wide, roughly 57% of which are located in Lower Campus. Commuter parking consumes 80% of total parking supply, which equates to 4,423 parking stalls. Accounting for projected parking loss due to construction activity in 2011 (discussed below), the commuter parking supply has been adjusted to 4,378 parking stalls.

UH Manoa parking inventory is in need of substantial repairs, which will impact parking revenue in the near future.
As noted in the 2010 Pacific Intermountain Parking & Transportation Association parking study, the majority of parking structures and surface lots on campus show signs of cosmetic and possible structural degradation, documenting a substantial backlog of needed repairs and preventative maintenance for long-term utilization. The University has programmed significant renovations to the Parking Structure which will greatly impact capital expenditures in the near future, bringing Parking Services into a net deficit in operating cash balance by FY2013.

Faculty and Staff comprise of the largest parking user market on campus.
Faculty and staff account for over half (51%) of the parking space types on campus, and 42% of the local parking market (including on-street off-campus parking). See Figure 4-2 for a breakdown of parking space distribution by user group.

Figure 4-2 UH Manoa Parking Distribution by User Group, 2007

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UH Manoa’s parking supply extends beyond the campus’ boundaries.

UH Manoa students and faculty have a variety of parking options off-campus including the University Avenue/King Street commercial corridor and along Manoa Valley’s neighborhood streets. More informal parking options, such as church parking lots and household parking spaces, are also available for UH Manoa students and employees. On-street off-campus parking was estimated at 1,240 spaces in a 2007 parking study appended to the Long Range Development Plan, although this estimate is likely overstated.

The campus’ already constrained parking supply will decrease slightly over the next ten years.

The 2007 parking study stated that permit parking is currently operating at capacity and the University anticipates that this will remain unchanged in the next five years. In the next 10 years as many as 270 parking stalls may be removed. In the near-term (next five years), up to 130 parking spaces will be lost permanently due to construction projects including the Campus Center Project, the IT Center Project, and the reconfiguration of the Varney Circle Roundabout. Beyond the next five years, the loss of an additional 140 stalls is anticipated due to parking removal from Campus Road and from in front of Kuykendall Hall.

Parking revenue is expected to increase marginally this year, but more dramatically from permit parking.

In 2010, UH Manoa accumulated $5,956,042 in revenue from parking permit, daily parking and other parking sales. The projected revenue for FY 2011-2012 according to the University’s parking price increase scenarios will increase by 2.2%. The University projects that revenue from permit parking, the largest share of parking revenue, is will increase by 14.2%, assuming that demand will remain constant.

The existing UH Rideshare program is not effective, yet there is potential to increase carpool participation.

Although only 6% of affiliates carpool to and from campus, effective ride-matching services could potentially increase the capacity of carpools beyond 2 people. Eighty percent of carpool respondents participate in a 2-person carpool. Ride-matching services are an important tool to help affiliates find permanent and temporary car rides. The existing UH Rideshare program does not effectively market its ride-matching service, and those that have used the service do not find its interface to be user-friendly. Of the survey respondents that carpool to school, none used the ride-matching service when forming their carpool and 48% had never heard of the service.

Dedicated carpool parking is limited, but efforts to increase dedicated parking spaces are increasing.

UH Manoa promotes employee carpooling by awarding carpool parking passes through a lottery system. In FY 2012, $750 will be allocated for signage to designate preferred parking for carpool spaces in upper campus parking zones.

Gap Assessment

The following needs were identified based on the existing parking conditions.

- Improve management of short-term parking supply
- Capture a larger pool of carpoolers by re-envisioning how ridesharing is marketed and operated
• Vanpool, carpool, and car-share support
• Social network integration into ride-matching

POTENTIAL ACTIONS

Ridesharing and Carsharing

The following strategies aim to make automobiles available to affiliates on an on-demand basis. This could potentially reduce superfluous parking demand and making UH Manoa’s parking system more efficient.

AP1 Overhaul the UH rideshare system and marketing/Enroll in ZimRide

Target travel market: Drive alone affiliates.

Description: A key finding in the Existing Conditions Report is a lack of marketing and use of the existing UH rideshare system. UH Manoa, either coordinated with the UH system or as a standalone campus transportation improvement, should redesign the online ride matching interface and amenities. One attractive option for the rideshare system overhaul is to enroll in ZimRide—a social network ridesharing platform that provides tailor-fit software and applets, external marketing, and on-the-fly performance measurement and monitoring.

This service also provides real-time ride matching and market-based financial contribution (car owners set the price). Users can search for one-time rides or daily carpools/vanpools. Each user sets up a commute profile that can be viewed by affiliates seeking to find rides to and/or from campus. On the profile, users may provide feedback on each user's behavior, vehicle condition, and commute experience. In addition, a personalized commute calendar is offered (described in Strategy P1).

Implementation considerations: This strategy could be further streamlined if implemented, administered, and monitored by an institutional transportation management association serving the Manoa Valley (see Strategy P4).

ZimRide provides all marketing collateral, which alleviates staffing time required by UH staff to develop and distribute materials.

Source: ZimRide
AP2 Offer peer-to-peer (P2P) car rental

Target travel market: Resident affiliates; resident affiliates with a car parked on campus.

Description: UH Manoa should promote the use of peer-to-peer car sharing to reduce affiliates need to bring a car to campus—especially those living on-campus. Car owners use this service to rent out their vehicle people without access to a car, which typically nets active users between $2,200 and $2,800 per year. This has potential to attract a large pool of cash strapped students. Examples of third party peer-to-peer platforms include WhipCar (http://www.whipcar.com/) and Getaround (http://www.getaround.com/). This type of car share service will reduce parking demand at the residential dormitories by offering a vehicle on an on-demand basis.

Implementation considerations: Because UH Manoa is in the process of establishing Enterprise’s new carsharing service (WeCar), any peer-to-peer car rental service would serve as a supplement to WeCar.

An important component of implementing peer-to-peer car rental services in Hawai‘i is to change the state’s insurance laws to allow for multi-user umbrella insurance policies that circumvent other insurance policies. This type of legislation has recently been passed in California and Oregon, while Washington, New York, and handful of other states are in the process of amending their insurance laws. In order to initiate this type of legislation, UH Manoa would need to engage their state representatives to support and champion such a policy.

PARKING MANAGEMENT

The following parking management strategies aim to improve parking efficiency, relieve parking demand pressure through pricing and alternatives, and improve traffic conditions on campus and in the surrounding Manoa Valley neighborhood.

AP3 Develop parking buy out benefit

Target travel market: Drive alone staff/faculty.

Description: UH Manoa should allow employees to relinquish their semester parking permit at the beginning of each semester in exchange for a parking cash out benefit. This would be used to encourage individuals who are on the verge of using transit, but not fully decided. Rather than offer all staff and faculty a free bus pass, combine a free U-Pass with a parking permit buy out incentive—for example $200 per semester. It may be possible to encourage the first tier of staff and faculty to give up their parking permit and ride TheBus at a lower cost than giving passes to all staff and faculty some of whom will never use the pass.

Parking buy out is proven to shift SOV trips to transit. Research performed by Donald Shoup at the University of California-Los Angeles found that single occupancy vehicle trips declined by 17% and other modes increased significantly (carpooling by 64%, transit by 50%, and walking/biking by 33%) after a parking cash-out program was introduced at various urban and suburban worksites with varying levels of transit service. The analysis also found that reductions in auto trips tend to increase over time, as more employees find opportunities to reduce their driving and

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take advantage of the parking cash-out “fringe benefit.” Development of campus TDM encouragement programs will also impact mode choice over time.

**Implementation considerations:** This is an in lieu program that primarily encourages transit use, although it could shift a small segment of commuters to bicycles or even walking to campus, thereby reducing SOV trips. Strategy AT12 (Develop a Non-Motorized Transportation Commute Bonus) could be coordinated with the Parking Buy Out program. This should only be considered for implementation if the employee U-Pass is not established.

**AP4 Restructure the current parking fee proposal**

**Target travel market:** Drive alone affiliates.

**Description:** According to the parking demand and revenue projection analysis in Appendix A, anecdotal experience at the Manoa campus has shown latent demand for permit parking is relative unresponsive to price increases. Since a large portion of the parking market is unaffected by price modification, the University should further increase the permit pricing proposal to reflect market conditions. In addition, any parking permit price increase should focus more parking revenue toward alternative transportation programming.

**Implementation considerations:** The University should carefully monitor demand in order to maintain a balance between supply and demand, adjusting daily permit pricing until 85% peak occupancy is attained and no more than 90% peak occupancy for semester permit parking is achieved. This will in turn yield higher revenue for TDM programs.

**AP5 Develop a shared parking brokerage**

**Target travel market:** Drive alone affiliates.

**Description:** Shared parking passes can be developed to improve the temporal distribution of parking utilization, which in turn creates more efficient use of UH Manoa’s constrained parking supply. Shared parking passes would be provided to “matched” affiliates that typically utilize parking at inverse periods of time. The basic premise of such a system is to ensure a parking space is utilized as close to 90% of a day as possible. These passes could be re-issued on a semester-by-semester basis. This strategy is not intended to shift affiliates to alternative access modes. Rather, a brokerage would more efficiently use available parking capacity and reduce the need to construct additional parking supply even if parking is eliminated in Upper Campus. As with constructing new parking capacity this is a long-term and complex undertaking.

**Implementation considerations:** Developing a shared parking system is a complex effort requiring several steps that need time and an iron clad will to develop the system. The following are some key implementation steps to develop such a system:

- Specific parking spaces would likely require designation as shared parking spaces.
- Deploying parking passes of this nature would require UH Manoa to hire a parking broker within Auxiliary Service or restructuring existing staff resources to accommodate the new role. The parking broker would manage the program, track performance in terms of utilization and parking efficiency, and market the program.
- Instituting technology such as electronic parking gates with smart card or magnetic swipe technology to allow time-restricted access to Parking Structure.
- A shared parking pass could be priced to maximize the amount of revenue available for a given space, even though the relative permit cost for each affiliate would be less.
AP6  **Limit parking supply in Upper Campus surface lots**

**Target travel market:** Drive alone affiliates (staff/faculty).

**Description:** UH Manoa could further induce mode shift, on top of mode shift seen from the parking permit rate increase, by constraining parking supply in the Upper Campus lots. This could be coupled with more substantial permit rate increases as demand for parking is very high in these lots (near 100% utilization at all times during working hours).

**Implementation considerations:** This strategy maintains consistency with the UH Manoa Landscape Master Plan by reducing upper campus vehicle traffic, providing an opportunity to repurpose space for bicycle parking and pathways, facility development, and other balanced campus uses. Limiting supply is a highly effective way to shift campus access trips to alternative transportation; although it could have the unintended consequence of increasing the incidences of parking in the residential neighborhoods in Manoa Valley. Therefore, it must be accomplished carefully.

AP7  **Deploy a dynamic parking utilization software package and real-time electronic parking wayfinding signs**

**Target travel market:** Drive alone and carpool affiliates.

**Description:** Although UH Manoa currently uses a Twitter feed to inform affiliates of parking conditions and closures, the Auxiliary Services should consider investing in real-time electronic parking wayfinding (also known as variable messaging signs – VMS) to reduce parking search time and search-for-parking traffic in parking lots, Parking Structure, and campus streets. A supplement to this system includes an electronic space count system which can sense individual space availability and direct users to parking spaces through the use of signs located on each level. Combining real-time parking utilization software with VPS systems could greatly extend the effective availability and utilization of parking in today’s market where parking structure construction costs have greatly increased.

**Implementation considerations:** To implement this type of system, UH Manoa would need to install real-time parking software/hardware to track utilization at all parking locations. Wayfinding sign design should integrate into any proposed pedestrian/bicycle wayfinding branding strategy to limit the proliferation of excessive sign types. This should only be considered for installation in Parking Structure and Dole Street Structure as these are the facilities with the highest parking turnover.

Dynamic parking utilization software could also feed into a MyCommute real-time traveler information application (see Strategy P1). This strategy poses a de facto access management strategy by efficiently directing newcomers and visitors to kiosks and open parking spaces.

UH could also develop a planning and funding partnership with the City and County of Honolulu by making the case that this type of system could reduce weekday surface street congestion with substantial benefits for event parking search time.

AP8  **Increase preferential parking supply for carpoolers, vanpoolers, and car share vehicles near front entrances**

**Target travel market:** Carpools, vanpools, and car share.
Description: The University should incrementally increase the supply of designated carpool, vanpool, and car share parking spaces as demand for these programs increases. This will serve to encourage participation in these programs. Establishing these spaces near building entrances increases their visibility and sends the message that ridesharing and car sharing are priority access modes over single-occupant vehicles.

Increasing the availability of car share vehicles throughout campus will yield various positive benefits including reduced parking demand for resident and encouraging transit use, and providing a “missing link” in the package of alternatives to the private automobile. According to the Transportation Research Board, each car sharing vehicle takes nearly 15 private cars off the road – a net reduction of almost 14 vehicles. A UC Berkeley study of San Francisco’s City CarShare found that members drive nearly 50% less after joining.

Implementation considerations: The current FY2012 allocation to dedicate carpool and carshare spaces ($1,050) with restricted parking signs should be expanded to increase to the supply of preferential parking. The University could sponsor a small carshare program (think golf cart vehicle) for university staff that need to travel through the campus or from building to building, rather than driving their own vehicle. The on-campus employee car share could be electric and recharged with solar power.

AP9 Dedicate parking spaces in Parking Structure for incidental use parking

Target travel market: Non-SOV commuters.

Description: The University should provide flexible parking spaces for non-SOV commuters to ensure that they have an emergency parking option. This is a “Plan B” strategy for those affiliates that need to occasionally haul heavy equipment, for example. This strategy would help to encourage alternative transportation use by allowing for a level of commuting flexibility. The University could limit the use of these spaces to a couple uses per affiliate to ensure the spaces are open for actual emergencies and limit abuse of the spaces. This strategy could be coordinated with Strategy AP6 – Limit parking supply in Upper Campus surface lots.

Implementation considerations: The main drawback of this strategy is that each space designated for incidental use parking reduces potential revenue for alternative transportation funding and parking facility operations and maintenance. To reduce this impact, Auxiliary Services could look for underutilized pavement space in lower campus that could be striped as incidental use parking spaces.

AP10 Provide additional parking permit fee reduction for HOV ridesharing (three or more person carpools)

Target travel market: Carpools and vanpools (3+ participants).

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8 Robert Cervero and Yu-Hsin Tsai (2003), San Francisco City CarShare: Travel-Demand Trends and Second-Year Impacts, Institute of Urban and Regional Development, http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1026&context=iurd
Description: In an attempt to increase the size of carpools and promote the use of the existing or new ride matching service, UH Manoa should develop a separate parking permit category for high occupancy carpools (e.g. those carpools with 3 or more participants). This would be extended to vanpools as well, given that the vanpool includes at least three affiliates. This permit category should be offered at a reduced price relative to the existing carpool permit. HOV carpool permits will serve the dual purpose of encouraging carpooling, while alleviating parking demand in parking zones that are consistently at or above 95% utilization. This strategy will become more attractive to affiliates as the rideshare system is overhauled (see Strategy AP1).

Implementation considerations: The potential drawbacks of this strategy are twofold. First, as this permit becomes more popular, parking revenue that supports TDM programs and alternative transportation improvements will marginally decrease. Likewise, adding a new parking permit type will require a large amount of staff and administrative processing time and updating all parking rate information materials will be costly.

AP11 Improve management of short-term parking supply

Target travel market: Drive alone affiliates without parking permits and visitors.

Description: To ensure short-term parking is set aside for short-term use, prices should be increased to limit the incidences of daily affiliate parkers taking over spaces intended for short-term use. Another opportunity is to limit the amount and increase the price of daily parking passes and develop a 2-hour parking pass intended for use by those making quick trips to campus. The goal is to adjust parking prices to maintain an 85% occupancy rate. This will both increase short-term parking supply and revenue due to turnover, and shift some existing SOV users to alternative modes of transportation.

Qualitative Evaluation

The following matrix analyzes each of the recommended actions from Chapter 4 and qualitatively evaluates them based on their benefits and conditions for implementation. The far right column shows the relative cost of each program. The matrix uses a simple three point scale to determine each strategy’s relative level of performance within each indicator—three pluses (+++) equates to substantial capacity to achieve objectives in each respective criteria, while one plus (+) indicates either an inability or limited capacity to perform well in each criterion. This qualitative evaluation is conducted in each strategy chapter.

Figure 4-3 Summary of Proposed Automobile Access and Parking Management Actions

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1: Overhaul the UH rideshare system and marketing/Enroll in ZimRide</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>Low</td>
</tr>
<tr>
<td>AP2: Offer peer-to-peer (P2P) car rental</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Low</td>
</tr>
<tr>
<td>AP4: Restructure the current parking fee proposal</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low</td>
</tr>
<tr>
<td>AP5: Develop a shared parking brokerage</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>Low</td>
</tr>
<tr>
<td>AP6: Limit parking supply in Upper Campus surface lots</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Low</td>
</tr>
<tr>
<td>Strategy</td>
<td>Mode shift effectiveness</td>
<td>Return on investment</td>
<td>Institutional Capacity</td>
<td>Funding viability</td>
<td>Potential for partner support</td>
<td>Cost Range</td>
</tr>
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<td>----------</td>
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<td>------------</td>
</tr>
<tr>
<td>AP7: Deploy a dynamic parking utilization software package and real-time electronic parking wayfinding signs</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>High</td>
</tr>
<tr>
<td>AP8: Increase preferential parking supply for carpoolers, vanpoolers, and car share vehicles near front entrances</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>Low</td>
</tr>
<tr>
<td>AP9: Dedicate parking spaces in Parking Structure for incidental use parking</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>Low</td>
</tr>
<tr>
<td>AP10: Provide additional parking permit fee reduction for HOV ridesharing (three or more person carpools)</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td>AP11: Improve management of short-term parking supply</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
5 LOCAL AND REGIONAL TRANSIT ACCESS

EXISTING CONDITIONS

TheBus/HandiVan mode share: 17%

The University’s primary transit interface is along University Avenue.

The Campus Transportation Survey found that the most popular routes used to access campus include City Express A! and Routes 1, 4, 6 and 18. City Express A! and Route 4 are the only direct frequent service routes available. Figure 5-1 displays high daily boarding and alighting stops at campus are located at Sinclair Circle (2,335), University/Metcalf (1,913), and University/Dole (896).

TheBus provides service coverage to a large portion of UH Manoa affiliates, though level of service to campus varies.

The transit market analysis conducted for this report—summarized in Figure 6-2—found that 85% of affiliates live within a quarter-mile from a bus stop, 33% live within a quarter-mile of a stop served by a local route that directly connects to campus without a transfer, and 17% live within a quarter-mile of an express route stop that directly connects to campus without a transfer. The figures below display the geographic distribution of UH Manoa affiliates and the level of service provided.

Transit ridership is expected to increase.

Using data from the Campus Transportation Survey, this Report finds that 20.9% of non-bus riders who are interested in riding the bus in the future are projected to begin taking transit in the future, which generates an estimate of 3,737 net new riders when applied to the campus population of non-bus riders.

Directness, comfort, and flexibility of transit service affect rider’s mode choice.

Survey respondents and focus group participants identified some key issues impacting transit mode choice. These include the ability to provide one seat rides to campus for long haul trips, expanded service span for feeder service connecting to express routes, vehicle overcrowding during peak hour trips, and accommodating those with inflexible schedules to increase ridership.

TheBus stops on campus have a ranging level of passenger amenities.

Another key issue is making transit a dignified transportation option by providing attractive stop amenities. Stops along University Avenue have a relatively high level of passenger amenities, while Dole Street provides almost no passenger amenities.
Figure 5-1  UH Manoa Transit Service Overview

TheBus Transit Overview
Average Daily Boardings and Alightings

Boarding  Alighting
- 80A
- 83
- 84
- 84A
- 85
- 85A
- 90
- 94
- A City Express!

Data Source: UH Manoa, City and County of Honolulu GIS, Hawaii State GIS
Figure 5-2  Fixed Route Transit Access for UH Manoa Affiliates

All Routes

Direct Local Routes

1/4 Mile Buffer Analysis

1/4 mile buffer from TheBus stop

UnH M Affiliate Addresses

Data Sources: UH Manoa, City and County of Honolulu GIS, Hawaii State GIS
Gap Assessment

The following needs were identified based on the existing local and regional transit conditions.

- Coordination between UH Manoa and TheBus to ensure transit serves the needs of campus commuters, especially for peripheral Leeward and Diamond Head trips
- More reliable, frequent, and visible transit service
- Establishing programs that make transit more flexible (such as guaranteed ride home)
- Improved passenger amenities for TheBus
- Information at transit shelters, especially non-regular system users

POTENTIAL ACTIONS

This section provides recommendations for improving transit access to and from campus, specifically related to TheBus. While the University does not have control over service area expansion of TheBus, capital improvements to on campus stops will encourage a greater portion of those who live within walking distance of TheBus stops to ride transit.

T1 Expand U-Pass program to summer months

Target travel market: Drive-alone affiliates; summer course/research commuters.

Description: University affiliates expressed discontent with the discontinuation of the U-Pass program during the summer months. By extending transit passes for use in the summer, either at a marginal cost or for free, transit use would likely increase for the administrative staff, research staff, faculty and student travel markets. As noted before, this offering could substantially impact mode shift to transit.

Implementation considerations: This strategy is currently being pursued. It might be useful to develop a pilot program to evaluate the costs, benefits, and usage of expanding the student U-Pass program.

T2 Expand U-Pass program to faculty/staff and professional degree programs

Target travel market: Existing drive-alone faculty, staff, and professional degree students.

Description: The University plans to extend the U-Pass program to faculty, staff, and students at the law school and medical school. By providing transit passes at a marginal cost or for free, transit may become a more appealing mode of travel to non-transit users. The effect of extending the UH Manoa U-Pass program to faculty, staff, and professional students may have a profound impact on transit use. Studies at UCLA and the University of Washington (Seattle) found that U-Pass programs increase transit to campus trips by between 44-145%.

Implementation considerations: Prior to developing an agreement with TheBus, the University should negotiate higher level of service in return the U-Pass. This will require the University to take a stronger stance using funding as a bargaining tool to improve transit service

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9 Jeffrey Brown, Daniel Baldwin Hess, and Donald Shoup (2003). *Fare-Free Public Transit at Universities*. http://shoup.bol.ucla.edu/FareFreePublicTransitAtUniversities.pdf
along the University’s most popular routes. It is important to note that for most faculty, the cost of a transit pass is not the missing link that is hinder their use of public transportation. Rather, it is the level of service along key direct routes such as Route 4 and City Express A!. The University must put itself in a position to use this increased revenue as leverage to improve transit service to the campus. The gaps and possible improvements should be identified with City and Oahu Transit Services staff and a commitment established for implementation. This must end in a formal agreement that recognizes the revenue and the specifics of the new service, including the implementation timeline.

In addition, if a transportation management association is developed and matures, the employee U-Pass could be expanded in scope to serve the Manoa Valley’s educational institutions. District-wide employee transit pass programs like this have demonstrated the ability to capture and maintain a new base of captive riders (transit users that can afford other mobility options, yet choose to take public transportation). A recent pilot project in Boulder, CO’s Boulder Valley School District found that a school district employee pass program created a marked increase in regular transit use (37% of employees commute by transit at least once per week).  

A second consideration which may be less costly as a first step is to encourage individuals who are on the verge of using transit, but not fully decided. Rather than offer all staff and faculty a free bus pass, combine a free U-Pass with a parking permit buy out incentive—for example $200 per semester. It may be possible to encourage the first tier of staff and faculty to give up their parking permit and ride TheBus. (see Strategy 5F) at a lower cost than giving passes to all staff and faculty some of whom will never use the pass. The precise values to be used need further evaluation. The purpose here is to present the concept.

**T3  Focus investments on campus stop enhancements**

**Target travel market:** Existing and interested transit users.

**Description:** This strategy includes installation of real time transit displays, clear signage, shade elements like shelter structure and trees, and seating at bus stops. The ability to easily locate bus stops, wait in a weather-protected kiosk, and determine bus arrival and departure schedules helps create a dignified and comfortable mode of travel. Beyond providing transit signage on campus, University-bound buses should be branded to help users traveling to campus locate appropriate buses. By partnering with TheBus and/or purchasing advertising space, UH Manoa could help affiliates more easily identify the service area of TheBus that provides a direct connection to campus.

**Implementation considerations:** In order to convince TheBus to invest funds into high activity stop infrastructure, the University will need to fully or partially fund them or develop a cost sharing program or partnership with other organizations and the City to install new amenities.

The University should establish an annual effort to identify the largest gaps between the availability or capacity of service and establishing a priority for them to be addressed. It is understood that the University already meets with TheBus, this just becomes a specific part of the annual work program.

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11 Boulder Valley School District website, [http://bvsd.org/transportation/toschool/eco-pass/Pages/default.aspx](http://bvsd.org/transportation/toschool/eco-pass/Pages/default.aspx)
Qualitative Evaluation

The following matrix analyzes each of the recommended actions from Chapter 5 and qualitatively evaluates them based on their benefits and conditions for implementation.

**Figure 5-3  Summary of Proposed Transit Access Actions**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1: Expand U-Pass program to summer months</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>Moderate</td>
</tr>
<tr>
<td>T2: Expand U-Pass program to faculty/staff and professional degree programs</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>T3: Focus investments on campus stop enhancements</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
6  RAINBOW SHUTTLE ACCESS

EXISTING CONDITIONS

Rainbow Shuttle mode share: 3%

Rainbow shuttle regularly serves a small segment of affiliates, but more use the service on an infrequent basis.

Rainbow shuttle is a valuable campus connectivity mode that has been used by roughly one-third (33%) of survey respondents in the last six months. The majority of recent riders (about 61%) are considered casual users of the service (those using the service once per week or less), shown in Figure 6-1. Only 17% of users ride at least once every day.

Figure 6-1  Frequency of Shuttle Use

Universe: Respondents that have used Rainbow Shuttle in the last 6 months
Source: 2011 UH Manoa Campus Transportation Survey

Rainbow Shuttle does not optimally serve desired campus travel patterns.
Although stop data is not available, focus group participants and field work observations suggest that some of the routes do not optimally serve the University affiliates. Some routes and stops need consolidating and a full re-structure of the system may be in order. Additionally, different shuttle routes peak at different times—a reality that is not reflected in the service. Shuttle service during the peak travel periods experience substantial intersection delay along several points on University Avenue.

**Rainbow Shuttle lacks effective marketing and stop amenities.**

Stop locations, routing, general service information are not marketed effectively and there is no recognizable brand to make the service exciting and attractive. Sixty-two percent of affiliates that do not currently use the Rainbow Shuttle are unaware of shuttle routing and schedules. Stop infrastructure is basic and there is some concern about the ability to serve persons with disabilities—a market that would see great benefit to a more accessible shuttle system.

**Gap Assessment**

The following needs were identified based on the existing Rainbow Shuttle conditions.

- Redesign of the Rainbow Shuttle system to improve circulation, access, performance, and legibility
- Overhaul of transportation data collection and monitoring procedures
- Improved passenger amenities for Rainbow Shuttle passengers
- Branding and marketing of the Rainbow Shuttle service
- Peak feeder shuttle route to better connect affiliates to inbound and outbound express routes in the AM and PM peak periods
- External feeder network to connect nearby transit stops to Campus Center, filling the “last mile”

**POTENTIAL ACTIONS**

The following strategies seek to improve the operation, visibility and reputation of UH Manoa’s Rainbow Shuttle. The Rainbow Shuttle could be elevated from a campus circulator to a high quality connector service between neighboring destinations.

**RS1 Re-design the Rainbow Shuttle system to better serve demand generators**

**Target travel market:** Internal campus trips; downtown transit connections; adjacent neighborhoods riders.

**Description:** Rainbow Shuttle should be re-designed to better serve on- and off-campus demand generators, integrate with TheBus system (last-mile connections), and attract ridership through attractively branded and highly visible passenger information, maps, and web interface. The current route structure:

- Is circuitous in some cases;
- Duplicates service;
- Stops at low demand destinations; and
- Creates reliability issues (i.e. schedule adherence).
Scheduling and frequencies could be augmented to match the varying peak shuttle ridership periods. The system could also be re-designed to accommodate remote stops near King Street to provide an intermodal transfer location for TheBus’ Route 1 (see Strategy RS2). By expanding access to campus through the Route 1/Rainbow shuttle interface would tap into the long haul transit users market (specifically the Route 1 travel shed between Kalihi and Hawai‘i Kai). Providing Rainbow Shuttle service to and from King Street stops would expand campus access to affiliates living along Routes 1 and 1L, especially during peak period service. Costs will ultimately depend on routing and service span.

**Implementation considerations:** Route restructuring will likely require an additional shuttle study including a route-by-route and stop-by-stop ridecheck analysis to determine precise service adequacy, reliability issues, and peak travel periods. An on-board survey should also be conducted to determine demand for increased service frequency, service span, and other levels of service indicators. Empirical research suggests that improving route structure to make service more efficient can increase ridership by up to three times the boardings observed before the restructuring.  

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Case study: Campus Shuttle System Redesign, Western Kentucky University

Service Structure and Improvements

Western Kentucky University (WKU) in Bowling Green, Kentucky has a population of over 20,000 students, faculty, and staff. The WKU Campus Master Plan establishes the importance of its shuttle system by prioritizing the service as the preferred circulation mode used to reduce congestion. The WKU Shuttle service operates three routes that move passengers from point to point on campus (including perimeter parking lots), and one route that transports passengers to and from area shopping, recreation, and housing centers. This service underwent a redesign to improve ridership.

Between 2004 and 2010, WKU saw ridership on its campus shuttle bus system double. According to a survey completed by the WKU Parking and Transportation office in 2008, increases in the campus shuttle ridership can be largely attributed to route adjustments that meet the needs of customers, improvements in reliability and frequency of service, and new transit equipment. Capital improvements such as a new maintenance facility and replacement of school buses with low-floor, wheelchair accessible buses have contributed to the system’s success.

Several objectives imbedded in the Campus Master plan will help the WKU Shuttle system continue to serve the needs of campus. As new buildings are constructed, the number and location of shuttle stops will be reviewed. Likewise, coordination with the City of Bowling Green to create a city-wide mass transit system that is integrated with the campus community is ongoing.

Funding

The FY2007 operating budget of the WKU shuttle bus was $750,000. One third of this funding comes from the school general fund, while the remaining two-thirds is funded by parking fee revenue.

Application for UH Manoa

This is an important lesson for UH Manoa as its service currently exhibits operation inefficiencies and relatively low ridership. As was the case with WKU, redesigning a campus shuttle can yield immediate benefits in terms of improving speed, frequency, and reliability.

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13 Western Kentucky University 2010–2022 Master Plan Update, July 2011
RS2  Designate drop-off locations connected with existing or proposed remote shuttle stops

**Target travel market:** Drop-off affiliates, transit users.

**Description:** As a sub-component part of Strategy RS1, UH Manoa should work with the City and County of Honolulu to accommodate remote connections in the McCully-Mo‘ili‘ili district or other locations deemed appropriate to serve latent demand for shuttle service. A key component of this strategy is to increase the visibility of the Rainbow Shuttle as a service distinct from TheBus by providing stop amenities, transit information, and branded stop identification signs. These connections would likely run only during the AM/PM peaks to accommodate express bus routes.

By serving this connection, transit users, especially those using peak hour express routes (e.g. Route 1L), can be assured a more convenient connection to King/Beretania transfer locations. Moreover, peak hour vehicle loading/crowding issues on TheBus routes leaving directly from campus could be mitigated by this type of feeder.

**Implementation considerations:** This strategy should coordinate with a shuttle service redesign study or comprehensive operational analysis. In addition, if the Rainbow Shuttle is redesigned to include a peak hour Manoa Valley circulator for local primary schools, coordinating this service could be administered through a future Transportation Management Association.

As a provision of this strategy, the University should hire additional Campus Security staff to patrol major TheBus/Rainbow Shuttle stop transfer points and new remote stop locations. This would ensure that users feel safe during early morning and late night transit service hours. Many survey respondents and focus group participants expressed feeling discomfort when taking transit or the Rainbow Shuttle due to perceived personal security issues at night.

RS3  Target shuttle stop investments to improve system legibility and attract new riders

**Target travel market:** Shuttle riders; internal campus trips; short trips south of campus.

**Description:** Rainbow Shuttle currently offers basic or outdated stop infrastructure to shuttle riders. In addition, UH staff and affiliates are concerned about the ability to easily serve persons with mobility constraints. UH Manoa should invest alternative transportation funds in a variety of stop amenities to attract new riders and improve system legibility and passenger satisfaction. Depending on the stop location, Auxiliary Services could improve stops with benches, shelters and other shade structures, more visible route signs and system information (such as route maps /schedules), and bike parking. Curb ramps and tactile surfaces could also be provided for persons with disabilities and elderly staff members.

In addition, the University should make the Rainbow Shuttle more predictable by allowing students to track next shuttle in real time. The case study provides an example of an increasingly popular vehicle location technology.
Implementation considerations: Enhancing stops outside of campus will require permission from the City and County of Honolulu and coordination with adjacent property owners. This strategy should only be launched as part of Strategies RS1 and RS2.

Case study: Real-Time Transit Visualization

Creating a Transparent Shuttle System

Universities around the nation continue to enhance the visibility of their campus circulators by installing Automatic Vehicle Locating (AVL) systems and visualization technology. TransLoc is the most prevalent real-time visualization suite on the market—being used by over 40 universities and corporate campuses. The Raleigh, North Carolina based company helps shuttle systems implement real-time tracking tools for their vehicles that can be viewed on digital signage at transit shelters, computers, mobile phones, or any device with internet access. Yale University, a user of TransLoc, placed a touch screen monitor in the student Café outside of the main Library. As students leave the library, they can see the TransLoc map displayed on the monitor, indicating which routes are in service at that time and the location of each shuttle in order to best plan their trip.

More recently, users are afforded the ability to select a shuttle stop on the map and display the predicted number of minutes until the next bus arrives. As it delivers up-to-date visuals, this system offers a map interface that centralizes the transit system on one page as opposed to requiring users to look up specific bus routes or bus stops.

Application for UH Manoa

While the growing prevalence of smartphones may lead most regular users to access tracking information on a personal mobile device, the live interactive map may be displayed on screens around the UH campus, at transit shelters or elsewhere, to help visitors and new users learn about the system. Real-time shuttle tracking gives users a heightened sense of convenience and reliability—a critical gap in UH Manoa’s current system. UH Manoa could take advantage of the visual nature of these interfaces as they can serve as a valuable marketing tool, informing potential users of the existing services.

Qualitative Evaluation

The following matrix analyzes each of the recommended actions from Chapter 6 and qualitatively evaluates them based on their benefits and conditions for implementation.

Figure 6-2 Summary of Proposed Shuttle Access Actions

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS1: Re-design the Rainbow Shuttle system to better serve demand generators</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>Moderate</td>
</tr>
<tr>
<td>RS2: Designate drop-off locations connected with existing or proposed remote shuttle stops</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td>RS3: Target shuttle stop investments to improve system legibility and attract new riders</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>High</td>
</tr>
</tbody>
</table>
7 ACTIVE TRANSPORTATION

EXISTING CONDITIONS

Walking mode share: 25%
Biking mode share: 9%

There is a large market for pedestrian and bicycle access surrounding campus.
Active transportation could represent a large share of campus transportation given the density of
home locations within the 1-mile pedestrian and 3-mile bicycle catchment areas (or a 20-minute
commute at a leisurely pace—12-14 mph for bicycles and 3-4 mph for pedestrians), displayed in
Figure 7-1.\(^\text{14}\) A total of 43\% (8,032) of University affiliates live within walking or bicycling
distance from campus.\(^\text{15}\) Accounting for those that would be willing to bicycle beyond the 3-mile
catchment threshold, the effective bicycle market equates to 1,855 additional bicyclists, or 9,887
total potential bicyclists.\(^\text{16}\)

Providing safe walking and biking routes will encourage active transportation.

The most critical component of encouraging active transportation is to provide facilities that
make pedestrians and bicycles feel comfortable and indicate to other roadway users that they are
priority modes of transportation. The University’s key access corridors generally coincide with the
area’s high volume and high speed arterials. These primary access routes do not provide the kind
of bicycle and pedestrian facilities that would encourage the use of active transportation by a
larger share of affiliates. Affiliates typically use these corridors because they provide the most
direct route to campus. That being said, 77\% of non-bicyclist respondents would be more likely to
ride their bike to campus if there were better on-street facilities and low-stress bicycle routes.

The existing bicycle and pedestrian environment is generally perceived as unsafe.

In the past five years, seven pedestrian collisions and ten bicycle collisions were reported. A large
segment of pedestrians believe motorists do not respect the rights of pedestrians. Education and
enforcement was brought up in the pedestrian focus group as a critical need. Fifty-four percent of
all comments made during the Campus Transportation Survey’s Google mapping exercise were
related to bicycle and pedestrian conflicts and specific on- and off-campus improvements.

\(^{14}\) This roughly accounts for signal delay.

\(^{15}\) This does not include the population of affiliates that are willing to walk and bicycle more than one and three miles, respectively, to

access campus.

\(^{16}\) Uses a .231 adjustment factor, derived from data from the University of Washington.
Gap Assessment

The following needs were identified based on the existing active transportation conditions.

- Fill gaps in the bicycle and pedestrian network
- Collaboratively work with the City and County of Honolulu to address bicycle and pedestrian conflict zones
- Destination amenities for bicyclists including secure short- and long-term parking, showers, changing rooms, and lockers
- Education and enforcement for motorists to ensure pedestrians safe and comfort
- Branded wayfinding system for bicycles and pedestrians (on- and off-campus)

POTENTIAL ACTIONS

Bicycle access

Bicycling is a key campus access strategy because 43% of affiliates live within a “sweat-free” bicycling distance from campus (roughly 3-miles from campus or less). In addition, the 2011 UH Manoa Campus Transportation Survey found that 36% of respondents that do not currently use a bicycle for campus access would like to bicycle to campus. The following strategy options seek to attract this latent demand for cycling.
AT1: Develop a program to replace and increase the amount of short-term bicycle parking

**Target travel market:** Bicycle commuters.

**Description:** Provision of secure bicycle parking is a key determinant of bicycle mode choice,\(^{17}\) and adding bike parking help support the existing and latent demand for bicycling. Existing short-term bicycle parking that does not offer security from theft and damage and protection from the elements should be replaced with inverted U racks or other bike parking types that provide two points of contact to a bicycle frame.

**Implementation considerations:** Where possible, bicycle parking should be covered to protect bicycles from the wind, rain, and sunshine. Short-term bicycle parking should be well-lit and located in visible locations—preferably near building entrances. As part of this strategy, the University should require a minimum number of short term bicycle parking spaces determined by measures of unit quantity (e.g. retail space, classroom/building capacity by affiliate type) and/or the number of students and faculty each facility is designed to accommodate. Figure 7-2 provides general guidelines for short-term parking thresholds by affiliate count and square footage. Nelson\Nygaard determined that this will provide sufficient short-term parking supply for current affiliate needs. However, UH Manoa will need to monitor utilization and adjust the thresholds accordingly as facilities are installed and bicycle mode share and bicycle circulation increases.

**Figure 7-2 Guidelines for UH Manoa bicycle parking provision requirements**

<table>
<thead>
<tr>
<th>Parking type</th>
<th>Bicycle parking requirement</th>
<th>Bicycle parking requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Unit: Planned capacity</strong></td>
<td><strong>Unit: Square footage</strong></td>
</tr>
<tr>
<td>Short-term parking Classroom/Research/Office only</td>
<td>1 space for each 10 students of planned capacity. Minimum requirement is 2 spaces per building.</td>
<td>--</td>
</tr>
<tr>
<td>Short-term parking Activity centers (e.g. Campus Center)</td>
<td>--</td>
<td>2 spaces for each 2,000 s.f. of floor area. Minimum requirement is 10 spaces.</td>
</tr>
<tr>
<td>Long-term parking(^{18})</td>
<td>1.5 spaces for each 10 employees plus 1 space for each 10 students of planned capacity. This applies to all buildings.</td>
<td>1 space for each 20,000 s.f. of floor area. This applies to all buildings.</td>
</tr>
</tbody>
</table>

Source: Altered from the APBP Bicycle Parking Guidelines (2010), 2\(^{nd}\) Edition

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\(^{18}\) UH Manoa should select the measure that yields the most bicycle parking.
Harvard University recently installed high quality covered short-term bike parking. This type of parking structure provides high value to UH Manoa’s current and future bicycle commuters and low impact on campus aesthetics.

Source: Nelson\Nygaard

AT2: Develop a program to increase the amount of long-term bicycle parking

Target travel market: Bicycle commuters and on-campus residents.

Description: Increasing the amount of long-term bike parking supply, in the form of bike lockers and other secure parking facilities (such as multi-space bike cages), will increase the likelihood of long distance bicycle commuting (especially those that use a bicycle as a last mile to/from transit connection mode) and those existing cyclists with higher end bicycles, to access campus by bicycle. Research shows that providing secure parking at a destination has a significant positive effect on the attractiveness of cycling.\(^{19}\)

Implementation Considerations: Long-term bike parking facilities should be focused at major transit stops, in parking facilities, in underutilized spaces within buildings, at Lower Campus recreational facilities, at residential halls such as Hale Aloha, and near research centers. The University should consider replacing parking or restriping parking in Parking Structure to accommodate for bike cages with capacity to store up to 100 bicycles. Long-term bicycle parking should be constructed in concert with UH facility development, reconstruction, projects, and as part of the Landscape Master Plan implementation process. To ensure success of this program, Auxiliary Services should develop a strategy to consistently and randomly monitor long-term parking facilities. This will help deter bicycle theft that is currently experienced at the existing bike cage located south of Frear Hall.

Figure 7-2 (above) provides general guidelines for long-term parking thresholds by affiliate count and square footage. Nelson\Nygaard determined that this will provide sufficient long-term parking supply for current affiliate needs. However, UH Manoa will need to monitor utilization and adjust the thresholds accordingly as facilities are installed and bicycle mode share increases.

**AT3 Create full service bike stations**

**Target travel market:** Bicycle commuters.

**Description:** Full service bike stations include bike parking (potential connection with Strategy AT2), maintenance and repairs, education center (at select locations), retail shop, showers, lockers, and changing rooms. Bike stations are effective at shifting motorists to bicycles. An average of 33% and up to 65% of Bikestation® members who previously drove are now using the Bikestation® facility for the same trip. As opposed to simply creating a bike room, bike cage, or short-term bike rack, these facilities are successful because of their focus on high-quality, high value-added services geared toward new riders.

**Implementation considerations:** In order to construct and operate a bike station, UH Manoa will need to identify, not only a space to house the service, but also the funds to operate it. This can be done through multi-year sponsorship arrangements, a dedicated funding stream through the TDM program, or even through volunteer support. Cycle Manoa could play an integral role in developing a centralized bike station. The following case study illustrates how Portland State University phased in their “Bike Hub” facility.

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20 Email correspondence with Andrea White-Kjoss, Executive Director of Bikestation®. Note: Bikestation® is a non-profit service that plans, develops and operates bike station facilities. In no way does this reference to Bikestation® represent a recommendation to use their development services.
Case study: Portland State University Bike Hub

Portland State University in Portland, Oregon is a campus of roughly 30,000 students, faculty, and staff. In 2004 PSU Transportation & Parking Services started the PSU Bike Co-op (now PSU Bike Hub) in an vacant office space inside an on-campus parking garage. The primary goal of the Bike Hub is to inspire more PSU students and employees to commute by bike more often. The program offers a self-service station where students and employees can repair their bikes, get maintenance and route planning advice, and purchase basic repair parts.

Funding

PSU Bike Hub is an official alternate transportation program funded by PSU Transportation & Parking Services. Subsidies provided to Bike Hub by Transportation & Parking Services are funded by parking permit sales and citations revenue.

When Bike Co-op started in 2004, the initial startup cost of outfitting an unused office space as a bicycle repair station totaled roughly $20,000. Bike Co-op used the space free of charge (aside from improvement costs) and required an annual operating subsidy from Transportation & Parking services of about $40,000. The program had one part time employee, several student employees, and 300 members.

In 2009, PSU Transportation & Parking Services spent $500,000 on outfitting a new 2,000 square foot space for the new Bike Hub. The $500,000 covered the cost of new bicycle repair tools and work stations, as well as retail fixtures for selling bicycle parts. Revenue from membership sales, ($15 per term or $30 per year) retail sales, services, and rentals was projected to total $302,000 in FY12 (2011-2012). Operating expenses were budgeted to total $383,365 plus $54,000 in rent paid to PSU for the space, requiring a subsidy of $135,165 from Transportation & Parking Services. However, based on first and second quarter reports, a wider customer and member base has decreased the subsidy that Bike Hub will require to roughly $94,000. If the cost of renting the space is subtracted, the total operating subsidy remains the same as it was during the days of Bike-Coop, $40,000, while providing services to a greater number of people. Bike Hub now has 2 full time employees, between six and ten student employees, and 1,500 members.

Successes

In January 2010 PSU Bike Hub moved into a new 2,000 square foot space housed within the student academic and recreation center. Between January 2010 and January 2011 the Bike Hub membership grew from 300 to 1,500 members and 3,200 self-service repairs were performed. That year Bike Hub offered 45 workshops to 350 participants. Since the start of the Bike Hub in 2004, the bicycle mode share of trips has risen from 4% to 12%. Sixteen percent of students state that they use a bicycle at least once a week. The services provided by Bike Hub have helped cycling become a viable mode of access to PSU.

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21 PSU Bike Hub Website, http://pdx.edu/bikehub/bike-hub-mission-history
**AT4  Craft a bike parking duration policy**

**Target travel market:** Bicycle commuters.

**Description:** The University should consider instituting a bicycle parking duration policy to encourage bike parking turnover and preserve parking capacity especially at high demand/high activity locations. Such a policy could be administered by Auxiliary Services and enforced by Campus Services.

**Implementation considerations:** In order to implement such as policy, Auxiliary Services must establish a memorandum of understanding with Campus Security to clarify operating procedures for warning bicycle users and impounding bicycles. This policy will be more easily implemented if the University develops an optional bicycle registration program, which would offer Auxiliary Services/Campus Services direct email access to parking duration violators without penalty (see Strategy AT12).

**AT5  Develop a program to construct end-of trip facilities such as showers, locker rooms, and changing facilities**

**Target travel market:** Bicycle commuters

**Description:** A major barrier to bicycle commuting to and from UH Manoa is the lack of accessible gender neutral showers, lockers, and changing rooms. Responses from the campus transportation survey and focus group participants repeatedly stated the need for better end-of-trip facilities. Research suggests that providing showers and changing rooms at a destination equates to a significant positive effect on the attractiveness of bicycle commuting.\(^{23}\)

**Implementation considerations:** End-of-trip facilities could include small bike stations and should be coordinated with Strategy AT3. However, a more impactful program should integrate these facilities as a key element of future campus development or reconstruction/retrofit projects. The end-of-trip policy established in Chapter 3 (The Manoa Campus Access Policy) should be integrated into UH Manoa’s forthcoming “Building Design and Performance Standards” document. The UH Facilities Department should be an instrumental role player in implementing this program and policy a visible component of building renovation and construction projects.

**AT6  Improve Move with Aloha bicycle encouragement, education, and enforcement programs**

**Target travel market:** All affiliates; interested bicyclists; motorists.

**Description:** Encouragement, education, and enforcement programs could be developed to improve bicycle safety and visibility within the campus’ sphere of influence including key access corridors. These programs should be geared toward incoming students and returning motorists (including drive alone affiliates and carpoolers). This can be achieved through PSA-style postings around campus, orientation packet materials, residence halls, campus-wide email blasts, training courses, and diversion courses for traffic law violators.

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**Implementation considerations:** The University could partner with Cycle Manoa to organize, market, and administer training courses. These programs should use the Move with Aloha brand identity to develop a connection between the brand and campus safety awareness. The following case study shows how one European city promoted bicycling by exposing how “ridiculous” short car trips can be.

A second consideration for Move with Aloha is to expand the scope of its message and programs to include other modal emphases outside of active transportation such as transit use, ridesharing, and carsharing. Move with Aloha could the overarching TDM program’s brand, so every program promoting the use of alternative transportation is connected to the Move with Aloha brand identity.
Case study: “No Ridiculous Car Journeys” Campaign, Malmö, Sweden

Scandinavia is a world leader in developing effective social marketing campaigns. In Malmö, Sweden, short car trips (those less than three miles) are fairly common. To promote use of sustainable transportation modes for these short trips, the City developed a “No Ridiculous Car Journeys” campaign in 2007. By framing the issue as a shared responsibility, the campaign encourages residents to rethink how they navigate their neighborhoods by promoting cycling as a more attractive option over automobiles. One successful encouragement tool used to draw in more cyclists is a “storytelling” contest to win a bike. Residents are asked to submit a narrative of a ridiculously short car journey they made in Malmö. Once launched, the City made the campaign highly visible; half of all Malmö residents were aware of it. Although this a different context than a University environment, this case study offers insight into how UH Manoa’s TDM program could frame its own issues with short drive alone and carpool trips.

“What’s your most ridiculous car trip?”
Source: Green Citizens of Europe

24 Foletta, Nicole and Simon Field (2010), Europe’s Vibrant New Low Car(bon) Communities. ITDP.
AT7  Formalize and construct the Hipawai Place pathway connection

Target travel market:  Bicycle/Pedestrian commuters; Neighborhood parking walking flows.

Description:  The informal pedestrian trail between Pamoa Road and Woodlawn Drive is a key campus access route. As partial owner of this right-of-way, UH Manoa should undertake a design and path construction process to formalize this connection for non-motorized users. This will provide a pleasant alternative bicycle and pedestrian connection from Woodlawn Drive and Pamoa Road.

Implementation considerations:  In order to develop a pathway connection along the southeast side of Noelani Elementary to Pamoa Road the University will need to buy an easement from various landowners, including the Hipawai Corporation, the City and County of Honolulu, and various homeowners. The amount of land needed to purchase is fairly minimal and would not be cost-prohibitive. However, negotiating the transfer of ownership could be a difficult venture.

AT8  Develop a formal avenue through which to address bicycle and pedestrian issues outside of campus

Target Travel Market:  Bicycle and pedestrian commuters

Description:  In order to ensure that affiliates have safe and direct bicycle and walking routes from their homes to campus, it is necessary for UH Manoa to stay abreast of projects and policies being considered outside of the campus boundary, and provide input so that changes in the area surrounding campus will result in improvements for active transportation access. UH Manoa should appoint a person to act as a liaison between the University and surrounding committees and governments whose decisions may impact campus access for cyclists, pedestrians, and those with mobility and visual impediments. By providing feedback to the greater community, UH Manoa may see more favorable planning decisions executed.

Implementation considerations:  While there already exists a Bicycle Advisory Committee at UH Manoa, the issues discussed within the BAC must be transmitted to relevant parties outside of the University in order to present a stronger voice. The BAC may appoint one of its members to act as this liaison in a formal manner, actively contacting the City and County in order to be aware of relevant issues, and reporting back to the BAC on potential impacts.

AT9  Develop a “Bike Buddies” Program

Target Travel Market:  Interested by concerned cyclists

Description:  Bike Buddies are groups of people commuting to campus together, led by an experienced cyclist, in order to show riders safe cycling routes and get inexperience riders comfortable with the rules of the road and bicycle handling techniques. Riders meet at designated locations along a planned route so they can be “picked up” along the way, and join the ride to campus. Bike Buddies programs are becoming more common in US cities, such as Portland, Oregon’s “Bike Train” program.

Implementation considerations:  Cycle Manoa is an on campus cycling organization that may be able to provide support or administer a Bike Buddies program by assigning members in different neighborhoods to lead rides to campus. Because Cycle Manoa has an awareness of cycling issues on and off campus, they should be used as a resource to identify missing links for
commuters and identify why people are not comfortable riding to campus. Research shows that the needs of women differ from the needs of men when becoming comfortable commuting by bike. Typically, women prefer to use separated bicycle facilities as opposed to shared road space. Red Hot Ladies, a program of the Hawaii Bicycling League, conducts short educational rides specifically for women. In order to target all potential riders, UH Manoa should also provide women-specific rides through the Bike Buddies program.

**AT10 Install frontloading bike racks on Rainbow Shuttle**

**Target Travel Market:** Long-range bicycle commuters

**Description:** Front loading bike racks carry between one and three bicycles at a time. Before boarding the bus, riders who wish to take their bicycles on board notify the driver, and can quickly fold down the bike rack and load their bicycle onto it. For riders who prefer not to ride in poor weather, bike racks on shuttles make it possible for someone to get where they are going quickly and keep their bicycle with them. It also allows commuters who are coming from more remote areas to ride from their home to a bus stop and take the bus to their destination, rather than needing to walk long distances or be dropped off at a bus stop.

**Implementation Considerations:** Bike racks will be particularly important if Rainbow Shuttle expands its service beyond the campus boundary. Affiliates in remote locations will be able to complete their trip between the shuttle stop and their home, expanding the bicycle commuter market from just those areas within riding distance of campus to all area within riding distance of a Rainbow Shuttle stop.

**AT11 Develop optional bicycle registration program**

**Target Travel Market:** Bicycle commuters

**Description:** By creating a program that allows individuals to register their bicycles, people can be assured that if their bike is stolen or goes missing, campus security will be on the lookout for their bike and try to return it to its rightful owner. Bicycle registration would be optional and free, but would require users to affix a license number to the bicycle. This would not only allow campus security to identify missing bicycles, but it would also benefit the University in the event that a bicycle parking duration policy is instated. Those enforcing bike parking regulations could notify the owners of registered bicycles by email or phone if their bike was in violation of a policy and in danger of being removed from a bike rack. An incentive such as a free tune up from Cycle Manoa could be used in order to encourage people to register their bikes.

**Implementation Considerations:** In order for this strategy to succeed, it is necessary that a Memorandum of Understanding be developed with campus security in order to ensure that registered bicycles will be actively searched for if they go missing. It should also be noted that there will be administrative time and resources required in order to develop and maintain a registration database.

A secondary consideration would be to invest more funds into chip ID mechanism that can be remotely detected and hidden from sight. This would be more effective for recovering stolen bicycles than a sticker registration system that would require a very high level of effort to actively search for missing bicycles. With a remote detection system the chances of a search actually
happening are much better (various mainland start-up companies are developing bicycle tracking systems that would achieve this objective).

**AT12: Develop a Non-Motorized Transportation (NMT) Commute Bonus**

**Target Travel Market:** Bicycle and pedestrian commuters (faculty/staff only).

**Description:** The University should actively promote active transportation by incentivizing employees that bike and walk to campus. A Non-Motorized Transportation Commute Bonus would be a small employee financial benefit appended to faculty and staff paychecks. Employers across the country are investing in tracking technology to monitor their employees travel behavior in return for financial incentives. Employers often use this type of benefit to tie active transportation to employee health goals. This would be the non-motorized counterpart to the new U-Pass extension for employees. Incentive programs are proven to shift people from motor vehicle use.

**Implementation considerations:** In order to institute this type of incentive the University would need to track commuter behavior using tacking software like the MyCommute intranet site. Therefore, the NMT Commute Bonus and MyCommute software (Strategy P1) are paired strategies—the NMT Commute Bonus would not be feasible without it. Higher one-time bonuses could be provided to those employees that decide to discontinue purchasing a parking permit, serving as an active transportation -oriented parking cashout program.

In addition, the University could partner with local health care providers by creating a corporate partner for the program. This is a strategy being used across the United States.

**Pedestrian access**

Pedestrians seeking to access the UH Manoa campus are presented with major challenges and barriers that impact the directness of travel and user comfort. This strategy area focuses on opportunities to improve the pedestrian environment on- and in some cases off-campus. Specific physical improvements outside of the campus boundary are covered in the “Priority Improvements” strategy area as they fall under the jurisdicitional responsibility of the City and County of Honolulu.

**AT13 Improve Move with Aloha pedestrian education and enforcement programs**

**Target travel market:** All affiliates motorists.

**Description:** Education and enforcement programs should be developed or redesigned to improve pedestrian safety and visibility within the campus’ sphere of influence including key access corridors. These programs should be geared toward incoming students and returning motorists (including drive alone affiliates and carpoolers).

**Implementation considerations:** This can be achieved through PSA-style postings around campus, orientation packet materials, residence halls, campus-wide email blasts, training courses (see Strategy CE4 in the Campus Enhancement Strategies section), and diversion courses for
traffic law violators. These programs should use the Move with Aloha brand identity to develop a connection between the brand and campus safety awareness. To supplement this brand, education and enforcement programs should convey a strong unifying message like public health, livability, or quality of life that will resonate with the campus population.

**AT14 Broadly market and improve the nightly walking escort service**

**Target travel market:** Pedestrians.

**Description:** Walking around campus at night on and off-campus can be perceived as a personal security risk or uncomfortable for various groups of affiliates. Campus Security currently offers a walking escort service that should be more widely marketed by the Move with Aloha program and the Auxiliary Services division. This service could also be extended to walking trips into the Manoa Valley and destinations in the McCully-Mo’ili’ili neighborhood, which focus group participants identified as periodically seeing crime directed toward UH affiliates.

**Implementation considerations:** The nightly walking escort service should be structured so that officers have bicycles for their return trip. This program should be restricted for use by a single applicant (no group escorts).

**AT15 Develop and implement a pedestrian and bicycle safety action plan in coordination with the City and County**

**Target travel market:** Pedestrian and bicycle commuters.

**Description:** UH Manoa should develop a pedestrian and bicycle safety action plan to target safety hot spots and identify countermeasures and programs that might mitigate any further conflicts or safety issues. Safety improvements should target crossings, signal priority, sidewalk improvements, opportunities for access management (i.e. driveway consolidation), ADA issues that create hazards for persons with disabilities, and programs that could further promote comfort, safety, and respect for pedestrians and bicyclists.

**Implementation considerations:** Because many safety concerns related to pedestrian travel are focused outside of the campus boundary, UH Manoa must collaborate with the City and County of Honolulu Department of Transportation Services as a project partner and co-financier.

**Qualitative Evaluation**

The following matrix analyzes each of the recommended actions from Chapter 7 and qualitatively evaluates them based on their benefits and conditions for implementation.

**Figure 7-3 Summary of Proposed Active Transportation Actions**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT1: Develop a program to replace and increase the amount of short-term bicycle</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>Strategy</td>
<td>Mode shift effectiveness</td>
<td>Return on investment</td>
<td>Institutional Capacity</td>
<td>Funding viability</td>
<td>Potential for partner support</td>
<td>Cost Range</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>-----------------</td>
<td>-------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>AT2: Develop a program to increase the amount of long-term bicycle parking</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>AT3: Create full service bike stations</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>High</td>
</tr>
<tr>
<td>AT4: Craft a bike parking duration policy</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
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</tr>
<tr>
<td>AT5: Develop a program to construct end-of-trip facilities such as showers, locker rooms, and changing facilities</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>High</td>
</tr>
<tr>
<td>AT6: Improve Move with Aloha bicycle encouragement, education, and enforcement programs</td>
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<td>+++</td>
<td>+</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
</tr>
<tr>
<td>AT7: Formalize and construct the Hipawai Place pathway connection</td>
<td>+</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
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</tr>
<tr>
<td>AT8: Develop a formal avenue through which to address bicycle and pedestrian issues outside of campus</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
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<td>AT9: Develop a “Bike Buddies” Program</td>
<td>+++</td>
<td>+++</td>
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<tr>
<td>AT10: Install frontloading bike racks on Rainbow Shuttle</td>
<td>++</td>
<td>++</td>
<td>++</td>
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</tr>
<tr>
<td>AT11: Develop optional bicycle registration program</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>Low-Moderate</td>
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<td>AT12: Develop a Non-Motorized Transportation (NMT) Commute Bonus</td>
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<td>++</td>
<td>++</td>
<td>+</td>
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<td>AT13: Establish Move with Aloha pedestrian education and enforcement program</td>
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<td>+++</td>
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<td>++</td>
<td>Moderate</td>
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<tr>
<td>AT14: Broadly market and improve the nightly walking escort service</td>
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<td>++</td>
<td>++</td>
<td>++</td>
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<tr>
<td>AT15: Develop and implement a pedestrian safety action plan in coordination with the City and County</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>Low</td>
</tr>
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</table>
8 ALTERNATIVE TRANSPORTATION PROGRAMMING

EXISTING CONDITIONS

In the next five years there will be a dramatic increase in funding for alternative transportation programs

In FY 2012, UH Manoa plans to allocate $149,880 of parking revenue for alternative transportation programs. This will increase precipitously to $556,800 in FY 2013 with the implementation of the employee transit pass program. After that, funding is planned to remain at $445,000 until FY 2017.

Lack of performance evaluation limits UH Manoa’s ability to track the success of alternative transportation programs

The main issue with alternative transportation programs and initiatives is that the University is not evaluating performance. Program dissemination could never be effectively and accurately critiqued and amended without performance data. The University cannot identify which programs have been effective in encouraging alternative transportation and which ones have not.

Existing TDM Programs are generally under-marketed

Information gathered during the focus groups suggests that University affiliates are unaware of the campus’ existing transportation information resources and alternative transportation programming. Move with Aloha is a good attempt to increase the visibility of alternative transportation; however, the University could be more effective at promoting its existing transportation services.

Gap Assessment

The following needs were identified based on the existing alternative transportation programming conditions.

- More diverse and/or more reliable transportation funding sources
- Area school and college demand management partnership
- Focused initiatives for commutes originating in outlying communities
- Strategies to improve intra- and inter-campus circulation
SIDEBAR: Existing TDM Infrastructure

UH Manoa has a solid organizational and support backbone to develop a successful TDM program. Below is a list of existing services and conditions that serve as critical TDM “infrastructure”:

- Forward thinking UH Administration
- TDM Coordinator
- Bicycle Parking program
- Kukui Cup
- Student/Faculty intellectual capital (e.g., Makahiki software)
- Cycle Manoa student organization
- Bicycle Advisory Committee
- Departmental parking coordinators
- Student U-Pass
- Move with Aloha

POTENTIAL ACTIONS

This section provides recommendations for extending the existing base of TDM programs and expanding the TDM program into new areas of multimodal transportation promotion and making mobility-related information available. Another key goal of this section is to extend UH Manoa TDM “infrastructure” by applying new technologies and institutional structures that help to deploy programs and monitor progress.

P1  Develop a personalized MyCommute intranet site

Target travel market: All non-resident affiliates.

Description: This strategy is focused primarily toward the UH staff and faculty and is included to help describe how a more aggressive parking management program, that includes pricing, could be developed in a way that is (and would be perceived as) less punitive to employees. Institutions are using personalized commuter programs as means to implement more holistic transportation management programs, reduce the need for expensive parking facilities, and to communicate the health and financial benefits of using alternative transportation. Typical features provided by MyCommute software include:

- Commute information and program matching to meet affiliate needs
- Performance tracking (ridership, bicycle use, etc.)
- Central location for information, incentives, travel profiles, etc.
- Commuter calendars (links into performance measurement)
- Potential new platform for ridematching (if Strategy AP1 is not pursued) and shared parking brokerage
- Dynamic transit and parking updates (including SMS rider alerts for transit or shuttles)
• Supplemental mobile phone app interface for transportation information on the fly and commuter calendars en route
• Trip planners
• Parking management and revenue collection
• Transportation benefit management and distribution (staff/faculty only)
• Environmental and health benefits tracking

The interface of MyCommute programs operate as intranet websites and can provide affiliates with a range of information on their commute options and reduce demand at relatively little cost simply by raising awareness.

**Implementation considerations:** The application of a personalized commute program can range from a simple informational tool to a fully integrated program that tracks student/staff parking access and shuttle use through University identification cards and ties parking charges and alternative commute bonuses (employee-only feature) directly to the University’s human resource and payroll department.

This is a high cost application that will likely require the University to secure grant funding. In the mean time, ZimRide could act as a stand in program before the University has the funds to develop a customized Manoa campus intranet site.

**P2   Develop a centralized transportation information clearinghouse**

**Target travel market:** All affiliates; all modes.

**Description:** The University should develop a centralized transportation information clearinghouse in the form of a standalone website and a campus access mobile app. University affiliates generally reflected that transportation information was difficult to obtain or that they were unaware of the campus’ transportation offerings.
**Implementation considerations:** This strategy could coordinate with the branding and content development for transportation information kiosks (see Strategy P8), a MyCommute intranet site (see Strategy P1), or even a transportation management association’s information clearinghouse (see Strategy P4).

**P3  Deploy more effective transportation marketing strategies**

**Target travel market:** All affiliates; all modes

**Description:** UH Manoa’s transportation programs are largely unseen by the University’s commuting population. Improved branding, deployment strategies such as events, social networking, attractive materials, and promotional tools can increase the visibility and attractiveness of many of the University’s existing TDM programs. Additional marketing efforts may include:

- Multimodal guide for walking, bicycling, transit, ridesharing, parking and programs like Guaranteed Ride Home, carsharing, etc.
- Highly streamlined and attractive bike maps/routes.
- Orientation events and information packets for new employees and students.
- Special events like bike and transit-to-work week, safety programs and group rides/walks.

Another approach is for UH Manoa to develop culturally specific messaging for its promotional efforts. The Move with Aloha initiative is a good example of program messaging that resonates with the Hawai’ian culture. Below is a case study of another messaging scheme geared towards active transportation promotion and education.

**Implementation considerations:** In order to save staff time and limited funds, this strategy should be implemented using existing resources. Existing staff within Campus Services Marketing and Communications team is well-equipped to develop high quality and coordinated marketing schemes for the TDM program. In addition, Auxiliary Services’ TDM coordinator should consider hiring student intern support for marketing programs.
In order to effectively market its alternative transportation programs to the university community, UH Manoa should focus on developing messages that resonate with the local Hawaiian population. One example of this type of messaging is the HO’ĀLA program. Between 2009 and 2011 researchers conducted a project titled “Hawaii’s Opportunity for Active Living Advancement” or “HO’ĀLA” which in the Hawaiian language means to “wake up.” Spurred by the passing of Complete Streets and Safe Routes to School legislations in 2009, the project surveyed parents and school children about the mode of travel they use to get to school. The Hawaii Safe Routes to School initiative was then able to publicize findings from the survey in a way that resonates with the Hawaiian community. The research showed strong support for the need for Safe Routes to school, with 40% of parents surveyed stating that they would allow their child to walk or bike to school if there was a safer route. The project, which assessed the ability of Safe Routes to School legislation to address childhood obesity in Hawaii, also embodied the need for incorporating active living into everyday life through the title, HO’ĀLA.25

P4  **Form an institutional transportation management association (TMA)**

**Target travel market:**  All affiliates; all modes.

**Description:**  Transportation Management Associations (TMAs) are typically non-profit, member-controlled organizations that offer transportation services and commuter information in a particular area, such as a commercial district, or in the case of UH Manoa, an area with a high concentration of institutional/educational uses. TMAs typically operate as public-private partnerships, and seek to increase transportation options, provide financial savings for users, reduce traffic congestion and parking problems, and reduce pollution emissions.

Several educational institutions neighbor UH Manoa’s campus, creating an opportunity to collaborate and pool resources as a way to effectively deliver transportation options and programs to the broader travel market. The Punahou School, Mid-Pacific Institute, University High School, Chaminade University of Honolulu, and several elementary schools are all located in proximity to one another and UH Manoa, which makes such an effort feasible.

The formation of a united constituency in the Manoa Valley would help address transportation issues beyond UH Manoa’s campus boundaries and perhaps provide a greater source of leverage when asking for funding and/or improvements from City, regional, and State agencies. This is largely due to its ability to institute regional congestion management and mitigation measures. The single most attractive benefit a TMA would yield is the ability to deploy many of the strategies detailed in this plan over a broad travel market, thereby alleviating many of the existing staffing and funding capacity issues.

**Implementation considerations:**  The creation of a transportation management association would require cooperation, representation, and investment from participating institutions to expand and improve existing services, such as the Rainbow Shuttle, to a wider service area and user base. The University would need to act as lead “champion” and facilitate a process with neighboring institutions to determine:

- Feasibility, roles, and a sustainable business plan;
- Investment levels likely based on neighborhood impact; and
- A shared vision for a future TMA.

In addition, the University would need to develop a stronger relationship with the Manoa Neighborhood Board as this community body holds a large amount of political sway regarding transportation and parking related decisions in the area. A key task for the new TDM Coordinator is to inform the Board of the benefits a TMA could bring to the neighborhood (particularly parking management, congestion mitigation, better traffic enforcement, and even development of key pedestrian improvements in the vicinity of schools. Figure 8-1 displays a continuum of opportunity showing how robust a TMA can become as its constituency grows and funding increases.

Implementing a Manoa area TMA will neither be fast, or simple. Institutional characteristics and the momentum of the status quo are always difficult barriers to overcome. Some institutions may not immediately recognize the benefits that could accrue to them as a result of a TMA, or the organization may perceive that their transportation situation is quite different from the University’s, so why join with the University. The establishment of a TMA will be a long term process.
It is suggested the process begin with the University’s active pursuit of the internal TDM program and program monitoring. As the program matures, the results can be shared with institutional neighbors to show the value of the program. There are existing relationships with St. Francis and Mid-Pacific Institute that are structured around joint use of access roads. These relationships should be maintained and used as opportunities to expand the working relationship to include other aspects of transportation demand management. This expanded relationship could form the basis for formation of a TMA once the institutions each understand the potential benefits of demand management techniques and the leverage that can be gained through cooperative efforts. From that beginning, others can be asked to join the group, perhaps even before there is a formal TMA established.

**Figure 8-1  TMA continuum of demand management strategies**

<table>
<thead>
<tr>
<th>Low effort/cost</th>
<th>Moderate effort/cost</th>
<th>Major effort/cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Develop a “Bike Buddies” Program</td>
<td>- District Guaranteed Ride Home program</td>
<td>- Designate Rainbow Shuttle drop-off</td>
</tr>
<tr>
<td>- Expand scope of Move with Aloha and improve education and encouragement programs for walking and bicycling</td>
<td>- Expand U-Pass as a district institutional employee pass</td>
<td>locations in Mānālul and create a branded circulator route</td>
</tr>
<tr>
<td>- Create a formal voice for bicycle and pedestrian issues</td>
<td>- District rideshare network using ZimRide</td>
<td>- Jointly fund TheBus stop improvements and enhanced amenities</td>
</tr>
<tr>
<td>- Basic centralized transportation information clearinghouse (website only)</td>
<td>- Basic centralized transportation information clearinghouse</td>
<td>- Bike Stations/bike parking (fund/operate)</td>
</tr>
<tr>
<td>- Basic marketing of transportation strategies and initiatives</td>
<td>- Moderately aggressive marketing of transportation strategies and initiatives</td>
<td>- Develop a districtwide MyCommute intranet site</td>
</tr>
</tbody>
</table>

**P5  Create a departmental and residential hall transportation “ambassadors” program**

**Target travel market:** Resident affiliates and staff/faculty.

**Description:** Modeled after the Employee Transportation Coordinator roles developed in Washington State, each department (with a reasonable staffing threshold) and residential hall should designate a transportation “ambassador”. This ambassador position would be filled on a volunteer basis likely by environmentally-conscious staff members that are willing to act as enthusiastic promoters of alternative transportation. Ambassadors would act as the departmental/residential hall transportation information resource. Ambassadors would also produce semester reports on the success and performance of the program by administering basic travel surveys to be developed by the newly hired TDM Coordinator.

**Implementation considerations:** UH Manoa has the structures in place to establish an ambassadors program. Each department within UH Manoa designates a parking coordinator. If a parking coordinator can act as a champion for alternative transportation options, they will be a natural choice to be an ambassador. Residential hall assistants could act as the key point of contact for the ambassador program. This program could also be integrated into the Kukui Cup initiative—an undergraduate race-to-the-bottom competition using real-time energy feedback,
energy education, and incentives to induce behavioral change in the way residential hall occupants consume energy.

**P6 Encourage alternative work schedules and telecommuting/telelecturing**

**Target travel market:** Faculty/staff.

**Description:** UH Manoa should be more proactive to encourage alternative work week (AWW) schedules—including flexible work schedules and compressed work weeks—and telecommuting or tele-lecturing. This might involve allowing employees to arrive and depart campus during off-peak hours, if consistent work performance is observed. The University should actively promote telecommuting and the use of other technologies, such as videoconferencing, to reduce overall travel demand. These are highly effective strategies at mitigating large employer-based traffic impacts. Flextime reduces peak period congestion directly, and can make ridesharing and transit use more feasible. Staggered shifts can reduce peak-period trips, particularly around large employment centers. Reid Ewing estimates that flextime and telecommuting together can reduce peak-hour vehicle commute trips by 20–50%.

**Implementation considerations:** This strategy is currently an available option for University employees; however, AWW and telecommuting is not marketed or encouraged effectively. The University should consider promoting AWW and telecommuting in two ways:

- Randomly select faculty staff members to test out either AWW or telecommuting. This would familiarize affiliates with the practice of telecommuting or compressing a work week. Additionally, this method would initiate the process, rather than waiting for interested affiliates to sign up.
- Set up departmental seminars to determine feasibility of altering work schedules and working from home as well as educate faculty and staff what tools are needed to take advantage of such an opportunity.

**P7 Develop and fund a Guaranteed Ride Home program**

**Target travel market:** Non-SOV users.

**Description:** In order to encourage use of alternative transportation, the University should develop a Guaranteed Ride Home (GRH) program to provide limited free emergency rides via taxi or rental car if a medical or personal emergency arises while on campus. This type of program would require initial registration to determine eligibility. GRH programs are often seen as one of the most important encouragement tools for a TDM program. Several studies found that providing GRH services is among the most important factors in determining the effectiveness of a SOV trip reduction program.

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26 Alyssa Freas and Stuart Anderson (1991), *Effects of Variable Work Hour Programs on Ridesharing and Organizational Effectiveness*, Transportation Research Record 1321.
27 Reid Ewing (1993), *TDM, Growth Management, and the Other Four Out of Five Trips*
Implementation considerations: The University should initially create a GRH pilot program for one travel market only to evaluate usage and potential cost when applied to the broader University population. The pilot should only be open to employees at first to ensure further control of the pilot program results. The easiest market to monitor would likely be the carpool market as this group can be tracked through permit sale information. We recommend utilizing a reimbursement process with local taxi services since UH Manoa has an internal structure set up that would enable reimbursements. This will require establishing memoranda of understanding with participating taxi companies.

The GRH pilot program should be administered by the new TDM Coordinator.

P8 Install transportation information kiosks throughout campus

Target travel market: All affiliates.

Description: In conjunction with the pedestrian and bicycle wayfinding sign program, UH Manoa should construct branded and visible transportation information. These information resource centers will provide affiliates with information on alternative transportation options, upcoming events, and training courses. These kiosks could be staffed by a student transportation representative, although this would precipitously increase the cost of operating the kiosk.

Implementation Considerations: This strategy should coordinate with the University’s current plan to develop a new branded wayfinding signage system for pedestrians and motor vehicles—which includes design guidance for information kiosks. Information kiosks could also be affixed onto the covered bicycle parking structures recommended in Strategy AT2.

P9 Organize bike-to-campus week and/or a month long bike commute challenge

Target travel market: Bicycle commuters and latent bicycle demand population.

Description: The University should expand upon the success of the Bike to Manoa event by developing an annual bike-to-work week to raise awareness of bicycling as an attractive campus access mode. This should continue to be branded as Bike to Manoa. Events could include group rides, training courses, bicycle races, bicycle tours, and guest speakers. A potential upgrade would include development of a friendly competition called a bicycle commute challenge. The goal of such an event is to increase awareness of bicycle issues and to convince affiliates to bicycle to campus at least occasionally. This will, in turn, facilitate the role of marketing in encouraging incremental increases in bicycling.

Implementation considerations: The bike-to-campus week is considered a low hanging fruit program that could be fully supported by Cycle Manoa. Cycle Manoa could provide bike valet services for bike-to-campus events.

Bike commute challenges typically require developing an online personalized bicycle commute calendar to track percent of one-way trips made by bicycle and the amount of mileage clocked in. These websites can calculate the cumulative reduction of vehicle miles of travel and greenhouse gas emissions reduced. This type of online tool could be developed by UH staff that created the Makahiki software, the same suite developed for the Kukui Cup.
If the University decides to invest in the MyCommute software (see Strategy P1), the tracking the bicycle commute challenge competition results could be offered in-house at minimal cost. An event like this would likely need sponsors and partnerships to cover the cost of developing a website, materials and incentives, and potential part-time labor.

**P10  Organize a transit-to-campus week**

**Target travel market:** Current and latent transit demand population.

**Description:** UH Manoa should consider developing an annual transit-to-work week to promote transit use and get affiliates more familiar with the TheBus system and specific routes.

**Implementation considerations:** A weeklong event would require development of materials, promotional campaigns, and prizes. An event like this would likely need sponsors and partnerships to cover the cost of putting on events. Activities could include guided tours and educational seminars on how to use transit and how to bike to transit.

**P11  Develop neighborhood-based marketing initiatives for commutes originating in outlying communities**

**Target travel market:** Long haul commuters.

**Description:** The University could supplement campus-based outreach and marketing with targeted outreach to affiliates living in outlying communities. Outreach and marketing might include development of a monthly newsletter, maps, brochures, commute tip sheets and tool kits, and event schedules for bicycling, transit, ridesharing, and alternative work schedules. Events could include group bicycle rides (e.g. “Bike Trains”) and transit trips to campus, bicycle maintenance and skills training courses, and women-oriented bicycle group events. Another opportunity is to host quarterly “zip code” meetings for affiliates living in outlying zip codes. This could be used as a platform to improve rideshare program visibility, disseminate other TDM program events and offerings, and encourage use of transit.

**Implementation considerations:** Pilot target communities might include Kaneohe, Ewa Beach, Waianae, and Kailua. A potential starting point for ensuring the right communities are being targeted is to set up a dot map in Campus Center to gauge interest for mode shift in specific neighborhoods. That way, the TDM program can engage affiliate communities with demonstrable potential for behavioral change.

UH Manoa should reach out to OahuMPO and the City and County of Honolulu to share resources and potentially develop a multi-partner program with shared responsibility. It should be noted this program could be much more effective if administered by an institutional transportation management association (see Strategy P4 for more information).

**SIDEBAR:** A model neighborhood-based program like this has been implemented in Portland, OR (SmartTrips) exhibiting between a 9% and 13% reduction in SOV trips. About one-third of the neighborhood target area population either ordered materials or participated in a SmartTrips event or activity.
Qualitative Evaluation

The following matrix analyzes each of the recommended actions from Chapter 8 and qualitatively evaluates them based on their benefits and conditions for implementation.

**Figure 8-2  Summary of Proposed Alternative Transportation Programmatic Actions**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1: Develop a personalized MyCommute intranet site</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+++</td>
<td>High</td>
</tr>
<tr>
<td>If administered through a TMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2: Develop a centralized transportation information clearinghouse</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>P3: Deploy more effective transportation marketing strategies</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>If administered through a TMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4: Form an institutional Transportation Management Association (TMA)</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>P5: Create a Departmental and Residential Hall Transportation “Ambassadors” program</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Low</td>
</tr>
<tr>
<td>P6: Encourage alternative work schedules and telecommuting/telelecturing</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>P7: Develop and fund a Guaranteed Ride Home program</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>Low</td>
</tr>
<tr>
<td>If administered through a TMA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P8: Install transportation information kiosks throughout campus</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td>P9: Organize bike-to-campus week or a month long bike commute challenge</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
</tr>
<tr>
<td>P10: Organize a transit-to-campus week</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
</tr>
<tr>
<td>P11: Develop neighborhood-based marketing initiatives for commutes originating in outlying communities</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Low-Moderate</td>
</tr>
</tbody>
</table>
9 ADJACENT NEIGHBORHOOD STRATEGIES

The following strategies fall under the jurisdiction of the City and County of Honolulu and other local entities. Although UH Manoa has little to no control over their implementation, it could align with project partners to provide planning oversight and funding support for various roadway improvements. The University should act as an advocate for campus mobility and access issues. Because these strategies are not under the direct control of the University, they are not evaluated or prioritized for implementation. The University must actively engage the appropriate entities the issues affiliates face while accessing campus. The adjacent neighborhood strategies include:

**Work with TheBus to develop routes that directly serve campus (one seat rides).**

Transferring can reduce the likelihood of using transit if transfers are not timed and transfer facilities are not well-designed. This may require providing some financial support for TheBus as their current budget will not allow for substantial increases in service hours.

**Work with TheBus to increase service frequency on routes that directly serve campus.**

Improved service frequency was often requested by survey respondents and focus group participants and would increase the likelihood of transit use by all affiliate types. The elasticity of transit use with respect to transit service frequency is about 0.5, which means that a 1.0% increase in service (measured by transit vehicle mileage or operating hours) increases average ridership by 0.5%.[30] This may require providing some financial support for TheBus as their current budget will not allow for substantial increases in service hours.

**Work with TheBus to expand service span later in the night.**

Many affiliates require greater flexibility in their schedule to work or study longer than the current service provides. The University should work with the University to provide additional buses later at night. This may require providing some financial support for TheBus as their current budget will not allow for substantial increases in service hours.

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Advise the City and County of Honolulu on roadway construction, reconstruction, and restriping projects to include or improve bicycle and pedestrian facilities.

The University should serve as an advisory role on projects, policies, and programs that may impact campus access. Special attention should be allotted for bicycle and pedestrian facilities. The final plan will detail potential bicycle and pedestrian improvements that could frame discussions with the City and County.

Prioritize University Avenue and Dole crossings for high visibility enhancements.

Crossing Dole at University is not a pleasant or efficient experience for pedestrians. The University should be plugged into any discussion that deals with changes, maintenance or improvements to this intersection, including signal timing. The campus should also lobby for prioritized improvements given the flow and volume of pedestrians traveling north and south along University Avenue.

Construct/widen sidewalks to improve pedestrian comfort and safety.

Sidewalks along Dole Street, Maile Way, East Manoa Road, and Wilder Avenue should be widened to ensure pedestrian demand is met and those walking to and from campus are afforded a comfortable pedestrian experience. The University should also advocate for sidewalk construction along Metcalf and other neighborhood streets within the Manoa Valley.

Improve signal sequencing to limit pedestrian delay.

The University should work with Honolulu Department of Transportation Services to improve signal timing for pedestrians entering and exiting campus at its key access points. These efforts should be focused at the intersections of University Avenue and Dole Street, University Avenue and Metcalf Street, University Avenue and Maile Way, and Dole Street and East-West Road. Consider removing pedestrian activation during peak travel period and institute pedestrian-scaled signal phasing.
10 STRATEGY PRIORITIZATION AND PHASING

This chapter compiles the summary charts from each modal strategy chapter and evaluates how well each program performs according to six criteria (mode shift effectiveness, return on investment, institutional capacity, funding viability, potential for partner support, and cost range). This set of criteria examines how each strategy performs across various indicators of success and conditions that impact successful implementation. Taken together, the information in this chapter is intended to help UH Manoa’s transportation decision-makers prioritize the various options for investment that are considered in this Plan.

UH Manoa is operating within a constrained financial situation where each implementation decision will influence the University’s ability to implement other strategies. Therefore, it should be clarified that we do not recommend every proposed action for implementation; rather UH Manoa should seek a balance of strategies right-sized to current and potential funding. Many of these benefits will be qualitative rather than quantitative. As a result, the charts mix qualitative and quantitative measures in a simple matrix format so that strategies can be easily weighed. The results of this methodology are detailed in the next section.

STRATEGY EVALUATION

The strategies described in the previous chapters are a second pass of proposed solutions that underwent an initial screening and evaluation process. Several strategies were deemed infeasible for logistical and financial reasons—as determined by UH staff, the Campus Transportation Advisory Committee and University affiliates at the October 2011 open house —while others would not provide the benefits and mode shift potential as determined by the plan’s consultant team.

Figure 10-1 compiles all of the programs from each respective strategy area’s quantitative evaluation matrix and sorts them according to cost effectiveness. For this effort, professional judgment was used to establish qualitative “cost” and “benefit” assessments. Since this is a strategic level plan and many of the recommended projects and programs are not yet well defined, only order of magnitude cost estimates are provided rather than detailed costing. For some strategies, costs could vary widely depending upon the scope of deployment and design details. For these reasons, this chart should be used only as a starting point in prioritizing individual recommendations for implementation.
### Figure 10-1  Strategy Evaluation Matrix by Cost Benefit (CB)

#### KEY:
- +++ Substantial capacity to achieve criteria
- ++ Moderate capacity to achieve criteria
- + Limited/no capacity to achieve criteria
- ✓✓✓ High cost benefit
- ✓✓ Moderate cost benefit
- ✓ Low cost benefit

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Mode shift effectiveness</th>
<th>Return on investment</th>
<th>Institutional Capacity</th>
<th>Funding viability</th>
<th>Potential for partner support</th>
<th>Cost Range</th>
<th>CB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1: Overhaul the UH rideshare system and marketing/Enroll in ZimRide</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>P7: Develop and fund a Guaranteed Ride Home program</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AP6: Limit parking supply in Upper Campus surface lots</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AT9: Develop a “Bike Buddies” Program</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AP4: Restructure the current parking fee proposal</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AT2: Develop a program to increase the amount of long-term bicycle parking</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low-Moderate</td>
<td>✓✓</td>
</tr>
<tr>
<td>AT1: Develop a program to replace and increase the amount of short-term bicycle parking</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>Low-Moderate</td>
<td>✓✓</td>
</tr>
<tr>
<td>AT8: Develop a formal avenue through which to address bicycle and pedestrian issues outside of campus</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AP8: Increase preferential parking supply for carpoolers, vanpoolers, and car share vehicles near front entrances</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AT12: Develop a Non-Motorized Transportation (NMT) Commute Bonus</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>Moderate-High</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>P5: Create a Departmental and Residential Hall Transportation “Ambassadors” program</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>AT10: Install frontloading bike racks on Rainbow Shuttle</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Low</td>
<td>✓✓✓</td>
</tr>
<tr>
<td>P8: Install transportation information kiosks throughout campus</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>AT15: Develop and implement a pedestrian safety action plan in coordination with the City and County</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>Low</td>
<td>✓✓✓</td>
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<tr>
<td>AP9: Dedicate parking spaces in Parking Structure for incidental use parking</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>+</td>
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<td>AP5: Develop a shared parking brokerage</td>
<td>+</td>
<td>+++</td>
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<td>AP2: Offer peer-to-peer (P2P) car rental</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
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<td>Strategy</td>
<td>Mode shift effectiveness</td>
<td>Return on investment</td>
<td>Institutional Capacity</td>
<td>Funding viability</td>
<td>Potential for partner support</td>
<td>Cost Range</td>
<td>CB*</td>
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<td>AT4: Craft a bike parking duration policy</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>Low</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>T1: Expand U-Pass program to summer months</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>Moderate</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>P11: Develop neighborhood-based marketing initiatives for commutes originating in outlying communities</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Low-Moderate</td>
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</tr>
<tr>
<td>AP11: Improve management of short-term parking supply</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Moderate</td>
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<tr>
<td>P6: Encourage alternative work schedules and telecommuting/telelecturing</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
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<td>✓</td>
</tr>
<tr>
<td>AP3: Develop a parking buy out benefit</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Moderate</td>
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<tr>
<td>P3: Deploy more effective transportation marketing strategies</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>If administered through a TMA</td>
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<tr>
<td>RS1: Re-design the Rainbow Shuttle system to better serve demand generators</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Moderate</td>
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<td>T3: Focus investments on campus stop enhancements</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
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<td>Moderate</td>
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<tr>
<td>P2: Develop a centralized transportation information clearinghouse</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Low-Moderate</td>
<td>✓</td>
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<tr>
<td>RS2: Designate drop-off locations connected with existing or proposed remote shuttle stops</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>AP10: Provide additional parking permit fee reduction for HOV ridesharing (three or more person carpools)</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>AT11: Develop optional bicycle registration program</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>Low-Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>AT6: Improve Move with Aloha bicycle encouragement, education, and enforcement programs</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>AT14: Broadly market and improve the nightly walking escort service</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>P9: Organize bike-to-campus week or a month long bike commute challenge</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
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</tr>
<tr>
<td>P10: Organize a transit-to-campus week</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>AT13: Establish Move with Aloha pedestrian education and enforcement program</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>Moderate</td>
<td>✓</td>
</tr>
<tr>
<td>T2: Expand U-Pass program to faculty/staff and professional degree programs</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>Moderate-High</td>
<td>✓</td>
</tr>
<tr>
<td>P4: Form an institutional Transportation Management Association (TMA)</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td></td>
<td>Moderate-High</td>
<td>✓</td>
</tr>
<tr>
<td>P1: Develop a personalized</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+++</td>
<td>High</td>
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</table>
CATALYTIC STRATEGIES

Three strategies stood out as critical needs to jump start implementation of the Campus TDM Plan. Each of the following three strategies scored high in the qualitative evaluation, particularly in the return on investment, cost, and mode shift effectiveness criteria. In addition, these three strategies directly close the most major gaps in access to campus: a poorly routed shuttle service, no user-friendly ridematching service, and a limited flexibility for those electing to travel using alternative transportation.

- AP1: Overhaul the UH rideshare system and marketing/Enroll in ZimRide
- P7: Develop and fund a Guaranteed Ride Home program
- RS1: Re-design the Rainbow Shuttle system to better serve demand generators

PRIMARY PRIORITY STRATEGIES

The next set of strategies represent the second tier of priority projects and programs. These are generally well suited for near- or mid-term implementation, but could be more aggressive as more funding becomes available.

- P3: Deploy more effective transportation marketing strategies
- AP6: Limit parking supply in Upper Campus surface lots
- AP5: Develop a shared parking brokerage
- T2: Expand U-Pass program to faculty/staff and professional degree programs
- P4: Form an institutional Transportation Management Association (TMA)
- AT8: Develop a formal avenue through which to address bicycle and pedestrian issues outside of campus
- AP8: Increase preferential parking supply for carpoolers, vanpoolers, and car share vehicles near front entrances
- AT2: Develop a program to increase the amount of long-term bicycle parking
- AT1: Develop a program to replace and increase the amount of short-term bicycle parking
- T1: Expand U-Pass program to summer months
• P11: Develop neighborhood-based marketing initiatives for commutes originating in outlying communities
• AT9: Develop a “Bike Buddies” Program
• AP4: Restructure the current parking fee proposal
• AP2: Offer peer-to-peer (P2P) car rental
• P2: Develop a centralized transportation information clearinghouse

SECONDARY PRIORITY STRATEGIES

Although these strategies have scored lower than the catalytic and primary strategies—especially in the staff capacity and cost range criteria—several of these strategies could be deployed early in the 20-year planning horizon. Several of these low hanging fruit will be highlighted for near-term implementation in the following section, while the cost of other strategies relegate them to long-term implementation pending new revenue generation.

• T3: Focus investments on campus stop enhancements
• AT4: Craft a bike parking duration policy
• AP3: Develop Parking Buy Out Benefit
• AT12: Develop a Non-Motorized Transportation (NMT) Commute Bonus
• AT11: Develop optional bicycle registration program
• AP11: Improve management of short-term parking supply
• P6: Encourage alternative work schedules and telecommuting/tele-lecturing
• P5: Create a Departmental and Residential Hall Transportation “Ambassadors” program
• P1: Develop a personalized MyCommute intranet site
• AT6: Improve Move with Aloha bicycle encouragement, education, and enforcement programs
• AT5: Develop a program to construct end-of trip facilities such as showers, locker rooms, and changing facilities
• AT14: Broadly market and improve the nightly walking escort service
• AT10: Install frontloading bike racks on Rainbow Shuttle
• RS3: Target shuttle stop investments to improve system legibility and attract new riders
• RS2: Designate drop-off locations connected with existing or proposed remote shuttle stops
• P9: Organize bike-to-campus week or a month long bike commute challenge
• P8: Install transportation information kiosks throughout campus
• P10: Organize a transit-to-campus week
• AT7: Formalize and construct the Pamoa Road shared use path connection
• AT3: Create full service bike stations
• AT15: Develop and implement a pedestrian safety action plan in coordination with the City and County
• AT13: Establish Move with Aloha pedestrian education and enforcement program
• AP9: Dedicate parking spaces in Parking Structure for incidental use parking
• AP10: Provide additional parking permit fee reduction for HOV ridesharing (three or more person carpools)
• AP7: Deploy a dynamic parking utilization software package and real-time electronic parking wayfinding signs
FUNDING OPPORTUNITIES

As noted in the previous section, implementation scenarios for the Campus TDM Plan are dependent on the University’s ability to tap into new revenue streams. The University must identify a diverse range of reliable transportation funding sources in order to promote, market, and deploy more effective TDM programs. UH Manoa’s current funding snapshot for alternative transportation initiatives is $150,000 for FY 2012. Funding will increase to $550,000 to initiate an employee U-Pass program in FY 2013 and drops slightly to $445,000 annually from FY2014 until 2017.

Below are several funding options that could boost Auxiliary Services baseline revenue set aside for alternative transportation initiatives. Each strategy includes an assessment of potential financial contribution and the likelihood each option could be acquired given level of effort and staffing needed to obtain funding and political challenges. In the next section, these funding opportunities are applied to the baseline funding picture to create future funding scenarios that could pay for more aggressive and costly TDM strategies.

Institute a comprehensive transportation fee

As is done at college campuses across the nation, UH Manoa should consider charging a small semester fee (in the range of $5 to $50) to all students, faculty, and staff to generate revenue to maintain a financially sustainable TDM program. The fee could be assessed on a sliding scale based on an individual’s affiliate type and/or income and would pay for benefits directly returned to the affiliate in the form of general transportation improvements such as Rainbow Shuttle improvements, bicycle and pedestrian infrastructure, car sharing programs, TMA membership, and MyCommute software programming. The comprehensive fee would be incurred on top of the student transportation fee which funds the U-Pass program. Because the student transportation fee was recently increased, this type of fee would need to be introduced in the three to five year time frame.

Likelihood to secure funding: Moderate
Potential contribution: High

Make parking fines revenue generating

Revenue from parking can be increased to support campus access endeavors by increasing fine amounts to City of Honolulu charge levels and aggressively enforcing parking violation fines. It is important to note that exorbitant increases to parking violation fines combined with increased frequency of parking enforcement patrols may effectively deter people from violating parking rules and thus may not be a reliable source of revenue. Returns that pay for initial parking enforcement labor and capital investments (such as vehicles, handheld computers, etc.) could eventually diminish.

Likelihood to secure funding: High
Potential contribution: Low

Increase parking meter and daily parking prices

Parking revenue can be increased and used to fund the TDM program by increasing the daily parking rate to more adequately reflect the price of the local parking market. The daily parking
price structure should be geared toward short-term visitor parking rather than daily users that cannot find neighborhood parking or do not have a semester permit. In addition short-term parking pricing should reflect parking demand by increasing the parking charge during peak occupancy periods. This will also increase the likelihood of affiliates using alternative transportation options.

**Likelihood to secure funding:** Moderate  
**Potential contribution:** Moderate

**Sell additional advertising inside Rainbow Shuttle vehicles**

Rainbow Shuttle currently sells small advertising space inside shuttle vehicles. This funding stream could be substantially increased if large-scale advertising were developed on the interior of shuttle vehicles. This could be coupled with digital advertising displays to expand the advertising space made allowable by UH Manoa’s current shuttle operator. The University is open to leveraging retail advertising for commercial districts located along the current remote access route to McCully-Mo’ili’ili or to future route extensions. This opportunity could directly fund shuttle operations and system improvements, although this amount would not be substantial.

**Likelihood to secure funding:** High  
**Potential contribution:** Low

**Increase the cost of event parking**

Currently the cost of parking at the Dole Street parking structure and Upper Campus visitor lots during special events is $6.00 regardless of the type of event. A restructuring of event parking fees will both improve campus access and circulation during events, and also provide increased revenue for TDM programs. The University of Washington charges varying rates depending on the type of event and parking lot proximity to the event. Football game ranges from $30.00 for a car with two or fewer persons, to $25.00 for a car with three or more people in it. Attendees may also park in more remote parking lots for $15.00. Other less well attended sporting events charge between $7.00 and $15.00 depending on how convenient the parking is to the event. Parking for non-athletic evening events is $10.00 on campus. UH Manoa should raise its rates in order to more accurately reflect the cost of providing parking and also provide a disincentive for driving alone. Revenue from special event parking should be allocated to TDM programs in order to further manage the limited parking supply and encourage alternate forms of access. Because many of the highly attended special events are UH Manoa athletic events, the University should consider appropriating a portion of special event parking revenue to the athletics department to gain support for the fee increase. This revenue sharing arrangement should only be allowed if all event parking rates are increased.

**Likelihood to secure funding:** Moderate  
**Potential contribution:** Moderate

**Explore TDM funding opportunities provided by OahuMPO**

The OahuMPO Transportation Plan 2035 specifies developing a TDM program as one of its mid-range projects. This provision is anticipated for development between 2011 and 2020 at an expense of $10 million. As a major destination and trip generator in Oahu, UH Manoa should
look into the possibility of receiving funding for its TDM initiatives from the MPO. UH Manoa’s
TDM coordinator should approach the MPO with plans for reducing drive-alone commuting, and
make the case that successful TDM programs at UH Manoa will reduce congestion throughout the
regional transportation system. Additionally, grants for TDM funding should also be pursued.
Overall, more communication with the Oahu MPO will help the University be aware of funding
opportunities. This relationship may also accelerate the ability to form an institutional TMA with
OMPO joining as a catalytic partner with no specific stake in the outcome, but a more general goal
of reducing single-occupant auto travel.

**Likelihood to secure funding:** Moderate

**Potential contribution:** High

**Lobby for TDM earmarks in the State budget**

The large number of UH Manoa affiliates commuting via H1 and through downtown Honolulu
each day contributes to the area’s congestion problem. It is in the best interest of the State to
reduce congestion for environmental and economic reasons linked to pollution and inefficiency
resulting from cars sitting in traffic. By taking steps to reduce travel demand on campus, UH
Manoa is positively impacting these challenges. The UH Manoa administration should lobby state
senators and representatives to earmark funds for TDM projects, using this report as the basis for
the campus’ TDM funding need.

**Likelihood to secure funding:** Low/Moderate

**Potential contribution:** Moderate
Discussion: Section 5307 Urban Area Funds

UH Manoa is interested in competing for the Federal Transit Administration’s 5307 funding source in order to potentially expand and enhance its Rainbow Shuttle service. Urbanized areas with populations over 50,000 are eligible to receive formula funding through the Section 5307 urbanized area grant program. For urbanized areas with a population over 200,000, such as Honolulu, funds are apportioned and flow directly to a designated recipient selected locally to apply for and receive Federal funds. Currently, TheBus, as the sole transit agency in the Honolulu Urbanized Area, receives section 5307 funds. Typically, Urbanized Areas that contain multiple transit agencies designate the Metropolitan Planning Organization (MPO) as the recipient of funds, which are then allocated to local transit agencies. This is an arrangement used in many college communities including the University of Iowa CAMBUS system, North Carolina State University’s Wolfline, and the University of Arkansas’ Razorback Transit, among many other systems. Section 5307 funding is formula funding, appropriated to each recipient based on locally derived process that usually involves a combination of metrics, including the number of riders served, miles of service area, and service hours provided. Section 5307 funding apportionments, can be used for both capital and preventive maintenance of the fleet. Transit-related capital projects are eligible and typically fund 80% of projects.

If UH Manoa were to pursue 5307 funds, to be eligible it would need to expand the Rainbow Shuttle service to be open to the general public. Funding recipients are also held to strict reporting standards that may require significant new effort on the part of the University. While requirements of the Americans with Disabilities Act for complimentary paratransit service may, or may not, apply depending on the future character of service offered to the public (current would be required to offer complimentary paratransit service), this would be another consideration. Because 5307 funds are crucial to transit agencies such as TheBus, it may be more beneficial for UH Manoa to collaborate with TheBus in order to meet service needs rather than attempting to receive funding directly from the FTA.

STRATEGY SCENARIOS

The size and mix of demand management strategies implemented by UH Manoa ultimately depends on its ability to close the projected imbalance in the parking operations budget (see Appendix A for more details), generate new parking revenue, and identify new sustainable funding sources. Figure 10-2 and Figure 10-3 display the Campus TDM Plan’s phased approach to implementation given funding assumptions and anticipated impact of key recommendations that might influence the intensity of other strategies (e.g., instituting a transportation management association). Funding scenarios span across the Plan’s 20-year planning horizon (+/-) and are broken into four timeframes: Immediate (FY2012), Near-term (FY2013-2016), Mid-term (FY2017-2021), and Long-term (FY 2022 and beyond).

Each scenario is based on the likelihood of obtaining competitive and/or unrealized sources of transportation funding, which is detailed in the previous section. In addition, each scenario assumes staff time can be used for strategy implementation and determines whether new staff or existing staff can accommodate the increased TDM workload.
### Recommended strategies by funding scenario and phasing – Catalytic and Primary Priority

**Catalytic Strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Baseline</th>
<th>Moderate</th>
<th>Aggressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP1: Overhaul the UH rideshare system and marketing/Enroll in Zimride</td>
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<td></td>
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<tr>
<td>P7: Develop and fund a Guaranteed Ride Home program</td>
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<tr>
<td>RS1: Re-design the Rainbow Shuttle system to better serve demand generators</td>
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</tr>
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</table>

**Primary Priority Strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Baseline</th>
<th>Moderate</th>
<th>Aggressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3: Deploy more effective transportation marketing strategies</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AP6: Develop a shared parking brokerage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2: Expand U-Pass program to faculty/staff and professional degree programs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>P4: Form an Institutional Transportation Management Association (TMA)</td>
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<td></td>
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<tr>
<td>AT8: Develop a formal avenue through which to address bicycle and pedestrian issues outside of campus</td>
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<tr>
<td>AP8: Increase preferential parking supply for carpoolers, vanpoolers, and car share vehicles near front entrances</td>
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<tr>
<td>AT2: Develop a program to increase the amount of long-term bicycle parking</td>
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<tr>
<td>AT1: Develop a program to replace and increase the amount of short-term bicycle parking</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T1: Expand U-Pass program to summer months</td>
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<td></td>
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<tr>
<td>P11: Develop neighborhood-based marketing initiatives for commuters originating in outlying communities</td>
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<tr>
<td>AP4: Restructure the current parking fee proposal</td>
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<td></td>
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<tr>
<td>AP2: Offer peer-to-peer (P2P) car rental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2: Develop a centralized transportation information clearinghouse</td>
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</tr>
</tbody>
</table>

**TDM Program Intensity**

- **Baseline**
- **Moderate**
- **Aggressive**

**New Funding**

- Immediate FY2012
- Near-term FY2013-2016
- Mid-term FY2017-2021
- Long-term FY2022 and beyond

**Key:**
- ● Program deployment/Project initiation (corresponds to Phasing bar)
- --- Pre-deployment planning and coordination (corresponds to Phasing bar)
- ◆ Increase in program intensity (corresponds to Program Intensity bar)
- ○ Increase in program intensity due to TMA presence (corresponds to Program Intensity bar)
### Figure 10-3  Recommended strategies by funding scenario and phasing – Catalytic and Primary Priority

#### TDM Program Intensity

<table>
<thead>
<tr>
<th>New Funding</th>
<th>Baseline</th>
<th>Moderate</th>
<th>Aggressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>FY2012</td>
<td>FY2013-2016</td>
<td>FY2017-2021</td>
</tr>
</tbody>
</table>

#### Phasing

- **Immediate**: FY2012
- **Near-term**: FY2013-2016
- **Mid-term**: FY2017-2021
- **Long-term**: FY2022 and beyond

#### Secondary Priority Strategies

| T3: | Focus investments on campus stop enhancements |
| AT4: | Craft a bike parking duration policy |
| AP3: | Develop Parking Buy Out Benefit |
| AT12: | Develop a Non-Motorized Transportation (NMT) Commute Bonus |
| AT11: | Develop a program to construct end-of-trip facilities such as showers, locker rooms, and changing facilities |
| AT14: | Broadly market and improve the nightly walking escort service |
| AT10: | Install frontloading bike racks on Rainbow Shuttle |
| RS3: | Target shuttle stop investments to improve system legibility and attract new riders |
| RS2: | Designate drop-off locations connected with existing or proposed remote shuttle stops |
| P9: | Organize bike-to-campus week or a month long bike commute challenge |
| P8: | Install transportation information kiosks throughout campus |
| AT7: | Formalize and construct the Panoo Road shared use path connection |
| AT3: | Create full service bike stations |
| AT15: | Develop and implement a pedestrian safety action plan in coordination with the City and County |
| AT13: | Establish Move with Aloha pedestrian education and enforcement program |
| AP9: | Dedicate parking spaces in Parking Structure for incidental use parking |
| AP10: | Provide additional parking permit fee reduction for HOV (driving three or more person carpools) |
| AP7: | Deploy a dynamic parking utilization software package and real-time electronic parking wayfinding signs |

#### Key:
- ● Program deployment/Project initiation (corresponds to Phasing bar)
- - - Pre-deployment planning and coordination (corresponds to Phasing bar)
- - - On-going program operation and monitoring (corresponds to Phasing bar)
- ◆ Increase in program intensity (corresponds to Program Intensity bar)
- ○ Increase in program intensity due to TMA presence (corresponds to Program Intensity bar)
11 IMPLEMENTATION

TDM COORDINATOR ROLES

UH Manoa recently hired a TDM Coordinator tasked to implement, manage, and monitor demand management efforts. Due to the recent nature of the hiring, the coordinator’s key roles and tasks have yet to be fully defined. The following is a recommended list of critical tasks and roles currently not undertaken by Auxiliary Services that should fall under the purview of the TDM Coordinator:

1. **Implement and manage many of the final recommended programs from the Campus TDM Plan.** The coordinator’s immediate priority is to implement as many “low hanging fruit” strategies, as funding will permit. This will likely manifest in the form of promotional, education, and marketing efforts for existing programs.

2. **Develop strong relationships with active student groups and local advocacy groups.** The TDM Coordinator should identify liaison at various interest groups to gain feedback on programs and ideas, while maintaining a point of contact for marketing and advocacy efforts. Cycle Manoa and the Hawaii Bike League are excellent examples of organizations that need to be engaged.

3. **Develop semester reports that quantify trip reduction and shift to non-SOV modes, calculate program participation, and discuss successes and challenges.** The Coordinator should promote the success of programs using various outlets including the University website, local newspapers, local chapter of the American Planning Association, and other national outlets.

4. **Develop, manage, and analyze results from an annual campus transportation survey.** This is a critical monitoring tool that, not only gauges program success but also identifies new challenges and trends from new students, faculty, and staff.

5. **Track performance of key benchmarks including:**
   - Parking utilization study (coordinate with Auxiliary Services staff)
   - Monitor parking stays at meters annually (coordinate with Auxiliary Services staff)
   - Shuttle stop inventory
   - Collaborate with TheBus to adopt new passenger/U-Pass counting procedures
   - Conduct a shuttle ridecheck to identify stop level boardings/alightings
   - Work with Rainbow Shuttle service providers to develop detailed daily passenger counting procedures
   - Monitor bicycle parking supply and utilization

6. **Sit on various City, County, and State transportation committees to advocate for campus access issues.** The University currently lacks a voice on local and regional
transportation committees that make impactful decisions. The Coordinator could use these to build relationships and ensure plans, policies, and projects reflect the goals indicated in this Plan.

7. Write grant proposals to increase funding streams for TDM efforts (e.g. OahuMPO grants, CMAQ, and SRTS). The TDM Coordinator should also enlist the help of student interns to search and apply to grant opportunities.

8. Hire and groom one or more new TDM staff member in the mid-term and long-term phases, depending on program planned and in operation. The purpose of hiring additional staff is to re-focus the TDM coordinator’s role toward influencing policy, projects, and local, regional and state funding.

PARTNERSHIPS

UH Manoa should not embark on implementing the Campus TDM Plan in isolation. Some of the most pressing issues related to this Plan’s implementation (funding, right-of-way control, political clout, planning support) stem from the roles, responsibilities, and opportunities of other local and regional entities. The University must foster relationships with key decision-makers and potential project partners to develop consensus on the Manoa neighborhood’s goals for mobility and residential, commercial, and campus access. The University needs to frame their position as facilitating:

- Improved access to educational opportunity;
- Better quality of life for those that move within and through the campus area; and
- Mitigating regional impacts of single occupant vehicle travel for campus bound motorists traveling along H1 and other corridors of regional significance.

In larger TDM efforts with regional benefits, the Campus TDM Plan should offer a solid foundation for state and regional investment with an existing, broad-based consensus. Figure 11-1 offers a short list of potential partners and their anticipated function for plan implementation.

**Figure 11-1  Key implementation partners**

<table>
<thead>
<tr>
<th>Potential partner</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Departmental program managers at UH Manoa</td>
<td>Identify the most cost-effective use of limited funds, better utilization of existing parking resources</td>
</tr>
<tr>
<td>City and County of Honolulu Department of Transportation Services (DTS)</td>
<td>Funding, level of service improvements, data collection/monitoring</td>
</tr>
<tr>
<td>TheBus (part of DTS)</td>
<td>Funding, transit level of service improvements, data collection/monitoring</td>
</tr>
<tr>
<td>Chaminade University</td>
<td>Collaborative partner for neighborhood projects and programs</td>
</tr>
<tr>
<td>Local Health Organizations</td>
<td>Funding and program support</td>
</tr>
<tr>
<td>Local primary schools</td>
<td>Collaborative partners for neighborhood projects and programs</td>
</tr>
<tr>
<td>OahuMPO</td>
<td>Funding, technical support, TDM advocacy</td>
</tr>
<tr>
<td>Cycle Manoa</td>
<td>Program support</td>
</tr>
</tbody>
</table>
BENCHMARKING

UH Manoa should continually update and track performance data for each of its transportation programs and initiatives. By developing a monitoring program, the University will better understand how programs are utilized and how they impact travel behavior over time. Tracking mode split over time and collecting mobility related data is a not only valuable for right sizing UH Manoa’s infrastructure and TDM program investments, but also it should be viewed as a component of their funding strategy. This is especially critical if the University decides to apply for federal, state, and regional funding.

This data also provides crucial tracking of campus travel demand and the impact on vehicle volumes, parking usage and capacity. This is an important step as the University continues to work with permitting requirements of the City and County of Honolulu. The data can be used to directly show that the University’s program is functional and provides exactly the benefits promised. In the long run this activity will be very cost effective when compared to the costs of constructing and maintaining new parking supply that may be required by city permitting processes in absence of proof that the TDM program is working.

Figure 11-2 below highlights the list of available baseline data that the University collects according to key benchmarks. Figure 11-3 lists out future benchmark indicators that the University should begin monitoring as new TDM programs are deployed. Both figures note the proposed strategies that each benchmark would support.

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**Figure 11-2 Existing baseline monitoring data**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Trend/Target</th>
<th>Measure</th>
<th>Baseline</th>
<th>Data Source</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Campus Access/Mode Share</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual percent change in alternative transportation commute mode share (walking, bicycling, transit use, carpool)</td>
<td>Increase over time</td>
<td>Aggregate use of alternative transportation access mode</td>
<td>★ Transit – 17% ★ Walk – 25% ★ Bike – 9% ★ Carpool – 6% ★ Rainbow Shuttle – 3% ★ TOTAL – 60%</td>
<td>Annual Campus Transportation Survey</td>
<td>Multiple Strategies</td>
</tr>
<tr>
<td><strong>Parking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car share parking supply</td>
<td>Increase over time</td>
<td>Monitor the dedicated car share parking supply</td>
<td>4 car share vehicles (starting FY 2012)</td>
<td>UHM Parking and Auxiliary Service data</td>
<td>AP8</td>
</tr>
<tr>
<td>Benchmark</td>
<td>Trend/Target</td>
<td>Measure</td>
<td>Baseline</td>
<td>Data Source</td>
<td>Strategies</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>---------</td>
<td>----------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Ratio of University population to parking supply</strong></td>
<td>Increase over time</td>
<td>Divide the campus population by the effective parking supply annually</td>
<td>5,497 stalls 28,383 affiliates 5.2:1 affiliate to stall ratio</td>
<td>Annual UH Manoa population and UHM Parking and Auxiliary Service data</td>
<td>AP6</td>
</tr>
<tr>
<td><strong>Transit (TheBus)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TheBus Daily Boardings/Alightings at Key Stops</td>
<td>Increase over time</td>
<td>Identify major boarding and alighting locations and ensure operators accurately count activity</td>
<td>Sinclair Circle: 2,335 Dole St. &amp; University Ave: 895 University Ave &amp; Metcalf St.: 1913</td>
<td>TheBus ridecheck/Automatic passenger counters</td>
<td>T1, T2, T3, P10</td>
</tr>
<tr>
<td><strong>Rainbow Shuttle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuttle Ridership by Route (Productivity measure)</td>
<td>Increase over time</td>
<td>Average daily trips</td>
<td>D1: 404 D2: 364 E1: 174 F1: 451 H1: 102 J1: 197 N1: 52</td>
<td>UH Manoa Parking Operations passenger counts</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td><strong>Non-Motorized Transportation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle use by women</td>
<td>Increase over time</td>
<td>Cross-tabulate the percentage of women that use their bicycle as their primary campus access mode</td>
<td>8.8%</td>
<td>Annual Campus Transportation Survey</td>
<td>AT9</td>
</tr>
<tr>
<td>Miles of total bikeways/pedestrian facilities within campus sphere of influence</td>
<td>Increase over time</td>
<td>Calculate the lane mileage for bike lanes and multi-use paths from</td>
<td>Bikeways: 3.6 lane miles (2.24 bike lane miles, 1.06 miles of shared lane markings) Pedestrian facilities: No data</td>
<td>Google Earth (OTS data is not available)</td>
<td>AT7, AT8</td>
</tr>
<tr>
<td>Bicycle and pedestrian collisions with motor vehicles along or within the campus boundary</td>
<td>Decrease over time</td>
<td>Calculate the total annual number of crashes; potentially develop a crash rate with the number of trips</td>
<td>10 bicycle collisions (between 2006-2010) 7 pedestrian collisions (between 2006-2010)</td>
<td>Honolulu County Dept. of Public Health Bicycle and Pedestrian Collision reporting</td>
<td>AT6, AT13, AT14, AT15</td>
</tr>
<tr>
<td><strong>TDM Programming</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue for Alternative Transportation Programs</td>
<td>Increase over time</td>
<td>Monitor the budgeted allocation of parking revenue for alternative transportation programming</td>
<td>$149,880</td>
<td>UHM Parking and Auxiliary Service data</td>
<td>AP4, P4</td>
</tr>
<tr>
<td>Marketing Budget</td>
<td>Increase over time</td>
<td>Monitor the change in marketing budget for transportation</td>
<td>$25,000 per year</td>
<td>UH Parking and Auxiliary Service data</td>
<td>~</td>
</tr>
</tbody>
</table>
### Figure 11-3  Future benchmarks to be monitored by UH Manoa

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Trend/Target</th>
<th>Measure</th>
<th>Data Source</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpool use</td>
<td>Increase over time</td>
<td>Calculate the total number of carpool passes purchased per semester</td>
<td>UHM Parking and Auxiliary Service data</td>
<td>AP1</td>
</tr>
<tr>
<td>Carpool parking supply to demand</td>
<td>Hold constant at 90%</td>
<td>Monitor the dedicated carpool parking supply and compare to daily day/semester pass use</td>
<td>UHM Parking and Auxiliary Service data</td>
<td>AP8</td>
</tr>
<tr>
<td>Average peak occupancy rate by structure/lot</td>
<td>Maintain 85% rate</td>
<td>Survey peak/off-peak structure and lot occupancy</td>
<td>Parking occupancy counts</td>
<td>AP5, AP7</td>
</tr>
<tr>
<td>Percent of resident first-year students with cars on-campus</td>
<td>Less than 5%; decrease over time</td>
<td>Monitor parking permit sales to first-year students</td>
<td>UHM Parking and Auxiliary Service data</td>
<td>AP2</td>
</tr>
<tr>
<td>Metered parking stays</td>
<td>Decrease over time</td>
<td>Conduct a parking stay survey to determine average length of stay by block face (if on-street parking) and by lot</td>
<td>Parking stay survey</td>
<td>AP11</td>
</tr>
<tr>
<td>U-Pass Boardings (at major stops adjacent to campus)</td>
<td>Increase over time</td>
<td>Develop procedures to count UPASS users on a daily basis to generate annual usage</td>
<td>TheBus ridecheck; requires collaboration with OTS to adopt new passenger counting procedures</td>
<td>T1, T2, T3</td>
</tr>
<tr>
<td>Percent of Daily Campus Users that opt into U-Pass</td>
<td>Increase over time</td>
<td>Calculate the number of professional students that opt into the U-Pass program</td>
<td>TheBus/ASUH</td>
<td>T1, T2</td>
</tr>
<tr>
<td>Shuttle Ridership by Affiliate Type</td>
<td>Increase over time</td>
<td>Calculate the total number of trips by each affiliate type</td>
<td>UH Manoa Parking Operations annual weeklong ridecheck</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td>Shuttle Boardings at Key Stops</td>
<td>Increase over time</td>
<td>Compile the number of daily boardings at key stops</td>
<td>UH Manoa Parking Operations passenger counts</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td>Remote Stop Shuttle Boardings</td>
<td>Increase over time</td>
<td>Compile the number of daily boardings at major stops outside of campus like JCC and Puck’s Alley</td>
<td>UH Manoa Parking Operations passenger counts</td>
<td>RS2</td>
</tr>
<tr>
<td>Shuttle Cost per Passenger Trip (Cost effectiveness measure)</td>
<td>Decrease over time</td>
<td>Divide the annual number of passenger trips by the annual operating cost</td>
<td>UH Manoa Parking Operations passenger counts; annual financial reports</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td>Shuttle Passenger Trips per Hour (Productivity measure)</td>
<td>Increase over time</td>
<td>Divide the annual number of passenger trips by the annual number of service hours</td>
<td>UH Manoa Parking Operations passenger counts; annual financial reports</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td>Shuttle Passenger Trips per Mile (Productivity measure)</td>
<td>Increase over time</td>
<td>Divide the annual number of passenger trips by the annual number of service miles</td>
<td>UH Manoa Parking Operations passenger counts; annual financial reports</td>
<td>RS1, RS2, RS3</td>
</tr>
<tr>
<td>Shuttle Stop and Passenger Amenities (Quality of Service measure)</td>
<td>Increase over time</td>
<td>Inventory score of amenities such as benches, shade trees, trash receptacles, high visibility route signage, route descriptions and system maps, ADA ramps and access compliance, etc.</td>
<td>Annual shuttle amenity inventory</td>
<td>RS3</td>
</tr>
<tr>
<td>Total bicycle trips to and</td>
<td>Increase by 15% within 5</td>
<td>Calculate the total number of bicycle trips and usage</td>
<td>Annual Campus</td>
<td>AT5, AT10, P9</td>
</tr>
<tr>
<td>Benchmark</td>
<td>Trend/Target</td>
<td>Measure</td>
<td>Data Source</td>
<td>Strategies</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>from campus</td>
<td>years</td>
<td>weekly bicycle trips taken between campus and home, work, medical/personal, and shopping/entertainment destinations</td>
<td>Transportation Survey</td>
<td></td>
</tr>
<tr>
<td>Bicycle ownership</td>
<td>Increase over time</td>
<td>Calculate the total number of affiliates that own a bicycle</td>
<td>Annual Campus Transportation Survey</td>
<td>AT3</td>
</tr>
<tr>
<td>Bike parking supply and demand (peak occupancy)</td>
<td>Increase over time</td>
<td>Conduct an inventory of different parking types (short- and long-term) and determine utilization during weekday peaks</td>
<td>Semester counts (weekday by parking type)</td>
<td>AT1, AT2, AT4</td>
</tr>
<tr>
<td>Bicycle theft</td>
<td>Decrease over time</td>
<td>Identify the total number of reported thefts on an annual basis</td>
<td>UH Manoa Campus Security data/County of Honolulu</td>
<td>AT1, AT2, AT11</td>
</tr>
<tr>
<td>Alternative Transportation Program participation</td>
<td>Increase over time</td>
<td>Monitor participation for each program annually by tracking the number of non-SOV trips to and from campus</td>
<td>UH Parking and Auxiliary Service data</td>
<td>P1, P2, P3, P4, P5, P7, P8, P9, P10, P11, AT12</td>
</tr>
</tbody>
</table>
Appendix A  Parking Demand and Revenue Projections

In order to gain perspective on the future funding outlook for transportation demand management efforts, analysis of projected parking demand and revenue was conducted using two pricing scenarios developed by Auxiliary Services (see tables at the end of Appendix A for a detailed description of the scenarios). A multi-stage model was developed to describe the current parking supply and demand at UH Manoa and then estimate future parking supply and demand, as outlined below. The steps in making the model are the following:

1. Review current parking supply and demand and current population, by user group (faculty/staff, commuter students);
2. Estimate future transfers from the UH Manoa campus to the West O’ahu campus;
3. Estimate resulting future parking demand for each user group;
4. Project the effects of latent demand; and
5. Compare and summarize revenue impacts.

Input Variables and Model Assumptions

The model required numerous inputs, including:

- Campus population of commuter students and faculty/staff;
- Number of parking spaces on campus;
- Parking utilization rates;
- Future plans for campus parking;
- Current and projected revenues and expenditures.

In any model, a number of reasonable assumptions must be made. This model used the assumptions listed below:

- Manoa campus population and revenue growth projections received from the University;
- West O’ahu enrollment projections from the University of Hawai’i Institutional Research Office
- All transfers to the West O’ahu campus are coming from the Manoa campus
- Price elasticity of demand for parking was assumed to be -0.2 (i.e. a 10% increase in parking price reduces demand by approximately 2%).
- Annual inflation rate of 3%.
- Parking expense and revenue projections were provided by the University.
- Revenue projections from 2011 to 2018 were based on current budget estimates with parking fee increases calibrated to ensure adequate parking availability.
- For all parking spaces, this study uses an “effective parking supply factor” of 95 percent. Effective supply is defined as the total number of parking spaces in a lot, less the percentage of spaces that the parking operator wishes to have vacant even at the typical peak hour. Choosing an effective parking supply factor of 95% means that the operator wishes to have 5% of the parking supply vacant at peak hour. This provides a cushion of
spaces to reduce the search time for the last few available parking stalls and to allow for the dynamics of vehicles moving into and out of parking stalls during peak periods. This cushion also allows for unanticipated variations in parking activity as well as the temporary loss of spaces due to improperly parked vehicles, construction and other factors. The effective supply cushion also compensates for the loss of utilization and efficiency due to the segregation of spaces for various user groups (e.g. special events). For the purposes of this analysis, the effective supply calculation combines commuter student, visitor and faculty/staff spaces.

**Current Parking Supply and Demand**

The parking supply monitored by the campus shows a projected total commuter student and faculty/staff campus parking inventory of 4,378 spaces in 2011. Given a 95% factor, the effective parking supply for these groups is 4,159 spaces. Current estimated parking demand, as well as future parking demand, is based on parking occupancy counts conducted by the campus. Faculty/staff and commuter student demand combines to equal 3,939 spaces at peak hour, resulting in a 90% occupancy rate.

Although parking occupancy rates remain high across the Manoa campus, the number of affiliates (particularly students) parking on campus at peak hour relative to the overall number of affiliates is very small. Figure A-1 shows that the overall peak parking demand ratio is 0.19, meaning that for every five affiliates, there is one vehicle parked on campus at peak hour. This ratio is typical of universities and colleges. The Institute of Transportation Engineers (ITE) observed an average peak period demand of 0.22 vehicles per affiliate at its study sites. Peak parking ratios, though, fluctuate dramatically between commuter students and faculty/staff with rates of .09 and 0.61, respectively. This is particularly important when examining the impacts of transfers on parking demand.

**Figure A-4 Parking Ratios by User Group**

<table>
<thead>
<tr>
<th>User</th>
<th>Population (a)</th>
<th>Demand (b)</th>
<th>Peak Parking Ratio (c = b/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter Students</td>
<td>17,207</td>
<td>1,477</td>
<td>.09</td>
</tr>
<tr>
<td>Faculty &amp; Staff</td>
<td>4,042</td>
<td>2,462</td>
<td>.61</td>
</tr>
<tr>
<td>Total</td>
<td>21,249</td>
<td>3,939</td>
<td>.19</td>
</tr>
</tbody>
</table>

**Scenario Analyses**

**Future Parking Supply and Demand**

Future parking demand on the Manoa campus will be driven in large part to changes in the campus’ population and parking pricing structure. In terms of student enrollment, it is anticipated that the campus will remain relatively stable for the foreseeable future. According to the University of Hawai‘i Institutional Research Office, it is expected that transfers to the West

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31 University of Hawai‘i Manoa Campus Long-Range Development Plan, 2007 Update.
O’ahu campus will gradually increase in the coming years with many of those students coming from the Manoa campus, which will result in several vacant enrollment slots. Given the state of the economy and the strong likelihood that employment stagnation will continue, it is anticipated those available slots will be filled by students who would not have otherwise been able to attend the University of Hawaii.

The University of Hawai‘i Institutional Research Office anticipates 367 transfers to the West O’ahu campus in 2011, increasing to 626 transfers by 2016. Given the lack of information regarding their origins, this analysis assumes that all of those transfers are occurring from the Manoa campus. In order to gauge their relative impact on parking demand, this analysis examines the net transfers that occur after 2011. For example, between 2011 and 2012, there are anticipated to be an additional 89 transfers to the West O’ahu campus, all of which are assumed to be coming from the Manoa campus. Figure A-2 shows the number of expected transfers to the West O’ahu campus.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total to West O’ahu</td>
<td>367</td>
<td>456</td>
<td>494</td>
<td>534</td>
<td>579</td>
<td>626</td>
</tr>
<tr>
<td>Net from Manoa</td>
<td>0</td>
<td>89</td>
<td>127</td>
<td>167</td>
<td>212</td>
<td>259</td>
</tr>
</tbody>
</table>

Given the number of transfers and peak parking ratio of students, it is possible to calculate the parking impact of transferring students. Although students as a whole park at a peak ratio of .09 spaces per student, it is very likely that the parking ratio of transferring students is significantly higher as these students are likely transferring because they are closer to the West O’ahu campus than the Manoa Campus. As such, it is assumed for the purposes of this analysis that transferring students have a parking ratio that is triple than that of the average student. Figure A-3 shows that by 2016, there will be 70 fewer student vehicles parking in the Manoa campus lots, which will result in a negligible decrease in total campus parking demand of 1.8%.

In addition to the decrease in parking demand caused by transfer students, it is also expected that increased parking pricing will cause some affiliates to shift to alternative modes. Appendix A illustrates the parking price increase scenarios developed by UH Manoa Auxiliary Services. It should be noted that given the availability of data, this analysis model only measures parking demand for commuter student and University employees. Proposed rate increases vary based on affiliate type and location on campus with projected rate increases being considerably lower for students than they are for employees as the University does not wish to compromise students’
financial ability to access education. Figure 4-4 shows the varying parking price increases. This analysis uses a price elasticity model to gauge the impact of pricing on parking demand.

<table>
<thead>
<tr>
<th>User</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario 2A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Faculty/Staff (Upper Campus)</td>
<td>30%</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Faculty/Staff (Lower Campus)</td>
<td>25%</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Scenario 2B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>0%</td>
<td>10%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Faculty/Staff (Upper Campus)</td>
<td>0%</td>
<td>30%</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Faculty/Staff (Lower Campus)</td>
<td>0%</td>
<td>25%</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Price elasticity gives the percentage change in quantity demanded in response to a one percent change in price. In this case, the analysis determines the percent change in parking demanded in response to parking price increases. For the purposes of this analysis, we have applied a price elasticity of -0.2 (i.e. a 10 percent increase in parking price yields a roughly 2 percent decrease in parking demand). This elasticity is very conservative for a university campus as most urban universities on the West Coast observe elasticities of roughly -0.3. In addition, even parking studies at major rail that have highly inelastic parking demand stations (like Bay Area Rapid Transit in the San Francisco Bay Area) use a price elasticity figure of no less than -0.2. However, we have taken into account the unique cultural differences in willingness to pay for parking and need for flexibility observed on O’ahu. Figure A-5 to Figure A-7 illustrate the impacts of an assumed parking price elasticity of -0.2 on projected parking demand by user group.

---

32 Parking price elasticity measures change in parking quantity demanded as a result of a price change. The higher the price elasticity, the more sensitive parking consumers are to price changes. High price elasticity suggests that when the price of a parking increases, the aggregate demand for parking will drop and when parking price decreases, the aggregate demand for parking will increase. Therefore, an elasticity of -0.201 means that each 1% increase in parking price results in a 0.201% reduction in demand.
Figure A-8  Commuter Student Elasticity Curve

Figure A-9  Faculty/Staff Elasticity Curve (Lower Campus)
Parking price changes will impact demand. As noted above, the model assumes that the baseline campus parking supply for the 2011-2012 academic year will be 4,378 parking spaces, accounting for commuter stalls only. Therefore, effective parking supply is 4,159 assuming an optimal peak occupancy rate of 95%. This supply is anticipated to decrease due to revised construction program over the next five years.

Assuming an elasticity of -0.2, projected future parking demand will drop somewhat as prices rise. Given the price increases outlined in Figure A-4, a parking price elasticity of -0.2 (combined with the effects of inflation) would reduce projected parking demand from 3,939 today to 3,732 in 2017 in Scenario 2A and 3,742 in 2018 in Scenario 2B, a reduction in demand of over 5% (see tables at the end of Appendix A for a detailed description of the scenarios). Figure A-9 and Figure A-10 show that both Scenario 2A and 2B experience a drop in parking demand which slowly stabilizes over the next 10 years. The projected total surplus of campus effective supply is more pronounced in Scenario 2A in the near-term. The University will exhibit between 248 and 341 surplus effective parking supply for Scenario 2A and between 97 and 332 surplus effective parking supply for Scenario 2B between FY 2013 and FY 2018. The difference in effective surplus by parking price increase scenario is displayed in Figure A-8.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016</th>
<th>FY2017</th>
<th>FY2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>248</td>
<td>293</td>
<td>309</td>
<td>325</td>
<td>341</td>
<td>319</td>
</tr>
<tr>
<td>2B</td>
<td>97</td>
<td>210</td>
<td>283</td>
<td>300</td>
<td>316</td>
<td>332</td>
</tr>
</tbody>
</table>
Figure A-12  Parking Demand Impacts for Parking Price Increase Scenario 2A

Projected Total Demand, Assuming an Elasticity of 0
Adjusted Total Parking Demand (After Adjusting for Elasticity)
Total Projected Effective Parking Supply (95%)
Projected Total Campus Surplus

Figure A-13  Parking Demand Impacts for Parking Price Increase Scenario 2B

Projected Total Demand, Assuming an Elasticity of 0
Adjusted Total Parking Demand (After Adjusting for Elasticity)
Total Projected Effective Parking Supply (95%)
Projected Total Campus Surplus
Impacts of Latent Demand

Currently, there are a number of students parking off-campus on nearby streets in order to avoid paying parking fees and the inconvenience of trying to find limited on-campus parking. These students often use the free campus shuttles to park their vehicles and travel to campus, effectively turning the on-street spaces into a sort of satellite parking. The new availability of on-campus parking spaces due to (a) students transferring to West O‘ahu and (b) affiliates shifting to non-drive alone modes because of increased prices will allow some of these students who are primarily concerned with convenience and safety to park on-campus. This is an example of latent demand.

Latent demand is the phenomenon in which an increase in the availability of a particular good causes potential consumers to use more of that product so long as it increases their utility. In this case, newly available parking spaces will induce a certain number of students to park on-campus. However, the cost of purchasing a permit will continue to discourage many students from parking in available on-campus spaces despite of the gains in convenience and safety. In fact, parking pricing has been demonstrated to be one of two tools available (the other road tolling) to deter latent demand.\(^3\)

According to surveys conducted of students were able to deduce that roughly 2,217 students park off campus.\(^3\) Since only a portion of those students arrive at campus at the same time, there are fewer than 2,217 vehicles parked at any given time. With the potential gains in safety and convenience, it is anticipated that 1-10% of those students would park on campus at peak hour, but it is very likely that the actual number will be at the lower end of the range. This estimate provides a range of revenue impacts. For example, if the number of motorists anticipated to park in vacant on-campus spaces is underestimated, there will be more revenue than expected. On the other hand, if the number of motorists anticipated to park in vacant on-campus spaces is overestimated, there will be less revenue than expected. As such, it may behoove the University to opt for a lower, conservative figure so revenue benefits are not overstated.

Future Revenue Analysis

The parking scenarios will impact revenues with fees rising to provide more monies while motorists dissuaded from parking will drive revenues lower. Scenario 2A’s greater surplus of effective parking, spurred by a more substantial drop in demand, will impact revenue projections more severely in the near- and long-term. Although both scenarios will operate at a negative cash balance starting in FY 2012, Scenario 2A’s cash balance deficit without latent demand ranges between roughly $160,000 and $550,000 higher than Scenario 2B between 2013 and 2017 (see Figure A-11 and Figure A-12). As noted above, the latent demand of those seeking more convenience and safety will buoy revenues, but given the number of students who may opt to purchase permits, new estimated annual revenues may initially range from $9,400 to $94,000. Figure A-11 and Figure A-12 show the range of annual revenues and resulting balances from having no impacts due to latent demand to the maximum 10% impact discussed above. The figures demonstrate the long-range importance of latent demand in revenue generation.

The substantial negative cash balance is due in large part to the parking facility retrofit program seeking to fix the University’s aging parking facilities. In order to close the cash balance gap solely

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\(^3\) Moving Los Angeles: Short-Term Policy Options for Improving Transportation, RAND Corporation, 2008.

\(^3\) This reflects the weighted number of student respondents who either “strongly agreed” or “agreed” with the statement, “I drive to campus, but cannot afford a parking permit.”
through parking pricing, prices would need to increase by 40-45% in 2012 with subsequent increases of 5% from 2015 to 2017.

Since the proposed budget for alternative transportation programs does not account for any negative cash balance, we assume that such a substantial negative difference in cash balance exhibited in Scenario 2A could impact the total budget for alternative transportation programming. This could potentially require Auxiliary Services to adjust expenses if parking is to be self-supporting and be a revenue source for alternative transportation programs.

**Figure A-14 Parking Revenue Impacts for Parking Price Increase Scenario 2A**

![Figure A-14 Parking Revenue Impacts for Parking Price Increase Scenario 2A](image)

**Figure A-15 Parking Revenue Impacts for Parking Price Increase Scenario 2B**

![Figure A-15 Parking Revenue Impacts for Parking Price Increase Scenario 2B](image)
## CAMPUS TDM PLAN | DRAFT
University of Hawai‘i at Manoa

### PARKING OPERATIONS BUDGET PROJECTION
**FY 2013 - 2017**

<table>
<thead>
<tr>
<th>SCENARIO 2A 07/16/11</th>
<th>Accrual</th>
<th>Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permit Parking</td>
<td>$2,426,813</td>
<td>$2,772,575</td>
</tr>
<tr>
<td>Daily Parking</td>
<td>$2,363,450</td>
<td>$2,363,450</td>
</tr>
<tr>
<td>Parking Passes</td>
<td>$522,801</td>
<td>$535,536</td>
</tr>
<tr>
<td>Investment Income</td>
<td>$10,411</td>
<td>$10,411</td>
</tr>
<tr>
<td>Other</td>
<td>$632,567</td>
<td>$405,621</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>$5,956,042</td>
<td>$6,087,593</td>
</tr>
</tbody>
</table>

| **EXPENDITURES:**     |         |           |
| Personnel Services    | $1,116,992 | $1,201,235 | $1,321,525 | $1,321,525 | $1,361,170 | $1,402,005 | $1,444,066 |
| Utilities             | $275,215  | $302,737   | $333,010   | $366,311   | $402,942   | $443,237   | $487,560   | $536,316   |
| Outside Services      | $2,637,914 | $2,717,051 | $2,798,563 | $2,956,680 | $3,045,380 | $3,136,742 | $3,230,844 | $3,327,769 |
| Student Payroll       | $146,053  | $150,435   | $154,948   | $159,596   | $164,384   | $169,315   | $174,395   | $179,627   |
| Other Current Expenditures | $328,749 | $338,611   | $348,770   | $359,233   | $370,010   | $381,110   | $392,543   | $399,826   |
| Ceded Land Payment    | $219,404  | $230,300   | $230,300   | $265,411   | $288,414   | $297,495   | $307,180   | $316,866   |
| Retirement of Indebtedness | $47,043 | $49,084    | $51,219    | $53,465    | $55,854    | $58,365    | $61,039    | $63,917    |
| Renewal and Replacements | $489,060 | $600,000   | $1,849,000 | $777,800   | $1,222,100 | $1,464,000 | $1,415,000 | $1,411,000 |
| Alternative Transportation Initiatives | $ - | $149,880   | $556,800   | $445,000   | $445,000   | $445,000   | $445,000   | $445,000   |
| **Total Expenses**    | $5,260,430 | $5,589,453 | $7,237,214 | $6,816,821 | $7,315,609 | $7,756,434 | $7,915,568 | $8,024,386 |
| **Operating Income (loss)** | $695,612 | $498,140 | (1,018,867) | $210,120 | $164,561 | (60,722) | $2,826 | $127,264 |

| **CASH BALANCE**      | $489,195  | $987,335   | (31,533)   | $178,587   | $343,148   | $282,426   | $285,251   | $308,021   |

| **WORKING CAPITAL**   | $(831,575) | $(898,036) | $(1,006,503) | $(1,015,585) | $(1,048,739) | $(1,083,428) | $(1,119,647) |

| **NET CASH BALANCE**  | $489,195  | $155,759   | $(929,568) | $(827,917)  | $(672,437)  | $(766,313)  | $(798,177)  | $(811,625)  |
# Parking Rates

**FY 2013 - 2017**

## Parking Permits

<table>
<thead>
<tr>
<th>Employees</th>
<th>CURRENT</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Rates</strong></td>
<td>0%</td>
<td>30%</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
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<tr>
<td>Upper Campus</td>
<td>$579.00</td>
<td>$579.00</td>
<td>$753.00</td>
<td>$867.00</td>
<td>$912.00</td>
<td>$960.00</td>
<td>$1,008.00</td>
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<tr>
<td>Lower Campus</td>
<td>$426.00</td>
<td>$426.00</td>
<td>$534.00</td>
<td>$615.00</td>
<td>$648.00</td>
<td>$681.00</td>
<td>$717.00</td>
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## Student Rates

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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>$142.00</td>
<td>$142.00</td>
<td>$157.00</td>
<td>$165.00</td>
<td>$174.00</td>
<td>$183.00</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>$142.00</td>
<td>$142.00</td>
<td>$157.00</td>
<td>$165.00</td>
<td>$174.00</td>
<td>$183.00</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td>$142.00</td>
<td>$142.00</td>
<td>$157.00</td>
<td>$165.00</td>
<td>$174.00</td>
<td>$183.00</td>
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<td><strong>Annual</strong></td>
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<td>$426.00</td>
<td>$471.00</td>
<td>$495.00</td>
<td>$522.00</td>
<td>$549.00</td>
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## Evening Permits

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<th>Employees</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
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</thead>
<tbody>
<tr>
<td><strong>Per month</strong></td>
<td>$24.00</td>
<td>$24.00</td>
<td>$32.00</td>
<td>$37.00</td>
<td>$39.00</td>
<td>$41.00</td>
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## Moped/Motorcycle

<table>
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<th>Employees</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$39.00</td>
<td>$45.00</td>
<td>$48.00</td>
<td>$51.00</td>
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<tr>
<td><strong>Spring</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$39.00</td>
<td>$45.00</td>
<td>$48.00</td>
<td>$51.00</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$39.00</td>
<td>$45.00</td>
<td>$48.00</td>
<td>$51.00</td>
</tr>
<tr>
<td><strong>Annual</strong></td>
<td>$90.00</td>
<td>$90.00</td>
<td>$117.00</td>
<td>$135.00</td>
<td>$144.00</td>
<td>$153.00</td>
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## Students

<table>
<thead>
<tr>
<th>Employees</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$33.00</td>
<td>$35.00</td>
<td>$37.00</td>
<td>$39.00</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$33.00</td>
<td>$35.00</td>
<td>$37.00</td>
<td>$39.00</td>
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<tr>
<td><strong>Summer</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$33.00</td>
<td>$35.00</td>
<td>$37.00</td>
<td>$39.00</td>
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<td><strong>Annual</strong></td>
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<td>$90.00</td>
<td>$99.00</td>
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<td>$111.00</td>
<td>$117.00</td>
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## Daily Parking Rate

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<thead>
<tr>
<th>Upper Campus</th>
<th>$4 per hour</th>
<th>$4 per hour</th>
<th>$4 per hour</th>
<th>$4 per hour</th>
<th>$4 per hour</th>
<th>$4 per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Campus</td>
<td>$4.00</td>
<td>$4.00/5.00</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
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</tbody>
</table>

**6:30 AM to 4:00 PM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Flat Rate</th>
<th>Flat Rate</th>
<th>Flat Rate</th>
<th>Flat Rate</th>
<th>Flat Rate</th>
<th>Flat Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 4:00 PM</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.00</td>
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<td>$5.00</td>
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</tbody>
</table>
### PARKING OPERATIONS BUDGET PROJECTION
#### FY 2014 - 2018

<table>
<thead>
<tr>
<th>SCENARIO 2B 07/16/11</th>
<th>Fiscal Year</th>
<th>Accrual</th>
<th>Projected</th>
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<tbody>
<tr>
<td><strong>REVENUES:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permit Parking</td>
<td>$2,426,813</td>
<td>$2,772,575</td>
<td>$2,772,575</td>
</tr>
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<td>Parking Passes</td>
<td>$522,801</td>
<td>$535,536</td>
<td>$535,536</td>
</tr>
<tr>
<td>Investment Income</td>
<td>$10,411</td>
<td>$10,411</td>
<td>$10,411</td>
</tr>
<tr>
<td>Other</td>
<td>$632,567</td>
<td>$405,621</td>
<td>$405,621</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>$5,956,042</td>
<td>$6,087,593</td>
<td>$6,218,347</td>
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<td><strong>EXPENDITURES:</strong></td>
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<td></td>
</tr>
<tr>
<td>Personnel Services</td>
<td>$1,116,992</td>
<td>$1,201,235</td>
<td>$1,321,525</td>
</tr>
<tr>
<td>Utilities</td>
<td>$275,215</td>
<td>$302,737</td>
<td>$333,010</td>
</tr>
<tr>
<td>Outside Services</td>
<td>$2,637,914</td>
<td>$2,717,051</td>
<td>$2,798,563</td>
</tr>
<tr>
<td>Student Payroll</td>
<td>$146,053</td>
<td>$150,435</td>
<td>$154,948</td>
</tr>
<tr>
<td>Other Current Expenditures</td>
<td>$328,749</td>
<td>$338,611</td>
<td>$348,770</td>
</tr>
<tr>
<td>Ceded Land Payment</td>
<td>$219,404</td>
<td>$230,300</td>
<td>$230,300</td>
</tr>
<tr>
<td>Retirement of Indebtedness</td>
<td>$47,043</td>
<td>$49,084</td>
<td>$51,219</td>
</tr>
<tr>
<td>Renewal and Replacements</td>
<td>$489,060</td>
<td>$600,000</td>
<td>$1,849,000</td>
</tr>
<tr>
<td>Alternative Transportation Initiatives</td>
<td>$ -</td>
<td>$149,880</td>
<td>$556,800</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>$5,260,430</td>
<td>$5,589,453</td>
<td>$7,237,214</td>
</tr>
<tr>
<td>Operating Income (loss)</td>
<td>$695,612</td>
<td>$498,140</td>
<td>$(1,018,867)</td>
</tr>
<tr>
<td><strong>CASH BALANCE</strong></td>
<td>$489,195</td>
<td>$987,335</td>
<td>$(31,533)</td>
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<tr>
<td><strong>WORKING CAPITAL</strong></td>
<td>$(831,575)</td>
<td>$(898,036)</td>
<td>$(1,000,652)</td>
</tr>
<tr>
<td><strong>NET CASH BALANCE</strong></td>
<td>$489,195</td>
<td>$155,759</td>
<td>$(929,568)</td>
</tr>
<tr>
<td>PARKING PERMITS</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>-----------------</td>
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<td></td>
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<tr>
<td><strong>EMPLOYEES:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Annual Rates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UPPER CAMPUS</strong></td>
<td>$579.00</td>
<td>$579.00</td>
<td>$579.00</td>
</tr>
<tr>
<td><strong>LOWER CAMPUS</strong></td>
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<td>$426.00</td>
<td>$425.00</td>
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<td><strong>STUDENTS:</strong></td>
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<td><strong>Semester Rates</strong></td>
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<td>$142.00</td>
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<td>$426.00</td>
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<td><strong>EVENING PERMITS</strong></td>
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<tr>
<td><strong>EMPLOYEES:</strong></td>
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</tr>
<tr>
<td><strong>Per month</strong></td>
<td>$24.00</td>
<td>$24.00</td>
<td>$24.00</td>
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<tr>
<td><strong>STUDENTS:</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Per month</strong></td>
<td>$24.00</td>
<td>$24.00</td>
<td>$24.00</td>
</tr>
<tr>
<td><strong>MOPED/MOTORCYCLE</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>EMPLOYEES:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>FALL</strong></td>
<td>$30.00</td>
<td>$30.00</td>
<td>$30.00</td>
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<td><strong>SPRING</strong></td>
<td>$30.00</td>
<td>$30.00</td>
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<tr>
<td><strong>SUMMER</strong></td>
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<tr>
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<td><strong>SUMMER</strong></td>
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<tr>
<td><strong>DAILY PARKING RATE</strong></td>
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<td><strong>UPPER CAMPUS</strong></td>
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<tr>
<td><strong>LOWER CAMPUS</strong></td>
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<td>Flat Rate</td>
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<td>6:30 AM to 4:00 PM</td>
<td>$4.00</td>
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<tr>
<td>After 4:00 PM</td>
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Appendix B  Advisory Committee and Stakeholder Outreach

INCLUDED IN FINAL CAMPUS TDM PLAN