CHAPTER V

Affected Human Environment, Potential Impacts and Mitigation Measures

V. AFFECTED HUMAN ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

A. HUMAN ENVIRONMENT

1. Surrounding Land Uses

Existing Conditions. The project site is bound to the south by agricultural lands that are owned by the Applicant. These lands are leased by HC&S for sugar cane cultivation. To the west are agricultural lands that rise to the base of the West Maui Mountains. These lands are used for diversified agriculture and grazing cattle. To the east are agricultural lands that were recently acquired by the County of Maui for a County baseyard and regional park complex. Beyond the County owned property is agricultural land that A&B Properties proposes to develop. The proposed A&B development, known as Wai`ale, may include up to 2,550 residential units together with civic and commercial uses. In 2014 A&B Properties obtained a State Land Use Commission District Boundary Amendment from Agriculture to Urban to support the Wai`ale Development. To the north is the Waikapū Stream, which separates the proposed development from Waikapū Town. Waikapū Town is comprised mostly of single-family residences. Many of these residences were constructed from the early 1900s through the 1950s for workers of the Wailuku Sugar Company. The older neighborhoods are located along East and West Waiko Roads and are bound by the Waikapū Cemetery to the east, the Waikapū Stream to the south, and the mauka reaches of West Waiko Road. In recent years development has begun to stretch north, towards Wailuku, both mauka and makai of Honoapi'ilani Highway.

Potential Impacts and Mitigation Measures. The project area is located within the MIPs Small Town Growth Boundary. The MIP describes Waikapū Country Town as a "self-sufficient small town with a mix of single-family and multi-family housing units in a walkable community that includes affordable housing in close proximity to Wailuku's employment centers …." The

Waikapū area is an evolving community. The immediate area has seen several new housing developments built-our over the prior decade. These subdivisions have predominantly served the local market rather than off-shore buyers. With the planned development of Wai`ale and the WCT, Waikapū will evolve to become a more complete community, supportive of a concentration of residential housing, public facilities such as parks and schools, shopping, employment and infrastructure to become a more independent small town. The direct, indirect and cumulative impacts associated with the region's growth is discussed in Chapters IV through VI of the DEIS.

2. **Air Quality**

Existing Conditions. An Air Quality Study was conducted by B.D Neal & Associates to examine the potential short- and long-term air quality impacts that could occur as a result of the construction and operation phases of the development and suggests mitigation measures to reduce any potential air quality impacts where possible and appropriate (**See**: Appendix C, "Air Quality Study".

Both Federal and State standards have been established to maintain ambient air quality. Seven parameters are regulated: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone, and lead. State of Hawai'i air quality standards are either equally or more stringent than the comparable national standards. Hawai'i air quality standards are comparable to the national standards except those for nitrogen dioxide and carbon monoxide which are more stringent than the national standards.

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the project area is very much affected by its elevation near sea level and by nearby mountains. The predominant trade winds tend to be channeled through the area by the mountains to the east and west. Temperatures in the project area are generally very consistent and warm with average daily temperatures ranging from about 68°F to 81°F. A generally semi-arid climate pertains. The project site receives its highest rainfall during the winter and lowest rainfall during the summer. Throughout the year rainfall is relatively low, averaging approximately 20- to 30-inches per year, with the monthly average ranging from 0.25 inches in August to approximately 5-inches in January.[ix]

At 30-feet above the ground, wind speeds across the site range from about 5.5 meters per second to 7.5 meters per second, which is approximately 12 to 17 miles per hour.[x] Except for periodic impacts from volcanic emissions (vog) and possibly occasional localized impacts from traffic congestion and local agricultural sources, the present air quality of the project area is believed to be relatively good. There is very little air quality monitoring data from the Department of Health for the project area, but the limited data that are available suggest that concentrations are generally within state and national air quality standards. During this study's air quality modeling, it was determined that present 1-hour and 8-hour worst-case carbon monoxide concentrations are well within both the state and the national ambient air quality standards.

Potential Impacts and Mitigation Measures. There may be some short- and/or long-term impacts on air quality that may occur either directly or indirectly as a consequence of project construction and use. Short-term impacts from fugitive dust could occur during the project construction phases. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the minor disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction.

State air pollution control regulations require that there be no visible fugitive dust emissions at the property line. Therefore, an effective dust control plan must be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by the following types of BMP's:

- Watering of active work areas;
- Using wind screens;
- Keeping adjacent paved roads clean; and
- Covering of open-bodied trucks.

Other dust control measures to consider include:

- Limiting the area that is disturbed at any given time;
- Mulching or chemically stabilizing inactive areas that have been worked; and

- Paving and landscaping of project areas early in the construction schedule will also reduce dust emissions.
- Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular routes, and locating potential dust-generating equipment in areas of least impact;
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and

Exhaust emissions can be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

To assess the potential long-term impact of emissions from project-related motor vehicle traffic operating on roadways in the project area after construction is completed, a computerized air quality modeling study was undertaken. The air quality modeling study estimated current worst-case concentrations of carbon monoxide at intersections in the project vicinity and predicted future levels both with and without the proposed project. During worst-case conditions, model results indicated that present 1-hour and 8-hour worst-case carbon monoxide concentrations are well within both the state and the national ambient air quality standards.

In the year 2026 without the project, worst-case carbon monoxide concentrations were predicted to decrease (improve) despite an increase in traffic, and concentrations would remain well within standards. This is because emissions from the increase in traffic will be more than offset by the retirement of older, more-polluting vehicles over time. With the project in the year 2026 and with proposed roadway improvements, estimated worst-case carbon monoxide concentrations indicated only minimal or no impact compared to the without project case. Concentrations would remain well within standards. Due to the negligible impact the project is expected to have, implementing mitigation measures for long-term traffic-related air quality impacts is unnecessary and unwarranted.

3. **Noise Quality**

Existing Conditions. The noise level is an important indicator of environmental quality. In an urban environment, noise is due primarily to vehicular traffic, air traffic, heavy machinery, and

heating, ventilation, and air-conditioning equipment. Ramifications of various sound levels and types may impact health conditions and an area's aesthetic appeal.

A Noise Assessment Report was prepared by D.L. Adams & Associates to describe the existing and future traffic noise levels in the environs of the project site. Traffic noise level increases and impacts associated with the project were determined within the project site and along public roadways servicing the development. Impacts from on-site activities and short-term construction noise at the project site were also assessed. Recommendations for minimizing noise impacts are also provided (**See**: Appendix D, "Noise Assessment Report").

The project area is currently exposed to varying daytime ambient noise levels, depending on the proximity to major roadways. The areas adjacent to Honoapi'ilani Highway experience the highest ambient noise levels during peak traffic hours where vehicular traffic noise is the dominant noise source.

Ambient noise levels range from 53 to 64 dBA adjacent to Honoapi'ilani Highway. The ambient noise environment is relatively low in areas that are far from the major roadways. The areas adjacent to Honoapi'ilani Highway experience the highest ambient noise levels during peak traffic hours where vehicular traffic noise is the dominant noise source. The results from the long-term noise measurements conducted at the WCT site indicate that the existing day-night level is less than 60 dBA for areas located beyond 65 feet from the edge-of-pavement of Honoapi'ilani Highway. Therefore, the noise levels for a majority of the project site are within the HUD site acceptability standards, which state a design goal of Ldn ≤ 65 dBA for the exterior noise level. The noise sources that exist throughout the project site include traffic, wind, birds, occasional aircraft flyovers, and construction equipment.

Potential Impacts and Mitigation Measures. The Noise Assessment Report (See Appendix D) addresses the following noise related impacts:

- Construction phase impacts to neighboring properties and residents of the project;
- Operational phase impacts from project generated traffic and stationary mechanical equipment; and
- Impacts to residents of the project from internal and external vehicular traffic.

Construction Phase Traffic Impacts

The various construction phases of the project will generate significant amounts of noise. Depending on when construction occurs, the WCT development may impact existing adjacent properties, such as the homes and businesses adjacent to Honoapi'ilani Highway and Waiko Road. Similarly, residences from the initial phases may be impacted by construction noise from subsequent phases due to their proximity to the construction site.

Development of the project areas will involve excavation, grading, and other typical construction activities during construction. The use of impact equipment is not anticipated. The actual noise levels produced during construction will be a function of the methods employed during each stage of the construction process. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction. In cases where construction noise is expected to exceed the HDOH "maximum permissible" property line noise levels, a permit must be obtained to allow the operation of construction equipment.

Prior to issuing the noise permit, HDOH may require action by the contractor to incorporate noise mitigation into the construction plan. HDOH may also require the contractor to conduct noise monitoring or community meetings inviting the neighboring residents and business owners to discuss construction noise. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. However, HDOH may require additional noise mitigation, such as temporary noise barriers, or time of day usage limits for certain kinds of construction activities. Table 24 identifies standard construction noise source control methods.

Table 24: Construction Noise Source Control Methods

Construction Noise Source Control Methods	
Scheduling	Limit activities that generate the most noise to less sensitive time periods (e.g. daytime hours).
Substitution	Use quieter methods/equipment when possible (i.e. low noise generators, smaller excavators, etc.).

Construction Noise Source Control Methods	
Exhaust Mufflers	Install quality mufflers on equipment
Reduced Power Options	Use smallest size and/or lowest power as required.
Quieter Backup Alarms	Install manual adjustable or ambient sensitive alarms. Do not use backup alarms during night work.
Motors	Insulate or enclose motors
Equipment Selection	Electric equipment is quitter than pneumatic equipment
Equipment Retrofit	Rubber chucks in jackhammers
Equipment Maintenance	Sharpen and balance tools, repair silencing equipment, replace worn parts and open airways
Staging Area	Maximize the distance between the construction staging areas and nearby receptors to the greatest extent possible

Mechanical Equipment

Expected mechanical equipment may include air handling equipment, condensing units, refrigeration units, etc. Noise from this mechanical equipment at the commercial, mixed-use, and school sites could significantly impact the proposed adjacent noise sensitive residential areas. The HDOH Community Noise Rule stipulates maximum permissible noise limits at the property line for mechanical equipment. The noise limits are 60 dBA during the day and 50 dBA during the night for business and commercial areas. Mitigation of mechanical noise to meet the HDOH noise rules should be incorporated into the project design. For mixed zoning districts, the primary land use designation is used to determine the maximum permissible noise limits. However, the HDOH takes into consideration background noise levels when assessing noise infractions.

The build out of residential units in the may also incorporate stationary exterior mechanical equipment. For single family homes, noise limits are 55 dBA during the day and 45 dBA during the night. For multi-family homes, noise limits are 60 dBA during the day and 50 dBA during the night. As with the commercial build out, the design and selection of exterior mechanical equipment for the residential units must comply with the HDOH property line noise limits.

Impacts from On- and Off-site Traffic

Future year traffic projections show that the FHWA maximum noise limit of 67 dBA will be satisfied for homes that are located more than 60 feet from the edge-of-pavement of Honoapi'ilani Highway. Although the FHWA criteria is not a regulatory requirement for this project, as it has no authority to enforce land use, its noise limit criteria is recommended by the FHWA to be used as a guideline for consideration of land use and the impact of traffic noise.

The projected traffic volumes and speed limits on the future roadways that provide access to the WCT are not significant enough to generate noise levels greater than 60 dB at the adjacent residential property lines. This is true for the main access roads off of Honoapi'ilani Highway as well as the future Wai`ale Road extension.

The results from the long-term noise measurements conducted at the WCT site indicate that the existing day-night level is less than 60 dBA for areas located beyond 65 feet from the edge-of-pavement along Honoapi'ilani Highway. Therefore, the noise levels for a majority of the project site are within the HUD site acceptability standards, which state a design goal of Ldn ≤ 65 dBA for the exterior noise level.

Residences within the WCT development that are located along Honoapi'ilani Highway and the major perimeter roadways will be exposed to elevated traffic noise. HUD site acceptability standards must be satisfied by providing minimum setback distances or other traffic noise mitigation measures in order to reduce the noise impact to these homes.

Vehicular traffic noise from Honoapi'ilani Highway may impact the proposed development unless noise mitigation is considered. Table 25 identifies the minimum setback distances to satisfy the HUD Site Accessibility Standards.

Table 25: Minimum Setback Distances to Satisfy HUD Site Acceptability Standards

Minimum Setback Distances to Satisfy HUD Site Accessibility Standards	
Roadway	**Setback**

Honoapi'ilani Highway	60 feet
Future Wai`ale Road Extension	None Required
Future Main Street	None Required
Future Collector and Minor Streets	Non Required

The guidelines listed below are general in nature and should be applied where residential housing is constructed within the setback limits listed above and noise mitigation becomes necessary. The following are effective noise mitigation measures.

- Construct barrier walls and/or earthen berms along roadways.
- Air-condition buildings instead of relying on natural ventilation.
- Acoustically soften interior spaces by the addition of thick carpeting with a padding underlayment, an acoustical tile ceiling, louvered closet doors, etc.
- Use exterior wall constructions which exhibit high noise reductions.

Typical exterior-to-interior noise reductions for naturally ventilated homes, i.e., with open windows, are approximately 9 dB. Adding absorption to interior spaces, (acoustically softening), can further reduce the noise levels 1 to 5 dB, depending upon the absorption initially present, and the amount of absorption added to the space. Air-conditioned or mechanically ventilated homes will also typically exhibit higher exterior-to-interior noise reductions achieved by several types of building constructions.

4. **Historical and Archaeological Resources**

Existing Conditions. Archaeological Services Hawai'i, LLC conducted an archaeological inventory survey (AIS) of the subject parcels to be developed (TMK's 3-6-002:003; 3-6-004:003, 006; and 3-6-005:007) (**See**: Appendix E, "Archaeological Inventory Survey"). The AIS was conducted to determine the presence/absence, extent, and significance of historic properties within the project area and to formulate future mitigation measures for these remains.

For the purpose of conducting the AIS, the project area was divided into five areas of analysis based primarily on the TMK's. These areas are described below (**See:** Figure 32, AIS Site Survey Map).

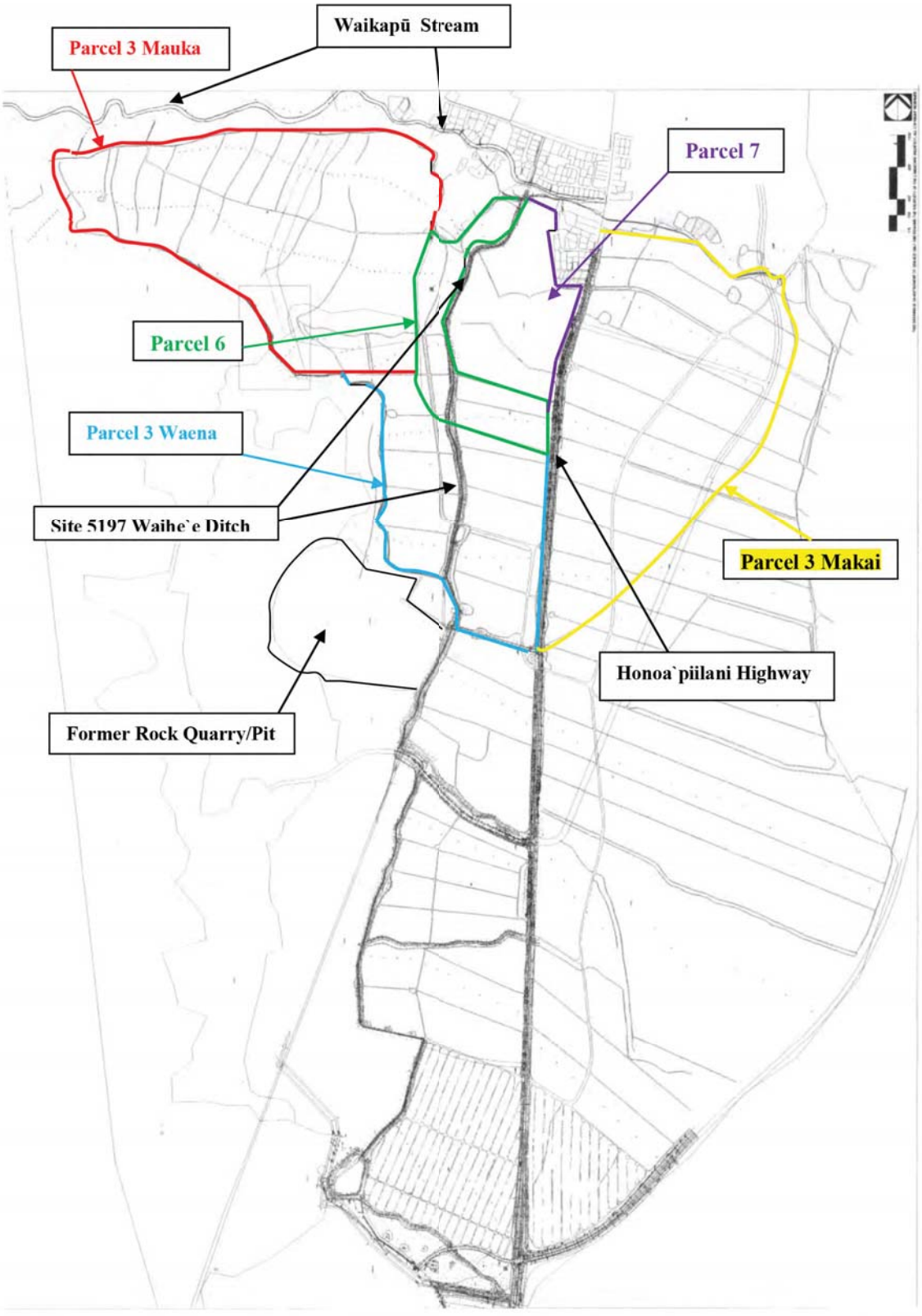

Figure 6. Location of Project Area on Topographic Map of Waikapū Partners Landholdings (also shown are cane field roads)

Parcel 3 Mauka

Parcel 3 Mauka is the northern portion of TMK 3-6-004:003 and comprises approximately 180 acres that defines the northwestern portion of the project area. Parcel 3 Mauka is currently utilized as pastureland, but was formerly fallow sugarcane.

Parcel 3 Waena

Parcel 3 Waena is the southern portion of TMK 3-6-004:003 and comprises approximately 70-acres. Site 5197 (Waihe`e Ditch) bisects the parcel north/south. Parcel 3 Waena is currently utilized as active sugarcane, pastureland and small scale agriculture.

Parcel 3 Makai

Parcel 3 Makai is a portion of TMK 3-6-002:003 and comprises approximately 250 acres. Parcel 3 Makai is cultivated in active sugarcane.

Parcel 6

Parcel 6 is an L-shaped parcel identified as TMK 3-6-005:006 and consists of 52.976 acres. The northern third of Parcel 6 is currently utilized as pastureland and was formerly fallow sugarcane; the central portion is in small scale agriculture for vegetables and fruit trees, and the southern third is active sugarcane.

Parcel 7

Parcel 7 is within the central portion of the overall project area and consists of the 59.054 acres which constitutes TMK 3-6-005:007 and the MTP. This parcel is enclosed by Waihe`e Ditch to the west; Honoapi`ilani Highway and residential development to the east; existing rural and residential lots to the north and Parcel 6 to the south.

HISTORIC LAND USE

The district (*moku*) of Wailuku is comprised of the following *ahupua`a*: Wai`ehu, Waihe`e, Waikapū, and Wailuku (See Figures 10 and 11 of the AIS in Appendix E of the DEIS). This region has also been referred to poetically as (four waters) (Nā Wai ‘Ehā and Elbert 1986: 377). The

land that encompasses the Wailuku District was extremely fertile with an abundance of water; thus, enabling large scale cultivation of *kalo* (taro).

The Waikapū Stream supported major irrigation systems with numerous pondfields (*lo'i)* and irrigation canals/ditches *('auwai)*, as well as agricultural crops and animal husbandry practices evidenced by LCA testimony during the Māhele and early map documentation (Figure 13 of the AIS). Subsequently, by the late-1800s the Waikapū Stream utilizing the same *'auwai* irrigation systems contributed to sugarcane cultivation that expanded far beyond the valley.

LAND TENURE

The entire Waikapū *ahupua`a* is comprised of 15,684 acres. There were 121 claims heard for Waikapū during the Māhele of 1845 (Creed 1993). Of these claims, 100 or 82% were awarded. Of these awards, the claimants listed in descending order the following land usage, *lo`i*, *kula*, house lot, salt, *wauke*, Hala, unspecified, potato, pig, sugar, fish , banana and a bull pen. Based on Creeds analysis, *lo`i* constituted the vast majority with 50%, *kula* 2.1%, house lots (1.8%) and the remaining less than 0.5%.

An analysis was conducted of the historic land tenure for the five specific project areas comprising the subject property. The assessment helped to determine the placement of back trenches for subsurface testing. The analysis produced the following documentation:

Parcel 3 Mauka

A total of twenty-eight (28) LCA's and seven (7) Grants were identified. Of the LCA claims, the majority were for *lo`i* (n=21), *kula* (n=11), house lots (n=5) and *hala* (n=5). For the seven grants, only two had land use which was for sugarcane at Grant 1844 'āpana 1 and 2.

In Parcel 3 Waena

No LCA or Grants were documented.

Parcel 6

A total of nineteen (19) LCA's and one (1) Grant were identified within this area. For the nineteen *Kuleana* claims, two had no information, *lo`i* were represented by 16, *kula* (n=7), house lots (n=3) and one no information. The Grant (GR 3152) was to Cornwell but no land use information was available.

Parcel 7

There were eleven (11) Land Commission Awards and 8 Grants within this area. For the *Kuleana* claims there were *lo`i* (n=7), house lots (n=6), *kula* (n=2), sugarcane (n=1) and *`auwai* (n=1). Of the eight Grants, only 2 had information which consisted of sugarcane.

Parcel 3 Makai

No Land Commission Awards were claimed and a total of one (1) Grant was identified within this section and consisted of a reservoir and sugarcane.

As exemplified in the land use tables and Figures 14 and 15 of the AIS (**See**: Appendix E, "Archaeological Inventory Survey"), other post-Contact land use consisted of the commercial production of sugarcane. The earliest commercial sugar production on Maui Island began in Wailuku in 1823 when Hungtai Sugar Works was founded by Chinese merchants. Wailuku Sugar Company was started in November of 1862 by James Robinson and Company, Thomas Cumming, J. Fuller, and C. Brewer and Company. In 1865, C. Brewer and company acquired controlling interest, with Robinson and Company and Cumming as the minority stockholders. In 1894, the Waihe`e Sugar Company and the Waikapū Sugar Company were bought out by the Wailuku Sugar Company. To assist in the infrastructure of sugarcane production, railroad construction was initiated in 1895. At this same time, political and economic issues surrounding water-rights emerged to the forefront (Donham1989:15). In the 1980's, the Wailuku Sugar Company converted to the Wailuku Agribusiness in order to diversify agricultural production.

TRADITIONAL SETTLEMENT PATTERNS

As noted, the current project area is situated along the foothills of the West Maui Mountains in the Waikapū *ahupua`a*. Previous archaeological investigations, coupled with the history of the

area focusing on previous land use, topographic features and ethno-historic accounts, can be used to develop a general predictive model for traditional Hawai'ian settlement and subsistence patterns for the project area. The general region, including and encompassing the current project area, is referred to and appears to have once been part of a large wetland taro production area:

> *…Spreading north and South from the base of Waikapū to a considerable distance below the valley are the vestiges of extensive wet-taro plantings, now almost obliterated by sugar-cane cultivation; a few here and there are preserved in plantation camps and under house and garden sites along the roads. Among these gardens there were, in 1934, a few patches of dry Japanese taro. Far on the north side, just above the main road and at least half a mile below the entrance to the canyon, an extensive truck garden on old terrace ground showed the large area and the distance below and away from the valley that was anciently developed in terraced taro culture. On the south side there are likewise several sizable kuleanas where, in 1934, old terraces were used for truck gardening. In the largest of these a few old patches were flooded and planted with Hawai'ian taro, and there was some dry Japanese taro. Several terraces were used as ponds planted with lotus for their edible seed. There were probably once a few small terraces on the narrow level strip of the valley bottom in the lower canyon… (Handy and Handy 1972:497).*

A hypothetical model for traditional Hawai'ian settlement was developed by Kirch (1985) and Cordy (1978). According to this postulation, the project area would have been an ideal setting for early Hawai'ian permanent habitation. Utilizing dates from other Hawai'ian Islands, Cordy postulated that initial pre-Contact settlement in lower valleys and coastal regions occurred from 300 to 600 A.D. and by 1000 A.D. fishponds, protected bays, and religious structures.

The subject area contains a dominant waterway, Waikapū Stream with rich alluvial soils. Traditionally, this stream would have been utilized to create extensive irrigation systems containing numerous pondfields with associated *`auwai*. This stream not only supported the main dietary staple, *lo`i kalo,* but also *mai`a* (bananas), *`uala* (sweet potatoes), *kī* (ti) and trees

such as *niu* (coconuts), *wauke* (paper mulberry) and *lau hala*, but was also the freshwater source for the Keālia Ponds.

Habitation and religious structures, along with agricultural sites would have been distributed near the *lo`i* patch and down by the shore for marine exploitation, fish pond maintenance and the collection of salt at the salt pans of Mā`alaea and/or Keālia. Historically, the water source would have been important for some of the same reasons but habitation structures would also have been established around towns, railroads and plantation camps. By reviewing old maps and the Māhele record, the historic settlement patterns can be discerned. Conversely, through these archival records and archaeological investigations, the traditional settlement patterns can merely be inferred.

SITE EXPECTABILITY

Since these earlier studies, numerous archaeological studies have been conducted in the Waikapū and Wailuku *ahupua`a*. The majority of the studies have been implemented based on requirements set forth in the laws pertaining to the environmental impact of proposed development. A significant portion of development has occurred in areas of fallow pineapple and sugarcane. The impact of commercial agriculture on archaeological sites located in non-sand substrates located below 500 feet amsl appears to be severe and has resulted in the complete destruction of a significant portion of pre-contact sites. In areas that contain a sand matrix, intact, previously disturbed and isolated human remains have been documented. Pre-contact site components appear to have been less impacted by intensive agriculture in areas located above 500 feet amsl. Post-contact sites in the region are typically associated with agricultural activities [clearing mounds, water diversion structures (flumes and ditches), habitation, roads, and railroads] and ranching activities (walls).

Based on the aforementioned background information and settlement patterns, the type of sites and/or features that may be encountered within the project area would be associated with traditional and historic habitation, as well as agricultural and animal husbandry sites. Due to the extensive grading activities associated with sugarcane cultivation and the construction of the MTP commercial buildings, no surface structural remains associated with the pre-Contact and

post Contact areas are anticipated; however, features associated with sugarcane cultivation are likely. Remnant subsurface historic properties may include rock alignments, buried cultural deposits, pits and human burials. The likelihood of encountering these subsurface features throughout will be dependent upon the depth of the sugarcane till zone.

AIS FINDINGS

Archaeological procedures were conducted intermittently from February through June 2013 by supervisor Ms. Diane Guerriero (B.A.) and archaeological personnel Ms. Rochelle Barretto. Overall direction and coordination was performed by Ms. Lisa Rotunno-Hazuka (B.A.) and the Principal Investigator was Mr. Jeffrey Pantaleo (M.A).

The AIS fieldwork consisted of a pedestrian survey and subsurface exploration through the execution of 150 backhoe test trenches within the five aforementioned zones. The following historic properties were identified (**See**: Figure No. 33, Historic Properties Identified during AIS):

- Sites 50-50-04-7881-7884 (formerly TS1, 3-5) comprised of 19 subcomponent features were newly recorded with the majority related to sugarcane cultivation.
- Site 5197 Waihe`e Ditch is extant within the central portion of the project area and was also recorded.
- Site 7881 Features 1-18 consists of concrete lined ditches, sluice gates, dirt culverts with concrete lined headwalls.
- Site 7882 (TS3) is a disturbed, historic L-shaped retaining wall.
- Site 7883 (TS3) comprises a World War II bunker.
- Site 7884 Features 1- 3 (TS 2 and 5) are secondarily deposited historic materials recorded at three localities within the project area.

Potential Impacts and Mitigation Measures. During the investigation, no evidence of traditional Hawai‘ian activities, with the possible exception of Site 7882 (remnant retaining wall or terrace) was recorded. These negative results are primarily due to the compounded disturbances from sugarcane cultivation, historic habitation and modern land use; and possibly the inherent bias of random sampling during the inventory survey testing.

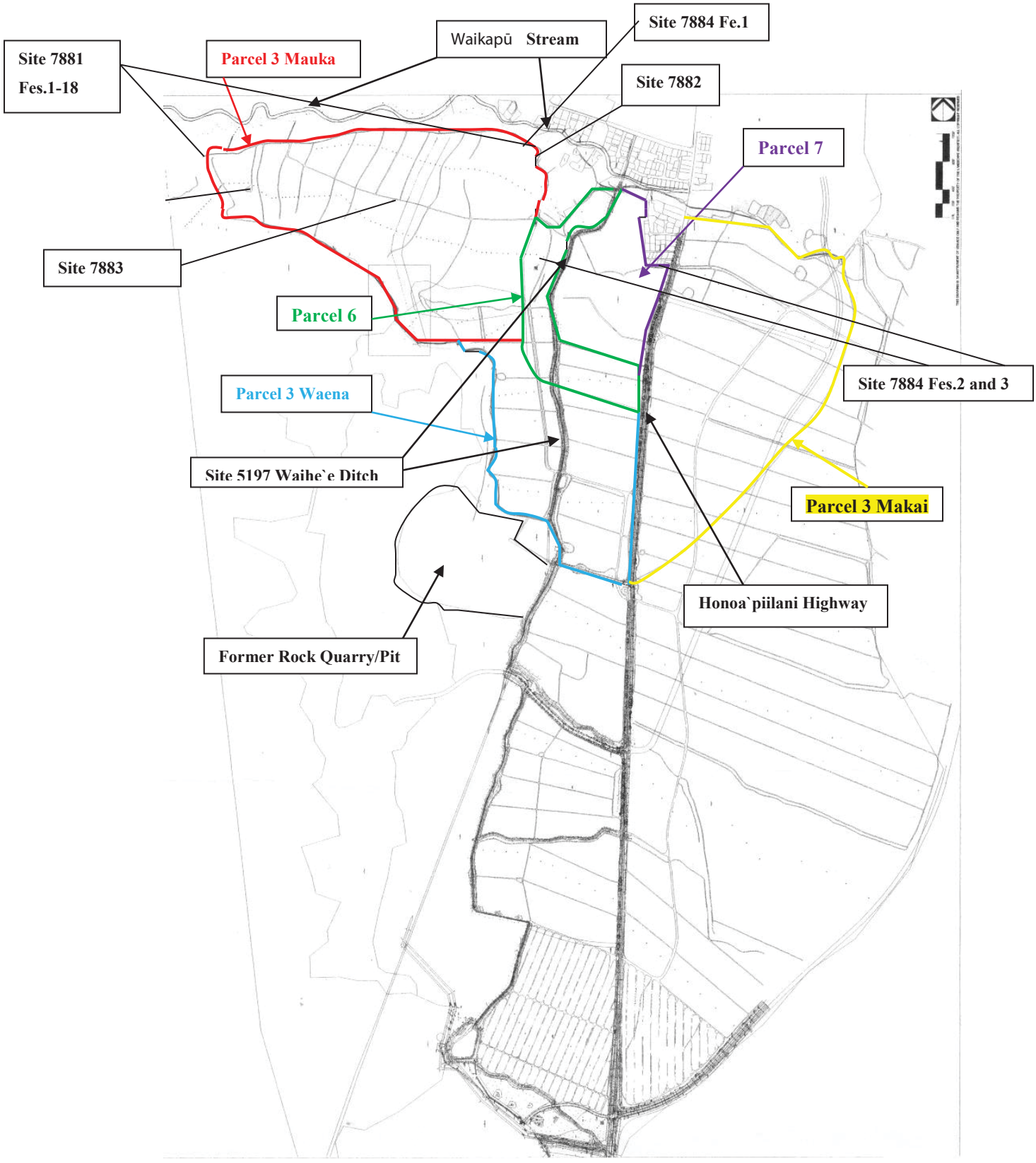

Figure 33: Historic Properties Identified during AIS

Sites 7881-7884 are considered significant under Criterion D, and one historic property, Site 7883 may be considered significant under Criterion C.

Site 7881 Features 1-18 is comprised of historic agricultural irrigation features consisting of a reservoir, concrete and earthen ditches, as well as sluice gates. These features are located along the northern boundary of Parcel 3 Mauka outside the proposed A.P.E. and will not be adversely affected.

Site 7882 is a remnant L-shaped retaining wall or terrace also located in the Parcel 3 Mauka within the northeast corner. This feature may have been constructed during the traditional period, but this supposition is inconclusive.

Site 7883 consists of a World War II bunker located within the east central portion of Parcel 3 Mauka. This site has been documented at the inventory level and may or may not be affected by proposed development.

Site 7884 comprises surficial scatters of historic domestic refuse (Features 1 and 2) and Feature 3 is a small historic trash dump, likely associated with former habitation.

A section of Site 5197 Waihe`e Ditch bisects the central portion of the project area in a north/south direction. This historic property was also recorded during the current undertaking and may be covered (though continue to be operational) during construction.

Based on the proposed development plan, Site 7884 Features 2-3 (historic trash scatter and refuse pit); a section of Site 5197 (Waihe`e Ditch) and possibly Site 7883 (WWII bunker) may be adversely affected during the development activities. These aforementioned historic properties have been properly recorded and may be removed and or altered during construction; however if it is recommended that if Site 7883, the WWII bunker cannot be preserved in place within the planned development, an interpretive plaque commemorating this site should be erected. Additionally, Sites 7881 (agricultural waterways, sluice gates, reservoirs) and 7882 (L-shaped retaining wall) may be removed and or altered during construction; although no ground-altering activities are planned at this time.

Archaeological monitoring of Parcel 3 Mauka and Waena is primarily recommended for those areas which contain former LCA's and Grants, as well as extant historic properties; however spot monitoring inspections of other localities not expressed above may also be instituted. Parcels 6 and 7 contain numerous LCA's and Grants; thus monitoring will initially be full time until the nature of the subsurface conditions in relationship to the proposed ground-altering activities is determined. Similarly for Parcel 3 Makai, monitoring will initially be full-time; yet it is envisioned that the primary focus will be along the eastern and western perimeters which are close to Wai`ale and Waiko Roads, known areas to contain traditional and historic burials.

Prior to the commencement of construction, an Archaeological Monitoring Plan (AMP) detailing the localities to undergo monitoring procedures will be prepared and submitted to SHPD for review and approval.

5. **Cultural Resources**

A Cultural Impact Assessment (CIA) was prepared by Hana Pono, LLC to describe existing Native Hawai'ian cultural activities, practices and resources that occur on the property, potential impacts from the project, and mitigation, if necessary, to address these impacts.

The CIA was prepared In accordance with the State Office of Environmental Quality Control (OEQC), "Guidelines for Assessing Cultural Impacts". The CIA identifies traditional, historical, or other noteworthy practices, resources, sites, and beliefs attached to the project area and analyzes the impact of the proposed development on these practices and cultural features. Information was collected through extensive research of historical and literary archives and by interviewing and consulting with lineal descendants, kūpuna, and long standing residents who have in depth knowledge of the area. (**See**: Appendix F, "Cultural Impact Assessment", for a complete presentation of the CIA).

Description of Historical and Existing Conditions. The WCT project site has been used for agricultural purposes, primarily for sugarcane, since the 1870s. Prior to sugarcane, the lands along the Waikapū Stream, and in and around the existing Waikapū Town, were settled by native Hawaiians who cultivated lo'i kalo (wetland taro) and other traditional crops in terraced lo'i. The Waikapū Stream, one of four streams that comprise the Nā Wai 'Ehā, is an important

cultural resource to native Hawaiians, who continue to have riparian rights for agricultural purposes. There are Kuleana lots, still owned by native Hawai'ian and kama'āina families, within Waikapū and in close proximity to the Waikapū Stream. The Waikapū Stream corridor provides access to the Waikapū Valley, where native Hawai'ian groups are currently reintroducing indigenous plants and trees into the valley.

The entire project area is located within the 'ili (subdivision) of 'Aikanahā, Kaumu'īlio, Luapueo, Ko'olau, Kaloapelu, 'Āhuakōlea, Ka'ōpala, Ka'alaea, Kama'uhāli'i, Pikokū, 'Ōlohe, Waihalulu, Kama'ūhāli'i, in the ahupua'a (land division) of Waikapū, moku (district) of Wailuku (Nā Wai 'Ehā), mokupuni (island) of Maui. The total land mass of the Waikapū ahupua'a, the southernmost ahupua'a in Nā Wai 'Ehā, consists of 15,684 acres from mauka to makai (mountain to the sea). The boundaries of the Waikapū ahupua'a are described in detail on page 18 of the CIA (See Appendix F).

Within the Waikapū watershed is an abundance of wai (water). Waikapū Stream was and continues to be an important cultural resource and part of the cultural landscape. Waikapū Stream flows on average of 3-4 MGD (Million Gallons per Day), which classifies it as a small perennial stream (USGS). It flows continuously above the diversions located in the stream built by the former Wailuku Sugar Company.

The upper regions of the Waikapū watershed once had an abundance of endemic and indigenous plants which were utilized for various cultural purposes by Hawaiians of the ahupua'a. The dryland forested areas were dense with koai'a (*Acacia koa*), 'a'ali'i (*Dodonaea viscosa*), and alahe'e (*Psydrax odorata*). All of these tree species would have been used for house construction. The stems of the olonā (*Touchardia latifolia*), a wet forest native plant would have been used for making cordage. Other native plants of importance that were commonly found in the Waikapū watershed was ko'oko'olau (*Bidens spp.*) and māmaki (*Pipturus albidus*), used for lā'au lapa'au (medicinal purposes). In the low lands of Waikapū, dry gulches, and at the entrance of Waikapū Valley is wiliwili (*Erythrina sandwicensis*) which was used to make papa he'e nalu (surfboards).

The interior portion of the Waikapū watershed once allowed for extensive traditional pre-contact ʻauwai (irrigation systems) which irrigated vast amounts of land for kalo cultivation. The Waikapū Stream once flowed mauka to makai through the plains of Kamaʻomaʻo, into the Keālia fishpond / wetland / estuary, and emptied into Māʻalaea Bay. Hawaiians utilized the fresh water resources of the Waikapū Stream for loʻi kalo cultivation. Ancient ditches called ʻauwai were built to bring a portion of stream water into traditional kuleana farm lands. Conservative estimates confirm that at the time of the Māhele of 1848, over 1,400 loʻi kalo were under cultivation throughout the Waikapū ahupuaʻa on a total of about 800 acres. According to oral accounts and scientific data, Waikapū stream once also contained native stream life such as the ʻoʻopu and ʻōpae. Gathering and eating these aquatic species helped feed the pre- and post-contact populace of Waikapū.

Waikapū Stream experienced some of the earliest impacts and changes due in part to the establishment of Maui's first sugar plantation; Waikapū Sugar Company, started by James Louzada and Henry Cornwell. Diversions built by Wailuku Sugar Company disrupted the Waikapū Stream and cut off the mauka to makai stream flow to Keālia. Native stream life began to decline and the wetlands of Keālia, which depended upon the stream flow, started to stagnate and dry up. By the early 1900s, the cultural landscape had increasingly changed due to impacts of the sugar plantation and the amount of water used to grow sugar. A visitor to Waikapū in the late 1860s wrote,

> *"The vestiges of extensive wet kalo plantations, are now almost obliterated by sugar-cane cultivation; a few here and there are preserved in plantation camps and under house and garden sites along the roads. The waters of this great stream, now utilized for irrigating a great acreage of sugarcane, was formerly diverted into loʻi."*

In 2013, there were fewer than 15 loʻi kalo on a total of 2 acres of kuleana land that are in cultivation. By comparison, 1,400 loʻi kalo were under cultivation 160 years ago.

There are ongoing efforts in the Waikapū ahupuaʻa to revitalize the water resources of the Waikapū Stream and to restore the remaining kuleana lands with loʻi kalo. The only remaining

intact Māhele kuleana lands within the project boundaries are those found along the Waikapū Stream. However, only one such parcel of land is being utilized in its traditional form. The upper most kuleana parcel awarded to Kupalii (LCA 3546) is being leased and managed by Hui Mālama o Waikapū where a few of the loʻi kalo have been restored as well as a native dryland koaiʻa forest. Other lands adjacent to the project area are also being revitalized and used as they once were during the Māhele. Eassie Miller Jr. and his ʻOhana are continuing to cultivate loʻi kalo and maintain their family cemetery. Across the stream is the Pellegrino ʻOhana. The Pellegrino ʻOhana is also cultivating loʻi kalo by utilizing the Waikapū Stream.

The Waikapū Stream is an important cultural resource that plays a significant role in the current traditional practices of the area. Waikapū Valley is another cultural resource which is used for traditional gathering of lāʻau lapaʻau or medicinal plants as well as native plant and tree seeds used for propagation by Hui Mālama o Waikapū and other kamaʻāina of Waikapū. Traditional varieties of kalo and maiʻa (banana) grow in areas throughout the valley and families still gather them as a food source.

The project area was impacted by plantation agriculture at a very early period of time, therefore many kamaʻāina of Waikapū have no recollection of specific traditional practices other than sugarcane cultivation and cattle grazing in the project area. Those that were interviewed during the CIA process remembered cultural practices on kuleana lands being cultivated around the project area but no accounts of traditional practices on the land being proposed for development.

There are, however, three kuleana lots still owned by descendants of the original claimant Ehunui (L.C.A. 2499 and Grant 1513) found within the lands owned by Waikapū Properties, LLC, but outside of the lands proposed for development.

Potential Impacts and Mitigation Measures. The purpose of the CIA was to investigate the impact that the WCT will have on the cultural practices and customs of the project area and surrounding lands through archival, literary, and oral accounts.

Waikapū has a long and rich cultural history and a strong representation of traditional cultural practices. The cultural practices and beliefs that are subject to this assessment include Hawai'ian subsistence and residential agriculture on kuleana lands. These lands utilize the Waikapū Stream, which is a valuable cultural resource. Intricate irrigation systems built prior to western contact continue to be maintained and utilized. There are also on-going projects in the mauka portion of the Applicant's land that are being utilized for cultural site and native habitat restoration, while providing a traditional access point into the Waikapū Valley for gathering of lā'au lapa'au (medicinal plants) and native seed gathering.

The surrounding lands as identified through oral and archival accounts are also considered traditional cultural properties or Kuleana lands. These historic lands are associated with traditional practices and beliefs that have been in use prior to the Māhele of 1848. The surrounding traditional cultural properties are associated with events that have made an important contribution to the broad pattern of the Hawai'ian culture while yielding information important for research on prehistory or current historical practices. The traditional agricultural practices and cultural/natural site restoration projects have an important value to the native Hawai'ian people, the Waikapū community, and other ethnic groups found in Hawai'i by enhancing cultural identity and well-being.

Mitigation Measures

The CIA demonstrates that development of the WCT will not have a direct impact upon cultural sites, practices and traditions within the project area. However, the project could produce indirect impacts if not property managed. The following are areas of cultural concern and proposed mitigation measures.

Mahi Kuleana Parcels

There are two kuleana lots privately owned by the Mahi family (LCAw: 2499, R.P. 4070 AP 1 &2 to Ehunui) and (Grant 1153 to Ehunui) that are situated within TMK: (2) 3-6-004:003 on lands that are proposed to remain in agricultural use. These Kuleana lots are identified as TMK: Nos. (2) 3-6-005:009 (0.06 acres) and TMK: (2) 3-6-005:010 (0.5 acres). The subject parcels were initially situated within the confines of the development project, but the development plan was modified to go around these two parcels of land. The Mahi family has expressed that they would

like to preserve their lands. In the oral interviews provided by the Mahi Family, they have voiced their concerns about the need to keep these lands in their family while working with the developer to seek a solution that will benefit both parties.

Waikapū Stream

Another community concern is the desire to protect and restore the Waikapū Stream. Waikapū Stream is considered Waikapū's most valuable cultural resource. Waikapū Properties, LLC uses a percentage of Waikapū Stream surface water via Wailuku Water Company's delivery system. The use of this water is for the MTP; irrigation of lands leased to HC&S for cultivating sugarcane, and irrigation to support diversified agriculture. Waikapū Properties since 2012 has drilled a total of 5 groundwater wells to be used for the Project and current and future agricultural endeavors. In May of 2014, The State Commission on Water Resource Management returned 2.9 mgd of surface water to the Waikapū Stream via the IIFS (Interim Instream Flow Process) (CWRM) and established a groundwater aquifer sustainable yield of 4 mgd (CWRM). The Waikapū community and many kuleana farmers are having discussions with the Applicant to establish a long term water use plan for both surface and groundwater. One significant concern of expressed by Kuleana farmers that are using water from Waikapū Stream for kalo cultivation is sedimentation into the stream. It was noted that sedimentation has occurred during large rainfall events as well as from maintenance and management issues associated with the existing plantation infrastructure. The Applicant is committed to working with neighboring kuleana farmers to help resolve these issues.

Ground Water

The sustainable yield of the Waikapū aquifer is 3 million gallons per day (mgd). The Applicant has drilled 5 ground water wells that will be used for servicing the Project's potable and agricultural water demand. Concerns have been expressed about overall impact of the drilling of wells upon the health of the aquifer and surface water stream flows. The Applicant will strictly adhere to the set forth by the State Commission on Water Resources Management (CWRM) to ensure that the pumpage from the on-site wells remains well within the sustainable yield for the aquifer.

Kuleana Agricultural Lands Adjacent to Waikapū Stream

The cultivation of kalo is an important traditional and customary right that is being practiced by kuleana farmers along the Waikapū Stream. These farmers rely upon stream water for their crops. Kalo farmers have shared their concerns about the accessibility of stream flow via the WCT's ʻauwai and the quality of the water within the Waikapū Stream.

Native Dryland Forest and Watershed

Degradation of native plant species and habitats within the Waikapū Ahupua'a are a significant concern for kuleana farmers that rely upon the Waikapū Stream and for Hui Mālama o Waikapū and other kamaʻāina of Waikapū that are actively engaged in the restoration of native dryland forests and invasive species eradication within the Ahupua'a. There is a concern that indirect impacts by increased accessibility into the Ahupua'a by future residents could result in further damage to the forest by introducing additional invasive species and disease. The Applicant is committed to working with the kamaʻāina of Waikapū and other concerned residents to develop proper access management programs to protect the Ahupua'a for future generations.

Inadvertent Finds (Artifacts & Burials)

Because the development will occur on former kuleana lands, there may be the potential of inadvertent finds such as artifacts and burials during the Project's construction phase. It is recommended that if any cultural features (i.e. artifacts, burials, etc.) are uncovered during construction that the developer immediately contact the State Historic Preservation Division and comply with all applicable state laws. It is further recommended that close communication be maintained with the Waikapū Community since many of the kuleana lands once belonged to Hawaiʻian families, many of whom have descendants that continue to live in Waikapū.

On-going Community Input

The Waikapū community desires to continue to provide input on how to incorporate traditional cultural practices and knowledge within the development plan in order to maintain the unique traditions and practices of Waikapū and to preserve the community's identity.

6. Visual Resources

Existing Conditions. The WCT project area is located between the town of Wailuku to the north and Māʻalaea to the south along the Honoapiʻilani Highway. The project site generally slopes from west to east with a high elevation of approximately 710 feet mean sea level (msl) at the northwesterly corner and a low elevation of about 256 feet above msl at the southerly corner, within the fertile Central Maui isthmus.

Views from within the project site are both diverse and dramatic. Largely unobstructed views of Haleakalā, the West Maui Mountains, the Central Maui isthmus and the Pacific Ocean are available at the mid and upper elevations. At the higher elevations Wailuku and Kahului, East Maui and South Maui are all visible. From the lower elevations largely unobstructed views are available of the West Maui Mountains, Haleakalā, and sugar cane lands that stretch from Honoapiʻilani Highway to Māʻalaea and Kīhei.

These same lower elevation views are presently available from Honoapiʻilani Highway looking into the project site. The existing mauka view from Honoapiʻilani Highway into the project site is of agricultural fields planted in sugar and diversified crops, the MTP, and the valley and ridgelines of the West Maui Mountains. The makai view from the highway, where not obstructed by right-of-way vegetation, is of the existing sugarcane fields and Haleakalā. When the sugarcane has been harvested there are intermittent views of the ocean horizon (**See:** Figure 8 A-N, "Site Photographs").

Potential Impacts and Mitigation Measures. Chris Hart & Partners, Inc. prepared an island-wide Scenic Resources Inventory Study for the County of Maui, Department of Planning, in July 2006 in support of the General Plan 2030 Update. The purpose of the study was to inventory and rate the island's scenic resources so that appropriate advanced planning and mitigation strategies could be employed to protect these resources. The MIP incorporates the study's scenic roadway corridor recommendations into its "Context and Character Map" and references the corridors in policies within Chapter 3, Heritage Resources (**See:** Figure No. 34, "Maui Island Plan, Context and Character Map").

"Registered Historic Parcels" and "Registered Historic Sites" only represent those listed on State or National Registers and included within Maui County's GIS system. Sites shown are not all-inclusive and do not represent all historic sites on Maui. As additional data becomes available it will be integrated into future mapping.

Kahana
Ka'anapali
Lahaina
Wailuku
Kahului
Property Location
Olowalu
Pa'ia
Ha'iku
Keanae
Makawao
Pukalani
Kihei
Keokea
Hana
Kipahulu
Makena

This map is for informational purposes only and subject to change based on future research and findings.

Figure 34: MIP Context & Character Map

Character & Context Map

Island of Maui

Background Map

For Informational Purposes Only

Legend

- Primary Road
- Na Ala Hele or Other Trail
- Stream
- Wetland, Pond or Reservoir
- Waterfall
- Registered Historic Site
- Registered Historic Parcel
- Parks

Scenic Corridor
- Exceptional
- High
- Medium

Boating Facility
- Boat Launch Ramp
- Small Boat Harbor

Aquatic Activity
- Ocean Recreation
- Board Surfing
- Body Surfing
- Canoe Paddling
- Snorkling/Diving

Miles 0 1 2 3 4 5 8

Product Code: M-CET_20120920-a1

This is not a zoning map. Please contact the Planning Department for Zoning confirmation.

Prepared by:
Long Range Planning Division
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Map I-1

The Scenic Resources Inventory Study identifies the area along Honoapi'ilani Highway, fronting the project site, as an area of "High" scenic resource value. In the study, areas of "Exceptional" and "High" resource value are described as having "dramatic and diverse resource values consistently throughout the corridor" and are "typically in a natural condition and unmarked by development." The study's GIS inventory provides "field study" notes that describe the character of the subject corridor. The notes describing the Honoapi'ilani corridor, fronting the project site, are as follows:

> *"High concentration of agricultural lands; open space; and distant Haleakalā views. Intact West Maui mountain views and expansive views of Mā'alaea and the Kīhei coastline and Lana`i views exist. There is considerable utility clutter along the highway. Sprawl conditions along the highway between Waikapū and Mā'alaea should be avoided through the establishment of clear boundaries and features such as landscape plantings and entry signage."*

Chapter 3, Heritage Resources, of the MIP contains policies that discourage sprawl and the merging of the island's small towns. MIP policies also protect views of Haleakalā, the West Maui Mountains, the Pacific Ocean and other scenic resources. As such, design strategies are needed to mitigate the impact of the WCT on visual resources from the Honoapi'ilani Highway fronting the project site. The following documents scenic resource impacts and describes proposed urban design strategies to help mitigate these impacts.

- ***Sprawl.*** The WCTs urban and rural development will have approximately 4,700 linear feet of frontage along the Honoapi'ilani Highway. The proposed development pattern will produce a significant change from the largely undeveloped and open space views that currently exist along what will become the frontage of the project. It is unavoidable that the current open space views of sugarcane will be impacted by the development. However, the following urban design and landscape architectural treatments will be implemented to help reduce the appearance of sprawl like conditions and to create an aesthetically pleasing sense of place fronting the project site:
    - ***Large Setbacks along the Highway.*** Setbacks of at least 60 feet, and in some areas significantly more than 60-feet, will be utilized along each side of the

Honoapi'ilani Highway to separate the development from the public right-of-way.

- ***Landscape Planting within the Right*-of-Way**. Within the setbacks, the planting of large canopy Monkey Pod trees, tropical shrubs and ground covers will be maintained to create a sense of separation and definition between the urban development and the highway and to create a green canopy enclosure and greenway as a passage through the town.
- ***Separated Pedestrian and Bicycle Facilities***. An approximate 10-feet wide shared pedestrian and bicycle track, separated from the highway, will meander along the highway frontage. The shared use path will promote non-motorized transportation, while producing more opportunities for the public to experience the pleasant scenery along the highway.

- ***Haleakalā and West Maui Mountains from Honoapi'ilani Highway***. From Honoapi'ilani Highway, the elevation of the project site rises rather gradually, at a 3% to 6% slope, from about 325-feet above msl to about 550-feet above mls where the Waikapū Ditch traverses north to south across the property. From the Waikapū Ditch the slopes increase to between 10% and 15% as the elevation increases to the foot of the West Maui Mountains. The foot of the West Maui Mountains is at an elevation of approximately 1,250 feet at the upper reaches of the WCT property and is about 6,800 feet from the highway.

  In order to mitigate the obstruction of views from the highway to the West Maui Mountains and Haleakalā, buildings will be setback at least 75-feet from the highway and building heights will be limited to a maximum of 30-feet along the highway frontage. Building placement and areas of separation will also help to create view corridors between the highway and the mountains.

  Within the project, roadways are purposefully aligned, where practicable, to capture mauka and makai view corridors. This opportunity exists at each entrance into the project site and along these roads as they travel east to west. In addition, views of the West Maui Mountains, Haleakalā and the Pacific Ocean will also be preserved in various

locations from public spaces within the WCT, including the Village Green, the Waikapū River Park, Waihe'e Ditch Greenway and the Waikapū Station Greenway.

- ***Open Space Resources***. The project will impact views of agricultural lands on each side of the Honoapi'ilani Highway fronting the development. While these views are not unique within Central Maui, they do enhance Maui's beauty and are an important visual resource. In order to mitigate this impact, approximately 800 acres of agricultural land will be preserved in perpetuity as an open space buffer and permanent separation between Waikapū Town and Mā'alaea. Along the section of the highway where agricultural land is to be preserved, largely unobstructed views of Haleakalā, the West Maui Mountains and partial views of the Pacific Ocean exist.

Within the project site, the WCT will transform the current character of the MTP from a visitor oriented attraction to a park-like village center, with its existing lagoon, gardens, open spaces, shops, and restaurant coming together to create a new sense of place. While the existing agricultural and open space ambiance of the lands abutting the MTP will become an urban and rural settlement pattern, the WCT will maintain a rural and agricultural ambiance at its boundaries because of the preservation of agricultural lands and incorporation of agricultural supporting activities, such as a farmers market, within the project site.

From an urban design perspective, the proposed project will complement the unique country-town architectural character that exists in Waikapū, Wailuku, Pā'ia, and Makawao. WCT design guidelines are being developed to control the density, architectural design, and variation of all buildings in the WCT to help preserve scenic resources and the aesthetic character of the development. Goals of the design guidelines will be to preserve views and maintain the aesthetic character of the community. A defining quality of the urban design character of the development will be to create architecturally pleasing streets with landscape planting that frames the travel ways and provides scale around architectural elements. As part of the DEIS, a visual impact assessment was conducted to determine how views might be impacted along Honoapi'ilani Highway, fronting the project site, following the Project's build-out. Figure No. 35 A-E, is a simulation of before project and after project views along Honoapi'ilani Highway.

1. ***Before***. Looking in a south-easterly direction towards sugar land with Haleakala in the background.

1. ***After***. Looking in a south-easterly direction over the makai development with Haleakala in the background and separated pedestrian and bicycle path in the foreground.

Figure 35, A
Visual Simulation of Pre- and Post Project Views

WAIKAPŪ COUNTRY TOWN

HAWAII LAND DESIGN

PLANNING CONSULTANTS HAWAII, LLC

2. ***Before***. Looking in a south-easterly direction towards sugar land with Haleakala in the background.

2. ***After***. Looking in a south-easterly direction over the makai development with canopy trees in the background and separated pedestrian and bicycle path in the foreground.

Figure 35, B
Visual Simulation of Pre- and Post Project Views

WAIKAPŪ COUNTRY TOWN

HAWAII LAND DESIGN

PLANNING CONSULTANTS HAWAII, LLC

3. ***Before***. Looking in a north-westerly direction with the West-Maui Mountains in the background and the MTP grounds in the foreground.

3. ***After***. Looking in a north-westerly direction through the project with the West-Maui Mountains in the background.

Figure 35, C
Visual Simulation of Pre- and Post Project Views

WAIKAPŪ COUNTRY TOWN

HAWAII LAND DESIGN

PLANNING CONSULTANTS HAWAII, LLC

4. ***Before***. Looking in a south-westerly direction through the MTP with the West Maui Mountains in the background.

4. ***After***. Looking in a south-westerly direction through the project with the West Maui Mountains in the background and the separated pedestrian and bicycle path in the foreground.

Figure 35, D
Visual Simulation of Pre- and Post Project Views

WAIKAPŪ COUNTRY TOWN

HAWAII LAND DESIGN

PLANNING CONSULTANTS HAWAII, LLC

5. ***Before***. Looking in a westerly direction through the MTPs agricultural fields with the with the West Maui Mountains in the background.

5. ***After***. Looking in a westerly direction through the project with the West Maui Mountains in the background and the separated pedestrian and bicycle path in the foreground.

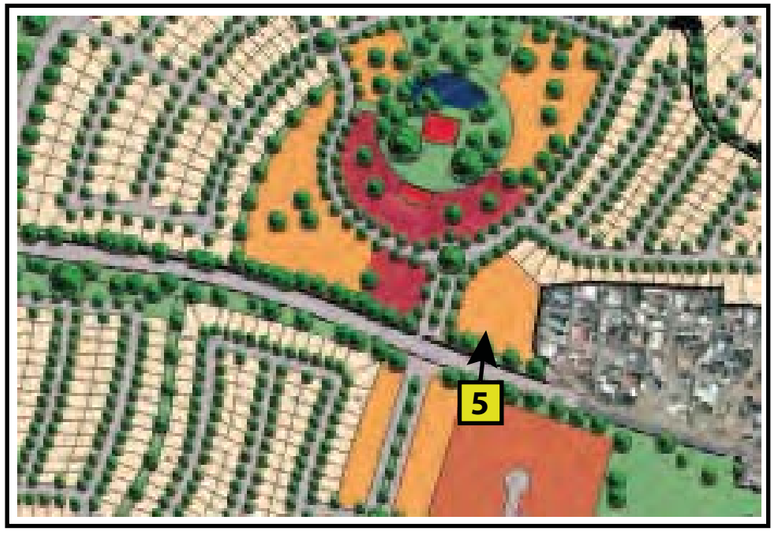

Figure 35, E
Visual Simulation of Pre- and Post Project Views

WAIKAPŪ COUNTRY TOWN

HAWAII LAND DESIGN

PLANNING CONSULTANTS HAWAII, LLC

7. Agricultural Resources

Existing Conditions. In July 2013 Planning Consultants Hawai'i, LLC prepared an Agricultural Impact Assessment (AIA) to assess the long-term impact of the project on the State's and County's agricultural industries (**See:** Appendix G, "Agricultural Impact Assessment").

The scope of the study included the following tasks:

- Assessment of the current status of Hawai'i's agricultural industry;
- Assessment of the current availability of agricultural lands;
- Analysis of existing agronomic conditions within the project site;
- Description of the recent agricultural history of the property;
- Assessment of the impact of the project on current agricultural operations; and
- Analysis of the project's consistency with State and County agricultural policies.

The project area encompasses approximately 14 acres of State Urban District land and 1,562 acres of State Agricultural District land (**See**: Figure No. 5, "State Land Use Designation"). The existing MTP retail shops, restaurant, convention hall, tropical gardens and lagoon are on the urban designated land. In order to implement the Master Plan, approximately 485 acres will be re-designated from the State Agricultural District to the State Urban and Rural Districts.

Current Status of Hawai'i's Agricultural Industry

While agriculture, predominantly sugar and pineapple, dominated Hawai'i's economy from the late 1800s through the 1950s, its overall significance has declined dramatically since the advent of mass market tourism. In 1927, sugar alone created 56,600 jobs throughout the State, whereas in 2011 the entire agricultural industry employed just 6,900 workers. [xi] In 2011, agriculture employed 1,600 Maui County workers, which was 2.4% of the 67,200 wage and salary jobs in the County.[xii]

Hawai'i farmers face stiff competition in local, national, and international markets. In the Hawai'i market, off-shore suppliers dominate the market for most fresh fruits, vegetables, dairy, meat, and poultry products. It has been estimated that 85% of all food consumed in Hawai'i statewide is imported.

In the U.S. Mainland market, Hawai'i growers have sustained the value of their sales in recent years, but have lost significant export value of sales to Japan. Significant impediments to agricultural development in Hawai'i include high labor costs, high transportation costs, high energy costs and high land costs.

Despite major challenges, Hawai'i's growers are competitive in many niche products and opportunities are available. Because 85% of food consumed in Hawai'i is imported, a significant market exists for farmers who can find creative ways to displace imports. Moreover, Hawai'i's seed crop industry has demonstrated that Hawai'i agriculture can have significant comparative advantage in some sectors. Substituting locally grown biofuels for imported petroleum may also provide opportunities for Hawai'i farmers over the coming decades.

State and County Agricultural Lands

Since 1960, there has been a release of approximately 316,590 acres from crop farming, primarily sugar and pineapple. [xiii] While some of these lands have been absorbed by urban development and other agricultural uses, much is fallow and available for agricultural use on Oahu, Maui, Moloka`i, Lana`i and Kauai.

The County of Maui has approximately 402,354 acres within the State Agricultural District. Of these lands, approximately 244,088 acres, or 61%, is located on Maui. [xiv] Using the LSB rating system, Maui alone has approximately 82,592 acres that are classified "A", "B", or "C".[xv] Since 1960, there has been a release of approximately 64,150 acres from crop farming, primarily sugar and pineapple, within the County.[xvi] While some of these lands have been absorbed by urban development and other agricultural uses, much is fallow and available on the islands of Maui, Moloka`i, and Lana`i.

Although there is an abundant supply of productive agricultural land throughout the State, access to affordable agricultural lots offering long-term tenure remains an impediment to agricultural development in Hawai'i. The current shortage of available State and County agricultural park lots is symptomatic of this issue.

WCT, including its adjoining agricultural lands, comprises approximately 1,576 acres, 14 acres of which are within the State Urban District. Over 90% of the project's agricultural lands are rated "A" or "B" by the Land Study Bureau and "Prime" by the Agricultural Lands of Importance to the State of Hawai'i rating systems (**See:** Figure Nos. 36 and 37, "Land Study Bureau Map" and "ALISH Map"). WCT agricultural lands are of very high quality and it has been determined that these lands are important resources to the State of Hawai'i.

Potential Impacts and Mitigation Measures. The Project will result in the urbanization of approximately 485 acres of prime agricultural land. This represents a very small percentage of agricultural lands statewide and on Maui. There are approximately 2 million acres in the State Agricultural District. The subject development represents just .024% of this area. On Maui, there are approximately 82,582 acres of agricultural lands rated by the LSB as A, B, or C. The subject development represents just 0.59% of these lands. Within Maui County, approximately 64,150 acres has been released from crop production since 1987. The subject development represents just 0.76% of these lands. Thus, the urbanization of the subject 485 acres should have minimal long-term impact on the availability of agricultural land within the County and/or State since an abundance of other land, of a similar or higher quality, is currently fallow and available for production elsewhere. As noted, the MTP Master Plan's agricultural component includes nearly 1,077 acres of land that will remain in agricultural use. Of these lands, approximately 800 acres will be permanently dedicated to agricultural use with no residential structures to be permitted. The remaining 277 acres may be subdivided into as many as five large agricultural lots where a farm dwelling may be permitted. Within the agricultural lands, several hundred acres may be developed as a public and/or private agricultural park to help facilitate Maui's agricultural development.

There are currently three commercial farms farming MTP lands. These include Kumu Farms, Hawai'i Taro LLC, and HC&S. The proposed urbanization will require both Kumu Farms and Hawai'i Taro to relocate their agricultural operations to the proposed agricultural park and other suitable agricultural lands within the Project's agricultural district. The Project will also impact a portion of the current lands being leased by HC&S.

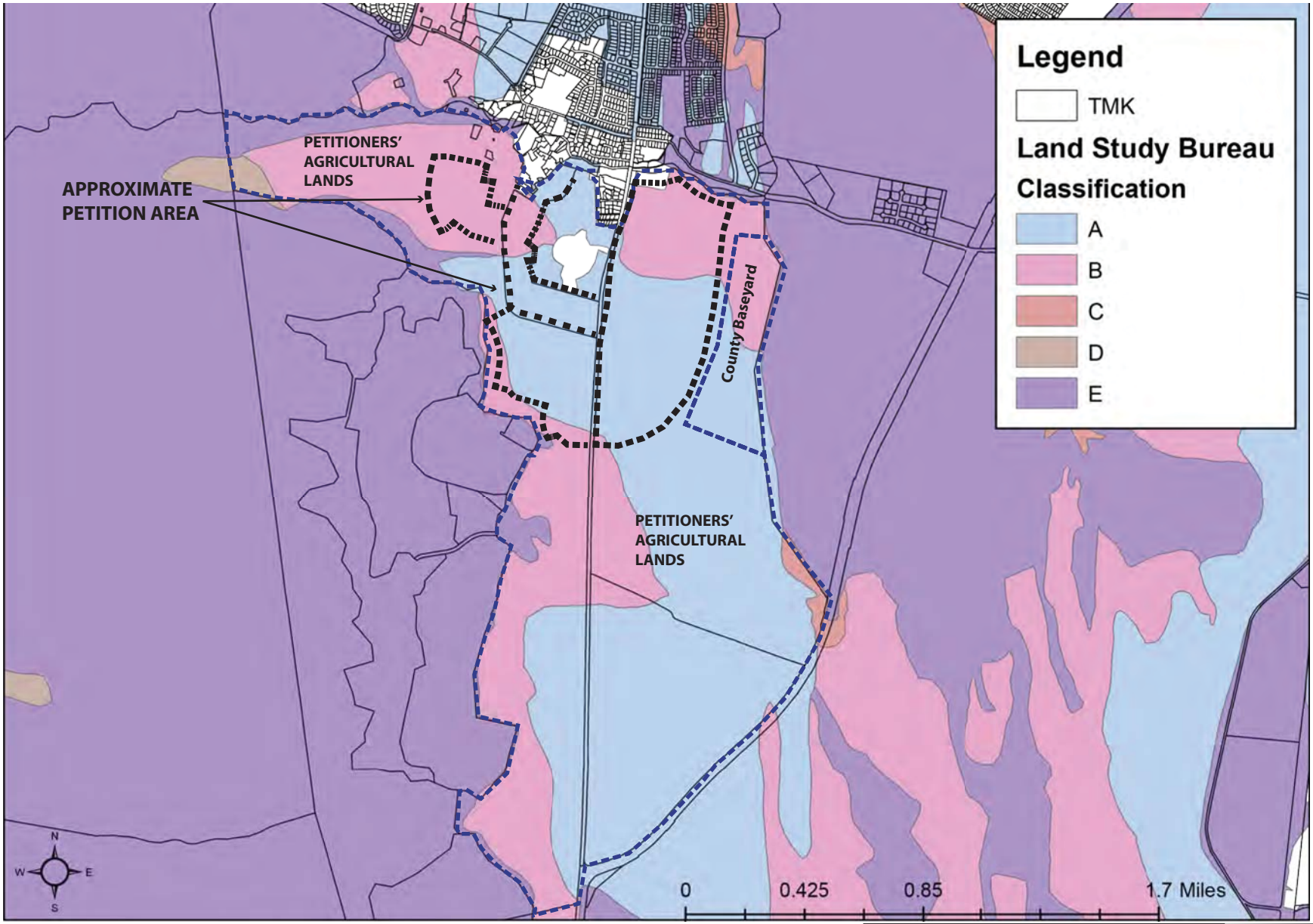

Figure 36
LAND STUDY BUREAU
DETAILED LAND CLASSIFICATION

Not to Scale

WAIKAPŪ COUNTRY TOWN

PLANNING CONSULTANTS HAWAII, LLC

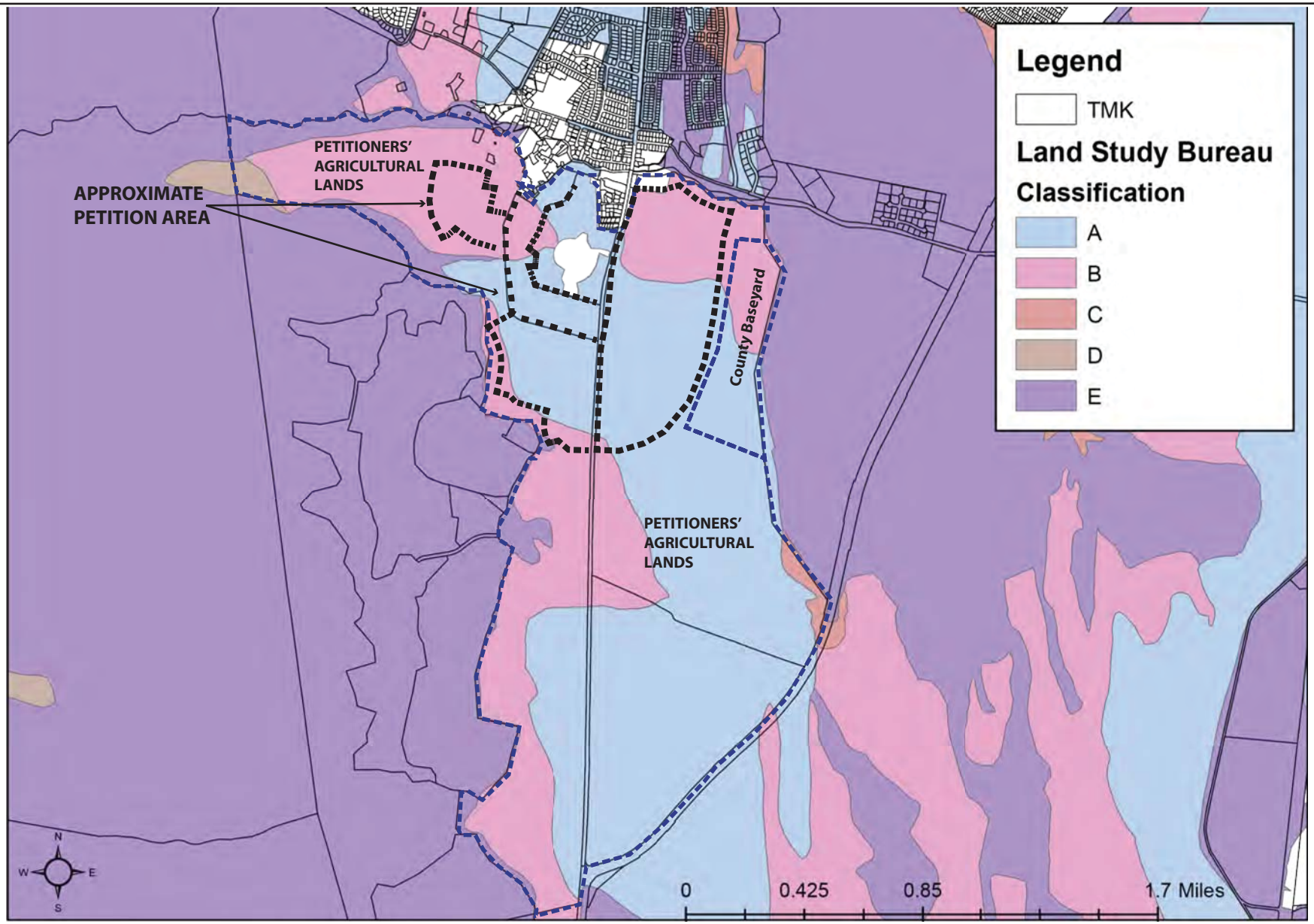

Figure 37
ALISH RATING

Not to Scale

WAIKAPŪ COUNTRY TOWN

PLANNING CONSULTANTS HAWAII, LLC

It is anticipated that these lands will gradually begin to be impacted in about three to five years. Over the long-term, HC&S may lose approximately 330 acres to urbanization and some additional acres to a private agricultural park. According to HC&S General Manager, Mr. Rick Volner, HC&S would desire to continue farming its MTP lands to maximize its current economy of scale in production. However, Mr. Volner acknowledged that HC&S has additional lands available that are currently fallow and that urbanization of a portion of its MTP leased lands will not significantly impact the Plantation's long-term economic viability.

It has been noted that a significant impediment to agricultural development on Maui, and throughout the state, is the scarcity of agricultural land that is both readily available and affordable for long-term lease to diversified farmers. The establishment of a centrally located agricultural park, with productive lands and affordable irrigation water, should help Maui farmers compete in local, mainland and international markets.

Consistency with State and County Agricultural Policies

The Hawai'i State Plan and State Functional Plans establish policy to protect the viability of the sugar and pineapple industries, protect agriculturally suitable lands for future agricultural needs, and promote the growth of diversified agriculture.

The Maui County General Plan (County-wide Policy Plan, Maui Island Plan, and Wailuku-Kahului Community Plan) seek to preserve productive agricultural lands and facilitate agricultural self-sufficiency in food production. The General Plan also recognizes the need to provide sufficient land areas to accommodate future population growth. Goal 7.1.1.f of the MIP states, "Strongly discourage the conversion of productive and important agricultural lands (such as sugar, pineapple, and other produce lands) to rural or urban use, unless justified during the General Plan update, or when other overriding factors are present."[xvii]

The subject land was placed into an Urban Growth Boundary during the General Plan 2030 update, when other overriding factors were present. These factors included the forecasted demand for additional urban lands to accommodate projected population growth, the development suitability of the subject land, as well as its proximity to existing employment, infrastructure, public facility systems and existing urban development. Moreover, as

documented in the Agricultural Impact Assessment, the urbanization of the subject lands will not significantly impact the future viability of the sugar or pineapple industries or the growth of diversified agriculture on Maui or throughout the State.

The proposed action has been carefully analyzed for its short- and long-term impacts upon the agricultural industry. While the proposed action will result in the loss of prime agricultural lands, it will not significantly impact the short- or long-term viability of agriculture in Hawai‘i since an abundance of currently fallow former sugar and pineapple land is currently available elsewhere. The project will, however, help to address the current shortage of agricultural park lots by establishing an approximate 800-acre agricultural preserve that will be used to establish a new private and/or public agricultural park within Central Maui.

As described in the AIS (Appendix G), agricultural operations can produce nuisance impacts to neighboring residential communities. The Applicant is committed to identifying appropriate counter measures to reduce potential impacts to future homeowners while providing assurances to farmers that their operations will be protected from such complaints. Some measures that can help to minimize these conflicts include:

- Advising prospective homeowners in advance of purchasing property that neighboring lands are in agricultural use, that nuisance impacts may occur, and that agricultural uses are protected under HRS Chapter 165, the Hawaii Right-to-Farm Law.
- Establishing appropriate buffers between actively used agricultural lands and homes.
- Planting windbreaks planting within the buffer areas to further mitigate agricultural impacts to homeowners.
- Locating residential communities upwind of agricultural operations.
- Where feasible, locating the least noxious agricultural activities in closer proximity to urban uses while locating the more noxious activities further away.
- Requiring farmers to implement agricultural best management practices to reduce the potential for overspray from the use of pesticides and to implement erosion control measures to reduce dust and agricultural runoff from impacting neighboring properties.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population

The resident population of Maui County has experienced rapid growth. According to census figures the resident population of Maui County has grown by approximately 56% since 1990, from 100,504 to 156,764 in 2011.[xviii] These robust growth rates are expected to continue through 2040. According to the State of Hawai'i, Department of Business, Economic Development, and Tourism, "Population and Economic Projections for the State of Hawai'i to 2040", the County's population is expected to reach 232,863 by 2040, which is an increase of 46%.[xix]

Wailuku-Kahului is the island's largest population and employment center. In 2010 the region's population was approximately 53,456[6], which was about 37% of the island's 2010 population of 144,444. Like the rest of Maui, the Wailuku-Kahului region has experienced high growth rates. In 1990 the region's population was 32,816 and by 2010 it had grown to approximately 53,456, which is an increase of 63% over 20 years. Between 2010 and 2030 the region's population is projected to grow to 65,616, which is a much more modest increase of 21%. As of mid-year 2015, there were approximately 57,616 residents in the Wailuku-Kahului region and projections of the resident population by 2035, based on County and State Forecasts range from circa 78,800 to 97,100 as shown below:

Table 26: Projected Wailuku-Kahului Population

	Year-End	Projected Wailuku-Kahului Population				
Scenario	**2013**	**2015**	**2020**	**2025**	**2030**	**2035**
One: Minimum Based on Adjusted Planning Department Baseline Population Forecasts						
Residents	56,919	57,618	62,642	67,909	73,269	78,764
Two: Maximum Based on Planning Department Historical Trend Run Population Forecast						
Residents	56,919	60,114	68,010	76,850	86,679	97,080
Source: Hallstrom Appraisal Group | CBRE, Inc.						

[6] Includes Census Designated Places of Kahului, Waihe`e-Waiehu, Waikapū, and Wailuku

Kahului is home to the island's only major airport and commercial harbor. The Central Maui Wastewater Treatment Facility is located in Kahului. Kahului is also home to the 78-acre University of Hawai'i Maui College, which offers Associate, Bachelor and Master Degree programs to more than 4,400 full- and part-time students. Several "Big Box" retail stores are also located in Kahului, including Costco, Walmart, Lowes, Target, K-Mart and Home Depot.

Wailuku is the island's civic center. Most State and County offices are located in Wailuku, along Main and High Streets. The Wailuku Police Station, which services Central and Upcountry Maui, is located in Wailuku as is the Maui Memorial Hospital. Maui Memorial Hospital is the island's sole hospital, offering 240 inpatient beds. The island's only State Correctional Facility, Maui Community Correctional Center (MCCC), is also located in Wailuku, along Wai`ale Road. A small "main street" commercial district that dates to the 1880s is located in Wailuku along Main, Market, Vineyard and Church Streets. Both Wailuku and Kahului have supporting shopping centers, parks, recreation facilities, educational facilities, libraries, industrial districts and residential districts.

Potential Impacts and Mitigation Measures. A Market Study and Economic and Fiscal Impact Assessment report was prepared by the Hallstrom Appraisal Group | CBRE, Inc. (**See**: Appendix A, Market Study, Economic Impact Analysis and Public Fiscal Assessment). The report estimates that at buildout the de facto population of the Project will be approximately 3,511 persons, comprised of 3,362 full-time residents and some 148 part-time residents and second home owners. The project population represents from approximately 8.40% to 15.40% of the region's projected population growth to 2035. It is not expected there will be meaningful in-migration to Maui as a direct result of the operating components of the project.

The project population will create short- and long-term economic impacts and will generate an increase in demand for public infrastructure and facilities. These impacts are documented in Sections V.C and V.D of the DEIS.

2. **Housing**

Existing Conditions. Median home prices on Maui, like in most other regions of the Country, rose sharply between 1998 and 2006 and then fell precipitously between 2007 and 2010. In

January 1998 the median sales price of a fee simple condominium on Maui was $160,000 and a single-family residence was $258,068. By 2006 the median sales price of a fee simple condominium had increased by over 300% to $505,000 and a single-family residence by 269% to $693,000. By December 2012, prices had come down from their peak by about 32% for single-family homes to $470,000 and by 28% for fee simple condominium units to $366,086. However, by December 2012 prices for single-family residences were still over 88% higher than prices in 1998, and for fee simple condominiums the prices were over 228% higher than in 1998.

Like the rest of Hawai'i, housing affordability on Maui is a significant concern. It is generally recommended that no more than 30% of monthly income be spent on rent. However, nearly half of all Maui residents exceed this threshold and, compared to the other counties, Maui residents spend more of their monthly income on housing. In 2011, 18% of Maui residents spent between 30 and 40% of their household income on shelter and 30.2% spent over 40%, while only 40.8% spent less than 30% of their income on shelter. By comparison, 54.1% of Oahu residents and 49.1% of Hawai'i County residents spent less than 30% of their income on shelter. According to the US Census Bureau, 2007-2011 American Community Survey 5-Year Estimates, 65% of renters in Wailuku spend over 30% of their income on gross rent and 44% spend over 50% of their income on gross rent.[xx]

According to the County of Maui, Department of Housing and Community Concerns, Affordable Sales Price Guidelines, in February 2014 a Maui family earning 100% of the median income ($75,800 as determined by the United States Department of Housing and Urban Development), could afford a $393,700 three-bedroom single-family residence at a 4.5% interest rate. The median single-family sales price in Central Maui between January and September 2014 was $433,787 (Realtors Association of Maui). Maui County's 2014 Affordable Sales Price Guidelines for a 1-bedroom condominium for a family earning 100% of the median income is $248,010. The median fee simple condominium sales price in Central Maui between February and September 2014 was $267,655.

According to the MIP (December 2012), there will be a demand for an additional 29,589 housing units on Maui through 2030. Of these units, approximately 10,845 are expected to be built on lands not currently entitled for urban development.[xxi]

Potential Impacts and Mitigation Measures. The WCT proposes the development of up to 1,433 residential dwelling units targeted at the full spectrum of workers in the development. It will offer a mix of single and multi-family housing types to address the diverse housing needs of Maui residents. The project will comply with the County's workforce housing ordinance, which will require that twenty percent of the Project's housing be sold to low, low-moderate and gap groups in accordance with sales price and resale restrictions enumerated in Chapter 2.96, MCC. Moreover, because of the Project's Central Maui location and proposed lot and unit size configurations, the Applicant expects that about 80 percent of the Project's market priced housing will be sold at prices deemed affordable to Maui County residents earning between 100 and 140 percent of the County's median income as determined by the United States Department of Housing and Urban Development. Housing types are expected to include multi-family condominiums, live-work units, small cottage homes on small lots with common open spaces, 'Ohana dwellings[7], traditional single-family lots within a variety of home and lot size configurations, rental apartments, townhomes and larger estate rural lots. The goal is to serve the demands of all Maui residents. When developed, the Project will accommodate approximately 4.8 percent of the projected housing demand through 2030.

3. **General Economy**

Existing Conditions. Tourism is the predominant component of Maui County's economy. In 2011 there was an annual average job count of 62,900 on Maui. At 29% of all jobs, the Accommodations and Food Service Industry accounts for the largest proportion of jobs on the island. This is followed by federal, state, and county government at 14%. The retail trade, also highly dependent upon tourism, ranks third at 13%. Professional and business services ranks fourth at 10%.[xxii] Agriculture generates just 2.1% of Maui County jobs but is disproportionately important for its historic and cultural legacy and its contribution to the island's scenic beauty and quality of life.

According to the Economic Development Issue Paper (October 2007) prepared for the County of Maui, Department of Planning, in support of the Maui County General Plan 2030 update, Maui County is much more dependent upon tourism than other Hawai'i Counties. Of Maui County's

[7] For planning purposes, it is assumed that about 15 percent of single-family homeowners may decide to build an 'Ohana unit.

Gross County Product (GCP), 39 percent is attributed to tourism, versus a range of 19-29% for the other counties (Economic Development Issue Paper, 2007). The Economic Development Issue Paper further notes that most Maui households support themselves on two or more jobs. Based on a living wage study of Maui County, a family of four (two adults, two children) would have needed an annual income of $61,650 to support itself in 2005. A corresponding analysis of 2005 jobs and wage data for Maui found that the average wage of 78 occupations – representing 54 percent of all jobs – fell below the $30,800 living wage standard.[xxiii]

Maui County had 2,446,084 visitor arrivals in the year 2011 and hotels on Maui Island experienced a 70.1 percent occupancy rate.[xxiv] In June of 2013 Maui's occupancy rate was 69.1 percent. In the aftermath of the great recession, Maui County's unemployment rate rose to a high of 9.5% in June 2009 but has decreased to a currently level of about 4.2 percent. In Central Maui, economic activity centers on wholesale and retail trade, transportation services, business and professional services, education and government. HC&S is also a major employer in Central Maui.

According to the Economic Development Issue Paper (October 2007), diversifying Maui's economy has been a key, longstanding County policy. Chapter 4, Economic Development, of the MIP, December 2012, states the following in its analysis of the island's challenges and opportunities:

> *The Island of Maui, like the County as a whole, faces two fundamental challenges in economic development: (1) diversification; and (2) increasing the number and proportion of living wage jobs. There is a subset of more specific challenges, such as the high cost of housing and the need to strengthen public education.*[xxv]

Potential Impacts and Mitigation Measures. The WCT is expected to indirectly support Maui's existing economic base activities by providing much needed housing to serve the island's workforce. The WCT is intended to provide housing along with supporting commercial, employment and institutional uses that will allow for Maui's economic base industries to grow,

diversify and become more sustainable - including the island's agricultural industry. By providing much needed housing in a format that will create a high quality of life for Maui's working families, and by generating both short- and long-term employment in the construction, trade and agricultural industries, the project is directly supportive of the State and County's economic development. Development of WCT is expected to generate short-term economic benefits in the form of construction-related employment, as well as long-term benefits that include increased permanent employment and tax revenues. Short- and long-term economic benefits will be more thoroughly analyzed in the following sections of the DEIS.

4. **Project Induced Economic Impacts**

A market study and economic and fiscal impact assessment was conducted by the Hallstrom Appraisal Group | CBRE, Inc. and is included as Appendix A. The Economic Impact Assessment (EIA) constructs a model depicting the economic impact of the WCT project on the Maui and Statewide community during the course of the Project's "lifespan" from anticipated ground-breaking in 2016, through build-out and full absorption (2026-27), and reaching full "stabilization" by 2030. The model builds on the absorption estimates and data contained in the market study.

The following are the expected short- and long-term economic impacts documented in the EIA:

- The WCT development will bring in $609.1 million[8] of new capital investment into the Maui economy.
- The construction of the WCT components will directly create an estimated 2,320 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the trades and associated businesses during build-out, averaging about 193 worker years annually, with an estimated $188.3 million in wages (averaging about $15.7 million per year).
- The on-going operations and maintenance of the business commercial and residential components will directly provide an estimated 4,251 FTE worker-years during the 2016-2030 projection period, providing stabilized employment for 531 permanent positions.

[8] Estimates shown are in constant 2015 dollars.

- The Project will require an estimated 66 worker years of maintenance and common area element employment on a continual basis, and will generate some 1,750 worker years of off-site employment from 2016-2030 and a stabilized demand for 149 FTE positions.
- In aggregate, during the development of the WCT 8,750 worker years of employment will be created during construction and operations, on-site/direct and off-site/indirect, with stabilized employment after completion of 746 jobs.
- During the 15 years projection period, WCT will have a base economic impact of $1.3 billion with a stabilized annual benefit of $137.3 million thereafter.

The above-referenced figures do not include the direct and off-site employment, wages and business activity generated by the in-place 29,000 square feet of the MTP commercial spaces, or the potentials associated with the possible 'Ohana units envisioned in the master planning concept. Table 27 summarizes WCT's employment impacts during the construction and operation phases:

Table 27: WCT Projected Employment Impacts

WCT Employment Impacts			
	Construction Period (12 Years)		Stabilization 2030 +
Employment Multiplier	Construction Jobs/Year	Operations Jobs/Year	Operations Jobs/Year
Direct	193	314	597
Indirect	149[9]		149

Table 28 summarizes the Project's cumulative economic impacts during the projection period (2016-2030) and stabilized thereafter. The column on the left summarizes the cumulative impacts during the initial 15-year projection period (2016-2030) covering build-out/absorption and ramp-up to stabilization, and the right hand column the annual impacts after stabilization.

[9] Indirect off-site jobs created through the modelling period from construction and operations

Table 28: Summary of Economic Impacts

SUMMARY COMPARISON OF MAJOR ECONOMIC IMPACTS All Amounts Expressed in Constant, Uninflated 2015 Dollars		
Analysis Item	Cumulative During Projection Period 2016-2030	Stabilized Annually Thereafter
Direct Capital Investment	$609,097,502	
Local Contractor's Profits	$60,909,750	
Local Supplier's Profits	$24,363,900	
Worker Years of Jobs	8,750	746
Employee Wages	$451,200,219	$27,096,572
Resident Population		3,362
Full-Time Resident Household Income	$1,290,464,422	$147,857,819
De Facto Population Expenditures (On & Off Site)	$684,361,379	$78,260,291
Total Operating Gross Receipts	$778,598,969	$106,061,686
Outside Patronage Expenditures	$424,077,299	$59,019,756
Total Maui "Base" Economic Impact	$1,348,042,748	$137,280,047

Application of the State Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from development of the WCT results in significantly higher economic out-flow indicators than those from the direct, subject-specific micro model developed by the Hallstrom Appraisal Group | CBRE, Inc. The total State economic impact from construction of the project would reach $1.28 billion, there would be 8,424 total worker-years of jobs created, and the total increase in earnings statewide would be $371.5 million.

The State model also estimates that the total annual economic output from business operations within WCT would be more than double the gross revenues at $221.7 million annually on a stabilized basis, the total number of worker years attributable to the subject dollars flowing through the economy would be 2,015 positions annually, and the increase in direct earnings would be $51.2 million per year.

5. **Project Induced Fiscal Impacts**

A market study and economic and fiscal impact assessment (FIA) was conducted by the Hallstrom Appraisal Group | CBRE, Inc. and is included as Appendix A.

The following are the conclusions of the FIA:

- The County of Maui will realize Real Property Taxes ($28.3 million), other secondary receipts, and impact fees of $48.8 million during the 15-year projection period (2016-2030), and $5.0 million annually on a stabilized basis thereafter. In addition, the WCT includes approximately 32.5 acres of active and passive park land within the project site, of which at least 16.5 acres will be dedicated to the County.

- The State of Hawai'i will receive Gross Excise and Income taxes, secondary revenues, and impact fees of $228.0 million during the 2016-2030 period, and $20.0 million per year thereafter. The WCT will also be providing a 12-acre elementary school site to the State.

As is typical of a residential-focused master planned community, with limited commercial components, and having a significant percentage of affordably-priced housing units for local families, the expense to the State and County from a "per capita basis" of all governmental operating costs perspective may exceed the specific on-site tax/fee revenue benefits. However, given the existing emergency services and social services infrastructure available in nearby Wailuku and Kahului, the provision of a school site within WCT, payment of impact fees, and young age of the project components, it is unlikely the "actual" public cost burden associated with the project would exceed the revenues generated or independently require the need for major new public facilities.

C. PUBLIC SERVICES

1. Recreational Resources

Existing Conditions. The MIP (December 2012) notes that Wailuku-Kahului has approximately 186 acres of sub-regional park land and 377 acres of regional park land. In projecting future park needs, the County used a standard of 10-acres of sub-regional park land per 1,000 persons and 15-acres of regional park land per 1,000 persons. This standard was adapted from standards recommended by the National Recreation and Parks Association (NRPA), Urban Land Institute, and the City and County of Honolulu. Using these standards, the MIP states that Wailuku-Kahului is currently deficient in sub-regional park land by approximately 322-acres and that future projections to 2030 indicate the deficit will increase to 541-acres. However, the MIP also acknowledges that the NRPA's updated 1996 guidelines recommend that communities develop individualized Level-of-Service standards and the MIP notes that LOS standards that recognize Maui's unique "assets, conditions, and resources" may "more accurately reflect the island's park land and facility needs". It should be noted that based on the mid-year 2015 Wailuku-Kahului population of 57,616, there are just 3.22 acres of sub-regional park land per 1,000 persons and 6.54 acres of regional park land per 1,000 persons.

There is a diverse selection of both active recreational parks and beach parks in Central Maui. Table No. 29 identifies select sub-regional active recreation parks within proximity of the project site.

Table 29: Sub-Regional Parks within Proximity of the WCT

Central Maui Regional Parks				
Park	Acres	Location	Facilities	Approx. Miles to WCT
Waikapū Community Center & Park	2.4	Waikapū	Community Center; softball; basketball; restroom	0.5
Kahului Community	31	Kahului	Community Center; soccer, baseball,	5

Central Maui Regional Parks				
Center			tennis, playground, walking and jogging paths	
Kahului Park	7.1	Kahului	Baseball, basketball, softball	5.5
Maui High School	13	Kahului	Baseball; multi-purpose fields	5.75
Pomaika`i	4.7	Kahului	Open fields	3.5
Wai`ale	3	Wailuku	Baseball, softball, basketball, tot lot	2.75
Wailuku Elementary	3.9	Wailuku	Baseball, basketball, playground	2.75
Wailuku Gymnasium	0.8	Wailuku	Basketball, gymnasium, weights, pool	3.0
Wailuku Heights	1.4	Wailuku	Playground, picnic areas	2.75
Wells Community Complex	6.6	Wailuku	Tennis courts, basketball courts, baseball	3.0

Table No. 30 identifies select regional active recreation parks within proximity of the project site.

Table 30: Regional Parks within Proximity of the WCT

Central Maui Regional Parks				
Park	Acres	Location	Facilities	Miles to WCT
War Memorial Complex	51	Wailuku	Football and baseball stadiums, aquatic center, tennis courts, gymnasium	3.0
Keopuolani	110	Wailuku	Softball, soccer, playground, walking and jogging paths	3.0

Table No. 31 identifies select beach parks within proximity of the project site.

Table 31: Central Maui Beach Parks within Proximity of the WCT

Central Maui Beach Parks				
Park	Acres	Location	Facilities	Miles to WCT
Ho'aloha Park	2	Kahului	Beach Park with Canoe Hale; Restroom; volleyball, exercise facility	5.0
Kanahā Beach Park	94	Kahului	Beach park with canoe hale; volleyball; picnic areas; camping; windsurfing, kite surfing and surfing destination	7.0

Moreover, the County of Maui recently acquired 209 acres in Waikapū, near the project site, for a regional park. According to the Mayor's proposed 2013 capital improvement plan, the park will include soccer, baseball, and softball fields and will be built out in phases. This park would be located within approximately one-half mile of the project site.

A central Maui sports complex is also being planned in Waikapū on 65 acres by the State of Hawai'i. The complex will be built in phases and may include a full-sized baseball field, a quad of softball fields, a little league baseball quad, an area for soccer fields, comfort stations, concession buildings, and new infrastructure.[xxvi] This facility would be located about two miles from the WCT.

Potential Impacts and Mitigation Measures. The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is expected to be about 3,511 persons, which represents from 16.6% to 8.9% of the projected population growth through 2035.

As noted in Section V.B.1 "Population", the project will generate a defacto population of approximately 3,511 persons. The population generated by the development will produce an increase in demand for park facilities. Using the standard of 10-acres of sub-regional park land

per 1,000 persons and 15-acres of regional park land per 1000 persons, the project would need to incorporate approximately 35-acres of sub-regional park land and approximately 52-acres of regional park land to accommodate the project population.

If the WCT is to provide 3.22 acres of sub-regional park land per 1,000 persons and 6.54-acres of regional park land per 1,000 persons, which is the ratio of park land to population that currently exists within Wailuku-Kahului, then the project should provide approximately 11-acres of sub-regional park land and about 23-acres of regional park land.

In order to comply with the County's park land dedication requirement of 500 square feet of park land per unit (not including the initial three units), the project would be required to dedicate approximately 16.5-acres of land for park use. The WCT proposes to dedicate approximately 32.5 acres of sub-regional park land. This land will comprise a variety of park types including mini-parks, neighborhood parks and a community park. The parks are strategically located to provide easy pedestrian and bicycle access from the project's single- and multi-family residential neighborhoods and the school (See Section III.B.4 of the DEIS). The project will also provide approximately 50-acres of greenways and open-space, which will include pedestrian and bicycle paths and will create additional opportunities for passive recreation. Moreover, within the abutting 1,077-acres of agricultural lands owned by the Applicant, opportunities for various forms of open-land recreation such as horseback riding, mountain biking, trail running, hiking and community gardening may also exist. With the incorporation of the proposed on-site passive and active park facilities, the WCT should produce minimal impact upon existing park facilities within Wailuku-Kahului.

2. Medical Facilities

Existing Conditions. Maui Memorial Medical Center, located in Wailuku approximately 4 miles from the WCT, is the island's only acute care hospital. It is an approximate 251-bed hospital that is part of the Hawai'i Health System Corporation, which is supported by the State. The Maui Memorial Medical Center provides 24-hour emergency services. It also provides intensive care, oncology, maternity and other specialized units.

Various private medical offices and facilities are located throughout Wailuku-Kahului. These facilities provide non-emergency medical care. Kaiser Permanente has clinics in Wailuku and in Maui Lani and Maui Medical Group has offices in Wailuku.

Potential Impacts and Mitigation Measures. The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is expected to be about 3,511 persons, which represents from 16.6% to 8.9% of the projected population growth through 2035.

The projected increase in Wailuku-Kahului's population will produce a demand for additional medical facilities. An estimate of the increase in demand for hospital facilities can be calculated based on the existing level-of-service. For acute and critical care, 0.0809 beds are needed to maintain the current level-of-service for every 100 persons on Maui Island. Based on this standard, the WCT would generate a demand for about of 2.84 beds.

To maintain current levels of ambulatory service, 0.0045 ambulances would be needed per 100 persons. Therefore, about .157 additional ambulances, with staffing, would be required to service the project population.

3. Police Protection

Existing Conditions. The Waikapū area falls within the MPD's District I. This police district is served by the Wailuku (Central) Station, which houses the MPD headquarters for the entire County. The Central Station is located approximately 4 road miles from the project site.

The Police Department includes the following four programs:

- *The Administration Program*. The Administrative Program is responsible for recruitment of personnel; compliance with The Commission on Accreditation for Law Enforcement Agencies (CALEA) standards; and addressing personnel matters.
- *Technical and Support Services Program.* The Technical and Support Services Program conducts recruit training, maintains reliable radio communications; promotes the use of

technology to improve law enforcement services; and promotes community involvement and crime prevention.

- *Investigative Services Program.* Conducts juvenile crime prevention; investigates vice and drug activities, prepares for a responds to critical incidents; conducts specialized and detailed criminal investigations; and investigates domestic violence incidents.
- *Uniformed Services Program*. Suppresses drug trafficking; conducts DUI enforcement; issues traffic citations; and enforces laws and ordinances.

Table No.32 identifies full time equivalent personnel identified for each program in the County's adopted fiscal year 2015 budget.

Table 32: Full-time Equivalent Police Department Personnel

Program	Full Time Equivalent Personnel	
	2012 Adopted	2015 Adopted
Administration Program	23.0	24.0
Investigative Services Program	89.0	106.0
Technical and Support Services Program	110.5	104.5
Uniformed Patrol Services Program	295.1	290.5
Department Total	517.6	525

Potential Impacts and Mitigation Measures. The de facto population of the County of Maui as of July 2012 was 201,870. Therefore, the level-of-service for Police Department Personnel in 2012 was one Police Department personnel per 390 persons.

The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is expected to be about 3,511 persons, which represents from 8.9% to 16.6% of the projected growth through 2035. Using a standard of one Police Department personnel per 390 persons, the project population would generate a need for about 9 personnel and accessory facilities. As noted in the Fiscal Impact

Assessment prepared for the project (Appendix A), the project will generate approximately $3.1 million in real property tax receipts on a stabilized basis following build-out of the project. A portion of these revenues should be allocated to help address the increase in demand for police protection services generated by the project.

4. Fire Protection

Existing Conditions. The Department of Fire and Public Safety includes the following five programs:

- The Administration and Maintenance Program;
- The Training Program;
- The Fire/Rescue Operation Program; and
- The Fire Prevention Program.

There are two fire stations that are within a five road mile service area of Waikapū. These include Wailuku Station at 21 Kinipopo Road and the Kahului Fire Station at 200 Dairy Road. The Wailuku Station is an Engine Company. The Kahului Fire Station is an Engine, Tanker and Rescue Company.

The County uses a distance standard of 2 to 3 miles to provide adequate coverage to residential districts. Waikapū is approximately 3 road miles from the Wailuku Fire Station and 4.5 road miles from the Kahului Fire Station.

In order to reduce response times for both fire and medical emergencies, construction of a new fire station is planned in Waikapū. According to the Mayor's proposed 2013 capital improvement program, the fire station will be situated on approximately 5 acres of the 100 acres recently acquired in Waikapū to accommodate a County campus for various departments, police and fire stations. The CIP states that the 5-acre fire station will be located along the proposed Waiko Road Extension. The development of a fire station within Waikapū will bring the proposed project well within the County's desired response time standard.

Potential Impacts and Mitigation Measures. The de facto population of the County of Maui as of July 2012 was 201,870. Therefore, the County-wide level-of-service for Fire Department Personnel in 2012 was one Fire Department personnel per 518 persons.

The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is 3,511 persons, which represents from 8.9% to 16.6% of the projected population growth through 2035. Using a standard of one Fire Department personnel per 518 persons, the project population would generate a need for 7 personnel and accessory facilities. As noted in the Fiscal Impact Assessment prepared for the project (Appendix A), the project will generate approximately $3.1 million in real property tax receipts on a stabilized basis following build-out of the project. A portion of these revenues should be allocated to help address the increase in demand for fire protection services generated by the project.

5. Schools

Existing Conditions. Maui schools are organized into complexes and complex-areas. A complex consists of a high school and all of the intermediate/middle and elementary schools that flow into it. Groups of two to four complexes form a "complex area" that is under the supervision of a complex area superintendent.

The WCT is located within the State Department of Education's Baldwin-Kekaulike-Maui Complex-Area. The Complex is comprised of the schools shown in Table 33:

Table 33: Baldwin-Kekaulike-Maui Complex Area Schools

Baldwin-Kekaulike-Maui Complex Area			
Name	Grades	2013 Enrollment	Approx. Road Miles from WTC
Pu'u Kukui Elementary	K - 5	541	2

Waihe'e Elementary	K - 5	775	6
Wailuku Elementary	K - 5	740	2.75
ʻĪao Intermediate	6 - 8	886	3
Baldwin High School	9 - 12	1538	3.5

Current and projected enrollment and capacities for area schools were provided by the Planning Section of the Department of Education's Facilities Development Branch and are shown in Table 34, "DOE School Enrollment & Capacity" below.

Table 34: DOE School Enrollment & Capacity

DOE School Enrollment & Capacity					
Schools	2013 Enrollment	2013 Capacity	Surplus / Deficit	2018 Projected Enrollment	**2018 Surplus / Deficit**
Wailuku Elementary	740	958	218	695	**263**
Pu'u Kukui Elementary	541	550	9	603	**-53**
ʻĪao Intermediate	886	999	113	972	**27**
Baldwin High School	1538	1809	271	1606	**203**
Kahului Elementary	1064	915	149	992	**-77**
Lihikai Elementary	943	1036	93	933	**103**
Pōmaika'i Elementary	550	760	210	545	**215**
Maui Waena Intermediate	1095	1276	181	1197	**79**
Maui High School	**1908**	**2035**	**127**	**1394**	**641**

Potential Impacts and Mitigation Measures. The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is 3,511 persons, which represents from 8.9% to 16.6% of the projected population growth through 2035.

The projected increase in Wailuku-Kahului's population will produce a demand for additional educational facilities. Pursuant to Act 245, the State Department of Education adopted Impact Fees to develop funding for educational facilities required to support new residential development. The Board of Education has designated Central Maui as one of four School Impact Districts. The DOE uses the following student generation rates for Central Maui.

Table 35: DOE Student Generation Rate Multipliers

DOE Student Generation Rate Multipliers		
Type of School	Generation Rate Per Unit	
	S.F.	M.F.
Elementary	0.23	0.13
Middle	0.11	0.04
High	0.15	0.05

Based upon these standards, the WCT would increase the student population as shown in Table 36. Expected WCT construction cost impact fees are shown in Table 37 and land dedication requirements in Table 38.

Table 36: WCT Projected Student Generation

WCT Projected Student Generation					
Type of School	Generation Rate Per Unit		WCT Residential Units		Student Generation
	S.F.	M.F.	S.F.	M.F.	
Elementary	0.23	0.13	241.5	49.79	291
Middle	0.11	0.04	115.5	15.32	131
High	0.15	0.05	157.5	19.15	177

Table 37: WCT Construction Cost Impact Fee

WCT Construction Cost Impact Fee

Type of School	Fee (dollars)		No. Units		Amount		TOTAL
	SF	MF	SF	MF	SF	MF	
Elementary School	791	447	1050	383	830550	171201	$1,001,251
Middle School	405	147	1050	383	425250	56301	$481,551
High School	957	319	1050	383	1004850	122177	$1,124,027
TOTAL							**$2,606,829**

Table 38: WCT DOE Land Dedication Requirement

WCT Land Dedication Requirement							
Type of School	Land (acres)		No. Units		Acres		TOTAL
	SF	MF	SF	MF	SF	MF	
Elementary School	.003588	.002028	1050	383	3.767	0.777	4.544
Middle School	.00121	.00044	1050	383	1.271	0.169	1.44
High School	957.00459	.00153	1050	383	4.820	0.586	5.406
TOTAL ACRES							**11.39**

The WCT will comply with State DOE impact fee requirements, which will mitigate the Project's impacts upon State educational facilities.

6. Solid Waste

Existing Conditions. The Central Maui Landfill services the residential waste stream for Central Maui, including Waikapū. The privately owned and operated Decoite Landfill services the island's construction and demolition waste stream. According to the County of Maui's Integrated Solid Waste Management Plan (ISWMP) (February 2009), the amount of waste generated in 2006 was 345,000 tons of which 124,000 tons was diverted for recycling.[xxvii] In 2006, the Central Maui Landfill received 213,993 tons of residential waste, the Maui Construction and Demolition Landfill (Decoite Landfill) received 50,000 tons of construction waste, and the Eco Compost Facility received 54,243 tons of yard waste. It is projected that by 2030 the total generated waste on Maui will be 499,381 tons per year (TPY) of which approximately 31 percent, or 147,309 TPY, would be recycled. Thus, by 2030 it is projected that

approximately 353,632 TPY of solid waste would be entering the island's landfills. In comparing planned capacity versus projected solid waste generation, the ISWMP projects that the planned capacity is sufficient to accommodate demand through 2026.

The County of Maui is currently assessing the feasibility of developing a waste-to-energy facility in Central Maui, on land near the Central Maui Landfill. The facility could have the potential to divert up to 80% of the waste generated on Maui with the byproduct used as a renewable fuel. Such a capital improvement would significantly mitigate the need for additional landfill space to accommodate the projected population growth.

The ISWMP also uses residential and commercial waste generation rates for its projections. The residential generation rate in tons per household per year for Maui (excluding Hana) is 2.3. The Commercial Generation Rate (tons per employee per year) for Maui (excluding Hana) is 1.58.

Potential Impacts and Mitigation Measures. The resident population of Wailuku-Kahului as of mid-year 2015 was 57,616. According to County and State Forecasts, the 2035 resident population of Wailuku-Kahului may range from 78,764 to 97,080 persons. This is an increase in population of 21,148 to 39,464, which is an increase of 36.7% to 68.5%. The projected project population is 3,511 persons, which represents from 8.9% to 16.6% of the projected population growth through 2035.

The projected increase in Wailuku-Kahului's population will produce a demand for solid waste disposal. Waste generated by site preparation will primarily consist of vegetation, rocks and debris from clearing, grubbing, and grading. Very little demolition material is expected, as the site is essentially vacant.

During the construction phase, construction activities will require the disposal of the existing on-site waste, as well as cleared vegetation and construction-related solid waste. Using a 2003 publication by the Environmental Protection Agency (EPA) entitled "Estimating 2003 Building-Related Construction and Demolition Materials Amounts", factors of 4.39 pounds per square feet of construction for residential and 4.34 pounds per square feet of construction for commercial buildings were used to determine potential construction waste generated by the

Project. Using these factors, it is estimated that during the construction phase (2017-2026) residential construction waste might total approximately 8.7 million pounds or 4,350 tons of waste. The commercial component would generate approximately 736,000 pounds or 368 tons of waste through 2026.

A solid waste management plan will be coordinated with the County's Solid Waste Division for the disposal of onsite and construction-related waste material. The Developer will work with the contractor to minimize the amount of solid waste generated during the construction of the project.

Using the ISWMP's residential generation rate of 2.3 tons per household per year and the commercial generation rate of 1.58 tons per employee per year, total solid waste generated during the operation phase of the project at stabilization in 2026 is 3,715 tons per year. Using a diversion rate of 31 percent, total waste from the project site is estimated to be approximately 2,563 tons per year.

The WCT will support the County's recycling, reuse and composting activities. The ISWMP provides strategies for diverting solid waste from landfills to reduce landfill dependency, save landfill capacity and improve operational efficiency. The WCT will implement these strategies by providing options for recycling, such as collection systems and bin space, within the project, and promoting sound recycling strategies among residents and businesses.

D. INFRASTRUCTURE

1. Roadways and Traffic

Existing Conditions. Existing regional roadway conditions are described in detail in the Preliminary Engineering Report, Appendix H, prepared by Otomo Engineering and in the Traffic Impact Analysis Report, Appendix I, prepared by Feher & Phers.

Figure No. 38 shows the location of regional roadways that serve the project area. The primary regional access to the Waikapū area is provided by Honoapi'ilani Highway, Highway 30, (Figure

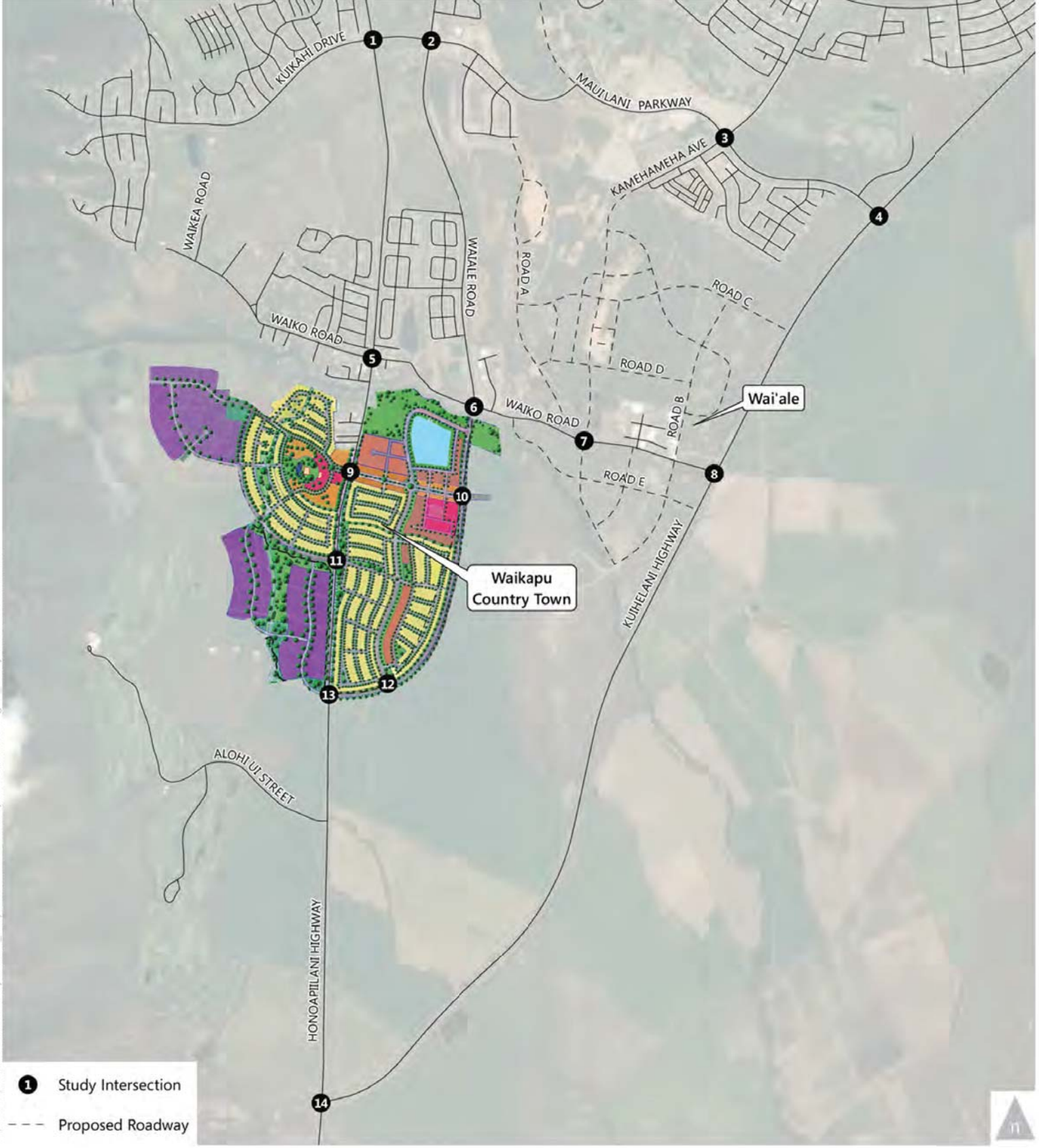

Figure 38:
Study Area and Analyzed Intersections

38, Location 1), which traverses through the project site. Honoapi'ilani Highway divides the project site into the mauka and makai sections. It is a two-lane undivided State Highway which runs in the north-south direction into Wailuku. The speed limit is 30 miles per hour (mph) in the vicinity of the project site and Waiko Road. The Waiko Road intersection is signalized with existing left turn pockets into East and West Waiko Road. There is a left turn pocket on Honoapi'ilani Highway at its intersection with the driveway for the existing MTP.

Kūihelani Highway, Highway 380, (Figure 38, Location 7) is located immediately east of the project site. It is a two-way, four-lane divided State arterial highway which also runs in a north-south direction. The posted speed limit on Kūihelani Highway at Waiko Road is 55 mph. There is an existing traffic signal at the Kūihelani Highway-Waiko Road intersection. The southern terminus of Kūihelani Highway is its intersection with Honoapi'ilani Highway. The northern terminus is at its intersection with Pu`unēnē Avenue, where it turns into Dairy Road.

Waiko Road (Figure 38, Location 2 and 3) is a two-lane County-owned collector roadway that runs in an east-west direction and connects Honoapi'ilani Highway and Kūihelani Highway. The posted speed limit on Waiko Road is 20 mph. Immediately east of Honoapi'ilani Highway, Waiko Road provides access to the Waikapū Gardens residential community. Further east, Waiko Road provides access to industrial and livestock land uses. There is a weight limit of 10,000 pounds for vehicles entering and exiting Waiko Road from Honoapi'ilani Highway.

Wai`ale Road (Figure 38, Location 5) is a north-south, undivided collector road that starts as an extension of Lower Main Street and terminates at Waiko Road. The roadway provides two travel lanes (one in each direction) and serves as the only access road for residents of the Waikapū Gardens neighborhood located between Kuikahi Drive and Waiko Road. The posted speed limit is 20 mph. The section of Wai`ale Road from Waiko Road to Kuikahi Drive is privately owned. The segment from Kuikahi Drive to Lower Main Street is County owned and used as a collector road.

Kuikahi Drive (Figure 38, Location 6) is an east-west collector road. West of its intersection with Honoapi'ilani Highway, Kuikahi Drive passes through the Wailuku Heights Subdivision and terminates in a cul-de-sac at the top of the subdivision. Approximately 1,000 feet east of Honoapi'ilani Highway, it intersects with Wai`ale Road. The eastern terminus of Kuikahi Drive is at its intersection with Maui Lani Parkway.

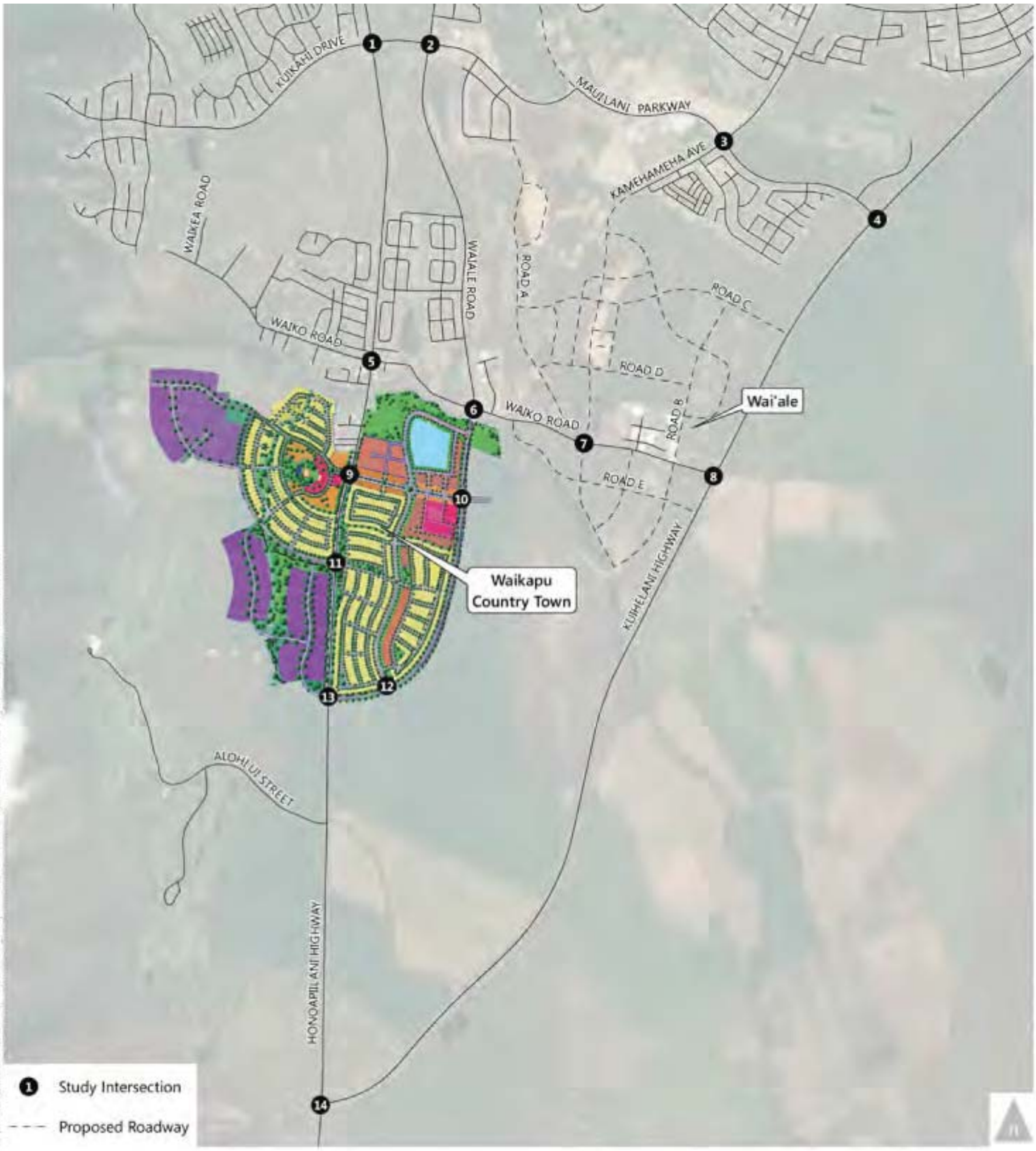

Figure 39:
Study Area and Analyzed Intersections

Kamehameha Avenue (Figure 38, Location 7) is a County-owned north-south collector road. It is a two-lane roadway which begins at its intersection with Hana Highway and extends southward through the Maui Lani development with its terminus just south of Pomaika`i Elementary School.

Maui Lani Parkway (Figure 38, Location 8) is a two-lane, east-west collector road with a raised median. It connects Kūihelani Highway with Kuikahi Drive. When completed, Maui Lani Parkway will extend to Kaahumanu Avenue near Baldwin High School. Upon completion of Maui Lani Parkway, it will connect Kūihelani Highway and Kaahumanu Avenue.

The mauka side of the Project at the MTP is accessible from Honoapi'ilani Highway. The makai side of the property is undeveloped and in sugar cane cultivation.

Access to the makai land is from Honoapi'ilani Highway, East Waiko Road and Kūihelani Highway from cane haul roads. Access for the proposed project will be from the roadway connections on Honoapi'ilani Highway for both the mauka and makai development sites, as well as the future Wai`ale Road extension for the makai development.

Traffic Impact Analysis Report (TIAR)

As noted, a TIAR was prepared by Fehr & Peers in December 2014 to document the impact of the project and propose mitigation measures (**See**: Appendix I, Traffic Impact Analysis Report"). The TIAR analyzed the typical weekday AM and PM traffic conditions under existing conditions and potential project-related traffic impacts at partial buildout in 2022 and at full buildout in 2026. The analysis evaluated the operations at eight existing and six future intersections (a total of 14 study intersections) in the vicinity of the proposed project. The analyzed intersections are shown in Figure 39 and are listed below.

1. Honoapi'ilani Highway (Highway 30)/Kuikahi Drive
2. Wai`ale Road/Kuikahi Drive
3. S. Kamehameha Avenue/Maui Lani Parkway
4. Kūihelani Highway (Highway 380)/Maui Lani Parkway
5. Honoapi'ilani Highway (Highway 30)/Waiko Road
6. Wai`ale Road/Waiko Road
7. *S. Kamehameha Avenue/Waiko Road**

8. Kūihelani Highway (Highway 380)/Waiko Road
9. *Honoapi'ilani Highway (Highway 30)/Main Street**
10. *Wai`ale Road/Main Street**
11. *Honoapi'ilani Highway/East-West Residential Street**
12. *North-South Residential Street/ Wai`ale Road**
13. *Honoapi'ilani Highway* (Highway 30)*/Wai`ale Road**
14. Honoapi'ilani Highway (Highway 30)/Kūihelani Highway (Highway 380)

**Future intersection*

Existing Levels of Service (LOS)

The TIAR evaluated operations of the eight existing study intersections during weekday morning (6:00 to 9:00 AM) and evening (3:00 to 6:00 PM) peak-period conditions. Traffic counts were collected during the weekday AM and PM peak periods at the study intersections in September 2013, when local schools were in session. Existing lane configurations and signal controls were obtained through field observations. Figure 3, A-B of the TIAR (Append I) presents the existing AM and PM peak-hour turning movement volumes, corresponding lane configurations and traffic control devices. Traffic count data sheets are provided in Appendix A of the TIAR. Existing peak-hour volumes and lane configurations were used to calculate levels of service for each of the study intersections. The results of the existing LOS analysis are presented in Table 39 and the corresponding LOS calculation sheets are included in Appendix B of the TIAR.

Table 39: Existing Intersection Level of Service

Existing Intersection Level-of-Service				
Intersection	**Traffic Control**	**Peak Hour**	**Delay (sec/veh)1**	**LOS2,3**
1. Honoapi'ilani Highway (Highway 30) / Kuikahi Drive	Signalized	AM PM	25.2 23.3	C C
2. Wai`ale Road / Kuikahi Drive	Signalized	AM PM	26.4 24.7	C C
3. S. Kamehameha Avenue / Maui Lani Parkway	AWSC	AM PM	48.3 54.4	E F
4. Kūihelani Highway / Maui Lani Parkway	Signalized	AM PM	21.4 21.9	C C

5. Honoapi'ilani Highway (Highway 30) / Waiko Road	Signalized	AM PM	13.3 11.9	B B
6. Wai`ale Road / Waiko Road	SSSC	AM PM	12.4 10.9	B B
7. S. Kamehameha Avenue / Waiko Road4	N/A	AM PM	Does not exist	
8. Kūihelani Highway (Highway 380) / Waiko Road	Signalized	AM PM	14.5 11.2	B B
9. Honoapi'ilani Highway (Highway 30) / Main Street4	N/A	AM PM	Does not exist	
10. Wai`ale Road / Main Street4	N/A	AM PM	Does not exist	
11. Honoapi'ilani Highway / East-West Residential Street4	N/A	AM PM	Does not exist	
12. North-South Residential Street / Wai`ale Road4	SSSC	AM PM	Does not exist	
13. Honoapi'ilani Highway (Highway 30) / Wai`ale Road4	N/A	AM PM	Does not exist	
14. Honoapi'ilani Highway (Highway 30) / Kūihelani Highway (Highway 380)	Signalized	AM PM	15.2 12.4	B B

Source: Fehr & Peers, 2014.

Notes:

** Indicated oversaturated conditions. Delay cannot be calculated

AWSC = All-way stop-controlled intersection

SSSC = Side-street stop-controlled intersection

1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

2 LOS calculations performed using the *2000 Highway Capacity Manual (HCM)* method.

3 Undesirable LOS highlighted in bold.

4 Future intersection

lts of the LOS calculations indicate that all of the existing study intersections operate at an overall acceptable service level (LOS D or better), with the exception of the following location:

- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway. This intersection operates at LOS E – AM peak hour and LOS F – PM peak hour. The poor operating conditions result from the all-way stop-control and high eastbound and westbound volumes traversing through a shared left/through/right configuration. This contributes to the relatively high eastbound and westbound approach delays and overall poor operating peak levels of service at this intersection.

Potential Impacts and Mitigation Measures. Refer to Appendix I, "Traffic Impact Analysis Report", for a complete presentation of the TIAR. To evaluate the potential impact of traffic generated by the proposed project on the surrounding street system, the TIAR developed

estimates of future traffic conditions in the area both with and without the project. Future traffic conditions without the proposed project reflect traffic increases due to general regional growth and development, as well as traffic increases generated by other specific developments near the project site. These conditions are referred to as the cumulative base condition (i.e., no project conditions). The sum of the cumulative base and project-generated traffic represents the cumulative plus project conditions. Tables 40 and 41 document the LOS conditions for post project conditions in 2022 and 2026. The TIAR identifies counter measures to mitigate the Project's traffic impacts.

2022 Post Phase I LOS Conditions

As shown in Table 40, the proposed project will contribute to cumulative impacts (LOS E or F conditions) during one or both peak hours at five study intersections:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive will operate at LOS F during the AM peak hour.
- Intersection 2: Wai`ale Road & Kuikahi Drive will operate at LOS F during the AM peak hour and LOS E during the PM peak hour.
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 4: Kūihelani Highway (Highway 380) & Maui Lani Parkway will operate at LOS F during the AM peak hour and LOS E during the PM peak hour.
- Intersection 7: S. Kamehameha Avenue & Waiko Road will operate at LOS F during the AM peak hour and PM peak hour.

In addition, a project-specific impact has been identified at Intersection 1: Honoapi'ilani Highway & Kuikahi Drive during the PM peak hour. At Intersection 1, the addition of project-generated traffic would cause the overall intersection operations to degrade from LOS D to LOS E.

2026 Post Phase II LOS Conditions

As shown in Table 41, the proposed project would contribute to cumulative impacts (LOS E or F conditions) during one or both peak hours at six study intersections:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive will operate at LOS F during the AM peak hour.

Table 40: Year 2022 Levels of Service – Phase I

Intersection	Traffic Control	Peak Hour	Year 2022 No Project Conditions		Year 2022 with Partial Development (Phase 1) Conditions		Delay Change	Mitigation Required?	Mitigated to:			
			Del/Veh1	LOS2,3	Del/Veh1	LOS2,3			Pre-Project or Better Conditions (≤ LOS D)		LOS D or Better Conditions	
									Del/Veh1	LOS2,3	Del/Veh1	LOS2,3
1. Honoapiilani Highway / Kuikahi Drive	Signal	AM	67.3	**E**	92.5	**F**	25.2	**YES**	43.2	D	Same as Pre-Project Mitigation	
		PM	38.6	D	66.1	**E**	27.5	**YES**	35.2	D		
2. Waiale Road / Kuikahi Drive	Signal	AM	73.5	**E**	108.2	**F**	34.7	**YES**	61.9	**E**	39.8	D
		PM	48.6	D	73.6	**E**	25.0	**YES**	34.8	C	31.3	C
3. S. Kamehameha Avenue / Maui Lani Parkway6	AWSC	AM	> 180	**F**	> 180	**F**	**	**YES**	131.5	**F**	30.5	C
		PM	> 180	**F**	> 180	**F**	**	**YES**	133.1	**F**	36.0	D
4. Kuihelani Highway / Maui Lani Parkway	Signal	AM	78.0	**E**	101.6	**F**	23.6	**YES**	22.7	C	Same as Pre-Project Mitigation	
		PM	57.9	**E**	79.9	**E**	22.0	**YES**	26.4	C		
5. Honoapiilani Highway / Waiko Road	Signal	AM	18.6	B	34.5	C	15.9	NO	No Mitigation Required			
		PM	17.5	B	29.8	C	12.3	NO				
6. Waiale Road / Waiko Road4,9	Signal	AM	8.1	A	8.8	A	0.7	NO	No Mitigation Required			
		PM	7.3	A	7.5	A	0.2	NO				
7. S. Kamehameha Avenue / Waiko Road6,7	SSSC	AM	> 180	**F**	> 180	**F**	**	**YES**	8.1	A	Same as Pre-Project Mitigation	
		PM	169.9	**F**	> 180	**F**	**	**YES**	7.4	A		
8. Kuihelani Highway / Waiko Road	Signal	AM	38.7	D	43.2	D	4.5	NO	No Mitigation Required			
		PM	17.9	B	18.6	B	0.7	NO				
9. Honoapiilani Highway / Main Street5,8	Signal	AM	Only built with project		9.0	A	9.0	NO	No Mitigation Required			
		AM			10.4	B	10.4	NO				
10. Waiale Road / Main Street5	Roundabout	AM	Only built with project		6.6	A	6.6	NO	No Mitigation Required			
		PM			7.1	A	7.1	NO				
11. Honoapiilani Highway / East-West Residential Street	N/A	AM	Only built with Phase 2 of project									
		PM										
12. North-South Residential Street /Waiale Road	N/A	AM	Only built with Phase 2 of project									
		PM										
13. Honoapiilani Highway / Waiale Road9	Signal	AM	5.9	A	7.4	A	1.5	NO	No Mitigation Required			
		PM	12.9	B	17.9	B	5.0	NO				
14. Honoapiilani Highway / Kuihelani Highway	Signal	AM	22.2	C	23.1	C	0.9	NO	No Mitigation Required			
		PM	20.3	C	22.2	C	1.9	NO				

Source: Fehr & Peers, 2014

** Indicated oversaturated conditions. Delay cannot be calculated.

AWSC = All-way stop-controlled intersection

SSSC = Side-street stop-controlled intersection

1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

2 LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

3 Unacceptable LOS highlighted in **bold.**

4 With the construction of the Waiale Bypass under future conditions, the intersection will include a fourth (south) leg and is assumed to be signalized.

5 Intersection provides access to the project site.

6 The proposed mitigation measure at this location is signalization and the delay and LOS displayed under this condition is based on the average control delay for the intersection as a whole.

7 Intersection is or is assumed to be controlled by stop signs on the minor approach(es).

8 The project intersection is assumed to be signalized in 2022.

9 Intersection assumed to be signalized as part of the Waiale Bypass project.

Table 41: Year 2026 Levels of Service – Phases I and 2

Intersection	Traffic Control	Peak Hour	Year 2026 No Project Conditions		Year 2026 with Phase 1 & 2 Conditions		Delay Change	Mitigation Required?	Mitigated to:			
			Del/Veh1	LOS2,3	Del/Veh1	LOS2,3			Pre-Project or Better Conditions (≤ LOS D)		LOS D or Better Conditions	
									Del/Veh1	LOS2,3	Del/Veh1	LOS2,3
1. Honoapiilani Highway / Kuikahi Drive	Signal	AM	75.3	**E**	111.1	**F**	35.8	**YES**	50.3	D	Same as Pre-Project Mitigation	
		PM	46.3	D	77.0	**E**	30.7	**YES**	37.7	D		
2. Waiale Road / Kuikahi Drive	Signal	AM	87.8	**F**	149.2	**F**	61.4	**YES**	81.8	**F**	46.6	D
		PM	55.3	**E**	99.4	**F**	44.1	**YES**	41.5	D	33.3	C
3. S. Kamehameha Avenue / Maui Lani Parkway 6	AWSC	AM	> 180	**F**	> 180	**F**	**	**YES**	> 180	**F**	30.2	C
		PM	> 180	**F**	> 180	**F**	**	**YES**	167.9	**F**	19.4	B
4. Kuihelani Highway / Maui Lani Parkway	Signal	AM	105.0	**F**	139.5	**F**	34.5	**YES**	27.2	C	Same as Pre-Project Mitigation	
		PM	75.9	**E**	100.1	**F**	24.2	**YES**	31.2	C		
5. Honoapiilani Highway / Waiko Road	Signal	AM	18.6	B	46.9	D	28.3	NO	No Mitigation Required			
		PM	18.5	B	37.8	D	19.3	NO				
6. Waiale Road / Waiko Road4,9	Signal	AM	9.0	A	15.0	B	6.0	NO	No Mitigation Required			
		PM	7.5	A	8.9	A	1.4	NO				
7. S. Kamehameha Avenue / Waiko Road6,7	SSSC	AM	**	**F**	**	**F**	**	**YES**	10.1	B	Same as Pre-Project Mitigation	
		PM	> 180	**F**	**	**F**	**	**YES**	8.1	A		
8. Kuihelani Highway / Waiko Road	Signal	AM	41.6	D	58.2	**E**	16.6	**YES**	25.2	C	Same as Pre-Project Mitigation	
		PM	17.1	B	19.7	B	2.6	NO	15.6	B		
9. Honoapiilani Highway / Main Street5,8	Signal	AM	Only built with project		9.8	A	9.8	NO	No Mitigation Required			
		AM			11.6	B	11.6	NO				
10. Waiale Road / Main Street5	Roundabout	AM	Only built with project		9.9	A	9.9	NO	No Mitigation Required			
		PM			10.3	B	10.3	NO				
11. Honoapiilani Highway / East-West Residential Street	Signal	AM	Only built with project		8.3	A	8.3	NO	No Mitigation Required			
		PM			6.1	A	6.1	NO				
12. North-South Residential Street /Waiale Road	SSSC	AM	Only built with project		17.4	C	17.4	NO	No Mitigation Required			
		PM			19.2	C	19.2	NO				
13. Honoapiilani Highway / Waiale Road9	Signal	AM	6.0	A	12.9	B	6.9	NO	No Mitigation Required			
		PM	15.5	B	30.2	C	14.7	NO				
14. Honoapiilani Highway / Kuihelani Highway	Signal	AM	22.5	C	24.0	C	1.5	NO	No Mitigation Required			
		PM	22.4	C	25.2	C	2.8	NO				

Source: Fehr & Peers, 2014

Notes:

** Indicated oversaturated conditions. Delay cannot be calculated. AWSC = All-way stop-controlled intersection; sssc = Side-street stop-controlled intersection.

1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized and all-way stop-controlled intersections. The vehicular delay for the worst movement is reported for side street stop-controlled intersections.

2 LOS calculations performed using the 2000 Highway Capacity Manual (HCM) method.

3 Unacceptable LOS highlighted in **bold.**

4 With the construction of the Waiale Bypass under future conditions, the intersection will include a fourth (south) leg and is assumed to be signalized.

5 Intersection provides access to the project site.

6 The proposed mitigation measure at this location is signalization and the delay and LOS displayed under this condition is based on the average control delay for the intersection as a whole.

7 Intersection is or is assumed to be controlled by stop signs on the minor approach(es).

8 The project intersection is assumed to be signalized in 2022.

9 Intersection assumed to be signalized as part of the Waiale Bypass project.

- Intersection 2: Wai`ale Road & Kuikahi Drive will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 4: Kūihelani Highway (Highway 380) & Maui Lani Parkway will operate at LOS F during the AM peak hour and PM peak hour.
- Intersection 7: S. Kamehameha Avenue & Waiko Road will operate at LOS F during the AM peak hour and PM peak hour.

In addition, project-specific impacts have been identified at intersections where the addition of project-generated traffic would cause their overall intersection operations to degrade below LOS D in the peak hours. The project-related impacts identified are:

- Intersection 1: Honoapi'ilani Highway (Highway 30) & Kuikahi Drive, which would experience a cumulative and project-specific impact.
- Intersection 8: Kūihelani Highway (Highway 380) & Waiko Road which would operate at LOS E during the AM peak hour.

Potential Traffic Improvements to Mitigate Project Impacts

Potential traffic improvements were developed to increase the capacity and/or efficiency of the roadway system at the locations where the addition of project-related traffic would cause or contribute to poor operating conditions. The emphasis was to identify physical and/or operational improvements that could be implemented within the existing or planned roadway rights-of-way. The potential intersection improvement measures are illustrated in Appendix F of the TIAR (See Appendix I). Tables 40 and 41 summarize the projected LOS in 2022/2026 at the impacted locations with these proposed measures in place.

With implementation of the proposed improvements, each of the identified impacts would be reduced such that future operations would be at the minimum desired LOS (LOS D) for the overall intersection with the project in place. Although HDOT also strives to maintain LOS D or better conditions at the movement level, measures to improve turning movement conditions would only be proposed where feasible and appropriate from a traffic engineering perspective

since adding lanes just to achieve the desired LOS for a particular movement also has secondary negative impacts to the environment and to active transportation modes.

Moreover, the scope of corresponding improvements for this type of mitigation process can be well beyond the project's actual impact, and could effectively eliminate existing or cumulative deficiencies, which should not be the project's responsibility consistent with State of Hawai'i law.

Therefore, in addition to developing improvements that will result in LOS D or better operations, measures that only return operations to pre-project levels have also been identified (i.e., under Year 2022 No Project Conditions and Year 2026 No Project Conditions). This is especially important where the addition of project traffic alone would not degrade operations below LOS D, but would contribute to projected poor levels of service caused by the addition of traffic from other cumulative developments (e.g., Pu'unani Residences, Wai`ale Development, etc.).

The full-range of improvements that address both project-related and/or cumulative traffic impacts for each impacted intersection is discussed in detail in the TIAR (See Appendix I). The following only describes the specific improvements that are proposed to be fully addressed by the WCT.

Proposed Project Improvements

WCT improvements are proposed at intersections identified as significantly impacted under Year 2026 with Project Conditions. In the past, development projects would make a fair share financial contribution for each mitigation measure to the appropriate governing agency (i.e., the County or HDOT). However, providing just partial funds for a variety of different improvements does not ensure construction of any individual improvement.

More recently, HDOT has indicated a preference for development projects like WCT to fully design and build improvements at a select set of locations to ensure their implementation. Accordingly, a mitigation program for WCT was developed that would require construction of improvements at intersections closer to the project site where the project contributes to, but does not directly cause a significant impact. Note that the mitigation program described below

is a preliminary recommendation based on project proximity to intersections and without planning level cost estimates. As such, it is subject to change as the planning process continues. The project proposes to fully fund mitigation measures that would return operations to pre-project levels at the following intersections:

- **Intersection 1: Honoapi`ilani Highway & Kuikahi Drive**

  The impact at Intersection 1 could be reduced by widening the westbound approach from a shared through/left- turn lane and right-turn lane to a left-turn lane, a through lane, and a right-turn lane, and widening the southbound approach from a left-turn lane, a through lane, and a right-turn lane to two left-turn lanes, a through lane, and a right-turn lane. Additionally, to complement the addition of a second southbound left-turn lane, the east leg would need to be widened to provide a second departure lane and the northbound and southbound left-turn phasing would need to be converted to protected left turns. This improvement would result in LOS D operations, and no other measure is feasible that would only mitigate the operations to pre-project levels.

  Although the measures described above would improve the Year 2022 AM and PM peak hour impacts at the overall intersection level, half of the left-turn movements are projected to continue to operate at LOS E or F in both peak hours. The volumes and V/C ratios for the left-turn movements are as follows:

  - AM Peak Hour
    - Westbound: single left-turn lane with 330 vehicles and a V/C ratio of 1.09
    - Southbound: dual left-turn lanes with 440 vehicles and a V/C ratio of 0.98
  - PM Peak Hour
    - Westbound: single left-turn lane with 384 vehicles and a V/C ratio of 0.98
    - Southbound: dual left-turn lanes with 370 vehicles and a V/C ratio of 0.94

- Intersection 8: Kūihelani Highway & Waiko Road

  The impact at Intersection 8 could be reduced by widening and restriping the eastbound approach to provide a left-turn lane and a right-turn lane. No changes are proposed to the signal timing. No other improvement is feasible that would only mitigate operations to pre-project levels.

The measure described above would improve the Year 2026 PM peak hour impact so that the overall intersection and intersection movements or approaches would operate at acceptable LOS D or better. For the Year 2026 AM peak hour impacts, however, the measure would only mitigate the impact at the overall intersection level. During the AM peak hour, the northbound left-turn movement is projected to operate at LOS E with 90 vehicles and a V/C ratio of 0.80. Based on HCM provisions for double left-turn lanes, the northbound left-turn movement does not warrant the provision of a second left-turn lane from a volume standpoint and the V/C ratio is within the acceptable range. Therefore, no further improvements are proposed for this approach.

- Intersection 13: Honoapi'ilani Highway & Wai`ale Road.
  Although this intersection is not significantly impacted under Year 2026 with Project Conditions, the project may also be responsible for funding intersection improvements necessary to provide access to the project site (i.e., a fourth/west leg).

For the remaining impacted intersections listed below, it is assumed that other development projects adjacent or in closer proximity to these impacted locations would be responsible for implementing the necessary intersection improvements as described in the TIAR (Appendix G).

- Intersection 2: Wai`ale Road & Kuikahi Drive
- Intersection 3: S. Kamehameha Avenue & Maui Lani Parkway
- Intersection 4: Kūihelani Highway & Maui Lani Parkway
- Intersection 7: S. Kamehameha Avenue & Waiko Road

Mitigation Funding

For a project such as WCT that will be constructed in phases over an extended period of time, it is appropriate to identify the proposed project's share for the cost of the intersection improvements. Fair-share calculations for developer contributions were made for the intersections impacted by project-generated traffic. The estimates were developed by calculating the increase in traffic volumes from existing conditions to the Year 2026 with Project conditions. The increase establishes the total amount of projected growth at each location. Next, the WCT project-only volumes are divided by the total volume increase at each impacted intersection. This step determines the amount of traffic that the WCT project is contributing to

the intersection and the approximate proportional contribution towards funding each potential proposed improvement.

The fair share calculations were performed for both the AM and PM peak hours, as shown in Table 42, Year 2026 Fair Share Intersection Traffic Contribution. For all but one location, the range of maximum project contribution is between 15.4% and 33.8%. At one location, the calculated maximum fair share does not accurately reflect the cause of the impacts at the intersection (i.e., the WCT causes the intersections to degrade from LOS D or better to LOS E or F). Based on the intersection analysis, the impact at Intersection 8, Kūihelani Highway & Waiko Road, is project- specific (rather than a cumulative impact to which the project would make a fair-share contribution), and therefore WCT should make a 100% contribution at this location. As noted, while the project's fair-share contributions and the planning-level cost estimates for each element of the recommended mitigation program has not yet been finalized, the project proposes to fully fund mitigation measures as described above.

Table 42: Year 2026 Project Fair Share Intersection Traffic Contribution

	AM Peak Hour					PM Peak Hour					
Impacted Intersection	Existing Traffic	2026 Projected Traffic	Total New Traffic	Project Only Traffic	Project % of New Traffic	Existing Traffic	2026 Projected Traffic	Total New Traffic	Project Only Traffic	Project % of New Traffic	Maximum Contribution
1. Honoapiilani Highway/ Kuikahi Drive **	2,073	3,238	318	1,156	27.3%	1,928	3,184	424	1,256	33.8%	33.8%
2. Waiale Road/Kuikahi Drive*	1,935	3,786	436	1,851	23.6%	1,849	3,627	507	1,778	28.5%	28.5%
3. S. Kamehameha Avenue / Maui Lani Parkway**	1,700	3,428	298	1,728	17.2%	1,593	3,173	353	1,580	22.3%	22.3%
4. Kuihelani Highway / Maui Lani Parkway**	1,856	4,013	273	2,157	12.7%	2,011	4,150	330	2,139	15.4%	15.4%
5. S. Kamehameha Avenue / Waiko Road*	0	1,709	229	1,709	13.4%	0	1,629	289	1,929	17.7%	17.7%
6. Kuihelani Highway/Waiko Road**	1,336	2,258	105	949	11.1%	1,407	2,242	122	835	14.6%	**100%1/**

Source: Fehr & Peers, 2014
*County of Maui jurisdiction
**State HDOT jurisdiction
1/ Based on Table 17, the impact of the intersection is directly attributable to the project. Therefore, the maximum contribution is assumed for this intersection.

2. Electric, Telephone and Cable TV

Existing Conditions. Electric, telephone and cable TV service for the MTP is brought in underground from the overhead utilities along Honoapi'ilani Highway. There is an existing overhead 69 kv utility line which traverses through the property along the Waihe'e Ditch.

Potential Impacts and Mitigation Measures. Electric, telephone and cable TV service will be provided by the existing facilities in the area. The project's electrical engineering consultant will coordinate the required improvements with the utility companies to determine the required onsite and offsite improvements to support the project. If approved by MECO, it is anticipated that the power poles will be relocated underground fronting the project site along Honoapi'ilani Highway. Within the WCT, utility poles will be placed underground within the road right-of-way. It is expected that the project will create a total demand of about 10 megawatts of electricity. The WCT intends to promote the use of renewable energy. The installation of photovoltaic systems will be encouraged on residential and commercial buildings. If forty percent of residential and commercial buildings install photovoltaic systems (generating approximately 11.9 GWh per year), demand for carbon-based fuels could be reduced by roughly 50 percent. Moreover, the WCT desires to install a limited number of solar farms in appropriate locations within the agricultural lands. If two solar farms of approximately 5-acres (0.75 MW each) each are developed, the electricity generated would be about 2.6 GWh per year, which could service approximately 236 residential units. Thus, the WCT could potentially generate about 70 percent of its energy consumption through renewables. However, the installation of such systems will depend upon the technical and financial viability of such systems at the time the project is being constructed.

3. Drainage

Existing Conditions. A Preliminary Engineering and Drainage Report was prepared by Otomo Engineering. The report analyzes current conditions, including drainage patterns, existing improvements, and runoff totals (**See**: Appendix H, "Preliminary Engineering and Drainage Report). The following summarizes existing drainage conditions on the property.

Figure No. 40 shows existing drainage pattern across the project site. Onsite runoff generally sheet flows in a west to east direction. Currently there are seven (7) diversion berms along the

upper most portion of the mauka site, which intercept surface runoff and divert it into Waikapū Stream. Based on a 50-year, 1-hour storm, the existing diversion berms intercept approximately 140,509 cubic feet of storm runoff and divert it into Waikapū Stream. These diversion berms prevent runoff from sheet flowing into the proposed development areas. In addition, some existing runoff sheet flows into the Waiheʻe Ditch, which traverses along the western boundary of T.M.K.: (2) 3-6-005: 007. The ditch flows in a southerly direction toward Māʻalaea and supplies water to existing agricultural reservoirs.

Runoff from the areas below the existing diversion berms generally sheet flows in a west to east direction toward Honoapi'ilani Highway. There are several small culverts that divert runoff across Honoapi'ilani Highway and discharges it into the existing cane fields on the makai side of the highway.

There is an existing grass swale traversing across the MTP site parallel to Honoapi'ilani Highway from the northeast corner of the project site to approximately 1,000 feet south of the project driveway. Runoff sheet flowing across the mauka side of the project site is captured by the grass swale and diverted in a southerly direction and across Honoapi'ilani Highway by the existing 72-inch culvert located 1,000 feet to the south of the project driveway. Runoff within the grass swale is conveyed across the project driveway by a 30-inch culvert. The estimated existing 100-year, 24-hour storm runoff from the Phase I and Phase II project sites mauka and makai of Honoapi'ilani Highway are shown in Table Nos. 43 and 44.

Table 43: Phase I Existing Runoff from Mauka and Makai Project Sites

Phase I Existing Runoff from Mauka and Makai Project Sites		
Phase I	Existing Runoff (CFS)	Runoff Volume (CF)
Mauka	452	2,418,629
Makai	373	2,133,808

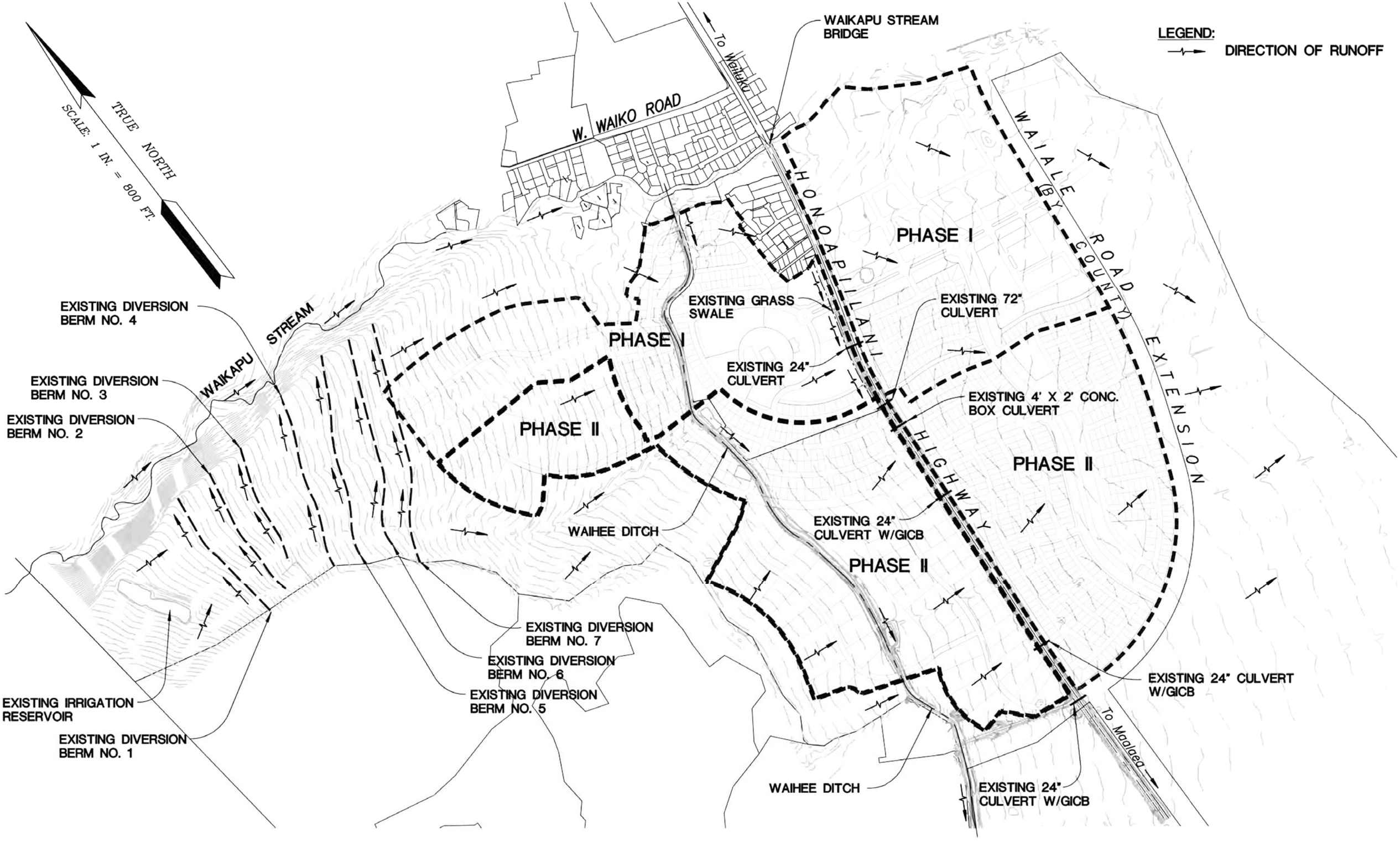

Figure 40: Existing Drainage Pattern

Table 44: Phase II Existing Runoff from Mauka and Makai Project Sites

Phase II Existing Runoff from Mauka and Makai Project Sites		
Phase II	Existing Runoff (CFS)	Runoff Volume (CF)
Mauka	447	2,916,206
Makai	361	2,062,681

Presently, onsite runoff sheet flows across the project site in a west to east direction, across Honoapi'ilani Highway and into the existing sugar cane fields towards Kūihelani Highway and eventually discharges into Keālia Pond in North Kīhei.

Potential Impacts and Mitigation Measures. The Drainage Report analyzes anticipated changes in stormwater runoff and identifies improvements necessary to comply with County drainage requirements. In general, the drainage design criteria are to minimize any alteration to the existing drainage patterns and volumes. Figure No. 41 identifies the proposed drainage system improvements. The system will accommodate the increase in runoff generated by the project. Table Nos. 45 and 46 compare pre- and post-development runoff conditions.

Table 45: Phase I Pre- and Post-Development Runoff from Mauka and Makai Project Sites

Phase I Pre- and Post-Development from Mauka and Makai Project Sites						
Phase I	Pre-Development Runoff (CFS)	Pre-Development Runoff (CF)	Post Development Runoff (CFS)	Post Development Runoff (CF)	Increase (CFS)	Increase (CF)
Mauka	452	2,418,629	497	2,567,545	45	148,916
Makai	373	2,133,808	634	2,905,771	261	771,963

Table 46: Phase II Existing Runoff from Mauka and Makai Project Sites

Phase II Existing Runoff from Mauka and Makai Project Sites						
Phase II	Pre-Development Runoff (CFS)	Pre-Development Runoff (CF)	Post Development Runoff (CFS)	Post Development Runoff (CF)	Increase (CFS)	Increase (CF)
Mauka	447	2,916,206	507	3,131,436	60	215,230
Makai	361	2,062,681	506	2,454,808	145	392,127

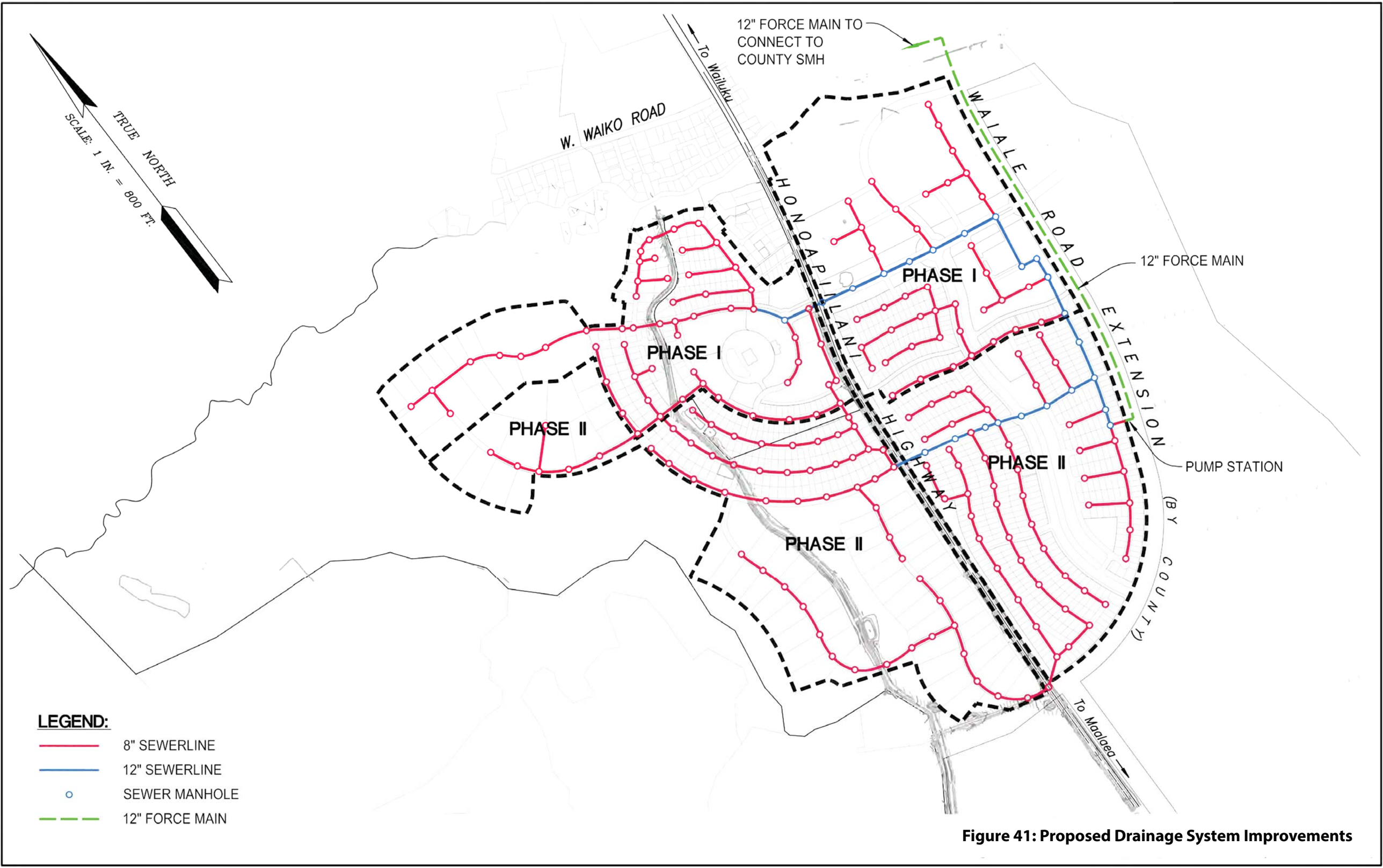

Figure 41: Proposed Drainage System Improvements

The drainage system will be designed to accommodate the increase in surface runoff volume from a 100-year, 24-hour storm created by the project. In addition to the detention basins, large grassed swales will be constructed within the open space areas to divert runoff to designated outlets.

In accordance with the County's *"Rules for the Design of Storm Drainage Facilities",* the Phase I development mauka of Honoapi'ilani Highway will be required to mitigate an increase in runoff of 45 cfs and provide a minimum storage volume of 148,916 cubic feet and the Phase I development makai of Honoapi'ilani Highway will be required to mitigate an increase in runoff of 266 cfs and provide a minimum storage volume of 771,963 cubic feet.

The Phase II development mauka of Honoapi'ilani Highway will be required to mitigate an increase in runoff of 60 cfs and provide a minimum storage volume of 215,230 cubic feet. Phase II makai of Honoapi'ilani Highway will be required to mitigate an increase in runoff of 145 cfs and provide a minimum storage volume of 392,124 cubic feet.

After the development of the proposed project, there will be no change in the volume of runoff diverted to Waikapū Stream from the upper agricultural preservation area. The existing diversion berms will continue to divert runoff from the areas mauka of the project site into Waikapū Stream.

In accordance with the County's *"Rules for the Design of Storm Water Treatment Best Management Practices",* the design of the stormwater system will include water quality treatment to reduce the discharge of pollutants to the maximum extent practicable. Some examples of stormwater best management practices (BMP) are:

Grassed Swales will be implemented within the landscaped areas where practical. Grass and groundcover provides natural filtration and allows for percolation into the underlying soils.

Open Space and Parks will be maintained with grass or other landscape materials, thereby reducing the amount of impervious surfaces which promotes infiltration.

Stormwater Detention serves to collect stormwater allowing some of the suspended solids to settle out. The stored runoff will infiltrate into the underlying soils and recharge groundwater.

A maintenance plan will also be developed for the stormwater BMPs. The plan will include the requirements for removal of the accumulated debris and sediment, maintaining vegetation, and performing inspections to insure that the BMPs are functioning properly.

Temporary erosion control measures will be incorporated during the construction period to minimize dust and soil erosion. Additional controls will be implemented to protect Waikapū Stream. Temporary BMPs include the construction of diversion berms and swales, dust fences, silt fences, stabilized construction entrances, truck wash down areas, inlet protection, temporary grassing of graded areas, and slope protection.

Water trucks and temporary sprinkler systems will be used to minimize dust generated from the graded areas. A National Pollution Discharge Elimination System (NPDES) permit will be required by the Department of Health prior to approval of the grading permit.

The drainage design criteria will be to minimize any alterations to the drainage pattern of the existing onsite surface runoff. No additional runoff will be allowed to sheet flow toward Keālia Pond.

4. Water

Existing Conditions. The Preliminary Engineering Report documents existing sources of water and infrastructure improvements that service the property (**See**: Appendix H, "Preliminary Engineering and Drainage Report).

Water service in the vicinity of the project site is provided by the County's water system consisting of a 12-inch waterline from the 300,000 gallon tank near the mauka terminus of Waiko Road. The storage tank is at an elevation of 764 feet.

The existing 12-inch waterline crosses Honoapi'ilani Highway and terminates to the east of Waikapū town in the vicinity of the industrial area. A 4-inch waterline connects to the 12-inch

waterline on Honoapi'ilani Highway and traverses in a southerly direction and ends near the northerly boundary of the MTP. The MTP site is currently being serviced by two 5/8-inch water meters located at the northeast corner of the mauka property.

Fire protection for the MTP is presently provided by a private system consisting of a gravity fire line from the existing lagoon located immediately to the west of the MTP restaurant. Non-potable water from the lagoon is fed to fire pumps located on the exterior of the existing buildings and supplies water to the fire sprinkler systems in the buildings. There are also fire hydrants located on the grounds of the MTP. However, the fire hydrants may not have adequate pressure and capacity.

Potential Impacts and Mitigation Measures. The Preliminary Engineering Report (Appendix H) analyzes anticipated increases in water demand and proposes improvements to meet the projected demand.

Water and fire protection for the project will be provided from a private onsite water system (**See**: Figure 42, "Private Water System"). Five (5) wells have been drilled on the site. Three (3) wells have been designated for potable use and two (2) for non-potable purposes. All of the wells are located within the Waikapū Aquifer. The three potable water wells have been approved by the State of Hawai'i, Commission on Water Resource Management for a total pumping capacity of 2,300 gallons per minute (gpm). Water pumped from the non-potable wells will be discharged into the Waihe'e Ditch or lined onsite reservoirs and used for irrigation purposes for the residential lots, agricultural farming, parks and open areas.

The estimated water demand for the project was determined from the Department of Water Supply's Water System Standards (DWSWSS), dated 2002, as follows:

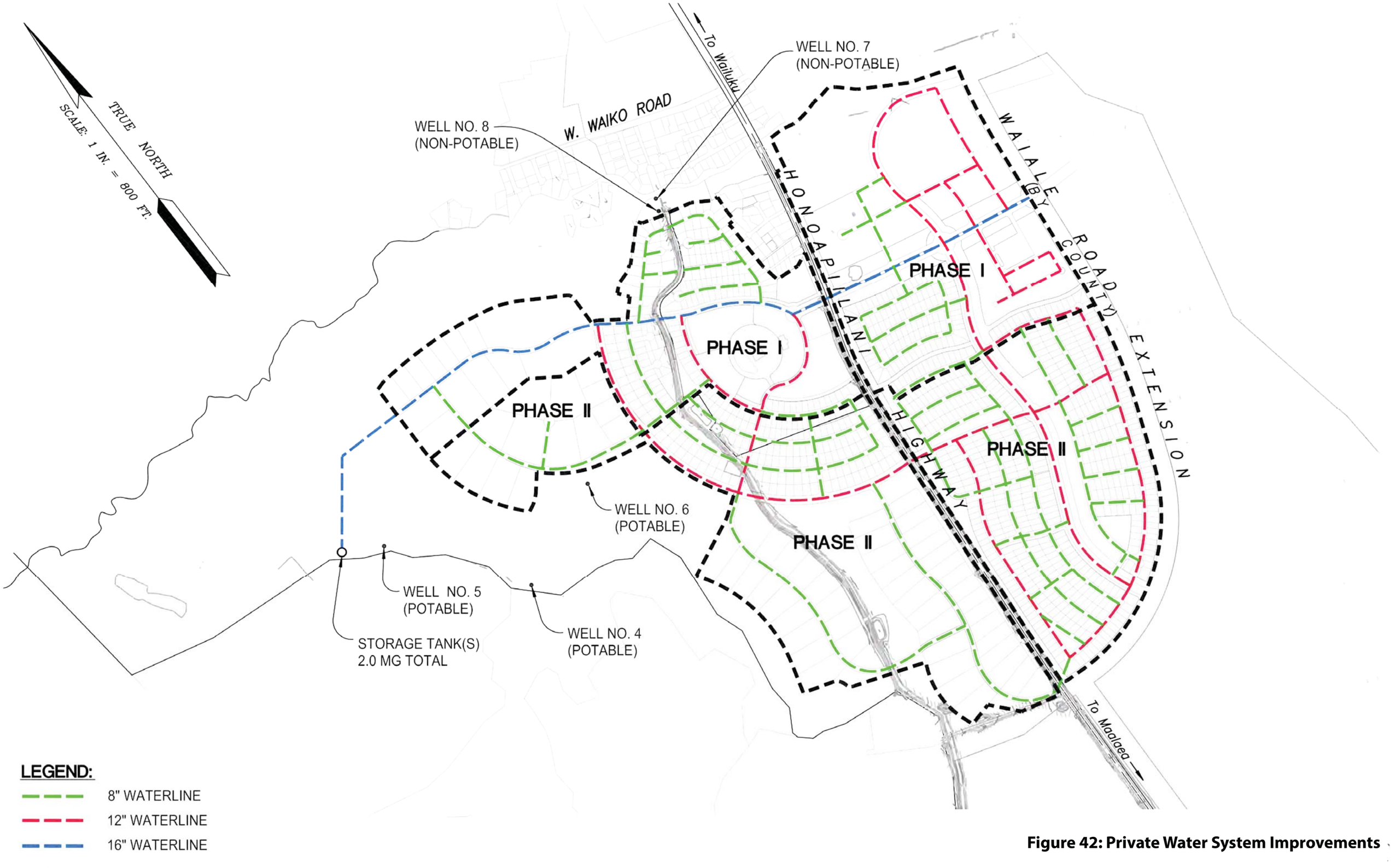

Figure 42: Private Water System Improvements

Table 47: Department of Water Supply Water System Standards, 2002

Department of Water Supply Water System Standards, 2002	
Use	Gallons per Day (GPD)
Single-Family	600 gallons per day (gpd) per unit
Rural Residential	1,000 gpd/unit
Multi-Family	560 gpd/unit
Country Town Mixed-Use (Dwelling)	560 gpd/unit dwelling
Country Town Mixed-Use (Commercial)	140 gallons/1,000 s.f.
Commercial/Employment	140 gallons/1,000 sq. ft.
Parks and Open Space	1,700 gallons/acre
School	1,700 gallons/acre

The Department of Water Supply (DWS) does not have water demand standards for a dual water system (both potable and non-potable). However, in discussions with the DWS, it was determined that the DWSWSS standards could be conservatively reduced by one-third if a dual water system was used for a project. Table 48 identifies the estimated water demand for the project based on the use of a duel water system.

Table 48: Estimated Demand for Potable Water Using a Dual Water System

Department of Water Supply Water System Standards, 2002	
Use	Gallons per Day (GPD)
Single-Family	400 gallons per day (gpd) per unit
Rural Residential	667 gpd/unit
Multi-Family	373 gpd/unit
Country Town Mixed-Use (Dwelling)	373 gpd/unit dwelling
Country Town Mixed-Use (Commercial)	93 gallons/1,000 s.f.
Commercial/Employment	93 gallons/1,000 sq. ft.
Parks and Open Space	0 gallons/acre
School	1,300 gallons/acre

Based on the water usage, the projected average daily water demand for Phase I is 311,033 gpd. In accordance with the DWSWSS, the maximum daily water demand is calculated as being 1.5 times the average daily demand, or 466,650. Based on the school and commercial uses, the maximum fire demand is 2,000 gpm (See Appendix B of the Preliminary Engineering and Drainage Report (DEIS Appendix H) for Water Demand Calculations). The projected average daily water demand for Phase II is 334,475 gpd and the maximum daily water demand 501,713 gpd. Irrigation of parks and open spaces, including landscaping of residential and commercial lots, will be provided by the non-potable water system.

Water conservation measures, such as low-flow toilets and shower heads, will be utilized throughout the project, which will further decrease water demand. As noted, irrigation of the parks and open space will be from the non-potable water source, which will also decrease potable water demand.

The reservoir capacity is based on the DWSWSS Criterion 1 for Reservoir Capacity. Based on this criterion, the required storage volume for the two phases is 968,263 gallons. It is recommended that a 1.0 million gallon reservoir be constructed to accommodate the two phases of the project. As an alternative, the developer could construct two storage reservoirs, each with a storage volume of 0.50 million gallons. Each 0.50 million gallon reservoir could be constructed at the beginning of each phase. The two reservoir option would allow the second reservoir to be constructed as the demand increases and allow for more flexibility during maintenance and repair should one of the reservoirs have to be taken out of service.

The 1.0 million gallons of water storage will be constructed mauka of Well No. 5 at an elevation of approximately 800 feet MSL. This will allow for the entire project to be serviced by gravity flow from the reservoir(s).

5. Wastewater

Existing Conditions. A Preliminary Engineering Report was prepared for the DEIS that assesses current wastewater system capacity and existing infrastructure to support the project (**See**: Appendix, H, “Preliminary Engineering Report”.

The existing MTP is serviced by a private sewer system which connects to the County's sewer system on Waiko Road near Waikapū Town. The system is owned and maintained by the MTP. The system consists of a 6-inch sewerline and manholes from the existing buildings, crossing Honoapi'ilani Highway, to a sewer pump station located approximately 500 feet east of Honoapi'ilani Highway. A 4-inch forcemain conveys the wastewater from the sewer pump station through the cane fields, across Waikapū Stream, up to Waiko Road where it connects to a sewer manhole on Waiko Road east of Waikapū town. There is an 8-inch gravity sewerline from the existing sewer manhole which connects to a County-owned sewer manhole east of Waikapū Town.

The County's sewer system traverses from the manhole on Waiko Road through the Waikapū Gardens Subdivision, through privately owned properties, onto Wai`ale Road, down Lower Main Street and discharges into the Wailuku Sewer Pump Station near the intersection of Kahului Beach Road, Lower Main Street and Waiehu Beach Road. Sewer collected at the Wailuku Sewer Pump Station is pumped to the Kahului Wastewater Reclamation Facility (KWRF) in Kanahā.

According to the Wastewater Reclamation Division, County of Maui, as of July 31, 2014, the KWRF has a capacity of 7.9 million gallons per day (mgd). The average flow into the KWRF is 4.7 mgd and the allocated capacity is 6.33 mgd. The remaining wastewater capacity at the KWRF is approximately 1.57 mgd.

Potential Impacts and Mitigation Measures. In a letter dated July 16, 2013 (See Appendix I), the Department of Environmental Management (DEM) notes that the Kahului Wastewater Reclamation Facility, as of June 30, 2013, has capacity allocation remaining for approximately 1.11 mgd (3,000 dwelling units) and 0.54 mgd for other supportive uses to issue building permits. The Department notes that most of this capacity is necessary to accommodate existing entitled projects at Kehalani, Waiolani Mauka, Waikapū Gardens Multi-Family and Maui Lani. The Department further notes that in order for the existing collection system to accept flows from the WCT, the following transmission system improvements will be required:

Table 49: Required Off-site Wastewater Transmission System Improvements

Required off-site Wastewater Transmission System Improvements		
Location	**Description**	**No. Units Accommodated**
Lower Main Street	Upgrade existing gravity sewer line in Lower Main Street from 12-inch to 15-inch. This segment stretches from ʻĀinahou Place to Hala Place (Manholes KA2OGE0100 to KA20GB0510) and is approximately 1,950 linear feet.	200
Waiko Road; Wailuku Pump Station	Upgrade approximately 2,750 linear feet of the 8-inch main trunk line from the force main daylight manhole in Waiko Road through Waikapū Gardens to 12-inch; Upsize the final two pipe segments prior to the Wailuku Pump station from 24-inch to 36-inch, which is approximately 150 linear feet with a major bypass operation.	450
TOTAL UNITS		**650**

The DEM further states that adding additional WCT residential units beyond 650 would require further analysis to determine the extent of Lower Main Street improvements.

The policy of the DEM is that wastewater capacity cannot be reserved until the project is ready to receive building permits. If capacity at the KWRF is available at the time building permits are ready to be issued for the project, the project proposes to temporarily connect to the County's sewer system and complete the upgrades to connect up to 650 units in the phase I development.

The DEM's long-term desire is for a wastewater treatment plant to be constructed in the Waikapū Area to accommodate future flows generated by development within the Waikapū region. The WCT will need to construct a stand-alone private wastewater treatment facility, or partner with other projects in the Waikapū area, such as A&B's Wai`ale project or the County of Maui to construct a regional wastewater treatment facility. The planning and design of a stand-alone or combined wastewater treatment facility will be coordinated with the availability of capacity within the County system. The Applicant is analyzing several package wastewater treatment options, including a conventional wastewater treatment facility and a

facility using a Food Chain Reactor (FCR) configuration (**See**: Appendix H, "Preliminary Engineering and Drainage Report").

In addition, Brown and Caldwell Consultants were retained by the Department of Environmental Management to prepare the *"Central Maui Recycled Water Study".* The report dated April 2015, concluded that the major elements required for the Central Maui service area includes:

- Three new WWPSs.
- A wastewater conveyance system that includes gravity sewers and forcemains.
- A new Central Maui WWRF to produce R-1 recycled water.
- A soil aquifer treatment system for excess recycled water disposal.
- A brackish groundwater well to provide supplemental water to the recycled water system.
- A recycled water pump station and storage tank.
- Recycled water transmission pipelines to the Tier 1 areas.

The study notes that the total cost for the system is estimated to be $91.4 million, or $20,300 per market-rate EDU.

The WCT could construct a stand-alone private wastewater treatment plant near the northeast corner of the project site after the maximum units is serviced by the County's wastewater system. However, the treatment plant will be needed in about 2017 and the developers will continue to work with the County and other projects within the Waikapū area on a collaborative wastewater treatment facility.