

# **MAUI COUNTY GENERAL PLAN 2030**

## **MAUI ISLAND PLAN**

### **Infrastructure and Public Facilities Technical Issue Paper**



**SEPTEMBER 2007**

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### Infrastructure and Public Facilities Technical Issue Paper



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## INTRODUCTION

**I**nfrastucture and public facility systems are the physical plant, structures, networks, and services that are the most basic element of community building; the systems that bring people together, allow for communication,



trade and commerce, and provide the basic services to sustain human settlements and allow for social and economic activity vital to our community and way of life. It is the drinking water system; roadways and mass transit; public parks and recreation areas; public schools and community college; wastewater treatment; fire and police; public libraries; and other government support services. This Chapter will examine the following infrastructure and public facilities: Water; Roads and Transit (Mobility); Public Schools; Wastewater Treatment and Disposal; Solid Waste Disposal; Parks; and other public facilities including Fire, Police,

Civic Facilities, and Libraries. The discussion will include the existing setting; existing plans and programs; regional analysis of existing and planned capacity versus projected 2030 demand; new capacities or expansion strategies; key issues; major CIP Investments and “Order of Magnitude” Costs.





## **WATER**

### **EXISTING SETTING**

Water is the life giving element that sustains all biological systems. As the most isolated island archipelago on earth, a clean and reliable source of fresh water is vital to the Hawaiian Islands. Water has played a major role in Maui's past and present, and will continue to be a driving force in Maui's future. Beginning with the first plants and animals to inhabit and evolve on the island, water has influenced the distribution and abundance of these species and has shaped the island's ecosystems. Fresh water was a vital resource in Hawaiian society for drinking, cooking, and irrigating taro and other agricultural crops. Water has continued to play a central role in Maui's history with the conception and expansion of the sugar industry. Looking forward, fresh water will continue to be of paramount importance to Maui's urban, agricultural, industrial, and native

Hawaiian users, as well as biological systems. Land use decisions must be closely tied to water availability. The wise management of freshwater resources is vital to the quality of life on Maui.

***Maui’s Watersheds***

Maui has two primary forested mauka watersheds; West Maui and East Maui. The West Maui watershed is composed of the mountain ridges, valleys, streams, and aquifers stretching from the top of Puu Kukui down to the sea. The East Maui watershed begins at the summit of Haleakala and is the island’s largest water producer. Sources of water on Maui consist of streams (surface water) and aquifers (groundwater). Maui’s perennial streams are predominantly on the windward slopes of the island’s watersheds. Streams are also influenced by periods of prolonged drought, resulting in minimal flow or even a dry stream bed. As a result of high precipitation and geology, Maui possesses vast underground reservoirs of freshwater. Rainwater seeps through the highly permeable basalt of the volcanoes and is stored in aquifers, floating on the underlying saltwater. The majority of the water supplied by the County comes from groundwater. Groundwater is typically more reliable and less expensive to purify than surface water.

***Water Systems***

Maui County Department of Water Supply (DWS) is responsible for the development, operation, and maintenance of the municipal water system and supply. On the island of Maui, DWS manages four water systems: Central Maui; West Maui; Upcountry; and Hana.

**Table 1: Water Districts on the Island of Maui**

<b>Districts</b>	<b>Areas Supplied</b>
Central Maui	Wailuku, Kahului, Waihee, Waiehu, Puunene, Spreckelsville, Paia, Maalaea, Kihei, Wailea, and Makena
West Maui	Lahaina, Launiupoko, Kaanapali, Honokowai, Napili, and Kapalua
Upcountry	Makawao, Haliimaile, Pukalani, Kula, Ulupalakua, Kanaio, and Haiku
Hana	Hana, Keanae, Nahiku, and Kaupo

The Central Maui water system services the largest population. The Upcountry water system is the second largest system and covers the largest geographic area. The West Maui system is the third largest, and the Hana system is the smallest. The mission of DWS is to “provide clean water efficiently”. One method by which the Department ensures the efficiency of all water systems is by enforcing system standards. System standards are set statewide and are based on national utility standards, however there is currently no approved County policy regarding water system standards. The standards vary by source (ground and surface) and take into account various factors such as redundancy, aquifer sustainable yield, peak demand, drought, and equipment malfunctions.

***Regulatory Controls***

In addition to the DWS, the Board of Water Supply (BWS) and the County Council Water Resources Committee are also responsible for decisions regarding fresh water on Maui. The BWS has the duty to review and submit DWS’s request for an annual appropriation for operations and capital improvements, and to recommend the establishment and adjustment of water rates and charges. The Water Resources Committee has the duty to review and consider



matters relating to DWS, the State Commission on Water Resource Management (CWRM), and compliance with safe drinking water rules and regulations.

All DWS sources, both ground and surface, must meet Federal Safe Drinking Water Act (SDWA) quality standards. Regulation of this act is administered by the U.S. Environmental Protection Agency (EPA) through the State Department of Health (DOH). The CWRM also has some regulatory control over Maui's water resources. CWRM, through administration of the State Water Code (HRS 174C), has the responsibility to set policies, protect resources, define uses, establish priorities while assuring rights and uses, and establish regulatory procedures. Within designated Water Management Areas, CWRM possesses regulatory control over water withdrawals through a water use permit process. The permit process is designed to provide better protection of freshwater resources. Only one ground water management area has been designed by CWRM on Maui, the Iao Aquifer system.

### EXISTING PLANS AND PROGRAMS

The primary DWS plans include the *Capital Plan* and the *Water Use and Development Plan* (WUDP). The *Capital Plan* is a base plan that outlines long range capital improvements for all County water supply systems. The plan is updated on an annual basis to coincide with the budget.

The WUDP is defined by the State Water Code as part of the Hawaii Water Plan. It is a long-range plan that provides policy guidance, land use water allocation, and sets the stage for DWS long-range functional planning. The plan is adopted by the County Council as ordinance and can include specific policy measures. The plan must also be approved by CWRM. The plan is designed to be updated on an ongoing basis to be consistent with the Maui County General Plan. The 1990 WUDP is currently undergoing a comprehensive update and is expected to be completed by 2009. The plan is divided into six "sub-plans" (Central Maui, West Maui, Upcountry, Hana, Molokai, and Lanai) to best address the unique issues and opportunities of each regional water system.

### REGIONAL ANALYSIS

As previously stated, DWS manages systems in four water districts on the island of Maui: Central Maui; West Maui; Upcountry; and Hana. Although located on the same 727 square mile island, each water system possesses unique challenges, constraints, and opportunities. The following regional analysis provides an overview of each system's existing demand and sources and projected 2030 demand<sup>1</sup>. Since the WUDP is currently undergoing a comprehensive update, the regional analysis is based on the best available information at this time. The *County of Maui Infrastructure Assessment Update* (May, 2003), prepared by Wilson Okamoto & Associates,

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<sup>1</sup> Water demand is expressed as million gallons per day (mgd) and existing demand refers to 2005. When referring to an aquifer's *sustainable yield*, the given calculation represents the estimated maximum amount of groundwater that can be withdrawn without damaging the aquifer's ability to replenish itself.

Inc., DWS Availability Worksheets, and *Maui County Water Use and Development Plan, Water Use and Demand* (Draft May 2007), prepared by Haiku Design and Analysis were used as the primary sources of information for the regional analysis.

***Central Maui Water System***

<b>System Summary (mgd)</b>	
Water Supply	26
2020 Demand	28.22
2030 Demand	34.11
Surplus/ (Shortage)	(8.11)

The Central Maui water system covers the community plan regions of Wailuku-Kahului, Kihei-Makena, and the Paia portion of Paia-Haiku. The majority, approximately 75 percent, of the water supplied by this system is withdrawn from the Iao Aquifer in the vicinity of Iao Stream and Waiehu stream. The remaining 25 percent is supplied primarily by the Waihee Aquifer with a small portion coming from surface water sources. The available supply of water for the Central Maui system is estimated at 26 mgd.

As mentioned previously, Maui has one CWRM designated water management area, the Iao Aquifer. CWRM considered designation of the Iao Aquifer on multiple occasions beginning in 1986 because of high pumpage levels and concern for the integrity of the aquifer; however, the aquifer did not become designated until June, 2003. The most recent petition to designate the aquifer was submitted in 2001, resulting in a commission decision to set a trigger for future designation in lieu of issuing the water management area designation at that time. The trigger was set at 18 mgd (90 percent of the aquifer’s sustainable yield), which meant that when the 12-month moving average for withdrawals from the aquifer exceeded 18 mgd the aquifer would automatically be designated. In June, 2003, designation of the Iao Aquifer was triggered, imposing the permit process on all major aquifer users.

The average daily demand on the Central Maui system for 2005 was 21.39 mgd. The Central Maui system services a wide range of users, including commercial, industrial, governmental, single and multi-family residential, and hotel. The South Maui region places the largest demand on the system and this demand is projected to steadily increase into the future. Demand projections indicate that demand will outpace current supply prior to 2020. Total projected 2030 demand on the Central Maui system is estimated at 34.11 mgd, which exceeds the current 26 mgd supply of the system by 8.11 mgd. Development of additional sources is crucial for the Central Maui system.

***West Maui Water System***

<b>System Summary (mgd)</b>	
Water Supply	8
2030 Demand	6.56

The West Maui water system covers the West Maui Community Plan region. The primary user of this system is single-family residential. The resort areas of Kaanapali and Kapalua are served by private systems (Amfac/JMB and Maui Land and Pineapple (ML&P) Co. Ltd). The West Maui system receives water from both ground and surface sources. Water withdrawn from

Surplus/ (Shortage)	1.44
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Kanaha Stream is treated at the Lahaina Water Treatment Plant, while the Mahinahina Water Treatment Plant receives water by way of ML&P’s Honokohau Tunnel from the Honokohau, Honolua, and Kanaha Streams. Groundwater development in West Maui consists of nine wells within the Honolua and Honokowai Aquifers. Total available water supply is 8 mgd. Current demand on the system is 5.17 mgd. Projected demand for 2030 is 6.56 mgd.

***Upcountry Water System***

<b>System</b>	
<b>Summary (mgd)</b>	
Water Supply	15
2030 Demand	8.83
Surplus/ (Shortage)	6.17

The Upcountry water system services the community plan region of Makawao-Pukalani-Kula and the Haiku portion of the Paia-Haiku community plan region. Agriculture is the dominant water user in portions of this region, however single-family residential also places a significant demand on the system. The Upcountry system is supplied primarily by surface water sources; however groundwater sources are available to service the Upcountry system during periods of drought. The Upcountry system is one of the more complex DWS systems for several reasons. The system is composed of four interconnected sub-systems, a range of source and service area elevations, and is almost completely reliant on surface water, making it vulnerable to drought conditions.

The sub-systems that makeup the Upcountry system include the Upper Kula system, Lower Kula system, Makawao system, and Haiku system. During periods of normal rainfall the Upper Kula system consists of the Olinda Treatment Plant and the Upper Kula transmission line and services the Upper Kula area, Ulupalakua, and Kanaio. The Lower Kula system consists of the Piihola Treatment Plant and the Lower Kula transmission line and services the Lower Kula area. Streams feeding both Kula systems include Haipuaena, Puohakamoa, Waiakamoi, and Honomanu. The major source of water for the Makawao system is the Wailoa Ditch, owned by East Maui Irrigation Company. The Kamole Water Treatment Plant treats water from the Wailoa Ditch for residential use in Makawao, Pukalani, Haliimaile, and Haiku. The Haiku system receives the only ground water in the Upcountry system. The Kaupakalua and Haiku wells service the Lower Kaupakalua and Haiku areas.

Total available supply of the Upcountry system is 15 mgd. Average daily demand on the system is 7.24 mgd. Projected 2030 demand is 8.83 mgd, with single-family residential exuding an increasing demand on the system. Although an analysis of the Upcountry system’s available supply and projected 2030 demand reveals a 6.17 mgd surplus, this conclusion is somewhat misleading due to the system’s dominant reliance on surface water sources. During periods of prolonged drought, the system often has difficulties meeting daily demand due to reservoir storage capacity deficiencies. During dry summer months demand increases, often reaching levels as high as 10 mgd. However, DWS’s estimated drought capacity for

surface sources plus ground sources is approximately 9 mgd, falling short of meeting drought demand. As discussed previously, the system is supplemented by pumping ground water during drought periods; however, this activity is extremely expensive due to the high energy costs of pumping water to the elevation of the service area. Voluntary, and at times mandatory, water use restrictions are imposed on both residential and agricultural users of the system during dry periods, often negatively impacting the productivity of Upcountry farmers.

***Hana Water System***

**System  
Summary (mgd)**

Water Supply	0.487
2030 Demand	0.215
Surplus/ (Shortage)	0.272

The Hana water system services the community plan region of Hana, which includes the sub-districts of Nahiku, Keanae, Kaupo, and Hana. The system currently receives all of its water from ground sources consisting of two wells. Total available supply for the Hana system is approximately 0.487 mgd. Two private water systems, Hana Water Resources and Hana Water Company, are also present in the area.

In 2005, average daily demand on the system was 0.195 mgd. Single-family residential is the primary water user in the region. Of all DWS systems, the Hana system has historically experienced the lowest demands as well as the slowest rate of demand increase, and this trend is expected to continue. Projected demand for 2030 is estimated at 0.215 mgd.

**LONG-RANGE REGIONAL IMPROVEMENT NEEDS AND COSTS**

The following section discusses long-range improvements needed for each regional water system. The primary sources of information relied upon for this section include DWS Source Schedules, DWS 6-year CIP, and the Maui County WUDP Central District Preliminary Draft (September 2006), prepared by Haiku Design & Analysis. All capital costs discussed are preliminary estimates and are subject to change.

***Central Maui Water System***

**Source Development**

***Develop Waikapu Aquifer***

Two wells are currently being planned for the Waikapu aquifer. Total combined costs for the two wells are estimated at \$6 million. The contribution of these wells as a new source of water is limited to the 2 mgd sustainable yield of the Waikapu aquifer. This new water source is expected to be on line sometime between 2008 and 2010. The primary issue with this source is that it is only a short term resource option and does not address the long term needs of the Central Maui Water System

***Acquisition of Na Wai Eha Surface Water***

Na Wai Eha, or the “four great waters”, includes Iao, Waihee, Waikapu, and Waiehu streams. The Waihee ditch system was constructed by Hawaiian Commercial and Sugar (HC&S) and Wailuku Sugar in the early 1900’s to supply water for sugarcane irrigation from these four streams. The system consists of 12 miles of ditches and tunnels stretching from Waihee to Waikapu. With increasing constraints on the Central Maui water system, the County is considering acquiring the ditch system from its current owners, Wailuku Water Co. (formerly Wailuku Agribusiness) and HC&S.

The existing yield from the ditch system is approximately 30 to 40 mgd; however, the potential yield available to the County is unknown due to the number of existing users drawing from the ditch system. The Waihee ditch system is also involved in several legal challenges, complicating the acquisition of this source. If the litigation issues can be resolved in the next two to three years, DWS estimates that this source could be on line by 2012. Capital costs for acquisition of the surface water source range anywhere from \$5 million to \$30 million depending on which portion(s) of the system are acquired.

***Development of North Waihee Aquifer***

DWS currently draws approximately 4 mgd of water from the south half of the Waihee Aquifer which has a sustainable yield of 8 mgd. Additional wells have not been developed in the south half due to CWRM recommendation that only half of the aquifer’s sustainable yield be drawn south of Makamakaole gulch. Developing wells in the north half of the aquifer would allow DWS to tap into the aquifer’s remaining yield of approximately 3 to 4 mgd.

Development of this source would require construction of wells, transmission improvements, a storage tank, and a booster station. Capital costs for developing the north Waihee Aquifer are estimated at \$20 to 30 million. If pursued, this potential future source could be on line by 2013.

***Development of Kahakuloa Aquifer***

Development of the Kahakuloa Aquifer within northwest Maui is another potential future source for the Central Maui water system. Located northwest of the Waihee Aquifer, the Kahakuloa Aquifer has a sustainable yield of 8 mgd with no current withdrawals. Development of this source would require construction of substantial transmission lines to deliver the water to the Central Maui region. This potential source is considered an extension of development of the north Waihee Aquifer. Based on 90 percent of the aquifer’s sustainable yield, the potential yield from this source is estimated at 7.2 mgd. Capital costs involved with developing this source are approximately \$24 million with a potential on line date somewhere between 2015 and 2030. The primary issue involved with developing this source is the access difficulties due to the region’s steep slopes.

***Development of East Maui Aquifers***

DWS is considering development of East Maui aquifers as a potential source to address long-term demand on the Central Maui system. East Maui aquifers contain the largest, untapped supply of freshwater on the island. DWS is considering development of the two most westerly aquifers, Haiku and Honopou.



In the early 1990's, DWS began planning for the development of the Haiku Aquifer. The *East Maui Water Development Plan* (September, 1992), prepared by Norman Saito Engineering consultants, Inc., for DWS, proposed developing the Paia and Haiku aquifers as a clean and reliable source of water for the fast growing Central and South Maui regions. The Final Environmental Impact Statement (EIS) for the plan was completed in 1993, and a Supplemental EIS (SEIS) was completed in June, 2002. However, the adequacy of the SEIS was challenged by a coalition of citizen's groups (The Coalition to Protect East Maui Water Resources, et al. v. The Board of Water Supply, et al.). The key issues of the litigation included concerns over potential impacts on stream flows, aquatic species, and existing agricultural and residential water users in the East Maui region. On December 23, 2003, the plaintiffs and defendants agreed to a consent decree to settle the litigation which established numerous terms and conditions, basically halting development of East Maui aquifers until the County conducted a cost/benefit study of the surface and groundwater resources available in the Central Maui, Upcountry, and East Maui regions.

The potential yields of the Haiku and Honopou Aquifers are approximately 11 mgd and 10 mgd to 16 mgd respectively. Development of these sources would require extensive transmission improvements to deliver the water to the Central Maui system. Capital costs for developing these new ground sources are \$91 million for the Haiku Aquifer and \$112 million to \$126 million for the Honopou Aquifer depending on the number of wells drilled. Anticipated on line date for this source is 2014. The key issues involved with development of East Maui aquifers include concerns from East Maui residents regarding potential impacts on stream flows, aquatic species, and existing agricultural and residential water users, and the extensive and costly transmission system required to deliver the water to Central Maui.

Regardless of which new sources are pursued for the Central Maui water system, the construction of addition storage tanks will be required to adequately store and distribute water to the region's users.

Table 2 outlines preliminary estimates for major system upgrades planned for the Central Maui Water District.

**Table 2: Central Maui Water System Major Upgrades**

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
Waiale Water Treatment Plant	9 mgd (installed capacity)  6 mgd (average capacity)	2009	25 million	<ul style="list-style-type: none"> <li>• Needed to treat additional surface water sources</li> <li>• Construction design is 80% complete</li> <li>• Project design sponsored by A&amp;B</li> </ul>

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
Waihee Water Treatment Plant	6 mgd (installed capacity)  4 mgd (average capacity)	2015	17 million	<ul style="list-style-type: none"> <li>• Needed to treat additional surface water sources</li> <li>• Wailuku Water Company (WWC) is potentially financing development of the facility</li> </ul>

***West Maui Water System***

**Source Development**

***Development of Honolua, Honokowai, or Honokohau Aquifers***

DWS currently withdrawals approximately 4 mgd of water from the Honolua Aquifer which has a sustainable yield of 8 mgd. With the construction of additional wells and transmission lines, withdrawals from the aquifer could be increased. Withdrawals from the Honokowai aquifer, south of the Honolua Aquifer, could also be increased. Additionally, the Honokohau Aquifer, northeast of the Honolua Aquifer, is currently undeveloped and has a sustainable yield of 10 mgd. Development of these three aquifers is currently being studied by DWS to provide additional groundwater sources for the rapidly growing West Maui region. Estimated capital costs are \$20 million. Improvements will be implemented incrementally between 2012 and 2030. The key issue involved with this potential future source is the need for an extensive and costly transmission and storage system to deliver the groundwater from the northeastern aquifers to the West Maui system.

***Increase Surface Water Use***

Through negotiations with ML&P the County could increase withdrawal capacity from the Honokohau Tunnel. Increasing surface water withdrawals for the West Maui system would require the subsequent enlargement of the Mahinahina treatment plant to treat water to EPA standards.

Table 3 outlines preliminary estimates for major system upgrades planned for the West Maui Water District.

**Table 3: West Maui Water System Major Upgrades**

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
Lahaina Water Treatment Plant Retrofit	1.4 mgd	2007	1.5 million	<ul style="list-style-type: none"> <li>• Plant retrofit will allow for more efficient treatment of Kanaha Stream surface water</li> </ul>

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
Mahinahina Water Treatment Plant Enlargement	2.3 mgd	2009	11 million	<ul style="list-style-type: none"> <li>• Needed to treat potential additional withdrawals from the Honokohau Tunnel</li> </ul>
Honokahua Well Treatment	N/A	2008-2010	2 million	<ul style="list-style-type: none"> <li>• Install treatment to remove DBCP</li> </ul>
Napili C Well Treatment	N/A	2008-2010	2.8 million	<ul style="list-style-type: none"> <li>• Install treatment to remove DBCP</li> </ul>

### ***Upcountry Water System***

The County recognizes that actions must be taken to ensure the reliability of the Upcountry system during drought conditions. Since new sources of supply, both surface and ground, are limited, improvements to the system must also focus on increasing storage capacity. Proposed improvements to the Upcountry system include a mix of additional ground water development, increased well and stream intake storage capacity, construction of additional reservoirs, and improvements to treatment facilities.

### **Source Development**

#### ***Pookela Well***

Two additional groundwater sources are planned for the Upcountry system. Study and design for the Pookela Well are complete and the source is expected to be on line in late 2007. The well will provide an additional 0.45 mgd for Upcountry users during drought conditions. Capital costs for the project are approximately \$4 million.

#### ***Piiholo Well***

The Piiholo Well is the second additional groundwater source planned for the Upcountry system. The well will be developed by ML&P and dedicated to the Department upon completion which is expected in 2008. The Piiholo Well will also only be used during drought conditions.

Table 4 outlines preliminary estimates for major system upgrades planned for the Upcountry Water District.

**Table 4: Upcountry Water System Major Upgrades**

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
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Lower Kula Reservoir	300 mgd	2011	65 million	<ul style="list-style-type: none"> <li>• Reservoir need to increase reliability of Upcountry system</li> </ul>
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***Hana Water System***

**Source Development**

***Hamoia Well 2***

While projections indicate that existing system supply is sufficient to meet 2030 demand, the system lacks adequate backup and redundancy. The County is addressing this deficiency by constructing a backup well to supplement the system. Anticipated yield for the Hamoia Well 2 is 0.192 mgd and capital costs for the project are approximately \$2 million. The well is estimated to be on line by 2009.

Table 5 outlines preliminary estimates for major system upgrades planned for the Hana Water District.

**Table 5: Hana Water System Major Upgrades**

<b>System Upgrade</b>	<b>Potential Yield/ Additional Capacity</b>	<b>Anticipated Completion Date</b>	<b>Estimated Capital Cost (\$)</b>	<b>Key Issues/ Comments</b>
Upper Keanae Tank	250 mgd	2010	1.7 million	<ul style="list-style-type: none"> <li>• Tank needed to provide adequate water storage and fire protection for the Keanae area</li> </ul>

**CONSERVATION AND ENERGY EFFICIENCY**

In addition to the potential future sources discussed in the regional analysis section, several conservation and energy efficiency options also exist to ensure a reliable and clean supply of water for all four regional systems.

***Demand Side Management Programs:*** Demand side management (DSM) describes actions that DWS can take to influence how customers utilize County water. The goal of DSM is to ensure an adequate supply of water through both voluntary and mandatory conservation measures. DSM can include an array of programs such as incentives for installing efficient appliances and low flow water fixture and toilets, encouraging customers to shift their time of use, landscaping ordinances requiring drip irrigation and drought tolerant plants, and water rate design and pricing policies which increase water rates with increasing consumption.

***Supply Side Leak Reduction:*** Supply side leak reduction involves continually inspecting transmission lines and distribution pipes for leaks and breaks. This practice reduces the unnecessary loss of ground and surface water due to infrastructure failures.

**Energy Production and Efficiency Measures:** Since energy use is a substantial component of DWS costs, increasing energy efficiency is a key element of reducing long-term water service costs. In addition, energy cost savings will leave the Department with more funds to address long overdue maintenance and replacement and acquire additional water sources. Multiple energy production and efficiency options exist including hydroelectric generation, wind power for water pumping, and system operation efficiency improvements.

**Stream and Watershed Restoration and Protection Measures:** Protecting and restoring watersheds and streams is a key element of ensuring a reliable source of fresh water for current and future generations. Numerous options exist for ensuring the protection and restoration of stream and watershed resources including requiring minimum streamflows, stream channel restoration, and supporting watershed protection partnerships and programs.

**Wastewater Reuse:** Wastewater reuse involves the treatment and reuse of wastewater for agricultural, golf course, landscape, and other irrigation needs. Reuse of wastewater extends the life of used water and conserves freshwater sources. The feasibility of treating and utilizing wastewater depends on many factors. Treating wastewater to acceptable levels for planned use can be a costly process. The location of the wastewater facility and the proposed service area is also a key consideration for wastewater reuse.

## ISLAND-WIDE PLANNING ISSUES

In addition to issues concerning the specific potential future sources for each DWS system, several general water resource planning issues exist which are relevant to all four systems. These issues present challenges for each DWS system and must be considered when conducting long-range planning for Maui's water resources. Resource planning issues discussed below include DWS budget constraints, in-stream flow standards, native Hawaiian water rights, and agricultural water use.

- ⇒ **DWS Budget Constraints**      The DWS is currently facing a major financial deficit. The Department's current budget is not able to cover cost for long overdue replacements and repairs for all water systems. Many systems are in drastic need of updating to ensure a reliable supply of water for users. The Department is currently conducting a study to formulate solutions for this budget shortfall.
  
- ⇒ **Instream Flow Standards**      The State Water Code defines instream use as "beneficial uses of stream water for significant purposes, which are located in the stream and which are achieved by leaving the water in the stream" HRS 174C-3. Instream uses include the maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems, aesthetic and scenic values, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream users, and the protection of traditional and customary native Hawaiian rights. Protection of these uses is administered by CWRM, Stream Protection and Management Branch, Instream Use Protection Section. CWRM is mandated to establish



instream flow standards which protect instream uses while allowing for reasonable and beneficial offstream use. Interim instream flow standards (IIFS) were adopted for both East and West Maui in 1988 (HAR 13-169-44 and 48); however, the standards are not based on scientific information, rather they simply continue the “status quo” by setting the standard at the amount of water that was flowing in each stream on the date of adoption. CWRM is currently drafting an Instream Flow Program Implementation Plan which will, among other actions, develop a standardized IIFS methodology and set scientifically-based IIFS statewide. These standards will influence DWS’s long-range planning for surface water resources, both instream and offstream.

⇒ **Native  
Hawaiian  
Water Rights**

Also within the State Water Code, native Hawaiian water rights are protected. These water rights include current and future water use for Hawaiian Homelands, domestic water use for kuleana lands, and traditional and customary rights. Chapter 174C-101 of the Hawaii Revised Statutes states that native Hawaiian water rights shall not be diminished or extinguished by any requirements of the State Water Code. As with instream uses, the protection of native Hawaiian water rights is an issue of growing concern on Maui and relevant to long-term planning for all DWS systems.

⇒ **Agricultural  
Water Use**

*Existing Sources.* The State Water Code identifies agriculture as a valid and protected use of water. Agriculture is important to Maui’s economy, lifestyle, history, and quality of life. Large agricultural operations, namely sugarcane and pineapple, have dedicated water sources as a result of their establishment on the island and development of these sources over a century ago. HC&S’s sugarcane fields in Central Maui are irrigated with water diverted from East Maui byway of EMI’s Wailoa Ditch, and water from the West Maui watershed byway of the Waihee Ditch system. Pineapple fields in Upcountry, Haiku, and Paia are also irrigated by the Wailoa Ditch. In West Maui, ML&P irrigates pineapple fields with water from the company’s Honokohau Tunnel. While large-scale agriculture has privately owned water sources, diversified agricultural operations rely predominantly on DWS systems to supply water for irrigation. The majority of diversified agriculture is located Upcountry and utilizes the same County water supplied throughout the region for domestic purposes.

*Current and Future Issues:* As discussed previously, there exist numerous valid and protected users of Maui’s freshwater sources. The State Water Code mandates that a balancing of uses, including domestic, commercial, Hawaiian water rights, instream flow, and agriculture, must be achieved to obtain maximum beneficial use of State waters and best serve the public good. While agriculture is one of these uses, the current high demand for water from all types of users, coupled with the potential

establishment of IIFS and growing concern over native Hawaiian water rights, will present complex challenges for both large-scale and diversified agriculture regarding water supply in the future.

With the recent downsizing of the sugar and pineapple industries, many uncertainties arise regarding the future of their water rights. As demonstrated in the ongoing Waiahole Water Case on Oahu, competition for unused diverted water is likely to arise, requiring tough decisions to ensure the equitable distribution of the water. Additionally, this uncertainty has the potential to negatively affect future agriculture due to the requirement of many lending institutions to demonstrate long-term access to water to secure loans.

For Upcountry diversified agriculture a major water issue is the common occurrence of droughts during summer months. Since Upcountry farmers rely predominantly on County water, mandatory water use restrictions often implemented during severe drought conditions can have negative consequences on these farmers. Additionally, since County water is treated for domestic use, farmers are paying high water rates for a use which does not necessitate treatment. DWS, in conjunction with State and Federal agencies, is currently implementing a project to supply Kula farmers with less expensive untreated surface water. While completion of this project will provide a more affordable source of water for crop irrigation, the use of untreated water gives rise to yet another potential future issue. Some grocery stores are considering banning any produce irrigated with untreated water.

**Potential Opportunities:** Several potential opportunities exist to supply Maui's current and future agriculture with reliable water.

- **Upcountry Dual Water System.** The Upcountry Dual Water System, currently under construction and planned for completion in 2011, will bypass the treated municipal water supply with a parallel pipeline system to supply farmers with less expensive untreated water for crop irrigation. The goal of the project is to support and expand diversified agriculture Upcountry and lessen demands on County water sources.
- **Reclaimed Water Use.** While some agricultural operations utilize reclaimed water for irrigation, the potential exists to increase this usage where feasible. Utilizing reclaimed water conserves new water sources while extending the life of used water.
- **Collecting Urban Runoff.** With any heavy rain event, torrents of runoff flow down urban streets into the County's wastewater

system or the ocean. Collecting and storing this urban runoff in strategic locations could provide an additional source of water for agriculture.

- **Acquisition of Water Sheds.** The County of Maui's acquisition of Maui's key watersheds will help to ensure that water distribution is prioritized in a manner that best reflects the community's values.



## ROADWAYS

### EXISTING SETTING

Streets and highways are the primary infrastructure supporting Maui's transportation system and play a major role in shaping urban settlement patterns. The quality of the roadway system affects all modes of travel including automobile, transit, bicycle, and pedestrian. The condition of Maui's roadway system also directly impacts the safety of all roadway users, efficiency of emergency services, and quality of life. As the roadway network experiences increasing demand associated with island growth and development the level of service of streets and highways will continue to be challenged. If infrastructure investments can not keep pace with growth, lower levels of service will be reflected in increased congestion, extended travel times, higher rates of vehicular and non-vehicular accidents, and longer emergency response times. Maintaining the existing roadway network and expanding the network to improve traffic flow, safety, and efficiency is a key infrastructure issue for Maui.

Maui's roadway network is comprised of both State and County roadways which provide connections between the island's major urban centers and circulation within communities. Major highway systems on the island include Honoapiilani Highway and Kuihelani Highway which connect Central and West Maui; Mokulele Highway and Piilani Highway which connect Central and South Maui; Hana Highway which connects Central and East Maui; and Haleakala Highway and Kula Highway which connect Central and Upcountry Maui.

According to the State of Hawaii Department of Transportation for the year 2003, average daily traffic volumes indicate that the most heavily traveled roadways on Maui during the day are Honoapiilani Highway, Kaahumanu Avenue, and Hana Highway.

## EXISTING PLANS AND PROGRAMS

The State of Hawaii Department of Transportation (HDOT) has jurisdiction over State roadways while the County of Maui Department of Public Works, Highways Division has jurisdiction over County roadways. Effective coordination between these two agencies is important for ensuring the quality and efficiency of Maui's roadway network.

The primary plan governing improvements to Maui's roadway network is the Hawaii Statewide Transportation Improvement Program (STIP). The STIP provides a multi-year listing of State and County projects and identifies those projects slated for federal funding. It is a multi-modal transportation improvement program that is developed utilizing existing transportation plans and policies, and current highway, transit, and transportation programming processes. The STIP delineates the funding categories and the federal and local share required for each project. The current STIP is for fiscal years 2008 thru 2013.

Maui's roadway network was assessed in the *Proposed Roadway Development Program* (Fehr & Peers and Kaku Associates 2007). The purpose of this study was to provide a capacity assessment of Maui's roads as they exist today and as they may exist in 2030 pursuant to proposed land use and development trends. This study was used as the primary source of information for the following regional analysis.

## REGIONAL ANALYSIS

The regional analysis provides an overview of each Community Plan region's major roadways. An analysis of existing (2004) and projected Level of Service (LOS) is also provided.

### ***Wailuku-Kahului Roadways***

As the main employment, civic, commercial, and residential center of the island, efficient circulation within and access into and out of the Wailuku-Kahului Community Plan region is important.

The primary major arterials connecting the Wailuku-Kahului region to



other regions of the island include Honoapiilani Highway, Kahekili Highway, Mokulele Highway, Kuihelani Highway, and Hana Highway. Other major arterials include South Puunene Avenue, Kahului Beach Road/Waiehu Beach Road, Dairy Road, and Keolani Place. Major urban collectors providing internal circulation within the region include Main Street/Kaahumanu Avenue, Kamehameha/South Kamehameha Avenue, South/West Papa Avenue, and East/West Wakea Avenue.

### ***Kihei-Makena Roadways***

The Mokulele Highway and North Kihei Road are the major arterials connecting the Kihei-Makena region with other regions of the island. The Piilani Highway is a major arterial within the region connecting North and South Kihei and Wailea. South Kihei Road is a major urban collector also connecting North and South Kihei and Wailea.

### ***West Maui Roadways***

Honoapiilani Highway is a major arterial connecting the West Maui region to Central and South Maui. Front Street is a major urban collector providing internal circulation within Lahaina Town.

### ***Makawao-Pukalani-Kula Roadways***

Haleakala Highway is a major arterial connecting the Upcountry region to Central Maui. Kula Highway provides access throughout Kula, Waiakoa, and Ulupalakua. Major and minor collectors in the region include Kehaulike Highway/Haleakala Highway, Haleakala Crater Road, and Makawao Avenue/Kaupakalua Road. Baldwin Avenue is also an important roadway in the region providing access between Makawao and Paia.

### ***Paia-Haiku Roadways***

Hana Highway is the only major arterial running through the Paia-Haiku region. Makawao Avenue/Kaupakalua Road and Baldwin Avenue are also important roadways within the region.

### ***Hana Roadways***

The primary roadway in the Hana region is Hana Highway. Hana Highway connects the Hana region to Central Maui and the Kanaio/Ulupalakua area via the Piilani Highway.

Table 7 provides a Level of Service (LOS) analysis of Maui’s roadway system. The analysis evaluated 2004 conditions and 2030 conditions based on projected population growth and land use trends. For 2030, “no improvements” and “proposed improvements” scenarios are provided. The “no improvements” scenario projects roadway conditions if current land uses and development trends are projected to 2030 with no improvements to the highway system. The “proposed improvements” scenario projects roadway conditions using the same population and land use projections, however also takes into account proposed roadway improvements. The proposed roadway improvements accounted for in this scenario are proposed improvements to the roadway system expected to be implemented by 2030 and are outlined in Table 6.

**Table 6: Proposed Highway Improvement Project List**

<b>Project Number</b>	<b>Project Description</b>
1	Haleakala Widening 2 (Firebreak Road to Haliimaile)
2	Up-Country - Kihei Corridor
3	Honoapiilani Realignment - aka Lahaina By-Pass
Phase A	Keawe St. to Lahainaluna Road
Phase B	Lahainaluna Road to Launiupoko
Phase C	Keawe St. to Honokowai
4	Pali to Puamana realignment aka Honoapiilani Realignment
5	Keawe St. Extension
6	Mill Street Extension (Aholo St to Keawe)
7	Paia By-Pass
8	Mokulele Widening
9	Kihei North-South Collector Road
10	Waiale Extension
11	Kahului Airport
12	Honoapiilani widening Aholo St to Lahainaluna
13	Waiale/Kuihelani Hwy Connector
14	Lono Ave extension to Kuihelani Hwy
15	Imi Kala/Piihana extension (bridge)
16	Imi Kala/Waiale -Mill St, extension
17	Paniolo Connector (Haleakala Hwy - Baldwin Ave)
18	Kehekili Hwy widening
19	Maui Lani Parkway
20	Kuikahi Drive Extension
21	Kehalani Collector Road
22	Kehalani Loop Road

Source: *Proposed Roadway Development Program* (Fehr & Peers and Kaku Associates 2007)

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**Table 7: Roadway Segment Level of Service (LOS) Analysis**

Location	Peak Hour	2004 LOS Analysis				2030 No Improvements LOS				2030 Improvements LOS			
		V/C N/E	V/C S/W	LOS N/E	LOS S/W	V/C N/E	V/C S/W	LOS N/E	LOS S/W	V/C N/E	V/C S/W	LOS N/E	LOS S/W
<b><i>Wailuku-Kahului Community Plan Region</i></b>													
Honoapiilani Hwy 0.2 Mi South of Keanu St	AM	0.86	0.48	D	A	1.39	0.96	F	E	1.16	0.79	F	C
	PM	0.56	0.64	A	B	1.04	1.04	F	F	0.87	0.82	D	D
Main St @ Central Av	AM	1.01	1.14	F	F	1.67	1.20	F	F	1.32	1.01	F	F
	PM	1.34	1.02	F	F	1.57	0.98	F	E	1.33	0.90	F	E
Kaahumanu Av @ Kanaloa Av & Mahalani St	AM	0.70	1.01	C	F	1.09	1.20	F	F	0.76	1.06	C	F
	PM	1.03	0.71	F	C	1.19	1.10	F	F	0.98	0.75	E	C
Kaahumanu Av @ Kahului Beach Rd & Kane St	AM	0.59	1.12	A	F	0.90	1.51	D	F	0.75	1.42	C	F
	PM	0.75	1.19	C	F	0.98	1.70	E	F	0.90	1.43	E	F
Hana Hwy @ Kamehameha Av & Hobron Av	AM	0.94	0.50	E	A	1.17	0.71	F	C	1.13	0.56	F	A
	PM	0.70	1.06	B	F	0.96	1.37	E	F	0.81	1.22	D	F
Puunene Av n/o Kuihelani Hwy/Dairy Rd	AM	0.65	1.22	B	F	1.29	1.91	F	F	1.36	1.74	F	F
	PM	0.69	1.21	B	F	1.02	1.89	F	F	0.86	1.99	D	F
Kuihelani Hwy w/o Puunene Av	AM	0.22	0.27	A	A	0.66	0.41	B	A	0.91	0.49	E	A
	PM	0.28	0.32	A	A	0.42	0.68	A	B	0.51	0.99	A	E
Dairy Rd e/o Puunene Av	AM	0.63	0.64	B	B	0.72	0.84	C	D	0.86	0.81	D	D
	PM	1.00	1.00	E	F	1.26	1.30	F	F	1.28	1.39	F	F
Kahekili Hwy 0.7 Mi N of Waiehu Beach Rd Jct	AM	0.46	0.31	A	A	0.79	0.52	C	A	0.79	0.52	C	A
	PM	0.22	0.52	A	A	0.35	0.84	A	D	0.35	0.84	A	D
Kahekili Hwy @ Waiehu Beach Rd	AM	0.65	0.83	B	D	1.03	1.63	F	F	1.03	1.64	F	F
	PM	0.48	0.42	A	A	0.76	0.71	C	C	0.77	0.71	C	C
Waiehu Beach Rd @ Iao Stream Bridge	AM	0.61	1.18	B	F	0.46	0.26	A	A	0.89	1.61	D	F
	PM	1.12	0.81	F	D	0.39	0.45	A	A	1.43	1.13	F	F
Kuihelani Hwy 0.33 Mi N of Waikapu Bridge	AM	0.18	0.14	A	A	0.46	0.26	A	A	0.23	0.13	A	A
	PM	0.20	0.18	A	A	0.39	0.45	A	A	0.23	0.26	A	A
Puunene Av @ Mokulele Hwy	AM	0.76	0.68	C	B	0.91	1.19	E	F	1.06	1.36	F	F
	PM	0.77	0.69	C	B	1.14	0.85	F	D	1.28	0.92	F	E
Hana Hwy @ Haleakala Hwy (Pukalani Jct)	AM	0.40	1.14	A	F	0.54	1.32	A	F	0.49	1.19	A	F
	PM	0.89	0.61	D	B	1.09	0.81	F	D	0.91	0.74	E	C
<b><i>Kihei-Makena Community Plan Region</i></b>													
South Kihei Rd @ Mokulele Hwy	AM	1.17	0.68	F	B	1.88	1.43	F	F	1.96	1.44	F	F
	PM	0.80	1.14	D	F	1.61	1.76	F	F	1.49	1.64	F	F
South Kihei Rd @ Keonekai Rd	AM	0.64	0.66	B	B	1.31	1.16	F	F	1.01	0.91	F	E
	PM	0.90	0.87	D	D	1.45	1.59	F	F	1.16	1.30	F	F
Piilani Hwy @ Mokulele Hwy	AM	0.50	0.77	A	C	1.04	1.12	F	F	0.78	1.08	C	F
	PM	0.69	0.63	B	B	1.08	1.26	F	F	1.04	1.04	F	F

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Location	Peak Hour	2004 LOS Analysis				2030 No Improvements LOS				2030 Improvements LOS			
		V/C N/E	V/C S/W	LOS N/E	LOS S/W	V/C N/E	V/C S/W	LOS N/E	LOS S/W	V/C N/E	V/C S/W	LOS N/E	LOS S/W
Piilani Hwy @ Lipoa St & Lipoa Pkwy	AM	0.81	0.90	D	D	1.26	1.52	F	F	0.97	1.24	E	F
	PM	1.00	0.87	E	D	1.72	1.37	F	F	1.29	1.07	F	F
Piilani Hwy between Kanani & Alanui Ke Alii Rds	AM	0.79	0.77	C	C	1.19	1.10	F	F	0.93	0.96	E	E
	PM	0.92	0.84	E	D	1.36	1.25	F	F	1.11	0.95	F	E
<b>West Maui Community Plan Region</b>													
Honoapiilani Hwy 0.7 Mi W of Honolua Bridge	AM	0.12	0.06	A	A	0.23	0.31	A	A	0.23	0.27	A	A
	PM	0.30	0.18	A	A	0.92	0.35	E	A	0.84	0.31	D	A
Honoapiilani Hwy @ Kahana Kai Bridge	AM	0.62	0.58	B	A	0.93	1.02	E	F	1.28	1.21	F	F
	PM	0.65	0.91	B	E	1.04	1.23	F	F	1.21	1.55	F	F
Honoapiilani Hwy @ Fleming Rd & Front St (N Jct)	AM	0.64	0.63	B	B	1.03	1.12	F	F	0.72	0.87	C	D
	PM	0.81	0.89	D	D	1.46	1.47	F	F	1.17	1.10	F	F
Honoapiilani Hwy @ Fleming Rd & Front St (S Jct)	AM	0.63	0.46	B	A	0.98	0.88	E	D	0.77	0.66	C	B
	PM	0.68	0.67	B	B	1.29	1.08	F	F	1.01	0.82	F	E
Honoapiilani Hwy 1.07 M W of Tunnel	AM	0.66	0.99	B	E	1.18	1.52	F	F	0.65	0.62	B	B
	PM	1.11	1.00	F	F	1.78	1.78	F	F	0.696	0.86	B	D
<b>Makawao-Pukalani-Kula Community Plan Region</b>													
Haleakala Hwy @ Haliimaile Rd	AM	0.87	0.23	D	A	0.99	0.33	E	A	1.02	0.30	F	A
	PM	0.38	0.80	A	C	0.54	0.98	A	E	0.46	0.87	A	D
Haleakala Hwy @ Makawao Av & Loha St	AM	0.77	0.98	C	E	0.93	1.25	E	F	0.90	1.22	E	F
	PM	0.86	0.92	D	E	1.16	0.96	F	E	1.17	0.95	F	E
Kula Hwy @ Omaopia Rd	AM	0.73	0.45	C	A	0.76	0.72	C	C	0.76	0.70	C	B
	PM	0.47	0.55	A	A	0.69	0.63	B	B	0.66	0.59	B	A
Haleakala Hwy @ Haleakala Crater Rd	AM	0.17	0.11	A	A	0.14	0.33	A	A	0.10	0.25	A	A
	PM	0.13	0.10	A	A	0.45	0.17	A	A	0.36	0.15	A	A
<b>Paia-Haiku Community Plan Region</b>													
Hana Hwy & Baldwin Av	AM	0.46	0.89	A	D	0.53	1.07	A	F	0.24	0.21	A	A
	PM	0.73	0.56	C	A	0.84	0.63	D	B	0.26	0.19	A	A
Hana Hwy & Baldwin Av	AM	0.74	0.48	C	A	0.19	0.12	A	A	0.19	0.12	A	A
	PM	0.66	0.68	B	B	0.17	0.17	A	A	0.17	0.17	A	A
<b>Hana Community Plan Region</b>													
Hana Hwy & Kailua Bridge	AM	0.09	0.34	A	A	0.16	0.40	A	A	0.16	0.40	A	A
	PM	0.40	0.13	A	A	0.50	0.21	A	A	0.50	0.21	A	A

Source: *Proposed Roadway Development Program* (Fehr & Peers and Kaku Associates 2007)

The County of Maui's LOS goal for roadways is that all roadways throughout the island shall operate at LOS D or better. According to the 2004 LOS analysis in Table 1-8, three locations are operating at LOS E or F in the northbound/eastbound direction in the a.m. peak hour; seven locations are operating at LOS E or F in the northbound/eastbound direction in the p.m. peak hour; eight locations are operating at LOS E or F in the southbound/westbound direction in the p.m. peak hour; and nine locations are operating at LOS E or F in the southbound/westbound direction in the p.m. peak hour. This equates to a total of 27 locations in 2004 operating below the County's stated LOS goal of D.

The results of the 2030 "no improvements" analysis indicates that 18 locations will be operating at LOS E or F in the northbound/eastbound direction in the a.m. peak hour; 21 locations will be operating at LOS E or F in the northbound/eastbound direction in the p.m. peak hour; 19 locations will be operating at LOS E or F in the southbound/westbound direction in the a.m. peak hour; and 19 locations will be operating at LOS E or F in the southbound/westbound direction in the p.m. peak hour. This equates to 77 locations in 2030 operating below the goal of LOS D if no roadway improvements are implemented.

Finally, the results of the 2030 "proposed improvements" analysis indicates that 14 locations will be operating at LOS E or F in the northbound/eastbound direction in the a.m. peak hour; 16 locations will be operating at LOS E or F in the northbound/eastbound direction in the p.m. peak hour; 15 locations will be operating at LOS E or F in the southbound/westbound direction in the a.m. peak hour; and 17 locations will be operating at LOS E or F in the southbound/westbound direction in the p.m. peak hour. A comparison of the 2004 LOS analysis to the two 2030 scenarios indicates that with the implementation of the proposed roadway projects, V/C ratios will improve at 24 locations in both directions and both peak hours. These improvements indicate the effectiveness of the improvement projects in reducing congestion over the 2030 "no improvements" conditions.

## **ISLAND-WIDE PLANNING ISSUES**

***Addressing Transportation and Mobility.*** Despite the implementation of proposed roadway improvements, Maui's roadway network will continue to be strained and roadway congestion will remain an important quality of life issue. While the proposed roadway improvements are necessary to address roadway capacity issues, the expansion of the roadway network should no longer be considered the primary solution for addressing transportation and mobility on the island. Planning for an effective transportation and mobility system on Maui will require the following:

1. **Integration of Transportation and Land Use Decisions:** How Maui's communities are designed plays a major role in the efficiency of the movement of people and goods throughout the island. Land use planning and transportation planning must be linked to ensure successful strategies are designed to meet future transportation needs generated by planned land uses. Designing compact, mixed-use, livable communities and making efficient use of existing urban areas will play a major role in enhancing mobility and decreasing roadway congestion.



2. Expansion of the Multi-Modal Transportation Network: Mobility issues on Maui can be addressed by expanding a variety of transportation alternatives, including public transit, biking, and pedestrian movement. A balanced multi-modal transportation network provides mobility choices and contributes to an efficient network that meets varied user needs. For environmental and sustainability reasons, future transportation investment must shift away from the construction of additional roadways to accommodate the automobile and towards the expansion of a public transportation network. While the personal automobile will likely remain the dominant transportation choice for most residents over the next twenty years, providing transportation alternatives will allow for a less auto dependant Maui.
  
3. Management of Transportation Demand: Transportation Demand Management (TDM) involves the implementation of plans or programs aimed at influencing personal travel choices with the goal of reducing the use of single-occupant vehicles and increasing the efficiency of existing transportation resources. TDM strategies are primarily aimed at influencing the travel trends and options of weekday commuters. These strategies include supporting alternative travel modes and altering time and amount of travel through programs and amenities such as guaranteed ride home programs, bicycle lockers, commuter benefits, telework, and alternative work schedules.

***Funding Roadway Improvements.*** Transportation networks are inherently expensive to construct and maintain. Maui's roadways are primarily financed through Federal, State, and County programs, with Federal and State programs providing the majority of funds. However, in recent years Federal and State roadway funding have declined resulting in increased pressure on the County to finance needed transportation network improvements. As Federal funding continues to constrict, the County will need to explore alternative financing mechanisms to address roadway needs.



## TRANSIT

### EXISTING SETTING

Transit is the newest component of Maui's public infrastructure system. An acute need for public transit has arisen on Maui in the last 15 years as roadway congestion has reached levels that stimulated community demands for alternative modes of transportation. As a result of substantial growth of the resident population and visitor industry in the 1990's, key roadways have become increasingly crowded, prompting the County to pursue public transit.

Public transit was initiated on Maui in 1992 with two fixed routes servicing Central Maui and operated by Maui Economic Opportunity, Inc. (MEO). The service has experienced major transformations in the last 15 years as transit needs have evolved with the growing population and increased roadway congestion. The

current public transit system, which began on July 1, 2006, includes a public bus system, rural shuttles, and a variety of social service transportation programs. The current system is administered and funded by the County of Maui Department of Transportation (MDOT) and operated through contracts with Roberts Hawaii and MEO. The key distinction between the original transit service and the new service is that the new service addresses both the intra-regional and inter-regional mobility needs of Maui’s communities.

Since public transit is still in its infancy on Maui and implementation of the planned service is not yet complete, comprehensive evaluation of the system is premature at this time. However, with minimal staff and quickly escalating traffic congestion, MDOT has thus far implemented the current system successfully while remaining attentive to evolving community demands. MDOT has taken an adaptive management approach to establishing public transit and has initiated positive steps towards addressing roadway congestion and mobility issues on the island. MDOT has taken actions to promote inter-modal transit by utilizing existing and temporary park-n-rides and providing bike racks on all busses. MDOT transit ridership statistics indicate that ridership is steadily increasing, and this trend is expected to continue. July, 2006 ridership was approximately 33,000 boardings and October, 2006 ridership reached approximately 65,000 boardings, nearly doubling ridership in the first four months of the current service.

Table 8 outlines the components of the County public transit system:

**Table 8: Maui’s Public Transit System**

<i><b>Transit Component</b></i>	<i><b>Description</b></i>	<i><b>Communities Served</b></i>	<i><b>Bus Transfer Stations</b></i>	<i><b>Bus Routes</b></i>
<b>Maui Bus</b>	Consists of 14 bus routes and seven transfer stations operated by Roberts Hawaii. All routes operate seven days a week, including holidays.	Central Maui; West Maui; South Maui; Upcountry; and Haiku	Kaahumanu Center; War Memorial Stadium; Maalaea Harbor Village; Piilani Village Shopping Center; Wharf Cinema Center; Whaler’s Village; and Kuihelani Highway park-n-ride	Napili Islander; Kaanapali Islander; Lahaina Islander; Kihei Villager; Kihei Islander; Wailuku Loop; Kahului Loop; Upcountry Islander; Haiku Islander; Haiku-Wailea commuter; Makawao-Kapalua Commuter, Wailuku-Kapalua Commuter; Kihei-Kapalua Commuter; and Wailuku-Kahului Connector
<b>Rural Shuttle</b>	Demand response service operated by MEO. Passengers are picked up from residence and transported to the Kahului or Wailuku area of their choice.	Central Maui; West Maui; South Maui; Upcountry; and East Maui	N/A	N/A

<i><b>Transit Component</b></i>	<i><b>Description</b></i>	<i><b>Communities Served</b></i>	<i><b>Bus Transfer Stations</b></i>	<i><b>Bus Routes</b></i>
<b>Social Services Transportation</b>	Various programs for persons with disabilities, seniors, and youth. Eligibility requirements apply and prior reservations are required. Operated by MEO.	Varies by specific program	N/A	N/A

Maui’s current public transportation program is composed of multiple elements, each with a specific purpose, which are designed to function together as a comprehensive service to meet the transit needs of residents and visitors island-wide. While the above table provides an outline of the public transit program, the following discussion describes the individual elements that make up the program.

***Loop:*** The Kahului and Wailuku loop routes represent the backbone of the public transit program. The loop service provides intra-community connections and movement within Maui’s main population, employment, industrial, and commercial center. The service is offered to riders at no charge and operates from 7:30 AM to approximately 10:00 PM. The loop routes utilize Kaahumanu Center as a bus transfer station.

***Villager:*** The Kihei villager route provides a similar type of service as the Central Maui loop routes. The villager offers intra-community movement within South Maui. The one-way bus fare is \$1.00 and the service runs from approximately 5 AM to 9 PM.

***Islander:*** The islander service consists of five routes; Upcountry, Haiku, Lahaina, Kaanapali, Napili, and Kihei islander. Islander routes are designed to provide inter-community connections between Upcountry, Haiku, Central, West, and South Maui communities. The one-way bus fare is \$1.00 and the service operates from approximately 5:30 AM to 10:00 PM and utilizes Kaahumanu Center as a bus transfer station.

***Commuter:*** The Haiku-Wailea, Makawao-Kapalua, Kihei-Kapalua, and Wailuku-Kapalua commuter routes provide a connection from Upcountry, Haiku, and Central Maui to the resort areas in West and South Maui. Commuter routes are designed to offer resort employees an alternative mode of transportation to and from work. Departure and arrival times are designed to complement the work schedules of resort employees. The Haiku, Paia, and Pukalani Community Centers and Eddie Tam Gym parking lot are used as park-n-rides. Busses are not operated continuously throughout the day, only during peak commuter hours. The one-way bus fare is \$1.00. Kuihelani Highway park-n-ride is utilized as a bus transfer station. The Wailuku-Kapalua commuter route runs between Wailuku and Kapalua and utilize the War Memorial Stadium parking lot as a park-n-ride.

<b>Connector:</b>	The Wailuku-Kahului connector route provides a connection from Wailuku and Kahului to the Kuihelani Highway park-n-ride so that riders can catch the commuter busses to either the South or West Maui resort areas. The connector route also provides a connection from the park-n-ride to Kahului and Wailuku for Upcountry residents. The one-way bus fare is \$1.00.
<b>Rural Shuttle:</b>	The rural shuttle is a curb-to-curb service that provides transportation from rural areas across Maui to a variety of locations in Kahului and Wailuku. The service is designed to connect rural communities with shopping and other services offered in Central Maui. Frequency of service varies by community. The service is free and available to everyone; however reservations are required.
<b>Social Services Transportation:</b>	Maui County's social service transportation program offers transportation options for senior citizens, youth, and persons with disabilities. Frequency and route of service varies by program. The majority of the programs are free; however eligibility requirements apply.

## EXISTING PLANS AND PROGRAMS

The County of Maui Department of Transportation (MDOT) is responsible for the planning and implementation of all modes of transportation. MDOT strives to mitigate escalating traffic problems, provide transportation options for both residents and visitors, and improve public awareness of transit opportunities. With the initiation of the current transit service on July 1, 2006, the public transit responsibilities of MDOT have grown considerably.

Regulatory oversight of public transit service is conducted by the U.S. Department of Transportation. Of primary consequence are the provisions of the Americans with Disabilities Act of 1990 (ADA). This civil rights legislation states that public entities operating fixed route transportation service for the general public must also provide corresponding paratransit service to persons unable to use the fixed route system.

MDOT is currently operating the transit program on the basis of the *County of Maui Short Range Transit Plan* (SRTP) (January, 2005), prepared by Urbitran Associates, Inc. The SRTP was relied upon as the primary source of information for drafting the *Transit Section* of the *Infrastructure and Public Facilities Report*. The SRTP contains planning, policy, and financial components that provide direction for implementing a public transit system. Drafting the plan began in 2004 and involved community outreach, technical analysis, and coordination with key stakeholders aimed at addressing transportation needs on Maui. The current public transit system has been implemented according to the recommendations and implementation schedule outlined in the SRTP with minor alterations based on new data and increased demand. The major deviation from the SRTP that MDOT has taken is the initiation of the commuter service previously described. The commuter service was not an element of the SRTP; however the

Department recognized a need for a connection between Upcountry and the South and West Maui resort areas, particularly for hotel employees.

In 2003, Kaku Associates prepared the *Public Transportation Plan for the Island of Maui* for the Department of Planning. The ultimate goal of the plan was to assess the feasibility of establishing a public transportation program on the island and to provide program alternatives for implementation. While this plan was never implemented by the County, it offers potentially valuable baseline information on movement patterns and attitudes toward public transportation.

## REGIONAL ANALYSIS

Long-range planning for Maui's transit needs requires an analysis of current and forecasted island population distribution, as well as identification of transit dependent populations, employment centers, and major trip generators. Analyzing these elements by region provides an understanding of the island-wide mobility trends of Maui's residents and visitors. The following discussion provides a regional summary of existing services and transit needs, and projected 2030 transit needs. The socioeconomic data and projections discussed below were obtained from the *Socio-Economic Forecast: The Economic Projections for the Maui County General Plan 2030* (June, 2006), prepared by the Maui County Planning Department.

### Central Maui

#### Regional Summary

- Largest population
- Large transit dependant population
- Employment hub
- Concentration of trip generators

The Central Maui region provides a large transit market due to several key characteristics. This region houses over 36 percent of the resident population and contains a high concentration of elderly and disabled residents. Central Maui is also the major employment hub containing over 40 percent of the island's jobs. Major trip generators include Maui Memorial Medical Center, other medical and social service facilities, senior citizen housing and centers, Queen Kaahumanu shopping center, and other retail centers. The high concentration of trip generators in Central Maui has a significant influence on the frequency of trips to, from, and within this region.

#### Existing Transit Service and Future Service Needs:

Existing transit services are centered within Central Maui because of transit demand throughout the area. The Maui Bus, Rural Shuttle, and social service transportation programs all provide transit services to and from this region. Bus transfer stations are located at Kaahumanu Center and the Kuihelani Highway park-n-ride. The only loop bus routes offered by the Maui Bus are located in the Central Maui region. With current population and employment trends forecasted to continue to 2030, demand for transit services is expected to increase within this region.

### South Maui

#### Regional Summary

- Second largest population center

South Maui is the second largest population center on Maui, housing over 16,000 residents in 2005. With the second largest concentration of visitor

- Large visitor population
- Important trip generators

units on the island, South Maui’s defacto population is greatly influenced by the presence of visitors. This region provides approximately 20 percent of the jobs on Maui, the majority of which are centered around the visitor industry and the Maui Research and Technology Center. Major trip generators in the region include coastal recreation opportunities, resorts, and retail shopping centers. In the 1998 Kihei-Makena Community Plan, inadequate traffic circulation and lack of public transportation were recognized as the most significant problems in the region.

***Existing Transit Service and Future Service Needs:***

South Maui is currently serviced by all public transit programs. Two bus transfer stations are located in this region, and three fixed bus routes service these stations. Forecasts indicate that South Maui will remain as the second largest population center in 2030. Regarding employment trends, this region is expected to surpass West Maui as the second largest employment center on the island resulting in a 26 percent hold on the job market in 2030. Current and future population, employment, and visitor trends indicate that South Maui is and will continue to be an area with high transit demand.

***West Maui***

**Regional Summary**

- Visitor population
- Resort employment
- Geographically constrained Honoapiilani Highway
- Proposed master-planned communities

Due to the presence of the visitor industry, West Maui has similar population characteristics and transit needs as South Maui. Currently this region houses the fourth largest concentration of residents on the island and contains the largest number of visitor units (over 50 percent). West Maui is currently the second largest employment region, with the majority of jobs centered around the visitor industry. Like South Maui, major trip generators for this region include coastal recreation opportunities, hotels, and retail shopping centers. A key characteristic of this region which is of particular importance to public transit planning is the geographically constrained Honoapiilani Highway.

***Existing Transit Service and Future Service Needs:***

As with the previous two regions, West Maui is serviced by all existing public transit services. Two transit stations are located in this region and five fixed bus routes service the area. Population, employment, and visitor trends are expected to continue to 2030. Local development potentials which may affect the future demand for public transit include an increase in time-share units and large master-planned communities.

***Upcountry***

**Regional Summary**

- Bedroom community
- Low density population

Although not a major population and employment center like Central Maui, nor a resort area like South and West Maui, Upcountry possesses characteristics which make it an integral element of future island-wide transit planning. A key characteristic of the Upcountry area is its function as a “bedroom community” for the Central Maui employment center. With

households outnumbering jobs in this region, the majority of the area's residents commute outside the area for work.

**Existing Transit Service and Future Service Needs:**

The Maui Bus, Rural Shuttle, and some social service transportation programs service the Upcountry region. Three fixed bus routes service this area, however no transfer stations exist. Forecasts extend current population and employment trends to 2030.

**East Maui**

**Regional Summary**

- Isolated region
- Minimal demand

East Maui, being extremely isolated and somewhat self-sufficient, has little demand for public transit. East Maui has the smallest population as well as the slowest annual rate of increase. This region provides the least number of jobs on the island. Although a major visitor destination for single-day trips, East Maui contains the second smallest concentration of visitor units.

**Existing Transit Service and Future Service Needs:**

The only transit service currently offered in East Maui is the Rural Shuttle. Current population and visitor trends are expected to continue to 2030, resulting in a sustained minimal demand for public transit.

**ISLAND-WIDE PLANNING ISSUES**

Along with the benefits and opportunities that public transit provides also come numerous issues and challenges that must be addressed. The current public transit system is new to Maui so the concept of viewing mobility beyond the limited realm of roadways and personal automobiles will have to be overcome. The combination of the prevalent visitor industry, restrictive geography, and island lifestyle render a challenging and exciting environment for public transit planning. The following is a discussion of key island-wide transit issues:

- ✓ Bus ridership has not yet become a part of the *fabric of Maui life*. As a product of land use patterns, the prevalent rural lifestyle, and convenience, personal automobiles are the dominant mode of transportation for residents. In order to be successful, public transit needs to be accepted on Maui as a valid and legitimate option to service mobility needs island-wide.
- ✓ *Continual public involvement* is necessary to identify and address the growing transit demands of residents and visitors. Because of evolving mobility needs, increasing roadway congestion, and shifting attitudes towards transit, the Department needs to maintain communication with riders and non-riders to adaptively manage the public transit system.
- ✓ Since the *visitor industry* is a major contributor to Maui's roadway congestion problems, the industry must also be a significant player in the formulation of solutions. Through a coordinated effort, the visitor industry and MDOT can devise creative methods to alleviate the impacts visitors have on Maui's roadways.



- ✓ Long-range transit planning must be integrated with *land use decisions*. The location of future transit operations is directly dependent on future development and creation of population centers. Major land use decisions must consider the potential implications for resident and visitor mobility and plan for the beneficial integration of future development and transit.
  
- ✓ Coordination between rail transit, bus service, park-and-ride facilities, bike routes, and pedestrian paths must be achieved to encourage *inter-modal transit*. While public transit will not be used by all residents and visitors, ridership can be made more attractive to a larger group of people by efficiently coordinating all modes of transportation.
  
- ✓ *Innovative funding sources* need to be sought to address capital and operational expenses of the transit service. The current service is funded by a combination of County funds, Federal Transit Administration (FTA) grants, and rider fees. As the transit service expands, so will the service’s expenses. Current one-hour headways will soon need to be increased to half-hour headways, significantly increasing capital and operational costs. While the County will continue to be eligible for FTA grants and rider fees will most likely increase, the County will need to pursue innovative funding sources to cover its increasing share of the costs.

**FUTURE TRANSIT SERVICE NEEDS**

Future transit service needs are discussed below in an island-wide context rather than by individual regions in order to explore interregional mobility needs. Additionally, service needs are discussed in terms of milestones, in five year increments, aimed at improving efficiency of the transit system and meeting mobility needs of residents and visitors into the year 2030. The majority of the milestones discussed below concern improving and expanding the current bus system; however, preliminary measures for initiating a rail transit system are also discussed. While Maui’s current population density and bus ridership do not dictate the need for and could not successfully support rail transit, this alternative mode of transportation needs to be evaluated as a potential source to meet future demand and alleviate roadway congestion. Rail transit is on the distant horizon for island transportation options; however because of the need for key parcels of land and right-of-way corridors, long-range planning is necessary to successfully coordinate future transit and land use.

**Table 9: Transit Milestones**

	<b>Transit Milestones</b>
<i>Five Years</i>	<ul style="list-style-type: none"> <li>▪ Increase frequency of service for current routes to 30 minute headways.</li> <li>▪ Increase marketing of current bus service.</li> <li>▪ Enhance bus stops with improved signs and passenger waiting benches and shelters.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Acquire larger capacity vehicles.</li> <li>▪ Identify potential sites for a main public transit facility.</li> <li>▪ Identify potential rail transit corridors and stations.</li> </ul>
<i>Ten Years</i>	<ul style="list-style-type: none"> <li>▪ Establish Transit Division within MDOT.</li> <li>▪ Establish HOV lanes within major arterials.</li> <li>▪ Establish park-and-ride facilities in key locations.</li> <li>▪ Purchase land for public transit facility and construct facility.</li> <li>▪ Acquire right-of-ways for rail transit corridors.</li> </ul>
<i>Fifteen Years and Beyond</i>	<ul style="list-style-type: none"> <li>▪ Plan coordination of bus service and future rail transit.</li> <li>▪ Phase in rail transit system as demand requires.</li> </ul>

**OPPORTUNITIES**

Maui is currently at a pivotal stage in its growth and development where key decisions and actions made today will have long lasting impacts on local residents and the island landscape in the future. Correspondingly, prudent transit planning initiated at the present time will greatly influence the mobility of residents and visitors for years to come. With public transit being a relatively new function of the County, numerous uncertainties exist and unforeseen challenges arise daily. However, the infancy of the service also presents the County with a valuable opportunity to mold the transit service to best fit island mobility needs and to use it as a tool to achieve a desired future vision for Maui. Numerous opportunities exist for the County to integrate transit and land use planning, ensure financial viability of the service, and provide an efficient transit service that meets the needs of both residents and visitors. The following discussion explores several recommendations that the County should implement to guide the growth and development of Maui’s transit service.

***Integrate Transit Supportive Roadway Infrastructure into Subdivision and Zoning Code***

Providing adequate transit supportive roadway infrastructure is vital to the efficient operation of a transit service. Bus pullouts, waiting benches and shelters, and signs are key roadway infrastructure items which are needed to support transit. While retroactively adding this infrastructure to existing roadways is important, ensuring that new roadways and subdivisions adequately accommodate transit is also a vital step. To achieve this goal, the County should amend the County Zoning and Subdivision Ordinances to include transit supportive roadway infrastructure. The County should also require the Public Works Department to review subdivision plans and assess the adequacy of transit supportive roadway infrastructure. Ensuring future integration of this infrastructure into new roadways and subdivisions will greatly add to the efficient operation and growth of transit on Maui.

***Private Transit Services for Large New Planned Communities***

Within large new planned communities, residents may find that utilizing the County transit service is inconvenient due to the size of the development. In order to provide a connection for these residents to regional transit, the County should require developers of large master planned communities to provide a private transit service within the development that links to County transit. Developers could choose from a wide variety of services such as trolleys, busses, or large vans. This requirement would promote alternative transportation within large subdivisions and strengthen ridership of County transit.

***Guaranteed Ride Home Program***

The decision to utilize private vehicles rather than public transit is often based on the need for flexibility related to work schedules and unexpected emergencies or responsibilities. Providing transit riders with the assurance that if unexpected circumstances arise they have a reliable option for getting to their required destination could greatly increase transit ridership. The County should implement a “Guaranteed Ride Home” program whereby transit riders are provided with a free taxi cab or rental car if they are faced with an unexpected emergency.

***Transit Impact Fees***

Since new developments benefit substantially from transit, the County should impose a transit impact fee to account for the increased demand for the service. The impact fee would be a one-time payment from the developer based on the size and nature of the project. The fee would go towards funding system improvements needed to accommodate the development. Although the impact fee alone will not solve transit funding issues, it will provide a source of dedicated revenue to augment other funding.

***Funding from Major Hotels***

The major hotels within West and South Maui benefit significantly from the County transit service. In addition to providing an alternative mode of transportation for their guests, transit also benefits their employees and reduces the demand for employee parking. In particular, the Commuter services provide Upcountry and Central Maui residents who work at these resorts with a convenient connection between work and home. Since these resorts receive significant benefits from transit, they should be considered a potential source of funding. The County should encourage coordination among these hotels, the Maui Hotel and Lodging Association, and the Maui Visitors Bureau to establish a program to help fund the County’s transit operational expenses.

***Relocate Rental Car Facilities to West and South Maui***

The majority of visitors arriving at Kahului Airport stay at hotels in either West or South Maui. Most of these visitors rent a car from the car rental companies adjacent to the airport and drive to their hotel via Honoapiilani Highway or Mokulele Highway, two of the most

congested highways on Maui. Relocating the majority of car rental facilities to West and South Maui and providing a transit service, with accommodations for luggage, from the airport to the rental facilities could greatly alleviate the impact that visitors place on these congested highways. The County should coordinate with the car rental industry to identify commercial land in West and South Maui that would be suitable for relocation. The County should encourage the industry to jointly plan and fund the new transit service.

***Community Surveys***

Understanding the mobility needs of residents and visitors will enable the County to provide the most appropriate and efficient transit service for the island. With a growing population and evolving mobility needs, transit services must adapt accordingly in order to be successful. To best understand and respond to these evolving needs, the County should conduct community surveys on a regular basis. The surveys should seek input from residents (both bus riders and non-bus riders), visitors, and employers. The surveys can be used to evaluate the successes and deficiencies of the transit service and add or adjust bus routes as demand dictates.

***Main Public Transit Facility***

A key element of a successful public transit system is the presence of a main transit facility. The facility serves as the centerpiece of the entire transit system and offers rider amenities such as restrooms, newsstands, and coffee shops. The transit facility should contain a maintenance component to conveniently address all bus maintenance issues. Owning and operating a maintenance facility will open bidding to a larger number of companies, providing the County with more service operation choices. The County is currently utilizing the Queen Kaahumanu Shopping Center and the Kuihelani Highway park-n-ride as temporary transit “facilities”. As public transit grows on Maui, both of these temporary transit “facilities” will prove to be inadequate for meeting bus rider and system needs. The County should conduct a study to identify potential sites for a main public transit facility.

***Rail Corridors***

As previously discussed, rail transit is on the distant horizon for island transportation options; however identification of potential rail corridors is essential for the future of transit on Maui. The County should conduct a study to identify potential rail corridors and transit stations and take action to protect these lands for future County use. Identifying and protecting key right-of-ways and land parcels at the present time will provide the County with more flexibility in the future when rail becomes a feasible option for Maui.

***Establish Transit Division***

As ridership increases and transit services expand, the County will need to take over operation of the service from Roberts Hawaii. Owning and operating the service will place additional strain on the Department of Transportation and will necessitate added staff. Within the next five to

ten years, the County should create a Transit Division within the Department of Transportation with the function of planning and operating transit on Maui. Creating a Transit Division will allow the County to better address the evolving mobility needs of residents and visitors, manage day-to-day operational issues, obtain funding, and effectively coordinate transit with land use planning.



## SCHOOLS

### EXISTING SETTING

Public schools are an important element of a healthy and prosperous community. They foster the development of Maui's children, shape future employment opportunities, and influence the growth and development of the island. Ensuring the availability and quality of public education is essential for fostering within Maui's youth the attributes necessary for life-long learning and productive and responsible citizenship.

The Hawaii Department of Education (DOE) is responsible for the public school system including kindergarten through high school. The Hawaii school system is a statewide system, serving all public schools in the state, making it approximately the 10<sup>th</sup> largest school system in the nation. The Board of Education (BOE) provides policy direction and review for the development of the Department's plans, such as the State Education Functional Plan and portions of the Hawaii State

Plan. The County of Maui does not have any jurisdiction over the public school system; however coordination between the State and County is necessary for planning future school locations and acquiring adequate land. The Hawaii public school system includes elementary, intermediate, and high schools. The Island of Maui has a total of 25 Hawaii public schools. Several charter and private schools also exist on Maui. Table 10 provides a breakdown of the three school types, approximate student age by grade, and the number of schools on Maui.

**Table 10: Maui’s Public Schools**

<b>School Type</b>	<b>DOE Grades</b>	<b>Student Age (Approx.)</b>	<b>Number on Maui Island <sup>2</sup></b>
Elementary School	K-5/6	5-10	15
Intermediate School	6/7-8	11-13	6
High School	9-12	14-17	5

The BOE sets benchmarks for school size for each school type. Benchmark capacities are based on BOE policy which calls for the design of schools as small communities of learners. Specific BOE enrollment design guidelines by school type are outlined in Table 11.

**Table 11: BOE Enrollment Design Guidelines**

<b>School Type</b>	<b>Grade Level Served</b>	<b>Building Design Capacity</b>
Elementary School	K-5/6	550 Students
Intermediate School	6/7-8	600 Students
High School	9-12	1,000 Students

## **EXISTING PLANS AND PROGRAMS**

Plans for the state public school system are prepared in accordance with Chapter 226 HRS, and include the State Education Functional Plan and the State Education Plan. The State Education Functional Plan, adopted by the State Legislature in 1985, charts education directions intended to improve educational quality in Hawaii. The State Education Plan serves as a technical reference document to support the functional plan.

## **REGIONAL ANALYSIS**

The regional analysis provides an overview of existing public schools by community plan region. Existing total rated capacity for each school type, along with enrollment projections and major school needs are discussed for each community plan region. The projected need for additional schools are based on DOE enrollment forecasts (only available for 2005-2011), resident population and age cohort projections, and development potential in each community plan region. The primary source of information relied upon for the regional analysis was the *County*

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<sup>2</sup> Hana High/Elementary counted once for each school type

of *Maui Public Facilities Assessment Update* (February, 2007), prepared by R.M. Towill Corporation.

**Table 12: Paia-Haiku School Capacity and Enrollment, 2005**

**Central Maui**

**Regional Summary**

- 2 High Schools
- 2 Intermediate Schools
- 5 Elementary Schools

The Central Maui region, including Wailuku and Kahului, serves the most populous region on the island. Central Maui high schools also serve Kihei-Makena high school aged students. The Central Maui region has two high schools, Baldwin High and Maui High, two intermediate schools, Maui Waena Intermediate and Iao Intermediate, and four elementary schools, Waihee Elementary, Wailuku Elementary, Lihikai Elementary, Kahului Elementary and Pomaikai.. Table 13 provides a summary of total rated capacity and 2005 enrollment by school type:

**Table 13: Central Maui School Capacity and Enrollment, 2005**

<b>School Type</b>	<b>Total Rated Capacity</b>	<b>2005 Enrollment</b>
High School	3105	3283
Intermediate School	1953	1847
Elementary School	3962	3770

**Regional Needs to Meet Projected 2030 Enrollment:**

The Central Maui population forecast shows the highest growth in school aged children when compared to other community plan districts on the island. During the period 2010 to 2030, the resident population of the Wailuku-Kahului community plan area is expected to increase from 51,312 to 71,223, a gain of 38%. The development potential for Central Maui is also significant when considering large project districts like Maui Lani and Kehalani.

With the construction of a new high school in the South Maui area, capacity in the Central Maui high schools will be somewhat alleviated. However, given the continued growth expected in the area over the next 20 years, increasing capacity at either of the high schools, or a completely new school, may be needed.

As for elementary schools, the opening of Pomaikai Elementary has helped to offset the need for capacity to 2011. By 2011, however, the need for Wailuku Elementary II will become critical. The Department of Education has been engaged in planning discussions with developer Stanford Carr of Kehalani and has allocated funds to begin designing an additional elementary school in the Kehalani project district, with completion targeted for 2012. The DOE has also discussed the need for another new elementary or intermediate school in the Waiehu area. It



appears that a new intermediate school will be necessary given the existing capacity of Iao Intermediate School and Maui Waena Intermediate School and the realistic growth potential for the area after 2011.

***South Maui***

**Regional Summary**

- 1 Intermediate School
- 2 Elementary Schools

The South Maui region serves the communities of Kihei and Makena. The region has one intermediate school, Lokelani Intermediate, and two elementary schools, Kamalii Elementary and Kihei Elementary. As previously noted, Central Maui high schools serve the Kihei-Makena region. Table 14 provides a summary of total rated capacity and 2005 enrollment by school type:

**Table 14: South Maui School Capacity and Enrollment, 2005**

School Type	Total Rated Capacity	2005 Enrollment
High School	n/a	n/a
Intermediate School	646	762
Elementary School	1787	1513

**Regional Needs to Meet Projected 2030 Enrollment:**

DOE forecasts relatively stable enrollment in this region to 2011. However, resident population projections beyond 2010 suggest a significant increase in student population for the region. For the period 2010 to 2030, resident population is expected to increase from 28,114 to 38,757, a gain of 37%.

Given the population projections, and considering the amount of development occurring in this region and the opportunity for continued development, the need for additional schools will be pronounced. The lack of a high school is currently being addressed by the DOE and funds have been allocated for site selection and design. The DOE’s target opening date for Kihei High School is 2010. A new elementary school and intermediate school will also be warranted by 2030.

***West Maui***

**Regional Summary**

- 1 High School
- 1 Intermediate School
- 2 Elementary Schools

The West Maui region has one high school, Lahainaluna High, one intermediate school, Lahaina Intermediate, and two elementary schools, Kamehameha III Elementary and Nahienaena Elementary. Table 15 provides a summary of total rated capacity and 2005 enrollment by school type:

**Table 15: Maui School Capacity and Enrollment, 2005**

School Type	Total Rated Capacity	2005 Enrollment
High School	969	1033
Intermediate School	571	578
Elementary School	1258	1393

**Regional Needs to Meet Projected 2030 Enrollment:**

Resident population forecasts for the West Maui Community Planning area suggest increasing student enrollment in all grades over this planning period. For the period 2010 to 2030 resident population is forecast to increase from 21,577 to 28,903, a gain of 33%. Given the high number of development projects proposed in the area and increasing population numbers, the need for additional schools or the expansion of schools will be inevitable.

A new elementary school is in the planning stages for the area of Kahana, near the Kapalua Airport. This school is being proposed as part of Maui Land & Pineapple’s Pulelehua project. The DOE is supporting the construction of this school and has a targeted opening date of 2011. This will help with the growth expected to 2011. The DOE is also cognizant of the fact that a new intermediate school will be needed within this 2030 forecast horizon, however planning for this school has not yet begun. With the introduction of Maui Preparatory Academy and Kamehameha School, the need for additional high school capacity may be addressed with the addition of classrooms and facilities at Lahainaluna High School rather than the construction of a new high school.

***Makawao-Pukalani-Kula***

**Regional Summary**

- 1 High School
- 1 Intermediate School
- 3 Elementary Schools

The Makawao-Pukalani-Kula planning region has one high school, Kekaulike High, one intermediate school, Kalama Intermediate, and three elementary schools, Kula Elementary, Pukalani Elementary, and Makawao Elementary. Table 16 provides a summary of total rated capacity and 2005 enrollment by school type:

**Table 16: Upcountry School Capacity and Enrollment, 2005**

School Type	Total Rated Capacity	2005 Enrollment
High School	1339	1388
Intermediate School	1118	945

Elementary School	1745	1365
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**Regional Needs to Meet Projected 2030 Enrollment:**

DOE forecasts a drop in enrollment for all public schools in this region to 2011. While resident population projections show slightly increasing numbers for school aged children during the period 2012-2030, the somewhat limited potential for large growth in the area dictates that new schools should not be needed. Should a large scale project like that being proposed at Hali‘imaile occur, however, the need for a new elementary school may be warranted and additional classrooms may be needed at both Queen Kalama Intermediate and King Kekaulike High School to accommodate such growth.

***Paia-Haiku***

**Regional Summary**  
 ▪ 2 Elementary Schools

The Paia-Haiku planning region has two elementary schools, Haiku Elementary and Paia Elementary, and no high school or intermediate school. The region is served by Kalama Intermediate and either Kekaulike High or Central Maui high schools. Table 17 provides a summary of total rated capacity and 2005 enrollment by school type:

**Table 17: Paia-Haiku School Capacity and Enrollment, 2005**

School Type	Total Rated Capacity	2005 Enrollment
High School	n/a	n/a
Intermediate School	n/a	n/a
Elementary School	774	616

**Regional Needs to Meet Projected 2030 Enrollment:**

Population projections for school aged children in this region are minimal. However, projections suggest that additional capacity may eventually be warranted for Haiku Elementary as capacity could be reached, if not exceeded, by 2030. This could be addressed by increasing the number of classrooms and related facilities at the school.

***Hana***

**Regional Summary**  
 ▪ 1 Combined School  
 Grades K-12

The Hana planning region has one school which combines grades kindergarten through 12. The 2005 rated capacity of the school was 552 students and the actual 2005 enrollment was 356 students.

**Regional Needs to Meet Projected 2030 Enrollment:**

DOE expects enrollment at Hana High/Elementary to decrease by 38% by 2011. Population projections for the region to 2030 are also minimal. Additionally, the school currently has excess capacity, indicating no need for added capacity to handle future growth within the planning horizon.



## WASTEWATER

### EXISTING SETTING

Wastewater consists of used water and waste from homes and workplaces, also known as “sewage.” The County Code definition of wastewater is “water-carried wastes from dwellings, commercial establishments, institutions and industrial plant, and may include groundwater, surface water and stormwater not intentionally admitted”. Management of the wastewater stream is important because it helps guard the water supply from becoming contaminated, protects the environment, and also aids in water conservation by allowing reclaimed water to be used for non-potable water purposes. Proper disposal of the millions of gallons of wastewater produced on Maui protects the drinking water supply, coastal water quality, and other important environmental resources.

The Maui County Department of Environmental Management, Wastewater Resources Division (WWRD), is responsible for the development, operation, and maintenance of the municipal wastewater system. On the island of Maui, the Division operates three principal wastewater management and reclamation systems: Wailuku-Kahului; Kihei; and Lahaina. The above table lists the areas which are supplied by each wastewater system.

**Table 18: Maui’s Wastewater Systems**

<b>System</b>	<b>Towns Supplied</b>
Wailuku-Kahului	Wailuku, Kahului, Kuau, Paia, Spreckelsville, Waikapu
Kihei	Kihei, Wailea, Makena
Lahaina	West Maui, from Kapalua to Puamana

The three wastewater management systems operating on the island of Maui roughly correspond to the island’s Community Plan Districts. The Makawao-Pukalani-Kula Community Plan area is served by individual cesspools and septic tanks, with the exception of a portion of Pukalani which is served by a privately owned wastewater reclamation facility. Haliimaile is the only Upcountry subdivision that is served by a County collection system. Makena has a private treatment plant.

**EXISTING PLANS AND PROGRAMS**

The Maui County wastewater systems were assessed in the County of Maui Infrastructure Assessment Update (Wilson Okamoto 2003). The overall objective of the assessment was to determine required upgrades for the County wastewater systems and whether the systems will experience capacity constraints based on the population and visitor forecasts provided in the Socio-Economic Forecast of the Maui County General Plan Update Program. Wastewater system monitoring is an ongoing task for the WWRD. Much of the assessment and planning for different parts of the system, such as pumps and plants, is updated as frequently as every quarter. The Wastewater Division is currently developing a hydraulic model to analyze which areas of the system will require upgrades due to current use or further development.

**REGIONAL ANALYSIS**

The regional analysis provides an overview of each wastewater system’s existing demand, projected 2030 demand, projected surpluses/shortages, and major capital improvement project investments. Wastewater demand is expressed as millions of gallons per day (mgd). Existing demand refers to 2005.

***Wailuku-Kahului Wastewater System***

**System Summary** (mgd)  
Existing Capacity: 7.9

The Wailuku-Kahului wastewater system is the largest and oldest of Maui County’s wastewater collection systems. The treatment facility currently has a design capacity of 7.9 million gallons per day (mgd). Based on population growth to 2030, treatment facility capacity will not be reached by the end of

2030	
Demand:	7.3
2030	
Surplus/ (Shortage)	0.6

the planning horizon, rather there will be a surplus of capacity of 0.6 mgd.

In order to address future capacity needs and issues related to shoreline erosion and tsunami hazards at the Central Maui Wastewater Reclamation Facility (CMWWRF), the County contracted with a consultant to prepare a study to identify treatment and disposal alternatives for the future. The Central Maui Wastewater Reclamation Facility Study was completed in August 2005. The study evaluated 11 treatment and disposal alternatives that ranged from maintaining the facility at its current location with fortification to withstand shoreline erosion and tsunami hazards, to relocating the facility to an alternative inland location. Cost estimates associated with these alternatives ranged from \$30 million to \$400 million respectively. Based upon the alternatives analysis, the County Council has adopted a resolution to maintain the existing facility at its present location and fortify it to withstand shoreline erosion and tsunami hazards.

**Potential  
Future  
Upgrades**

The improvements to the CMWWRF will be conducted in the following phases:

- **FY 2007 - 2011:** Implement and maintain shoreline erosion and tsunami proofing of facility at an estimated cost of \$30 million.
- **FY 2017 – 2022:** Initiate facility planning, permitting, and design of facility expansion to meet demand by 2027.
- **FY 2027:** Initiate construction.

***Kihei Wastewater System***

<b>System Summary</b> (mgd)	
Existing Capacity:	8.0
2030	
Demand:	6.7
Surplus/ (Shortage)	1.3

The Kihei wastewater system was built in 1975 and has a design capacity of 8.0 mgd. In 2005 flows averaged 5.0 mgd. Based on population growth to 2030, treatment facility capacity will be sufficient to meet projected demand.

Approximately 1 mgd of final effluent is currently treated as reclaimed water for irrigation. Unused reclaimed water is disposed of by three gravity injection wells. The collection system for most of the newer areas is PVC pipe while the collection system for the majority of areas constructed prior to 1975 is clay or concrete pipe.

According to the Maui County Wastewater Division, there are few near-term concerns with the capacity of the Kihei wastewater reclamation facility. Larger projected developments like Makena and Wailea 670 have indicated they will build their own private treatment plants, not placing additional demands on the County system. However, should they connect to the County system then they will have a long-term impact on plant capacity.

A facility plan for additional plant capacity will be initiated when flows reach 75% of capacity, about 2023.

***Lahaina Wastewater System***

<b>System Summary</b> (mgd)		The Lahaina wastewater system is comprised of two separate wastewater reclamation facilities located at a single site. One of these facilities is currently undergoing rehabilitation to be done by late 2007. The other facility has an existing capacity of 6.0 mgd. Once repaired, the combined capacity of the two facilities will be approximately 9.0 mgd. In 2005, flows to the Lahaina facility averaged 5 mgd. Based on population growth to 2030, treatment facility capacity should be available at the end of the planning horizon.
Existing Capacity:	9.0	
2030 Demand	7.0	
Surplus/ (Shortage)	2.0	

There is about 1.0 to 1.4 mgd of wastewater reuse from the Lahaina facility for golf course irrigation by Kaanapali Resort, roadway landscape irrigation, some pineapple irrigation, and irrigation at the Lahaina WWRF. The Lahaina facility also offers a reclaimed water fill station that allows contractors to fill water wagons for dust control purposes and projects in the North Beach area are preparing to use reclaimed water for irrigation. The remainder of the effluent is disposed of by gravity injection wells.

***Makawao-Pukalani-Kula Community Plan Area***

The majority of the Makawao-Pukalani-Kula Community Plan area is served by individual cesspools and septic tanks. Hailiimaile is the only subdivision that is served by a County collection system. It is expected that new developments in the area, aside from those in Hailiimaile, will all be served by septic systems as required by the State Department of Health. Any new development in Hailiimaile is required by the Department of Environmental Management to obtain a letter from Maui Land and Pineapple Company accepting the added flow to their treatment facility before the County will issue approval for the connection. Otherwise, the project will be required to build their own package wastewater treatment plant.

**ISLAND-WIDE PLANNING ISSUES**

***Wastewater Disposal & Reuse.*** Each year the County of Maui treats approximately 17 million gallons of wastewater per day. This is an amount that is nearly equivalent to the sustainable yield of the Iao Aquifer. Once treated, some of this water could be re-used for non-potable water uses such as golf course irrigation, residential and commercial landscaping, and agriculture. On Maui, wastewater that is not reused is disposed of through underground injection wells. There are concerns that these disposal methods may have an impact on water quality by increasing nutrient loads in coastal waters. Wastewater reuse offers an alternative to wastewater disposal and development of new water sources. While wastewater reuse is not feasible island-wide, it

may be beneficial in some areas. The primary obstacle to expanding the use of reclaimed water has been the high cost of constructing a storage and distribution system to convey treated effluent to users. The Wastewater Division is currently performing an internal wastewater re-use feasibility study for each system. The following discussion explores the feasibility of wastewater reuse in each community plan area with a County operated wastewater reclamation facility.

### **Kihei-Makena**

Reclaimed water is currently used throughout Maui, but is especially used in Kihei, where the Kihei Wastewater Reclamation Facility (Kihei WWRF) is strategically located mauka of Piilani Highway, which allows for the effluent to gravity flow to individual users. The Kihei system currently supplies approximately 1.0 to 2.0 million gallons per day of wastewater for irrigation and dust control. This represents approximately 20 to 40 percent of the wastewater treated by the Kihei WWRF. Due to the advantageous location of the Kihei WWRF coupled with the projected growth for the South Maui region, increasing wastewater reuse within this region is a potential opportunity.

### **Wailuku-Kahului**

Central Maui WWRF disposes of its treated wastewater through injection wells. There are, however, on-going environmental concerns regarding effluent disposal through injection wells. With injection of treated wastewater, nutrient-rich water seeps into the ocean, but where, and to what effect, are unknown. Reuse of reclaimed wastewater offers an alternative to injection wells; however, because of the existing location of the Central Maui WWRF, widespread use of treated effluent for irrigation would be very expensive due to the high cost of pumping treated effluent uphill to individual users. These high costs make widespread wastewater reuse an unlikely alternative to injection wells in the Central Maui region.

### **West Maui**

In West Maui there is a potential to expand the use of reclaimed wastewater. About 1.4 mgd of reclaimed water from the West Maui facility is currently used for golf course irrigation at Kaanapali Resort. An investment into greater treatment capacity, storage capacity, and transmission lines would allow reclaimed water from this facility to be expanded to other users.

***Private Wastewater Treatment Plants.*** Private wastewater treatment plants are becoming an increasingly more affordable alternative to centralized plants for new communities that are located outside the service area boundaries. These privately owned and operated facilities can treat wastewater to a level of quality that meets all Federal, State, and County requirements. The wastewater from private treatment plants may also be reclaimed for irrigation when treated to R-1 quality. Because these facilities are privately paid for, the financial burden to taxpayers is negligible. The primary disadvantages associated with private wastewater treatment plants are the high up-front cost and ongoing operation costs that these facilities place on individual communities, which in-turn makes it more difficult to provide affordably priced housing. Private package treatment plants may be the best treatment option for larger projects which find it cost prohibitive or impractical to connect to the centralized system.





## SOLID WASTE

### EXISTING SETTING

According to the US Environmental Protection Agency (EPA), since 1960, the United States has witnessed a steady rise in both total tons of waste generated and pounds generated per person. Management of this waste will increasingly rely on a sophisticated array of strategies; however, landfill disposal remains the most common method of dealing with waste, both on the mainland and in Maui County. In the United States, approximately 57% of municipal waste is landfilled on average<sup>3</sup>. On Maui, waste management strategies include landfill disposal, source reduction, recycling, and composting. Source reduction and waste diversion have positively contributed to solid waste management on Maui; however, landfills are expected to remain the most widely used waste management method for the

<sup>3</sup> R.M. Towill Corporation. June 2006. *Public Facilities Assessment Update County of Maui*. Prepared for County of Maui, Planning Department.

foreseeable future. Solid waste management will remain an important land use issue for Maui’s population.

The Maui County solid waste management system includes two currently operating landfills with recycling operations and one convenience center. There are four former landfills on the island that have been closed.

The Maui County Department of Environmental Management’s Solid Waste Division is responsible for the planning, operation, and maintenance of the County’s open and closed landfills. The Central Maui Landfill is located off Pulehu Road. It is owned and operated by the County and accepts all types of municipal waste, except for regulated hazardous wastes and commercial construction and demolition debris. The Central Maui Landfill services the entire island of Maui except for Hana.

**Table 19: Maui’s Landfills, Recycling Centers, and Convenience Centers**

<b>Landfill/Center</b>	<b>Description</b>
Central Maui	<ul style="list-style-type: none"> <li>• Services entire island, except Hana</li> <li>• Accepts all waste and recyclables, except hazardous wastes and construction and demolition waste.</li> </ul>
Hana	<ul style="list-style-type: none"> <li>• Services Hana Community Plan Area</li> <li>• Six acres dedicated to waste burial</li> </ul>
Olowalu Convenience Center	<ul style="list-style-type: none"> <li>• Accommodates self-haul residential waste and recyclables for transfer to Central Maui.</li> </ul>

The Hana Landfill serves the Hana community plan area and has 6 acres dedicated to waste burial. The parcel is shared by Recycle Hana, which separates scrap metal, glass, cardboard and green waste for recycling and composting. The Olowalu Convenience Center, sited adjacent to the former Olowalu landfill, accommodates self-haul residential waste from residents of Lahaina for transfer to the Central Maui landfill. The site also includes a reusable item drop area and recycling drop station. The Maui Demolition and Construction Landfill is a privately owned and operated facility that accommodates the island’s construction waste.

**EXISTING PLANS AND PROGRAMS**

The County of Maui implemented a county-wide Integrated Solid Waste Management Plan (ISWMP) in 1994. The 1994 ISWMP remains the blueprint for the County’s waste management system. The plan presents a strategy for reducing the amount of waste entering the County’s waste management system by diverting 50% of the waste stream from landfills by 2000. Although the initial goal of diverting 50% was not met, the figure remains a target.

The Department of Public Works is funded to initiate an update to the ISWMP in 2006. The revised plan is anticipated to be completed by the end of 2008.

Since the implementation of the 1994 ISWMP, Maui County has made considerable progress implementing source reduction and waste diversion efforts. Despite an increase in both

population and pounds generated per person, approximately 30% of Maui County’s solid waste is now diverted by means of recycling, reuse, and composting. The remainder is landfilled. That puts Maui County above the national average for percentage of solid waste diverted from landfills, but below the County’s target 50% landfill diversion rate.

**REGIONAL ANALYSIS**

The regional analysis provides an overview of each landfill’s demand and existing capacity, projected 2030 demand, anticipated future capacity to meet projected demand, and major capital improvement project investments. Landfill capacity and waste generation for the Central Maui Landfill are expressed in millions of cubic yards (mcy). Landfill capacity and waste generation for the Hana Landfill are expressed in thousands of cubic yards (tcy).

**Central Maui Landfill**

<b>Facility Summary (mcy)</b>	
Existing Capacity	11.6
2020 Demand	10.4
2030 Demand	12.4
2030 Surplus/Shortage	(0.8)

The Central Maui Landfill currently provides 1,050 cubic yards of space to bury the 425 tons of waste it receives on average each day. By 2030, this amount is projected to reach 808 tons of waste requiring 2,020 cubic yards of space each day for disposal.

At the beginning of 2003, the Central Maui Landfill had an existing and planned capacity of 11.6 million cubic yards of landfill space. Projected cumulative waste generation within the service area for the years 2005 to 2030 is 5.7 million tons, which translates to 12.4 mcy of waste requiring burial in the landfill. Based on these projections, the Central Maui Landfill will have adequate capacity through 2025. By 2030, waste disposal is projected to reach 12.4 mcy, resulting in a 0.8 mcy shortage of capacity.

**Proposed Future Disposal:**

The Central Maui Landfill is being developed in six phases. Phases 1 and 2 are closed as of 2006. Phase 4a is nearly at capacity. Phase 4b will be opened by early 2007 and will have available capacity to 2009. At present, 70 acres of quarry and sugarcane land have been set aside for Phases 5 and 6, of which 60 acres are dedicated for waste disposal. Table 20 summarizes the Central Maui Landfill phasing plan through 2030:

**Table 20: Central Maui Landfill Phasing Plan**

Phase	Year Open	Interim Capacity Limit	Capacity (cubic yards)
Phase 3 – Compost	Current	Unlimited	Unlimited
Phase 4a	Current	2007	726,000
Combined Phase 4a + 4b	Current	2009	2,904,000
Phase 5	2009	2022	8,712,000 <sup>4</sup>

Phase 6                      2022                      2030                      n/a

***Hana Landfill***

<b>Facility Summary (tey)</b>		The Hana Landfill has 6 acres with an estimated capacity of 217 thousand cubic yards dedicated to waste burial. It is projected that approximately 77.5 thousand cumulative tons of waste requiring 195 thousand cubic yards of burial space will be required through 2030. At the future year (year 2030) annual waste generation rate of 3,437 tons, the remaining 110 thousand cubic yards of burial space will extend landfill operations a few years beyond 2030.
Existing Capacity	217.0	
2030 Demand	195.0	
2030 Surplus/Shortage	22.0	

***Maui Construction and Demolition Landfill***

Maui County’s landfills do not currently accept construction and demolition waste. This material is disposed of in the privately owned and operated Maui Construction and Demolition (Decoite) Landfill, which was opened in 1996 near Ma’alaea on property owned by Alexander & Baldwin.

The Decoite landfill services all construction and demolition operators on the island, and accepts only construction and demolition waste. A license agreement with Alexander and Baldwin allows Decoite Trucking to operate the facility. The facility has a capacity of 872,000 cubic yards of waste. After 10 years of operation, the landfill has reached approximately half its capacity, with roughly 5 to 10 years of capacity remaining. The Decoite landfill accepts 3,000 – 5,000 tons of waste monthly at the present time. However, the lifespan of the landfill could be considerably shortened with any increase in construction and/or demolition at major hotels on Maui, as well as any diversion of materials from the County landfill.

Ongoing operation of this landfill is critical to meeting Maui’s short to mid-term solid waste disposal needs.

**ISLAND-WIDE PLANNING ISSUES**

***Waste Diversion / Recycling.*** The County’s success with source reduction, recycling, and composting will significantly influence future waste generation rates. Recycling currently diverts approximately 30% of Maui County’s waste, as opposed to an average of 28% recovered, recycled or composted nationwide. Much of the County’s recycled material is exported to China, the Pacific Basin, and the Mainland. Should waste reduction and diversion rates increase, then the volume of solid waste deposited into Central Maui landfills will decrease as well. In addition to the environmental benefits which waste diversion programs such as recycling and composting possess, they also require considerably less land to operate than a landfill. Whereas a 20 acre landfill will overtime reach capacity and need to be closed, a 20 acre composting

facility can be utilized indefinitely; therefore consuming far less land overtime than landfilling waste.

Most recycling on Maui comes from the commercial sector with all bars and restaurants required to recycle glass. The majority of resorts conduct a comprehensive recycling collection program, including glass, cardboard, green waste, food waste, beverage containers, and cooking oil. Because of this effort, the resorts have been leaders in recycling on Maui. Curbside pickup of recyclables and yard trimmings will be absolutely necessary to engage private citizens more, in order to decrease consumption of the landfill and to reach the County's target 50% landfill diversion rate.

Recycling will be a key component of Maui County's integrated solid waste management program. The County is currently moving toward automation of its trash collection, with a goal of full automation. Once automation of trash collection is complete, personnel can be reallocated toward implementation of curbside recycling. The County's vision for recycling includes: commingled collection; alternating green waste pickup, twice-weekly trash pickup to once-weekly trash pickup and once-weekly recycling pickup, alternating with once-weekly yard trimming pickup.

Implementation of curbside recycling will require the acquisition and development of property to support a materials recovery facility (MRF). The MRF would handle materials collection and sorting which are essential for a successful recycling program. However, there is currently no adequate facility in place to handle materials recovery, and the cost to acquire such property could be significant.

***Waste to Energy Conversion.*** Waste-to-energy facilities are an increasingly attractive alternative to traditional landfilling and fossil fuel power plants. These facilities utilize municipal waste as fuel to generate electricity. There are currently 89 waste-to-energy plants throughout the country that supply enough electricity to service 2.3 million homes. These plants consume as their generating power the municipal waste (garbage) generated by 39 million people. Waste-to-energy facilities are required to meet strict State and Federal clean air standards, and have been shown to significantly reduce green house gas emissions by reducing the release of methane gases from landfills and carbon dioxide that would otherwise be emitted from fossil fuel burning power plants. By utilizing municipal waste as their primary fuel source, waste-to-energy facilities can reduce the volume of waste landfilled by 90 percent.

The City and County of Honolulu relies heavily on waste-to-energy conversion to dispose of municipal waste. The City's H-power facility currently burns approximately 600,000 tons of waste each year, and a proposed plant expansion would increase this capacity to 725,000 tons per year. H-power currently supplies Oahu with approximately 7 percent of the island's energy needs.

The primary obstacle to waste-to-energy conversion on Maui is the need for a guaranteed volume of waste. Maui's current population does not offer the critical mass necessary to ensure the success of waste-to-energy. In addition, the vast majority (est. 80%) of refuse is owned by the private refuse haulers, not the County, and haulers have the option of shipping refuse elsewhere

for disposal if the tipping fees are too high. While this waste management method may not presently work for Maui, with increasing population and waste flow, waste-to-energy conversion could prove to be a long-term option for disposing of Maui's municipal waste, but only after all recyclable and compostable materials are removed from the waste stream.

*Future Ameron Quarry Needs.* The County currently utilizes exhausted Ameron quarry sites for its disposal needs. Should Ameron discontinue quarry operations in Central Maui, then the County would be required to relocate its landfill operations. Given the environmental concerns associated with landfill operations, any new quarry would likely be sited in a remote and inconvenient location that will potentially have a significant impact on traffic.



## PARKS

### EXISTING SETTING

Maui County is a unique island environment blessed by an abundance of diverse natural amenities and recreational opportunities. These assets combine to make Maui a highly desirable place to live and an internationally renowned visitor destination. However, unless growth is properly planned the very qualities that make Maui a desirable place to live will be lost. Local actions to designate and protect parks and open space will play a key role in ensuring a high quality of life for Maui's residents as the island's population continues to grow.

Maui's rich geography, history, and culture make the island lifestyle uniquely oriented to the ocean and outdoor-oriented recreation. Maui's beach parks are world renowned and attract residents and visitors on a daily basis. However, population growth has resulted in significantly greater use of existing beach parks.

Population growth has also resulted in greater demand to develop along the shoreline and within our existing urban communities. Many of the remaining undeveloped shoreline and urban infill parcels are now proposed for development. It is therefore increasingly important to identify and secure undeveloped lands before development forecloses the opportunity to utilize these lands for future recreation needs.

Maui’s developed parks, and system of open spaces, includes lands utilized for both active and passive recreation purposes. Maui’s developed parks provide athletic fields, tot lots, tennis courts, gymnasiums, and a variety of other facilities for daily use by island residents. These facilities are dispersed throughout the community at a scale that ranges from small one-acre mini-parks to large regional parks of 100 acres or more. Maui’s system of open space resources ranges from natural wilderness areas to productive agricultural lands, gulches, wetlands, and waterways. These lands are often used for hiking, horseback riding, off-roading, mountain biking, fishing, hunting, camping, and many other recreation uses. In addition to recreation, open lands serve other important functions as well, including:

- Preserving important natural resources and critical habitats;
- Preserving lands for agriculture and forestry;
- Protecting important views;
- Protecting significant cultural and historic sites;
- Enhancing the aesthetic quality of the built urban environment; and
- Containing urban sprawl.

The combination of an adequate supply and distribution of developed parks, and a publicly accessible system of open space resources, is necessary to maintain a high degree of community livability.

**MAUI COUNTY PARK SYSTEM**

The Maui County Department of Parks and Recreation is responsible for the development, operation, and maintenance of County park facilities. The State Department of Land and Natural Resources (DLNR) has jurisdiction over State Beach Parks, Natural Area Reserves, and other managed lands. The National Park Service manages Haleakala National Park.

This report addresses County park lands and facilities. Maui County’s park system is comprised of a mix of sub-regional, special-use, and regional-level parks (See: Table 1-25)

**Table 21: Park Types**

<i>Park Type</i>	<i>Purpose</i>	<i>Size</i>
Mini-park	Provide passive park space for a “sub-neighborhood” area.	Approximately 1.5 acres
Neighborhood Park	Accommodate the active recreational needs of a neighborhood.	2 to 10 acres
Sub-regional park	Complement all other parks within a community, and provide for more diverse active recreation	15 to 20 acres
Regional Park	Provide recreational opportunities not available at the community level or at smaller parks.	between 40 and 150 acres



In March 2007, Maui County's parks included a total of 770 acres of sub-regional parks and 334 acres of regional parks. These totals exclude State, private, and National parks. There is currently a substantial shortfall in regional and sub-regional park space to service the existing population. The County's Public Facilities Assessment Update (March, 2007) finds that based on a standard of 10 acres per 1,000 of de facto population there is a deficit of sub-regional parkland in all of Maui's community plan regions, amounting to a cumulative deficit of 1,106 acres, based on 2006 population.

## **EXISTING PLANS AND PROGRAMS**

The Department of Parks and Recreation does not currently have the capacity to conduct an on-going program of long-range park land and facility planning. This task is typically performed on an intermittent basis when funding becomes available. The *South Maui Parks and Open Space Master Plan* (October, 2003), prepared in response to a recommendation in the 1998 Update of the Kihei-Makena Community Plan, provides a model for regional parks and open space master planning that can be utilized in other areas of the County. This plan provides a detailed inventory and preliminary level-of-services analysis of existing park facilities as well as a plan for an interconnected network of parks and open spaces linked by bikeways and pedestrian greenways. The Department of Parks and Recreation typically conducts facility planning on the basis of its six-year capital improvement project budget, which is updated on an annual basis.

## **LEVEL OF SERVICE (LOS) STANDARDS**

The County of Maui's Public Facilities Assessment Update (March, 2007), prepared by R.M. Towill Corporation, finds a notable deficit in land dedicated to parks relative to Maui's existing and projected population. The Towill study relies on a standard of 10-acres of sub regional park land per 1,000 of de facto population and 15-acres of regional park land per 1,000 of defacto population. These guidelines were adapted from standards recommended by the National Recreation and Parks Association (NRPA), Urban Land Institute, and the City and County of Honolulu. Similar standards have been widely adopted by cities across the country.

The NRPA published updated guidelines in 1995 in its publication titled *Park, Recreation, Open Space, and Greenway Guidelines*. The revised guidelines now encourage communities to develop their own LOS standards based on the unique conditions within their communities. The NRPA recommends that communities now conduct individualized LOS studies using the following types of techniques:

- Visitor surveys,
- Resident questionnaires, and
- Field observation of participation rates.

Because of Maui's unique position as an ocean-oriented visitor destination, an individualized LOS study that recognizes the island's assets, conditions, and resources may result in standards that more accurately reflect the island's park land and facility needs.

**REGIONAL ANALYSIS**

The regional analysis provides an overview of existing park acreage by community plan district, existing capacity or deficits, projected 2030 demand, and projected 2030 deficits or surpluses. Island-wide park planning recommendations and recommendations for major park improvements are discussed later in the report.

***Wailuku-Kahului Parks***

***Region***

**Summary (Acres)**

Existing Supply	186
2005 Demand	477
2005 Surplus/Shortage	- 291
2030 Demand	727
2030 Surplus/Shortage	- 541

The Wailuku-Kahului community plan area contains more parks per capita than any other Maui community plan region. Since many of the community’s parks provide region-wide facilities, they are used by residents of other communities. Many facilities are therefore used above their capacity.

The region currently has approximately 186 acres of sub-regional park land and 377 acres of regional parks. Based on a standard of 10 acres of sub-regional park land per 1,000 of de facto population, the region has a current deficit of approximately 477 acres. Based on projected population growth to 2030, this deficit will increase to 541 acres.

Based on a standard of 15 acres of regional park space per 1,000 of defacto population, Wailuku-Kahului also has a current deficit of 382 acres of regional park space. This deficit will increase to 756 acres by 2030 based on population projections. Unlike sub-regional park space, regional park space is intended to serve an island-wide population.

In addition to park land, the Public Facilities Assessment identifies the following facilities required to meet existing and projected population growth:

**Table 22: Wailuku-Kahului Park Facility Requirements**

	Needed Facilities
<b>2005</b>	2030
<b>17.8 tennis courts</b>	34 tennis courts
<b>18.2 sports courts</b>	25 tot lots
<b>0.8 community centers</b>	38 sports courts
	33 community centers
	0.9 gyms

***Kihei-Makena Parks***

***Region***

**Summary (Acres)**

Existing Supply	114
2005 Demand	451

The Kihei-Makena community plan area is a growing region with an increasing number of tourists and residents attracted to the area each year. Most parks within the region are located along the coast, and are mainly beach parks with few recreational facilities. Over 90% of Kihei-Makena’s parks are either directly on a beach, or separated from one by a road. There are slightly over 3.8 acres of total park land per 1,000 residents in the

		Kihei-Makena community.
2005		
Surplus/ Shortage	- 336	The region currently has 114 acres of sub-regional park land. Based on a standard of 10 acres of sub-regional park land per 1,000 of de facto population, the region has a current deficit of approximately 336 acres. Based on projected population growth to 2030, this deficit will increase to 605 acres.
2030		
Demand	719	
2030		
Surplus/ Shortage	- 605	

In addition to the shortfall of land allocated to parks in the Kihei-Makena area, the Public Facilities Assessment Update identifies the following additional park facilities required to accommodate existing and projected population growth:

**Table 23: Kihei-Makena Park Facility Requirements**

	Needed Facilities
<b>2005</b>	2030
<b>20 tennis courts</b>	37.9 tennis courts
<b>6 tot lots</b>	11.4 tot lots
<b>16.5 sports fields</b>	30 sports fields
<b>32 sports courts</b>	53.5 sports courts
<b>2.5 community centers</b>	5.2 community centers
<b>1.8 gyms</b>	2.9 gyms

***West Maui Parks***

***Region***

**Summary (Acres)**

Existing Supply	125
2005 Demand	447
2005 Surplus/ Shortage	- 322
2030 Demand	622
2030 Surplus/ Shortage	- 497

Due to the linear nature of the community along the shoreline most of Lahaina’s parks are within the coastal strip. The sub-regional park system in this area currently consists of 23 mostly neighborhood parks, totaling approximately 125 acres.

The region currently has approximately 125 acres of sub-regional park land. Based on a standard of 10 acres of sub-regional park land per 1,000 of de facto population, the region has a current deficit of approximately 322 acres. Based on projected population growth to 2030, this deficit will increase to 497 acres.

In addition to the shortfall of land allocated to parks in the Lahaina area, the Public Facilities Assessment identifies the following additional park facilities required to accommodate existing and projected population growth:

**Table 24: West Maui Park Facility Requirements**

	Needed Facilities
<b>2005</b>	2030
<b>20.8 tennis courts</b>	32.5 tennis courts
<b>4.9 tot lots</b>	8.4 tot lots
<b>12.9 sports fields</b>	21.1 sports fields
<b>19 sports courts</b>	46.7 sports courts
<b>32.8 sport courts</b>	4.2 community centers
<b>2.5 community centers</b>	1.5 gyms
<b>0.8 gyms</b>	

***Makawao-Pukalani-Kula Parks***

<b><i>Region</i></b>	
<b><i>Summary (Acres)</i></b>	
Existing	118
2005 Demand	232
2005 Surplus/Shortage	- 114
2030 Demand	309
2030 Surplus/Shortage	- 191

A major limitation with the provision of park services in this area is its widely dispersed population centers, which makes travel difficult to regional facilities such as golf courses, swimming pools and beaches. Due to the low density and distances between the Makawao-Pukalani-Kula communities, park numbers and area allocation may need to be altered in favor of larger, more centralized facilities. Consequently, the option exists to locate some of the smaller parks within future designated residential areas at the recommended level, and combine the remainder into larger parks placed near the center of major residential areas such as Makawao and Pukalani.

The region currently has approximately 118 acres of sub-regional park land. Based on a standard of 10 acres of sub-regional park land per 1,000 of de facto population, the region has a current deficit of approximately 114 acres. Based on projected population growth to 2030, this deficit will increase to 191 acres.

In addition to the shortfall of land allocated to parks in the Makawao-Pukalani-Kula area, the Public Facilities Assessment Update identifies the following additional park facilities required to meet existing and projected demand:

**Table 25: Upcountry Park Facility Requirements**

	Needed Facilities
<b>2005</b>	<b>2030</b>
<b>9.5 tennis courts</b>	14.6 tennis courts
<b>1.6 tot lots</b>	3.2 tot lots
<b>16.6 sports courts</b>	0.4 sports fields
	22.7 sports courts

***Paia-Haiku Parks***

<b><i>Region</i></b>	
<b><i>Summary (Acres)</i></b>	
Existing Supply	110
2005 Demand	123
2005 Surplus/Shortage	- 13
2030 Demand	139
2030	

The Paia-Haiku community plan region has a well-developed park system with over 8.9 acres of total (sub-regional and special use) park land per 1,000 residents. Due to the community’s linear nature, most of the parks are within the coastal strip.

The region currently has approximately 110 acres of sub-regional park land. Based on a standard of 10 acres of sub-regional park land per 1,000 of de facto population, the region has a current deficit of approximately 13 acres. Based on projected population growth to 2030, this deficit will increase to 30 acres.

According to the Public Facilities Assessment, Paia-Haiku currently has adequate park facilities accommodate projected demand to 2030.

Surplus/  
Shortage - 30

**Table 26: Paia-Haiku Park Facility Requirements**

	2005	Needed Facilities
	8.2 tennis courts	2030
	0.1 sports fields	9.3 tennis courts
	7.8 sports courts	1.0 tot lots
		9.1 sports courts

***Hana Parks***

***Region***

Hana has a well-developed park system and experiences by far the smallest deficit of park space of any of Maui’s Community Plan Districts.

***Summary (Acres)***

Existing  
Supply 29

Based on a standard of 10 acres of sub-regional park land per 1,000 people, the area will require an additional 7 acres of park space to support the de facto population by 2030.

2005  
Demand 22

2005  
Surplus/  
Shortage 7

According to the Public Facilities Assessment Update, one additional sport court will be required to accommodate projected demand to 2030.

2030  
Demand 29

2030  
Surplus/  
Shortage 0

**ISLAND-WIDE RECOMMENDATIONS**

***Conduct Long-range Parks and Recreation Planning.*** The Department of Parks and Recreation must initiate a robust and ongoing program of long-range park lands and facilities planning if it is to adequately service the recreation needs of Maui’s rapidly growing population. The program must have the capacity to continually monitor the community’s needs and respond to changing circumstances through the timely acquisition and development of park lands and facilities. A robust program will facilitate a better understanding of the community’s recreation goals, provide more relevant standards and criteria to express these goals, and help to facilitate sufficient community support to ensure adequate levels of staff and funding to achieve the goals. The following seven (7) steps should comprise the parks planning process:

***1. Define a community vision & facilitate broad public participation***

Broad community participation is necessary to determine both the types of facilities and location of facilities that the community desires. Without this input many facilities will go unused, or be significantly underutilized.

It is also important that the community articulate a vision for its future parks, recreation, and open space needs, and incorporate this vision into the overall vision

for community growth and development. This will help to reduce conflicts between competing land uses, and ensure that funding is made available during plan implementation.

**2. *Inventory existing conditions & identify problems and opportunities***

An inventory of existing park lands, facilities, and open spaces should be conducted to determine baseline conditions.

Thereafter, existing physical conditions including vacant lands, development patterns and densities, schools and other public facility sites, and environmental and site development constraints should be mapped to determine future park site problems and opportunities.

Sites that are level, centrally located, accessible to vehicular traffic and pedestrians, proximate to schools, and have other favorable characteristics such as good views, soil conditions, and linkages to the open space network of greenways, bikeways, jogging paths, and hiking trails provide ideal park sites.

**3. *Assess needs and project future demand***

The needs of the community should be translated into level-of-service (LOS) standards that adequately portray the desired level of service (park acres and facilities) per 1,000 residents of a community. LOS standards are best determined through both user participation and demand surveys of park facility users. These surveys collect data regarding the frequency existing facilities are used and the attitudes, perceptions, and needs of the community. LOS standards make it possible to quickly determine acreage and facility needs for existing and projected conditions.

The demand for future facilities should be based on projections of future population growth, and trends in recreation as influenced by changing demographics and lifestyles.

**4. *Develop community goals, objectives, and policies***

The parks planning process should establish clearly defined community goals, objectives, and policies. Goals should be general statements regarding a desired future condition. Objectives are more precise and measurable than goal statements. Policies give direction to ensure that the necessary actions are taken to achieve plan objectives. Together, these statements should

establish the community's priorities and the specific actions required to attain the community's vision.

**5. *Develop site selection criteria***

The development of site selection criteria should be based on the values expressed in the community's vision and goal statements. These criteria should relate to the location of park facilities, site features, adjacent uses, and types of facilities to be programmed.

**6. *Prepare parks and recreation plan(s)***

The parks and recreation plan(s) should contain the following elements:

1. Summary of existing conditions;
2. Demand and needs assessment;
3. Definition of park criteria and standards;
4. Identification of community vision, goals, objectives, and policies;
5. Inventory of opportunities;
6. Maps to define vision;
7. Identification and prioritization of land area and facility needs; and
8. Potential funding sources.

**7. *Facilitate implementation through County CIP***

The land and facility needs identified in the plan(s) must be incorporated into the County's annual, 6-year, and 20-year CIP plans in order to ensure availability of funding and timely implementation.

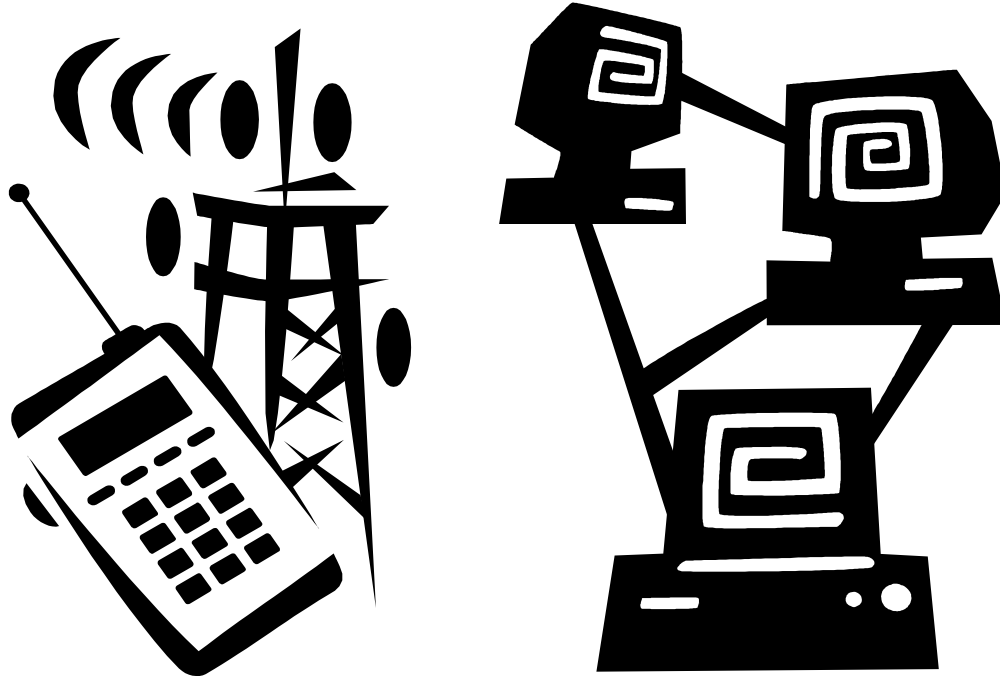
***Identify and Acquire Suitable Park Lands.*** The continued build-out of vacant lands within Maui's existing urban areas has made it increasingly difficult to find suitable park sites. Ideally, park sites should have favorable topography, with slopes of 6 percent or less, and be proximate to existing neighboring residential communities, schools, and roadways. These are the same lands that are generally most favorable for development. Because of the high cost required to purchase zoned urban lands for park use, Maui has relied on developers to provide park lands through the entitlement process. The County's reliance on park dedications has made it difficult for Maui to address existing acreage deficits, since park dedications generally mitigate only the impact caused by the proposed development.

The scarcity of suitable park lands, and the high cost to acquire these properties, makes it critical that appropriate park sites be identified early on in the planning process so that funding can be appropriated. Other benefits resulting from proactive planning is the greater likelihood that these lands will better serve the recreation needs of the community, while also helping to shape growth in a way that contains urban sprawl and provides for visual relief and open space.

***Identify and Acquire Shoreline Lands.*** Maui is an ocean-oriented community, and with population growth, its existing beach parks are becoming increasingly crowded. Since existing undeveloped shoreline lands are highly valued for development, it is critical that Maui identify

and acquire additional shoreline lands before they are lost to development. The Pali-to-Puamana Master Plan, which proposes the creation of an undeveloped 8-mile stretch of shoreline for recreation use through the realignment of Honoapiilani Highway, provides a significant opportunity for Maui to significantly expand its inventory of shoreline lands. In addition, *The Shoreline Access Inventory Update – Final Report (March 2005)*, prepared by Oceanit for the County of Maui, identifies specific parcels that the County should acquire to enhance beach access on Maui. These parcels should be incorporated into the County’s future parks and recreation master plan, with an implementation schedule and dedicated funding identified in the appropriate CIP.





## TELECOMMUNICATIONS

### EXISTING SETTING

Telecommunication services and underlying infrastructure are significant factors in maintaining modern economic and social life. The telecommunications industry provides direct communications services to consumers, industry, and government which have become an integral element of modern life. Having better access to telecommunication systems and services will mean greater opportunity for business growth and employment and educational opportunities within the County, thus allowing the County to be successful in a competitive economic development climate. Telecommunication systems are also becoming increasingly important for public safety and emergency response.

Located in the middle of the Pacific Ocean between the United States and Asia, Hawaii is in an advantageous location for telecommunications. The Hawaiian Islands are the hub of a diversified network of trans-Pacific high-bandwidth fiber optic and analog cable, satellite communication networks, and cellular and wireless services. Because of this diversified network, Maui offers residents, visitors, and businesses an abundance of telecommunications capacity.

Unlike the other physical infrastructure systems assessed as part of the General Plan update, telecommunications are not a County managed and operated system. However, assessing the adequacy, limitations, and opportunities relating to the systems and their physical infrastructure is a key element of planning for the island's growth into 2030.

Telecommunication services are offered by private industry to individual consumers, businesses, and government. Telecommunication providers are regulated by the State of Hawaii, Department of Budget and Finance, Public Utilities Commission (PUC). The PUC regulates all franchised or certificated public service companies operating in the State, including telecommunications. The PUC prescribes rates, tariffs, charges and fees; determines the allowable rate of earnings in establishing rates; issues guidelines concerning the general management of franchised or certificated utility businesses; and acts on requests for the acquisition, sale, disposition, or other exchange of utility properties, including mergers and consolidations. The PUC does not have any jurisdiction over land use issues, such as the placement of utility poles or transmission towers. Jurisdiction over such issues falls with the Counties.

For the purposes of this assessment, telecommunication services include telephone, wireless, and internet services. The following section identifies telecommunication providers operating on Maui, a discussion of technology currently available, and a general summary of coverage areas for each service type.

### ***Telephone Services***

Telephone service is the most basic form of telecommunications covered in this assessment. Several providers currently operate within Maui County, offering telephone services to residential and business customers.

⇒ ***Providers Operating Within Maui County***

The Incumbent Local Exchange Carrier (ILEC) is Hawaiian Telcom Communications, Inc., providing local and long distance services to residential and business customers. Pacific LightNet, Inc., and Time Warner Telecom, Inc., are the Competitive Local Exchange Carriers (CLEC), providing local and long distance services to business customers. Several other providers also offer long distance services within the County. Sandwich Isles Communications, Inc., is currently installing infrastructure to provide connectivity to Hawaiian Homelands. The following list identifies all telephone providers operating

within Maui County:

- Hawaiian Telcom Communications, Inc.
- Pacific LightNet, Inc.
- Time Warner Telecom, Inc.
- Sandwich Isles Communications, Inc.
- AT&T
- MCI
- Sprint Hawaii
- Oceanic Time Warner Cable

⇒ ***Technology Available***

Plain old telephone service, or POTS, is the standard telephone service used by most residential and business customers nearly everywhere in the world. Voice over Internet Protocol (VoIP), or digital phone service, is a relatively new technology which routes voice conversations over the internet. Oceanic Cable is the only provider to offer VoIP as a part of their bundle cable service.

⇒ ***Service Coverage***

Telephone service is widely available throughout Maui County. All homes and business have access to telephone service.

### ***Wireless Services***

Although not as ubiquitous as the common telephone, wireless telephone services are increasingly becoming a part of everyday life. Multiple companies offer wireless services within Maui County, with service coverage depending on location.

⇒ ***Providers Operating Within Maui County***

Unlike telephone service, wireless service does not have a primary provider; rather, wireless services are offered by multiple companies within the County. Wireless providers include:

- Verizon Wireless
- T-Mobile
- Sprint
- AT&T Wireless (Cingular)
- Ericsson
- Motorola
- Nokia
- Hawaiian Telcom Communications, Inc.

⇒ ***Technology Available***

Wireless services include cellular telephone and personal communication services (PCS). While both analog and digital wireless services are available in Maui County,

according to Rick Colletto, General Manager for Maui County Oceanic Time Warner Cable (personal communication, December 21, 2006) current trends indicate that analog service will be phased out in the near future.

⇒ *Service Coverage*

Wireless service coverage varies by individual service provider; however in general the major urban and residential areas within the County are covered by wireless services.

**Internet Services**

Similar to wireless, internet services are becoming a standard component of modern life. The internet is increasingly becoming an essential element of everyday home and business activities. With continually evolving technologies, Internet Service Providers (ISP) offer a range of internet services to customers in the County.

⇒ *Providers Operating Within Maui County*

ISPs on Maui range from locally owned and operated companies to large international corporations. However, according to Mike Perkins, Program Director for the Maui Economic Development Board, Inc., (personal communication, December 19, 2006) current trends indicate a shift toward larger companies and away from small-scale ISPs. ISPs operating within Maui County include:

- Oceanic Time Warner Cable (AOL, Road Runner, and The Wave)
- Hawaiian Telcom Communications, Inc.
- Pacific LightNet, Inc.
- Time Warner Telecom, Inc.
- Sandwich Isles Communications, Inc.
- AT&T
- Verizon Wireless
- SprintNextel
- MCI Telecommunications
- Earthlink
- Dragon Internet
- Aloha.com
- Lavanet
- Maui Net
- Pacific Information Exchange (Pixinet)
- Dish
- DirectTV
- Clearwire

⇒ *Technology Available*

Internet services are available on Maui in a variety of forms. Traditional dial-up service, which is available through the telephone companies and other providers, is the most basic

form of internet service. Broadband technologies, such as cable modems and Digital Subscriber Line (DSL) are also available. High-speed wireless, also a broadband technology, is offered by several ISPs in Maui County. Satellite internet is also available through satellite television companies.

⇒ *Service Coverage*

Internet service coverage varies by type of internet connection and ISP. Generally, all urban and residential areas on the island have access to at least dial-up internet service.

## REGIONAL ANALYSIS

The following regional analysis assesses telecommunication services and infrastructure for each Community Plan (CP) area. Service area coverage, capacity availability, and any current deficiencies within each region are identified. Qualitative recommendations to fill service gaps and accommodate 2015 and 2030 population projections are also discussed. It is important to note that due to the rate of technological advancement, the broad nature of the telecommunications industry, and the lack of industry specific planning multipliers; it is difficult to identify future telecommunication infrastructure needs. Population projections provided in the regional analysis were derived from the *Socio-Economic Forecast; The Economic Projections for the Maui County General Plan 2030*, June 2006, prepared by the Maui County Planning Department.

### ***Wailuku-Kahului***

**Regional Summary:** The Wailuku-Kahului CP area is the most populous and one of the fastest growing regions on the island. As the island's commercial, industrial, and civic center, telecommunication services are vital within this region. The Wailuku-Kahului CP area currently has the most comprehensive coverage for each telecommunication service when compared to the rest of the County. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is very strong throughout the region. Multiple wireless companies offer service within the Wailuku-Kahului CP area, providing customers strong coverage and a choice of providers. The only current gap in service is in the northwest portion of the region beyond Waihee. Wireless coverage in the northwest portion of the region is poor to nonexistent.

Internet: Since telephone service covers the entire region, dial-up

internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in most areas of the region.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

As one of the fastest growing regions on Maui, meeting telecommunication needs in 2015 and 2030 is critical for the Wailuku-Kahului CP area. The region's population is projected to grow to almost 56,000 by 2015 and over 71,000 by 2030, which is an increase of approximately 20% and 53% respectively from the 2005 population. As residential and commercial development within the region expands, telecommunication services will also need to expand to service these areas. Specifically, the Maui Lani and Kehalani development projects will produce increased demand on telecommunications systems and infrastructure. Additionally, as the population grows within existing developed areas, telecommunication capacity will need to be increased to meet the growing demand.

**West Maui**

**Regional Summary:**

As the third largest population center on the island, the West Maui CP area has relatively comprehensive telecommunications coverage. Telephone, wireless, and internet services are available throughout the urbanized areas of the region with minimal gaps in service. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is strong throughout the region, especially within Lahaina and Kaanapali. Southeast of Lahaina, toward Olowalu and around the Pali, wireless coverage diminishes. Likewise, the northeast portion of the region, including Kapalua, is serviced by fewer wireless providers, making coverage within this portion of the region less reliable and in some areas nonexistent.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

With an average annual rate of increase of approximately 1.5 percent and a 2030 resident population of almost 29,000, telecommunication needs of the West Maui region will continue to grow. Service deficiencies within the southeast and northeast portions of the region will need to be addressed as these areas become more developed. New developments in

Kapalua and Olowalu will require expansion of telecommunications infrastructure to service these areas. Telecommunication service capacity will also need to be increased in Lahaina and Kaanapali as demand grows.

### ***Kihei-Makena***

**Regional Summary:** The Kihei-Makena CP area has the second largest population and growth projections indicate that the CP area is tied with Central Maui for the fastest growing region on the island. Telecommunication services are available throughout the region's urbanized areas with minimal gaps in service. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is strong throughout the central portion of the region. Similar to the West Maui region, wireless coverage diminishes within the northern and southern portions of the Kihei-Makena Community Plan Area. The Maalaea area receives marginal wireless coverage, while the Makena area receives poor wireless coverage.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

The Kihei-Makena CP area is projected to grow by 20% from 2005 for a 2015 population of about 30,500 and by 50% for a 2030 population of almost 39,000. Telecommunication service demand will continue to increase with the growing South Maui population. With continued development of the Wailea and Makena areas, service area gaps will need to be addressed. Additionally, as residential and commercial development expands mauka of the Piilani Highway, telecommunication services will need to be planned for these areas. As with the West Maui and Wailuku-Kahului regions, telecommunication service capacity within the already developed areas of the Kihei-Makena region will need to increase with growing demand.

### ***Makawao-Pukalani-Kula***

**Regional Summary:** As population centers become less urbanized and settlement patterns become more dispersed across the landscape, the quality and choices of telecommunication services decrease. The following three CP area summaries demonstrate this trend.

Telephone, wireless, and internet services are available throughout the Makawao-Pukalani-Kula CP area, with gaps in service existing in the more dispersed areas. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the region. Makawao and Pukalani have good wireless coverage and are serviced by several companies. Wireless coverage becomes less consistent in the Kula portion of the region

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

Population projections indicate that the Upcountry region will grow at an average annual rate of increase of 1.2% from 2005 to 2030 with a 2030 resident population of over 30,000. This population increase will exude increased demand on telecommunication services within developed and non-developed areas of the region. Service coverage gaps, especially in the Kula area, will need to be addressed and service capacity will need to be increased. Large development projects, such as those planned at Haliimaile and on DHHL lands in Kula, will significantly increase demand for telecommunication services and infrastructure.

***Paia-Haiku***

**Regional Summary:**

The quality and extent of telecommunication coverage varies throughout the Paia-Haiku CP area. Gaps in service exist in the more dispersed areas of the region. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the region due to a deficiency in the number of wireless communication towers, particularly in the Haiku area. Wireless coverage is more reliable in the Paia area.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and



satellite, are also available in the region, however to a much lesser extent.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

While the Paia-Haiku CP area is the slowest growing region on the island with an average annual rate of increase of 0.5%, addressing telecommunication needs in 2015 and 2030 is still a concern. Telecommunication service areas and capacity will need to be increased to address current deficiencies and meet future demand. Specifically, additional wireless communication towers are needed in the Haiku area to address current gaps and accommodate future growth.

***Hana***

**Regional Summary:**

Telecommunication services are limited in the Hana CP area due to the remote location of the region. Gaps in service exist throughout the region. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is extremely limited throughout the region. Few companies service the area, providing consumers with very limited wireless options. Generally, the best coverage is in the Hana town area. No wireless coverage is available in the southeast portion of the region between Kaupo and Kanaio.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service are extremely limited in the region.

**Meeting Community  
Telecommunication  
Needs in 2015 and  
2030:**

The Hana region population is forecasted to grow at a similar rate as the Makawao-Pukalani-Kula population with 2015 and 2030 populations of about 2,200 and 2,600 respectively. As the population grows, current gaps in service will need to be addressed to meet the demand for telecommunication services.

**STRATEGIC PLANNING**

Telecommunication services are a key element of ensuring economic vitality, public safety, and social communication within modern society. However, unlike the majority of infrastructure systems assessed for the General Plan 2030 update, telecommunication infrastructure and services are planned and managed by private industry rather than County and State agencies. Because of this factor, the County must be diligent at educating itself on telecommunication issues which may influence the growth and development of the County. The following discussion explores strategic planning issues related both directly to Maui's telecommunication

infrastructure and current operating companies, as well as national trends, technology developments, and regulatory issues.

### *Existing Gaps in Infrastructure*

The Regional Analysis section and Service Coverage Maps identify the current gaps in telecommunications services and infrastructure on Maui. The following discussion provides a summary of the major infrastructure gaps which limit economic development, service delivery, and quality of life. The Regional Analysis section revealed that throughout the island there exists an array of the degree of telecommunication coverage, ranging from comprehensive coverage in Central Maui to minimal coverage in East Maui. The areas on the island which have existing major gaps in telecommunications infrastructure include:

- Hana Region: The remote location of the Hana region significantly impacts telecommunication services within this region. Specifically, areas outside of Hana town experience poor wireless coverage and limited internet coverage options due to infrastructure gaps. The existing gaps impact the region's economic development and quality of life.
- Haiku: The rural and dispersed nature of development in the Haiku area impacts telecommunication services. Most notably, the area lacks sufficient wireless coverage due to gaps in infrastructure.

### *Industry Plans for Expansion*

In general, industry plans for expanding telecommunication services include improving service in existing coverage areas, filling in existing service gaps, and expanding service coverage to newly developed areas. In order to strategically plan for service improvements and expansion, telecommunication providers communicate with customers, private developers, and the County Planning Department. Identifying specific plans for expansion is difficult due to the multitude of telecommunication providers on Maui. However, through communication with various industry representatives, a brief summary of potential future expansion plans are provided below:

- Hawaiian Telcom Communication, Inc. - expansion of high speed internet coverage on Maui.
- Oceanic Time Warner Cable – service all new developments with high speed internet.
- T-Mobile – addressing gaps in wireless service, particularly in the Haiku area.
- Clearwire – expand capacity in already served areas to strengthen service; provide service to growing areas with high demand such as Kapalua.

Telecommunication providers occasionally encounter regulatory impediments which may delay, or at times halt, plans for expansion of infrastructure. Regulatory impediments may include complying with zoning requirements and receiving right-of-way permits and building permits.

Additionally, it is important to note that costs associated with telecommunications infrastructure expansion are borne by private industry rather than the government.

### *Opportunities for Partnerships*

Opportunities exist for creating partnerships between private telecommunication companies and various levels of government to address areas that are lacking in service. According to Sean Cleveland, Commercial and Public Sector Sales Account Director for the Hawaii Region of Alcatel-Lucent (personal communication, December 20, 2006), state and county governments can work with private industry to address underserved areas by sharing existing infrastructure and frequencies. Sandwich Isles Communications Inc., is currently partnered with the U.S. Department of Agriculture's Rural Utility Service to provide telephone and internet service to Hawaiian Home Lands throughout the State. In Grand Rapids, Michigan, city officials recognized the importance of telecommunications as an economic development tool and partnered with Clearwire to develop a citywide wireless broadband network. Although the County and State governments do not have direct control over the planning and development of telecommunications infrastructure and systems, they can partner together with private industry and strategically plan the expansion of telecommunication services to underserved regions.

### *New Technology*

Telecommunication technology is continually evolving, offering customers improved services and changing infrastructure requirements. Technological advancements and industry trends which the County should be aware of include WiMAX and converged networks. WiMAX, or Worldwide Interoperability for Microwave Access, is the newest form of broadband wireless access which provides an alternative to cable modem service and telephone company DSL service. WiMAX offers a broad range of applications beyond broadband internet access including VoIP, Internet Protocol Television (IPTV), mobile telephone service, and mobile emergency response services<sup>5</sup>.

The convergence of a broad range of applications, such as WiMAX offers, is a relatively new trend in the telecommunications industry. The consolidation of voice, data, and video technology simplifies telecommunications for the end user and according to Sean Cleveland, Commercial and Public Sector Sales Account Director for the Hawaii Region of Alcatel-Lucent (personal communication, December 20, 2006), converged networks have the potential to lessen the need for telecommunications infrastructure in the future. With converged networks, the need for new telephone and cable infrastructure will decrease as telecommunications become increasingly wireless. However, according to Daniel Wedemeyer, professor in the School of Communications, UH Manoa (personal communication, December 19, 2006), as telecommunications become increasingly dependent on wireless broadband technology, the need for additional antennas and wireless communication towers will also grow. The potential increasing need for wireless communication towers will have implications regarding tower siting, building permits, and community concerns which the County will need to plan for.

### *Wireless Communication Towers*

Widespread use of wireless telecommunications has led to the placement of wireless communication towers in many suburban and rural communities throughout the County. Many communities are concerned about the health and aesthetic impacts associated with the placement of these towers in residential areas. The Telecommunications Act of 1996 preserves local authority over wireless communication tower siting decisions, with some limitations. Therefore, the balancing of the need for towers and the desire of some citizens to limit the number of towers is a responsibility of the County of Maui. The following discussion summarizes the health, aesthetic, and safety concerns of wireless communication towers and their placement near residential areas.

#### **⇒ *Health Concerns***

The primary concern most communities articulate regarding the placement of wireless communication towers near residences are potential health effects, particularly the development of cancer. The Federal Communications Commission (FCC) establishes radiofrequency (RF) emissions and safety guidelines which wireless companies are required to comply with<sup>6</sup>. The Telecommunications Act of 1996 prohibits local authorities from basing siting decisions on health concerns as long as the tower complies with FCC guidelines<sup>7</sup>. The only regulatory action local governments can take regarding health effects is to verify that the companies are meeting FCC guidelines. However, regardless of this limit placed on local authority, many communities remain concerned about the placement of towers in residential areas. Since wireless technologies are relatively new, complete information on health effects is unavailable. However, animal studies of RF have not suggested a risk of cancer and several theoretical reasons exist to explain why towers would not be expected to increase cancer risk<sup>8</sup>.

Public exposure to harmful RF emissions from wireless communication towers is very minimal due to several factors. Powers levels are relatively low, the antennas are mounted high above ground level, and signals are transmitted intermittently, rather than constantly<sup>9</sup>. The FCC's maximum permissible exposure level for RF to the general public is approximately 580 microwatts per square centimeter, a level which is many times greater than RF levels generally found near the base of wireless communication towers. Additionally, public exposure levels near towers are similar to background levels of RF radiation in urban areas from other sources such as radio and television broadcast stations<sup>10</sup>.

#### **⇒ *Aesthetic Concerns***

Communities are also often concerned about the potential aesthetic effects of wireless communication towers in residential areas. In order to transmit the wireless signal over a large enough geographic area, the towers are generally 50 to 200 feet tall<sup>11</sup>. Residents often

object to the height of the towers and are concerned that their presence may reduce property values. Unlike health concerns, local governments can take action to address this community concern. Through planning and zoning, the County can, within certain guidelines, influence the placement of towers<sup>12</sup>. Additionally, stealth, or camouflage techniques can be used to disguise towers as other less obtrusive structures such as windmills or trees.

⇒ *Safety Concerns*

Finally, some communities are concerned about the possibility of falling towers. While not a major concern due to the structural integrity of the towers, it is a concern that is often raised by communities which the County should be prepared to address. The establishment of height restrictions and setback requirements specific to wireless communication towers should address safety concerns regarding falling towers.

As previously discussed, increased use of wireless technology will most likely be accompanied by a decreasing need for telecommunication wires and cables, and a growing demand for wireless communication towers. Considering existing community concerns regarding towers, and the prominent role the County plays in the placement of these towers, the County would be wise to develop a comprehensive wireless communications tower ordinance to guide the permitting of future towers.

*Utility Poles and Lines*

Similar to wireless communication towers, the placement of utility poles and lines is a topic of interest for many communities and one that must be addressed by the County. Overhead utilities typically include electric, telephone, and cable television lines. These utilities are often co-located in an effort to reduce costs and minimize the number of utility poles in the County right-of-way. Pursuant to Chapter 12.16, Maui County Code, permission to place a utility pole within the County right-of-way requires County Council approval.

Common issues related to the use and placement of overhead utility poles and lines include aesthetics, safety, and damage from severe weather events. Overhead utility poles and lines are often perceived as having a negative affect on the aesthetics of a roadway or neighborhood. They often obstruct views and add visual clutter to roadways. Utility poles can also pose a safety concern for highway drivers due to motor vehicle collisions with the poles. And finally, during sever weather events, such as hurricanes, utility poles and lines are often damaged, resulting in power outages and costly repairs to infrastructure.

In a response to the issues related to the use and placement of overhead utility poles and lines, many communities across the U.S. have taken the initiative to place new utility lines, and sometimes existing utility line, underground. While a seemingly logical solution, the placement of utility lines underground is a serious endeavor that must be thoroughly analyzed before pursuing. There exist many advantages as well as disadvantages to placing utility lines underground (See Table 27, Advantages and Disadvantages of Underground Utilities).

**Table 27: Advantages and Disadvantages of Underground Utilities**

<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Improved aesthetics</li> <li>• Fewer power outages than over head lines</li> <li>• Less storm damage</li> <li>• Reduced tree trimming costs</li> <li>• Reduced risk of motor vehicle collision with utility poles</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely costly to place existing and new utility lines underground</li> <li>• Longer duration of power outages</li> <li>• More costly to maintain than overhead lines</li> <li>• Subject to damage or failure due to water or moisture infiltration</li> <li>• Shorter lifespan than overhead lines</li> </ul>

The biggest advantage underground utilities offer is improved aesthetics; where as the biggest disadvantage is the high costs associated with placing these utility lines underground. Underground utility systems are estimated to cost approximately 10 times what it costs to install overhead lines, furthermore relocating existing overhead utility lines underground can be even more costly. While placing utility lines underground comes with a large price tag, many communities are still willing to pursue this option in order to improve aesthetics. In an effort to help communities achieve this goal, Hawaiian Electric Company has a program where it pays for up to one-third of the cost to place existing neighborhood electric distribution lines underground. However, the program does not include transmission lines. Within new subdivisions, many developers are choosing to install underground lines to improve aesthetics, however this choice likely results in higher housing costs.



## PUBLIC FACILITIES

Along with infrastructure systems, public facilities are also important elements of building and supporting healthy communities. These facilities and the services they provide support social and economic activity and play a key role in our everyday lives. The following discussion examines public facilities from a regional perspective and identifies the current setting, projected 2030 demand for facility services, necessary improvements to meet future demand, and guiding principles, goals, objectives, policies, and proposed actions. Public facilities assessed include Fire Control, Police, Government Offices and Parking, and Library Facilities. The *Public Facilities Assessment Update* (March 2007), prepared by R.M. Towill Corporation, provided the primary source of information for this section.

## FIRE CONTROL

### EXISTING SETTING

An adequate fire protection service within close proximity to all populated areas is necessary to protect life and property. Fire control on Maui is administered by the Maui County Department of Fire and Public Safety (MCDFPS). MCDFPS's mission is to "protect life, the environment, and property from fires, hazardous material releases and other life threatening emergencies".

Adequacy of fire control coverage is determined by the distance from a fire station and the value of the property. Comparative property value is divided into three categories with corresponding coverage requirements: 1) "High Value Districts" – business, industrial warehouse and institutional facilities (within 2 road miles of fire station); 2) "Residential Districts" – one and two-story buildings and other detached and semi-detached dwellings (within 3 road miles of fire station); and 3) "Low Density/Rural Districts" – low density housing and agricultural uses (within 3 to 5 miles from fire station).

### REGIONAL ANALYSIS

Nearly all commercial and residential districts are within a five road mile coverage radius of a fire station. However, there are a number of rural and agricultural areas outside of the coverage radius of any fire station. The following discussion analyzes current fire control services and options available to provide better coverage and accommodate for projected growth by community plan region.

#### *Wailuku-Kahului*

**Regional Summary:** Three fire stations service the Wailuku-Kahului community plan region: Wailuku Fire Station; Kahului Fire Station; and Paia Fire Station. As the business and commercial center of Maui and housing a large majority of the residential population, adequate fire coverage in this region is crucial. Based on the Residential District standard of a 2 road mile service radius, areas around Waihee, Waiehu, and Waikapu do not have adequate protection.

**Providing Service for Projected Population Growth into 2030:** With both commercial and residential growth projected to continue within the Wailuku-Kahului community plan region, additional fire control services are necessary to address current deficiencies and provide for this future growth. Current MCDFPS plans call for an additional fire station in Waikapu which would service the areas of Maui Lani, Maui Waeana, Waikapu, and Wailuku Heights. Although there are no current plans for a facility in the Waihee-Waiehu area, this area also lacks adequate coverage due to recent development located farther from



existing fire services.

### *West Maui*

**Regional Summary:** Two fire stations service the West Maui community plan region, Lahaina Fire Station and Napili Fire Station. Current gaps in fire protection include the expanding residential and resort area of Kapalua and the vicinity of Olowalu. Additionally, planned growth at Launiupoko and areas mauka of Kaanapali do not have adequate fire protection.

**Providing Service for Projected Population Growth into 2030:** Projected resident and visitor population growth will continue to place high demands on the region's fire control facilities through the year 2030. With existing service gaps and planned growth, the addition of a fire station at the southern end of Lahaina town is warranted. A second priority for this the region is to replacing the existing fire station at the Civic Center with a larger facility in the vicinity of Kaanapali.

### *Kihei-Makena*

**Regional Summary:** Two fire stations service the Kihei-Makena community plan region, Kihei Fire Station and Wailea Fire Station. Similar to West Maui, growth of the resident and visitor populations within the Kihei-Makena region are placing increasing pressure on the existing fire facilities. Areas without adequate fire protection include the expanding residential and resort areas of Wailea and Makena, northern Kihei, and the residential area surrounding Maalaea.

**Providing Service for Projected Population Growth into 2030:** Population projections indicate that future growth will outpace the capabilities of the existing fire stations within this community plan region. In order to address current gaps and meet future population demands, a fire station is needed in the North Kihei area. Adding a fire station in North Kihei will service the residential community in this area and provide increased fire protection for the Maalaea area.

### *Makawao-Pukalani-Kula*

**Regional Summary:** Two fire stations service the Makawao-Pukalani-Kula community plan region, Makawao Fire Station and Kula Fire Station. All major business and commercial areas are adequately protected within the 2 road mile radius. However, due to the dispersed pattern of development within this region, several rural and agricultural areas do not have adequate fire protection including parts of eastern Haiku and the Keokea and Ulupalakua areas.

**Providing Service for Projected Population Growth into 2030:** Future Residential District and High Value District land uses are expected to occur within the service areas of exiting fire stations. No

additional fire stations are planned within this community plan region. However, the planned addition of a fire station in Haiku will take pressure off the Makawao Fire Station and provide additional coverage for parts of Makawao and Haliimaile.

### *Paia-Haiku*

**Regional Summary:** The Paia-Haiku community plan region is serviced by one fire station, Paia Fire Station. The commercial and residential areas of Paia have adequate fire protection; however large areas beyond Haiku do not have adequate coverage.

**Providing Service for Projected Population Growth into 2030:** Although the population of this community plan region is not projected to grow significantly to 2030, the existing gaps in coverage warrant the addition of a fire station in the region. MCDFPS currently has plans for a new fire station in the Haiku area to provide adequate fire protection to commercial, residential, and agricultural regions and alleviate pressure on the Paia Fire Station.

### *Hana*

**Regional Summary:** One station services the Hana community plan region, Hana Fire Station. Commercial and residential areas within Hana town are adequately covered; however, due to the dispersed pattern of development in the region, many outlying areas do not have adequate fire protection.

**Providing Service for Projected Population Growth into 2030:** Population growth is not projected to be significant in the Hana region. However, should the need for additional fire services be warranted, the Department will address those needs when necessary.

## **POLICE**

### **EXISTING SETTING**

Maintaining an established and well trained police force is important to keeping crime at low levels and combating unsafe practices. Police services are administered by the Maui County Police Department (MPD). A police force's effectiveness is a function of the number of police officers, the areas that they can cover, resources available to the police department, the speed at which they can respond to emergencies, and the frequency of calls distributed within an area. The planning standard used to determine future police facility needs is a derived ratio of the number of officers required per 1,000 defacto population to maintain existing levels of service.

## REGIONAL ANALYSIS

The effectiveness of Maui County's police force is evident in crime and traffic accident records. Maui County has a lower incident of crime per capita of defacto population compared to State averages. In order to maintain the police force's effectiveness it is important to assess current services and how projected population growth will impact these services. The following is an analysis of current police services and forecasted future needs by police district.

### *Wailuku (Central) District*

**District Summary:** The Wailuku (Central) District covers the community plan regions of Wailuku-Kahului, Makawao-Pukalani-Kula, and Paia-Haiku. The Wailuku District services the largest population and comprises the largest percentage of budgeted officers. The Wailuku Station is the sole police station in this district. Based on planning standards, the number of offices in this district is appropriate for the size of the defacto population.

**Providing Service for Projected Population Growth into 2030:** Based on population projections, by 2030 police service needs in the Wailuku District will increase by approximately 41 %. To accommodate this growth an expansion of the existing Wailuku Station may be required. Other alternatives include adding police substations in the other community plan regions serviced by the Wailuku Station.

### *Lahaina District*

**District Summary:** The Lahaina District services the West Maui community plan region with one police station, Lahaina Station. Due to the district's extensive area of coverage, large lag times between beats in outlying areas often occur, leaving communities less protected.

**Providing Service for Projected Population Growth into 2030:** To accommodate projected growth within the region an increase in officers of approximately 39% will be needed by 2030. This increase in officers, along with the need to improve time and effectiveness of service call responses, will require expansion of the existing Lahaina Station.

### *Kihei District*

**District Summary:** The Kihei District services the Kihei-Makena community plan region. The Kihei Substation was established to address the growing need for police services in this region. Prior to establishment of the substation, the community plan region was serviced by the Wailuku District. Based on planning standards, the current number of officers servicing the district is only half the number necessary to meet population needs. Additionally, the Kihei substation is currently not large enough to accommodate any increase in officers or personnel.

**Providing Service for Projected Population Growth into 2030:** Based on population projections, by 2030 a 60 % increase of officers will be needed to service the Kihei-Makena region. Due to this significant future increase of officers and the current service deficiency experienced in the area, a new permanent police station is being planned for central Kihei.

### *Hana District*

**District Summary:** The Hana District services the Hana community plan region which covers a large geographic area. There is one police station in the district, Hana Police Station. Based on population alone, the district's current number of officers is twice the number needed to service the population. However, due to the district's large area, dispersed population, and remote character, it is necessary to maintain this elevated number of officers.

**Providing Service for Projected Population Growth into 2030:** Population projections for the Hana community plan region indicate minimal population growth. Given this limited growth coupled with the already high number of officers in the region, current police services are determined to be adequate through the study horizon of 2030.

## GOVERNMENT OFFICES AND PARKING

### EXISTING SETTING

The Wailuku Civic Center District was established in 1905 when the Territorial Legislature designated Wailuku Town as the County's seat of government. The Civic Center encompasses State, Federal, and County owned parcels and buildings. This section covers County office buildings and parking lots.

A Civic Center is a place of great importance and symbolism. It is a place where key decisions are made, many people work, and numerous government services are provided. Maintaining adequate office space and parking accommodations is a vital component of a healthy and efficient Civic Center and County government.

### REGIONAL ANALYSIS

The *Wailuku Municipal Service Center Master Plan Report* (February 2004), prepared by Chris Hart & Partners, Inc., was relied upon as the primary source of information for this analysis. Existing County offices include the Kalana O Maui building, County Courthouse, and the Kalana O Pakui building. Construction dates for these buildings range from 1907 for the County Courthouse to 1970 for the Kalana O Maui building. The construction of the Kalana O Maui building represents the last significant contribution of County owned office space to service County employees. Maui's resident population and County government employment have both

grown significantly since 1970; however the supply of office space and parking has not kept pace with the growing demand. Table 28 outlines existing County office space and parking stalls.

**Table 28: Existing County Office Space and Parking Stalls**

<b>Office Space</b>	<b>Parking</b>
110,638 square feet	320 stalls within Civic Center District  208 stalls within the Wailuku Municipal Parking Lot

Based upon a study conducted in 2004, to adequately meet current demand from existing employees, the County needs an additional 31,172 square feet of office space. The County’s current supply of parking stalls is also unable to adequately meet current demand. The shortage of parking spaces forces County employees to utilize neighboring residential streets for parking.

As Maui’s resident population and County government employees grow into 2030, office space and parking stalls will need to be added to accommodate this growth. It is anticipated that by 2030 an additional 58,827 square feet of office space will be needed over and above the 31,172 square feet of pent-up demand, bringing the County’s total additional office space requirements to 89,999 square feet. Additional parking stalls are also needed to address current gaps and projected 2030 demand. Several options exist for addressing County government needs, including constructing a parking structure at the current municipal parking lot site and redesigning the Civic Center District to include two parking structures and one large surface parking lot.

**LIBRARY FACILITIES**

**EXISTING SETTING**

Libraries are an important community resource for residents of all ages. The Hawaii State Public Library System (HSPLS) is under the direct control of the Board of Education. There are a total of 49 libraries in the State with six servicing the island of Maui.

**REGIONAL ANALYSIS**

The methodology for assessing the adequacy of Hawaii’s public library facilities is based on a measure of 0.6 gross square footage (gsf) per capita and 10 road mile service area radius so that libraries are distributed equitably throughout the State. The following is an analysis of current library facilities and forecasted future needs based on projected population growth by community plan region.

*Wailuku-Kahului*

**Regional Summary:** There are two libraries currently servicing the Wailuku-Kahului community plan region, Wailuku Public Library and Kahului Public Library. Based on the 10 road mile service radius, all areas of the region are served by one or both libraries.

**Providing Service for Projected Population Growth into 2030:** While the two libraries combined are currently operating with a small space deficit, as the population grows to 2030 this deficit will also grow, resulting in insufficient library facilities for the Wailuku-Kahului community plan region. HSPLS recommends the development of a new 18,000 gsf facility to accommodate this population growth.

*West Maui*

**Regional Summary:** The West Maui community plan region is serviced by one library, the Lahaina Public Library. Due to the large size of this region, the few residential areas beyond Kapalua are not adequately served by the library.

**Providing Service for Projected Population Growth into 2030:** Population projections for 2030 indicate that the region's population will continue to grow, placing added demands on the existing library facility. By 2030, the library's space deficit is expected to reach a level that warrants the construction of a new library facility, preferably in a more northern location of the existing library.

*Kihei-Makena*

**Regional Summary:** The Kihei-Makena community plan region is serviced by one library, Kihei Public Library. The library's service radius adequately covers all communities within the region except Makena.

**Providing Service for Projected Population Growth into 2030:** As one of the fastest growing areas on Maui, the region's population will continue to put pressure on the existing library to upgrade and provide more coverage. Population projections indicate that by 2030 the Kihei Public Library's space deficit will exceed 7,000 gsf, requiring a renovation to the existing facility.

*Makawao-Pukalani-Kula*

**Regional Summary:** The Makawao-Pukalani-Kula community plan region is serviced by one library, Makawao Public Library. The service area of this library covers a large predominantly rural area and includes the eastern portion of the Paia-Haiku community plan region.

**Providing Service for Projected Population Growth into 2030:** Due to the dispersed nature of development in this region and projected

**Growth into 2030:** population growth, by 2030 the existing facility is expected to have a space deficit in excess of 12,000 gsf. To address this deficit a new library will be needed, preferably in the Pukalani area, as well as renovation and expansion of the Makawao Public Library.

### *Paia-Haiku*

**Regional Summary:** Currently there are no public library facilities in the Paia-Haiku community plan region. Library services are provided by the Kahului Public Library, located approximately 10 miles away, and the Makawao Public Library, located approximately 7 miles away. Most of the areas throughout the region are covered by one of the two libraries.

**Providing Service for Projected Population Growth into 2030:** As the region's population grows into 2030 the lack of a library facility in the region will need to be addressed. Based on population projections, the community plan region will qualify for a branch library by 2030.

### *Hana*

**Regional Summary:** The Hana community plan region is serviced by one library, Hana Public Library. While residents within the town of Hana have convenient access to the region's library, outlying communities such as Kaupo and Keanae do not have adequate library support due to the large area of the region and the rural road system which does not lend itself to quick travel.

**Providing Service for Projected Population Growth into 2030:** According to current population numbers, the Hana Public Library is of an adequate size to service the region. As the population grows into 2030, projections indicate that the library will still be capable of servicing the region and will have a surplus of over 4,000 gsf. Therefore no new facilities or expansions to the existing facility are warranted.