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OCT 23 2011

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2011/ELOG-2102 (mw)

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

October 11, 2011

Mr. Gary L. Hooser, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser:

Subject: Final Environmental Impact Statement (FEIS) for Kapaa Light Industrial Park, Tax Map Key 4-2-15: 1 (por.), 6 and 8, Koolaupoko, Oahu

The Department of Planning and Permitting has ACCEPTED the FEIS for Kapaa Light Industrial Park, as satisfactorily fulfilling the requirements of Chapter 343, Hawaii Revised Statutes. We request publication of this acceptance in the next issue of The Environmental Notice. Enclosed are the following items:

- One hard copy of the FEIS and two CD copies
- Completed OEQC Publication Form
- Completed FEIS Distribution List

Should you have any questions, please contact Mike Watkins of our staff at 768-8044.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:js

cc: Dr. Manfred Zapka, Sustainable Design & Consulting, LLC

FEIS acceptance

Publication Form
The Environmental Notice
Office of Environmental Quality Control

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Name of Project:	Kapa'a Light Industrial Park
Applicable Law:	HRS 343-5(c)
Type of Document:	Final EIS
Island:	Oahu
District:	Koolaupoko
TMK:	(1) 4-2-15: 1 (por.), 6 and 8
Permits Required:	Zone Change, SMA, NPDES, Grading Permit, Building Permit
Name of Applicant or Proposing Agency:	Kapa'a I, LLC
Address	905 Kalanianaole Highway
City, State, Zip	Kailua, Hawaii 96734
Contact and Phone	John King, (808) 853-4768
Approving Agency or Accepting Authority:	City and County of Honolulu, Department of Planning and Permitting
Address	650 South King Street, 7th Floor
City, State, Zip	Honolulu, Hawaii 96813
Contact and Phone	Mike Watkins, (808) 768-8044
Consultant	Sustainable Design & Consulting LLC
Address	P.O. Box 283267
City, State, Zip	Honolulu, Hawaii 96828
Contact and Phone	Dr. Manfred Zapka, (808) 265-6321

Project Summary:

This Final EIS was preceded by a Draft EIS (listed in the February 8, 2011 issue of the Environmental Notice), by an EIS Preparation Notice (listed in the July 23, 2010 issue), and by a Draft Environmental Assessment (listed in the January 8, 2009 issue).

The applicant, Kapa'a I, LLC, is proposing to expand its existing 22-acre light industrial park in Kapaa Valley on the windward side of Oahu. This area is currently zoned I-2 Intensive Industrial District. The applicant is seeking I-1 zoning for two adjacent areas now within the P-2 General Preservation District – an 11-acre area to the west and a 44-acre parcel to the east.

The proposed Kapa'a Light Industrial Park would be developed incrementally over a span of 18 years. Over 600,000 square feet of industrial zoned space would be constructed, or, as an alternative, baseyard space would be created. The lower portion of the site closer to environmentally sensitive Kawainui Marsh would use low impact development approaches and would hope to achieve Leadership in Energy and Environmental Design Silver certification upon completion of the project. The project would address a significant undersupply of industrial land in the Koolaupoko region.

FINAL ENVIRONMENTAL IMPACT STATEMENT

For activities to develop the proposed

Kapa'a Light Industrial Park

in Kailua, Island of Oahu

Volume I: Main Report

September 2011

Sustainable Design & Consulting LLC
www.sustain-HI.com

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Cover Sheet

Applicant:

Kapa'a I, LLC
905 Kalanianaole Hwy.
Kailua, HI 96734
Contact: Mr. John King and Mr. Paul King

Accepting Authority:

City and County of Honolulu
Department of Planning & Permitting
650 So. King St, Honolulu, HI 96813
Contact: Mr. Mike Watkins

Propose Action:

The Applicant's proposed action is the development the Kapa'a Light Industrial Park on his property, Kailua, Hawaii.

Designation: Draft Environmental Impact Statement (DEIS)

Abstract.

This ~~DEIS~~ FEIS evaluates the potential environmental impacts of construction and operation of a proposed light industrial park, the Kapa'a Light Industrial Park in Kailua, Island of Oahu. The Preferred Alternative would add approximately 606,000 square feet of industrial space to an already 283,000 square feet existing warehouse development at the site. The proposed industrial space would provide much needed industrial space to the Koolaupoko region and would result in an increase in the workforce of approximately 600 new employees at the site. The Preferred Alternative would develop approximately 60 percent of proposed site with a low impact development approach designed to achieve LEED Silver certification. The low impact development approach will greatly reduce impact to environmentally sensitive adjacent wetlands and streams. Under Alternative B, the same amount of space would be added and the entire industrial development would be built using conventional building and site preparation methods. The No Action Alternative, which is required by statute, assesses impacts at the proposed site in the event no further construction occurs.

For additional information concerning this document, please contact:

Consultant: Manfred Zapka, PhD, PE, Principal
LEED-AP, CEM, CBE
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawaii 96828, USA
Tel: 808-265-6321,
e-mail: sustainabledc@gmail.com

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EXECUTIVE SUMMARY

General

This ~~Draft~~ Final Environmental Impact Statement (FEIS) examines potential environmental impacts of the development of a proposed light industrial park, the Kapa'a Light Industrial Park, in Kailua on the windward side of Oahu, State of Hawaii.

The specific recommendations are:

- Construct a comprehensive light industrial development on a site that is adjacent to an existing industrial warehouse development;
- Provide much needed light industrial space to the market of the Koolaupoko region, and more specifically the greater Kailua/Kaneohe area, which is presently significantly undersupplied with industrial space;
- Prepare the site including grading, roadways and infrastructure and construct individual warehouses at a pace that matches the region's ability to absorb the added space in a time period expected to be between 15 to 17 years to full absorption;
- Implement impact mitigation measures to avoid any significant impacts to the environment and community, such as measures to project the water quality in the Kapa'a Stream and adjacent wetland;
- Develop the portions of the proposed of the site that are closest to environmentally sensitive wetland and stream using a low impact development approach, which significantly reduces environmental impact and can improve certain parts of environmental uses;
- Commit to design and construct the proposed project to the requirements of the U.S. Green Building Council's Leadership in Environmental and Energy Design (LEED) rating system and achieve LEED Silver certification for the portions of the site that are closest to the most environmentally sensitive portions of the proposed site and thus require the largest commitment of environmental mitigation measures.

This ~~Draft~~ Environmental Impact Statement (EIS) is prepared pursuant to the requirements of Chapter 343, Hawaii Revised Statutes, Act 241, Session Laws of Hawaii 1992, and Chapter 200 of Title 11, Department of Health Hawaii Administrative Rules, "Environmental Impact Statement Rules".

This EIS has been prepared to be submitted, in preparation for a Zone Change Application and a Special Management Area Permit, to the City and County of Honolulu, Department of Planning and Permitting. This FEIS documents potential environmental impacts of the proposed project and evaluates proposed impact mitigation measures. The FEIS presents evaluations, findings and the determination of significant criteria.

In the course of the environmental review for the proposed action, this FEIS was preceded by an Environmental Assessment (EA). The Approving Agency, the City and County of Honolulu, Department of Planning and Permitting, determined in its May 27, 2010 letter that a full EIS would be required for the project.

The Accepting Authority, the City & County of Honolulu, Department of Planning and Permitting, published the Environmental Impact Statement Preparation Notice (EISPN) on July 23, 2010 in *The Environmental Notice*, which is published by the Office of Environmental Quality Control (OEQC), State of Hawaii. The publication date of the EISPN initiated a 30-day public review period upon which nine responses to the EISPN were received. The comment letters are presented in this DEIS.

Background and need for the proposed action

Over the past two decades the applicant, Kapa'a I, LLC / Mr. John King, has developed industrial zoned land in the Kapa'a Valley, located at the outskirts of Kailua, a major economic and residential center on the windward side of the island of Oahu, State of Hawaii. After first building basic warehouse structures, including some 15 Quonset type warehouses, on land that he leased for more than two decades, the applicant acquired three contiguous land parcels, TMK 4-2-15:001 (portion of), 006 and 008, totaling 79 acres, in recent years. The applicant proposes to develop a light industrial park, the Kapa'a Light Industrial Park, on an approximately 27 acre portion of these three parcels. The proposed new industrial development would be built adjacent to existing warehouses and would share some of the existing infrastructure. While the existing warehouse development was started some twenty years ago without a uniform development approach, now that the entire property is under the ownership of the applicant, a comprehensive site development plan has been created, which endeavors to create a modern, efficient and environmentally friendly industrial park that will serve the community and the region.

The proposed new light industrial development would be built in response to the growing needs for industrial space in the Koolaupoko region. The Koolaupoko region is currently significantly undersupplied with industrial space and the per capita allowance of industrial space in Koolaupoko region is presently only 20 percent of the average per capital allowance on Oahu. This extremely low per capita allowance of industrial space in the Koolaupoko region renders this market one of the lowest supplied in the state and suggests that the community would greatly benefit from added industrial space in the region. The region's great demand and the fact that with the exception of the proposed site there are very few locations in the region that provide potential for a significant added supply of needed industrial space suggests that the proposed site would indeed be an appropriate location for a light industrial development.

The market study assumed that approximately 60 to 70 percent of current tenants at the existing warehouse development are relocations of newer and exiting small businesses; some upgrading from their home or non-conforming locations, seeking better value by leaving their more expensive locations to industrial developments in the Koolaupoko region, or being encouraged to locate the businesses closer to home in the Koolaupoko region. The remaining 30 to 40 percent are expected to be new businesses, including newly-formed companies and branch locations of already existing leeward companies. For the future it is likely that the newly developed industrial floor space will be about equally occupied by relocating companies and new companies. The main reason for businesses to lease space in the proposed light industrial park will be to serve the expanding windward market without incurring extra cost associated with trying to serve this market from a long distance.

~~The intended companies which would most likely lease space in the proposed project would be businesses from within the Koolaupoko region or business from outside the region, which would serve the region as local service centers, thus avoiding high costs and impacts associated with long-distance service operations.~~ The proposed project intends to primarily serve local and sub-regional demand of industrial services or small manufacturing companies.

A survey conducted for this DEIS shows that 85 percent of the companies currently leasing spaces at the existing warehouse development are small businesses with fewer than 10 employees. The survey further revealed that 57 percent of all employees reside in the greater Kailua and Kaneohe region. These results emphasize that the existing warehouse development primarily serves small companies from the local region, a trend that is expected to continue for the future under the proposed project. ~~It is not the intention of the proposed project to lease space to companies that serve an island-wide market, or whose operations would include handling, manufacturing or transporting materials or products that have a high risk of adverse impacts to the environment.~~

A market study conducted for the environmental review of the proposed project suggested that over the next 15 to 17 years, approximately one million square feet of industrial space could be readily absorbed by the region, which would satisfy new demand for industrial space. The applicant proposes to add 606,000 square feet of net new industrial space to the existing 283,000 square feet and add 30 new warehouses to the existing 31 warehouses. At full build out, the estimated added work force would be approximately 600 employees. This would double the number of warehouses and triple the industrial space and workforce at the proposed site.

The proposed site for the light industrial park would be located on portions of three contiguous land parcels which are owned by the applicant. One of the three land parcels, in the center of the proposed site, is within the Intensive Industrial (I-2) county land use district and therefore the zoning is consistent with the intended land use of the proposed project (e.g. industrial warehouses or base yards). The remaining two land parcels, situated at the western and eastern side of the proposed site, are within the county General Preservation (P-2) land use district and therefore require a zone change to Limited Industrial (I-1) to be consistent with the intended light industrial land use of the proposed project. Since a portion of the proposed site is also located within the Special Management Area (SMA), an SMA permit would also be necessary for the project.

The development footprint of the proposed new light industrial park would be exclusively located on land that is previously disturbed land, graded areas that are not or are only sparsely vegetated. Therefore no previous undisturbed land, natural vegetation area, wetland areas or streambeds would be used to construct any part of the development footprint, which includes buildings, roadways, parking areas, loading facilities and infrastructure.

The proposed project schedule expects a development period of between 15 and 17 years. During this time individual warehouses would be constructed in accordance with the pace of evolving demand for industrial space in the region. There would be two major project development milestones, the completion of development of the upper and lower portions of the proposed site. These two milestones are expected for the years 2016 and 2026, respectively. The development of both the upper and the lower portion of the site would include site development, including, grading, roadway construction and infrastructure installation. After this first phase, construction of the individual buildings would occur. Therefore short-term impacts would mainly occur during the site development work, and much less during construction of the individual warehouse structures. It is expected that during the anticipated 15 to 17 years of development, period minor construction activities on individual buildings would be carried out over three to four month of every year. It is anticipated that this construction work would not result in significant impacts due to the relative small scope of ongoing construction work. Thus, by stretching out the development over 15 to 17 years, impact will be limited and the effectiveness of mitigation measures can be continuously examined and streamlined to ensure effective impact mitigation.

A portion of the proposed site would use low impact development approaches in order to reduce the ecological footprint and to mitigate impact on the community. The lower portion of the site is closest to environmentally sensitive land, including wetlands and stream corridors, and a portion of the proposed site would be developed using a comprehensive range of sustainable building design and construction measures. The applicant has made a commitment to develop the lower portion of the site in accordance with requirements for Leadership in Energy and Environmental Design (LEED) Silver certification, which the project will apply for upon completion of the project. The LEED Silver certification reflects an advanced level of building "green" and the certification under the LEED rating system includes a third-party audit to ensure that low impact development is indeed implemented as planned. (*Leadership in Energy and Environmental Design (LEED) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts*)

Alternatives

To implement the proposed action, the applicant has identified two action alternatives that differ in their development approach for the lower portion of the site. These are the Preferred Alternative and Alternative B. The topography of the proposed site is basically divided into two near level plateaus, which have an elevation difference of about 50 to 60 feet. Both portions are situated on former landfill that was created several decades ago by quarry deposits and municipal waste. The upper portion of the site accommodates the existing warehouse development. The plateau of the upper portion of the site is 40 to 60 feet above the adjacent stream corridor that includes the Kapa'a Stream and a delineated wetland area of about 15 acres. The upper portion of the site is approximately 2,000 feet away from the Kawainui Marsh and the distance between the center of the upper portion of the site and the center of the delineated wetland area in the lower stretches of the stream corridor is about 1,400 feet. The lower portion of the site, on the other hand, is located directly adjacent to the stream corridor and wetland and is elevated between 10 and 30 feet above the wetland area in the Kapa'a stream corridor. The perimeter of the development footprint of the lower portion of the site is at least 300 feet from the nearest wetland areas of the Kawainui Marsh.

It is expected that the lower portion of the site has the largest need for effective and comprehensive impact mitigation. This assumption is also supported by the fact that the lower portion of the proposed site is located entirely within the Special Management Area (SMA), which calls for special considerations of potential impacts and effective impact mitigation.

The differentiating characteristics between the two action alternatives is that the Preferred Alternative would implement the development in the lower portion of the site with a comprehensive sustainable design approach, which would qualify for LEED Silver certification upon completion of the project. Alternative B, on the other hand, would use conventional building technologies in the lower portion of the site. Both action alternatives would develop the upper portion of the proposed site with conventional building technologies. Building “green” is still more expensive than conventional building development and the applicant, in his goal to use a low impact development approach to the extent possible, considers it more beneficial to invest in advanced sustainable site development for the lower portion than to implement a more basic sustainable development approach for the entire proposed site.

Both action alternatives would add the same amount of industrial space. The buildings under the two action alternatives, though having the same building footprint, would be significantly different in terms of building envelope, energy and water efficiency, reuse of material, indoor environmental quality and other differentiators.

The **Preferred Alternative** would add a net total of 606,000 square feet of industrial space -- 269,000 to the upper and 337,000 square feet to the lower portion of the site, respectively. It is anticipated that at build-out, the proposed project would eventually have a new workforce of 600 new employees, of which approximately 340 would be from Kailua or Kaneohe. Under the Preferred Alternative, a total of 27.3 acres of presently developed, graded, pervious but not vegetated land would be used for the proposed development footprint, which includes buildings, paved traffic areas and some landscaped area within the development. The development footprint for the upper and lower portion of the site would comprise 10.6 and 16.7 acres, respectively.

The 10.6 acre development footprint of the upper portion of the site would have a continuous impervious concrete pavement between the buildings. The warehouse structures would be steel framed structures with a varying size of up to 24,000 square feet. The paved areas would serve as internal roadways, parking and loading areas. The conventional warehouse structures would have septic wastewater systems; each system having one septic tank and one leach field which would serve multiple warehouses as needed. The below ground installed electricity and water infrastructure would be interconnected with some of the existing systems and new capacities would be added as required. The site would be drained through a system of concrete and grass swales and below ground channels. Two new conventional detention ponds would provide flood control before storm water is released to the Kapa’a Stream corridor, which is directly adjacent to but at a lower elevation than the upper portion of the site. As an alternative, the site drainage scheme might use an existing drainage area, which is located at the western site boundary. The upper portion of the development would use two existing driveways to the Kapa’a Quarry Access Road, and would construct one additional driveway, which would serve only as an emergency exit.

Of the 16.7 acre development footprint of the lower portion of the site, 5.7 acres would have either pervious open grid pavement or be landscaped areas around the buildings. Internal roadways would have a width of 22 feet, a total length of about 5,400 feet and with impervious concrete surface. The drainage of a portion of the roadways would be collected in underground cisterns for use in irrigating the landscaped area and part of the planned 7.8 acres of restored habitat around the site perimeter; therefore, no potable water would be used for irrigation. The overflow of the drainage along with the runoff from the remaining roadways would be conveyed to a number of flow-through catchment units draining into an extended detention pond. The runoff from the detention pond would flow to the existing drainage canal along the quarry road. The drainage from the roof of the buildings would similarly flow to the cistern and overflow to the detention ponds. Therefore 100 percent of all runoff would be treated and discharged to avoid streambed erosion. The warehouse structures would have a varying size of up to 24,000 square feet, would be steel framed featuring a building envelope with good thermal and day lighting performance, and would be equipped in accordance to the LEED Silver certification project goal. The warehouse buildings are designed to use 30 and 40 percent less electricity and water, respectively, than the baseline conventional warehouses. The wastewater would be treated in alternative septic systems, which would include aerobic, denitrification and absorption treatment processes in addition to regular septic treatment system. The effluent of the alternative septic systems, containing very low concentration of organics, nutrients and suspended solids, would be used for irrigation and/or could be safely injected into the ground even if the injection points have small vertical and horizontal distances to the adjacent wetland and stream. In the lower portion of the development, two new driveways to the Kapa’a Quarry Access Road would be constructed, one of which would only serve only as an emergency exit.

Alternative B would construct the same amount of industrial space as the Preferred Alternative in the upper and lower portions of the site, resulting in the same expected number of new employees working for companies in the new industrial development.

Under Alterative B, the development approach would be consistent in the upper and lower portion of the site, e.g. the site development and construction of the buildings would follow applicable codes and ordinances but without a LEED certification goal.

The 10.6 acre development footprint of the upper portion of the site would have continuous impervious concrete pavement between the buildings. The warehouse structures would be steel framed structures with a varying size of up to 24,000 square feet. The paved areas would serve as internal roadways, parking and loading areas. The conventional warehouse structures would have septic systems, each system having one septic tank and one leach field which would serve multiple warehouses as needed. The below ground installed electricity and water infrastructure would be interconnected with some of the existing systems and new capacities would be added as required. The site would be drained through a system of concrete and grass swales and below ground channels. Two new conventional detention ponds would provide flood control before the stromwater is released to the Kapa’a Stream corridor, which is directly adjacent. As an alternative the site drainage scheme might use an existing drainage area, which is located at the western site boundary. The development would use two existing driveways to the Kapa’a Quarry Access Road and would construct one additional driveway, which would serve only as an emergency exit.

Under Alternative B, the 18 acre development footprint of the lower portion of the site would have continuous impervious concrete pavement between the buildings. The warehouse structures would be steel framed structures with a varying size of up to 24,000 square feet. The paved areas would serve as internal roadways, parking and loading areas. The conventional warehouse structures would have septic systems, each system having one septic tank and one leach field which would serve multiple warehouses as needed. Electricity and water infrastructure would be installed underground. The site would be drained through a system of concrete swales and below-ground channels. One or more new conventional detention ponds would provide flood control before the stromwater is released to the drainage canal and/or the Kapa’a stream corridor, which is directly adjacent to the site. Two new driveways to the Kapa’a

Quarry Access Road would be constructed, one of which would only serve only as an emergency exit.

The third alternative is the **No Action Alternative**, which is required by statute. This alternative describes the impacts at the proposed project site in the event that the proposed project would not be built. Under this alternative there would be no construction.

Possible environmental impacts by area

Significant potential issues and impacts associated with the action-alternatives are discussed below. The No Action Alternative would not implement the planned development and therefore would not cause impact to the existing environment.

Geology, topography and soils: For the Preferred Alternative, 21.7 acres of the 27.3 acres development footprint would be converted from pervious to impervious land. An area of 2.2 acres of presently not vegetated land would be converted to a restored habitat, using native and adaptive plant species. Approximately 5.6 acres of the 27.3 acres development footprint would have pervious open grid pavement or would be landscaped area. Under Alternative B, 28.6 acres of the disturbed and pervious land would be converted to impervious land. Before construction, the project would require an approved erosion and sediment control plan and applicable permits, which would require appropriate site-specific best management practices (BMPs) for controlling runoff, erosion, and sedimentation during construction.

Water Resources: The Preferred Alternative and Alternative B would convert approximately 21.7 and 28.6 acres, respectively, from pervious to impervious land to implement the proposed development. Under both action alternatives, the implementation of erosion and sediment control plans would be required to reduce soils erosion, lower runoff flow rates and capture eroded soils and concentrated nutrients before they enter the downstream water flow. Stormwater runoff during construction would be controlled by stormwater BMPs and erosion and sediment controls to lower the potential impact to surface and ground water. Structural and non-structural management practices would be implemented for the operation of the proposed industrial park.

The surface water resources that would be affected by direct discharge of through seeping out of underground flow include adjacent wetland areas in the stream corridor, the Kapa’a Stream, the drainage canal along the quarry road and indirectly the Kawainui Marsh, which is the receiving water for the entire Kapa’a watershed. Groundwater recharge would be affected by converting previous to impervious land.

Under the Preferred Alternative: A total of 21.7 acres would be converted from pervious to impervious land. Runoff from impervious surfaces in the upper portion of the site would flow through detention ponds and be discharged through armored spill ways into the stream corridor. In the lower portion of the site an approximately 50 percent of the runoff from impervious surfaces such as roofs and roadways would be collected and stored in underground cisterns for use in irrigation. The rest of the runoff and the overflow of the cisterns would be conveyed to one extended detention pond, where the runoff would be gradually released to the drainage canal in order to lower the rate at which the water leaves the site.

Under Alternative B, all runoff from impervious surfaces would flow to detention ponds and be released to the stream corridor or the drainage canal.

The DEIS discusses possible impacts from leaching of the landfill body. The old landfill on which the proposed project would be developed lacks an underground sealing, such as by an impermeable barrier, which protects potential harmful leachate to seep into the groundwater. The DEIS discusses that it might be beneficial to restrict the amount of rainwater to infiltrate into the landfill body in order to reduce the amount of leachate. The DEIS discusses the positive effect of the proposed project on the overall water quality of the Kapa’a Stream since the stormwater discharge of the proposed project would reduce pollutants compared with existing conditions. None of the action alternatives would result in development within flood plains.

Biological Resources: Both action alternatives would convert only land that is presently developed. No open space, natural vegetated land or mature forest habitat would be used for the development footprint of either alternative. Under the Preferred Alternative, 2.2 acres would be converted from developed to restored habitat and 7.8 acres of open land at the site perimeter which presently has sparse or invasive vegetation would be restored to habitat, using native or adaptive plant species for promoting indigenous biodiversity. Under both action alternatives, rare and endangered species would not be affected since the existing condition of the project site is only habitat for a population of urbanized birds and small mammals but no endangered species. The adjacent Kawainui Marsh is habitat for federally listed water birds but no land of the marsh will be used for the proposed development.

Air Quality: Impacts on air quality would be primarily through increased traffic on the adjacent roads. The alternatives would not use fuel combustion for power generation or process heat. Some minor air impacts within the proposed project could result from dust and the operation of engines. Major air impacts are expected from diesel operated vehicles, such as trucks. While there would be an approximately 160 percent increase of heavy vehicle traffic on the section quarry road with the highest traffic volume after full build out, it is expected that air quality impacts would not significantly increase. Recent regulations for diesel engines exhaust and cleaner diesel would reduce the air quality impact of heavy vehicles over time.

<u>Noise:</u> Construction would occur under both action alternatives and would be short-term, typical of construction activities. It is expected that no sensitive receptors are located within the range of construction noise. Traffic related noise would be similar under both alternatives. The increased noise impacts due to the expected increases in traffic would be typically below threshold of a discernible difference to the human ear. The expected noise impacts would remain within the range typical for urban regions. Noise impacts during operations are not expected to be at significant levels, and would occur in industrially zoned land where some level of noise could be expected.

<u>Traffic</u>: Impacts on traffic are similar for both action alternatives, since the anticipated increase in traffic is a function of trips generated per unit of warehouse space. The increase of traffic would affect two roadways and three intersections. The level of service (LOS) on both roadways, the Kapa'a Quarry Road and the Kapa'a Quarry Access Road, would not decrease below a level, typically a LOS "D" that would result in a significant deterioration or require mitigation. The three intersections (1) Kapa'a Quarry Road & Mokapu Blvd, (2) Kapa'a Quarry Road & Kalanianaole Hwy, and (3) Kapa'a Quarry Road & Kapa'a Quarry Access Road would operate at sub performance level, e.g. at a LOS of "E" or worse, at the time of project completion, expected around 2026. This would require mitigation to improve the traffic flow through the most critical movements through the intersection. Prior to 2026 the LOS at these intersections is expected to be at a "C" or "D" level. The DEIS recommends that a new traffic impact analysis be conducted approximately seven years into the project development, or after the completion of the development in the upper portion of the site. As part of unresolved issues, <u>the State Department of Transportation (DoT) has required that the current Traffic Impact Analysis Report (TIAR) be revised and submitted for review and approval during the zone change request.</u>

<u>Infrastructure:</u> Impact on the infrastructure would be different depending on the alternative. It is expected that both alternatives would not have significant impact on the utility's capability to provide the required increase in electricity and water supply on an island wide level. In terms of site specific infrastructure, the water supply mains are expected to have sufficient transmission capability while the electric power lines supplying the site might need installation of additional capacity at existing utility poles. The site is presently not connected to the municipal sewer system and wastewater is treated onsite with septic tanks. The Preferred Alternative would result in less demand on the electricity and water infrastructure than Alternative B, due to the 30 and 40 percent electricity and water conservation rates, respectively, targeted under the LEED Silver certification. The mitigation of impact on wastewater systems would be more elaborate under the Preferred Alternative, since an advanced onsite treatment would be carried out in the lower portion of the site using alternative septic systems. These alternative septic systems have a much higher removal rate of pollutants in wastewater than conventional septic system and result in an effluent that can be safely injected into the ground or used for irrigation.

Socio-economic: The beneficial socio-economic impacts are expected to outweigh possible adverse impacts. The proposed project would provide much needed industrial space to the region and would strength the local economy be generating significant capital investment and tax revenues. It is expected that over half of future employees would come from within the region – it is estimated that only about 260 of the future employees would come from outside the region, and some are expected to relocate with their families to the region, thereby increasing the demand on public service through in-migration~~. It is forecasted that during the same time frame, the population of the Koolaupoko region will shrink by about 3,500 residents due to out-migration from the region.~~ The Koolaupoko region is expected to have a somewhat stable population through the year 2030, with a slight decrease projected of about 0.8 percent or approximately 1,000 residents from its current 114,000 residents. The reasons for projected decline of population in the Koolaupoko region are twofold: (1) fewer children are being born and there are deaths due to higher number of elderly, and (2) more adult children and other residents are moving out of the region (outmigration). Therefore comparing the project related in-migration with expected out-migration there would likely be a net decrease in residents, and an associated decrease in demand on public services.

Cultural: Neither alternative should have any adverse effect on cultural assets, since no cultural or archeological sites are known at the proposed site. The land on which the proposed development would be built is a landfill area that was created approximately two decades ago. In the unlikely event of an archeological find during construction, standard procedures would be followed to protect any assets.

Cumulative impacts: ~~There are no other major projects planned in the vicinity of the site and therefore there should be no significant cumulative impacts.~~ Cumulative impacts resulting from the proposed project on the transportation infrastructure in the area, on water quality and on the aesthetic impact have been identified and are discussed with respect to past, present and reasonably likely future activities at the project site. It is anticipated that most of the cumulative impacts can be mitigated to less-than-significant levels.

Potential mitigation measures

The DEIS has identified and discusses potential mitigation measures to reduce impacts on water resources, soil, air, noise and traffic, including the following:

Mitigation of construction related impacts from soil erosion and sedimentation include measures such as silt fencing and sediment traps to contain sediment onsite where necessary, covering disturbed soil or soil stockpiles, and sequencing construction activities with BMPs to reduce the amount of area exposed to erosion.

Stormwater Management Measures: Implementation of structural and non-stormwater management practices such as:

- Structural measures that could include detention ponds, filtration or screening systems, flow-through settling tanks, rainwater collection and harvesting
- Nonstructural measures that could include, landscaped areas, grass swales, disconnection of rooftop and non-rooftop runoff, and rainwater & stormwater irrigation

Air quality during construction: Control measures to limit fugitive dust would include water for dust control, applying filter material when handling dusty material, washing vehicles and tires before they leave the construction site, and cleaning adjacent streets frequently.

Air quality during operation: Controlling air quality during operation would include procedures to avoid hazardous handling and storage of material in the warehouses and open areas, cleaning internal roadways frequently, stabilizing all soil with vegetation, and cooperating with traffic authorities to reduce project related traffic on public roadways.

Noise Reduction during Construction: Measures would include adhering to local requirements for noise control and staying within allowable noise limits at different periods during the day, using equipment with low noise emissions, constructing vegetative buffer zones early in the project before mass grading or other noisy construction activities are carried out in the lower portion of the site, and scheduling especially noisy operations to occur in the same time period.

Noise reduction during operation: Methods of control could include monitoring all noise sources in development in accordance with occupational safety and health codes; using vegetation within and around the site to impede sound propagation, orienting noise sources away from environmentally sensitive areas, and cooperating with traffic authorities to mitigate project-related traffic noise on public roadways.

Improvement of traffic impacts: In accordance with the current traffic impact analysis, the project generated traffic would not require any mitigation until several years after completion of the development in the upper portion of the site; therefore no mitigation would be required earlier than approximately 2020. Before this point in time a new traffic impact analysis should be carried out to assess the actual increased traffic generated by the projects and decide on mitigating. Notwithstanding the absence of short-term mitigation, the DEIS has identified several mitigation measures which would reduce the impact on the three intersections by adding deceleration lanes at the two intersections of Kapa'a Quarry Road with Mokapu Boulevard and Kalanianaole Highway and adding a separate left turn lane to the north-bound traffic at the intersection Kapa'a Quarry Road & Kapa'a Quarry Access Road.

Impact mitigation through low impact development approach

Under the Preferred Alternative, the lower portion of the site which is close to environmentally sensitive areas would be developed using an array of sustainable building and site preparation methods and technologies. The low impact development approach will be quantitatively verifiable by achieving the LEED Silver certification goal of the applicant for this lower portion of the site. In order to qualify for LEED Silver certification that project has to achieve at least 50 percent of the total number credit points available under the selected LEED New Construction Core and Shell V.3 rating system. The applicant has chosen to select and satisfy those LEED credit categories which achieve the needed points, but this will also result in effectively mitigating the most prominent impacts on the environment and on the adjacent wetland areas and the Kawainui Marsh. Therefore the LEED Silver certification plan has become a blueprint for effective impact mitigation at the proposed site. Since the LEED Silver certification involves a third-party audit of the design and construction the commitment to mitigate certain impacts becomes transparent and verifiable to all stakeholders of the project.

The selected sustainable design approach of the proposed project is presented in detail in Appendix 4 of this DEIS. The selected credits mirror the types of impact that the applicant expects will require the most attention and invested capital. According to the plan, the water resource related impact is a priority for mitigation due to the proximity to important wetland areas and the desire to protect the Kawainui Marsh. The water resource related impact would be mitigated under LEED Water Efficiency and Sustainable Sites category by means of advanced stormwater treatment, advanced wastewater treatment, water efficient landscaping and water savings. Other credits that were selected to mitigate important impacts on the Marsh are light pollution reduction, energy efficiency, incentivizing alternative transportation, habitat restoration and open space improvement.

Considering Hawaii's Path to increased Sustainability

Recent initiatives, such as the Hawaii 2050 Sustainability Plan and the Hawaii Clean Energy Initiative, delineate visions, goals and strategies to implement more sustainability in Hawaii over the coming decades. Diversification of the economy, fostering local production of goods and food and significant energy savings are some of the cornerstones for Hawaii's path to more sustainability. The proposed Light Industrial Park will contribute to these goals through providing needed infrastructure for businesses in the Koolaupoko region to serve residents from within the region, Since the proposed project will follow a low impact development approach and will use sustainable building technologies and measures, the project can serve as an example that industrial developments can be built "green".

Project Funding: The development of the proposed Kapa’a Light Industrial Park project would be privately funded.

Relationship to Plans, Policies and Controls:

The proposed project would be consistent with all of the applicable plans and policies of the Honolulu City and County General Plan, and the Koolaupoko Sustainable Communities Plan.

Honolulu City and County Land Use Districts: The intended land use of proposed project would require a zone change for two of the three parcel properties from General Preservation (P-2) to Limited Industrial (I-1) to be consistent with the county land use zoning. The remaining third parcel of the property is already zone Intensive Industrial (I-2) ~~and the intended land use of the proposed project would already be consistent with county land use zoning~~.

State Land Use Districts: The intended land use of proposed project would be consistent with the state "Urban" land use district.

Permits and Unresolved Issues

The project will require permits to carry out construction work including but not limited to building, grading, and work on public roads. In addition, all applicable NPDES permits ~~plus underground injection permits~~ will be required. The project work may possibly also need permits to perform work in streams (stream alteration permit) and a permit to abandon two wells on the property.

~~It has to be determined if the~~ After communication with U.S. Army Corp of Engineers (USACoE) it has been determined that the proposed project ~~needs~~ does not need permits for planned constructions within wetland and other aquatic bodies under the jurisdiction of USACoE.

The proposed project needs an approved major zone change for two of its land parcels from General Preservation (P-2) to Limited Industrial (I-1) and a Special Management Area (SMA) Permit in order to proceed with proposed action.

As the project continues in the design process and enters the next phases of the permitting process (e.g. the zone change and SMA permit application), the design of system components, which were initially defined and developed in the concept design phase, will be updated and more design details will be developed. The technical refinement of the design will be delineated in updated project Masterplan for the zone change request and will contain the following main subject items:

- updating the layout of the proposed light industrial park,
- updating the drainage system,

- delineating the harvested rainwater system,
- identifying the load bearing capacity of the landfill surface in the lower portion of the site,
- assessing the capacity of onsite renewable (photovoltaic) energy generation to be installed at the site.

~~A further issue that is still unresolved is the capacity of photovoltaic panels (PV) that the applicant can install on the warehouse roofs. The final capacity of PV would determine the amount of electricity that needs to be supplied from the island wide grid.~~

The Hawaii State Department of Transportation (DoT) has requested that certain sections of the Traffic Impact Analysis Report (TIAR), presented with this FEIS, be updated and submitted as a revised TIAR during the zone change permit process.

Unresolved issues include potentially unsafe conditions on the Kapa’a Quarry Road, requests for more environmental precautions and possible rare failures of mitigation measures.

GLOSSARY OF ACRONYMS (This glossary has been added to the DEIS content)

BMP	Best Management Practice
BOD	Biological Oxygen Demand
BWS	Board of Water Supply
CFR	Code of Federal Regulations
CY	Cubic Yard
CZM	Hawaii Coastal Zone management (CZW)
cbft/sec	Cubic Feet per Second
dBA	Decibel (A-weighted measurements)
L_{dn} dB	Decibel (Day-night average sound level)
DBEDT	Department of Business, Economic Development and Tourism, State of Hawaii
DEA	Draft Environmental Assessment
DEIS	Draft Environmental Impact Statement
DoH	Department of Health, State of Hawaii
DoT	Hawai‘i Department of Transportation, State of Hawaii
DPP	Department of Planning and Permitting, City and County of Honolulu
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FAST	Fixed Activated Sludge Treatment
FEA	Final Environmental Assessment
EISPN	Environmental Impact Statement Preparation Notice
FEIS	Final Environmental Impact Statement
FIRM	Flood Insurance Rate Map
GIS	Geographical Information System
GPD	Gallons per Day
GPM	Gallons per Minute
HACCP	Hazard Analysis and Critical Control Point Plan

HAR	Hawai‘i Administrative Rules
HECO	Hawaii Electric Company
H-POWER	City and County of Honolulu waste-to-energy facility
ID	Innovation in Design
IAQ	Indoor Air Quality
IEQ	Indoor Environmental Quality
DoT	Hawai‘i Department of Transportation
HECO	Hawaiian Electric Company
HRS	Hawai‘i Revised Statutes
KLIP	Kapa’a Light Industrial Park
I-1	Limited Industrial Land Use Zone
I-2	Intensive Industrial Land Use Zone
LEED	Leadership in Energy and Environmental Design
LZ	Lighting Zone
LOS	Level of Service
LUC	Land Use Commission
Makai	In the direction the ocean (Hawaiian language expression)
Mauka	In the direction the mountain (Hawaiian language expression)
MG	Million Gallons
MGD	Million Gallons per Day
MPH	Miles per Hour
MR	Materials & Resources
MSL	Mean Sea Level
MSW	Municipal Solid Waste
MWh	Mega Watt Hours
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service

OEQC	Office of Environmental Quality Control
OMPO	Oahu Metropolitan Planning Organization
P-2	General Preservation land use Zone
PSI	Pounds per Square Inch
RP	Regional priority
SCP	Sustainable Communities Plan
SHPD	State Historic Preservation Division
SMA	Special Management Area
sqft	Square Feet
SS	Sustainable Sites
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
Total N	Total Nitrogen
TSS	Total suspended solids
UBC	Uniform Building Code
USACoE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service
V/C	Volume to Capacity (ratio)
VOC	Volatile Organic Compounds
VPH	Vehicles per Hour
WE	Water Efficiency

EXECUTIVE SUMMARY

GLOSSARY OF ACRONYMS

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CHAPTER ONE - PURPOSE AND ORGANIZATION OF THE EIS

This Environmental Impact Statement (EIS) will examine the potential environmental impacts of developing the Kapa'a Light Industrial Park (KLIP) on a site that consists of three contiguous land parcels, which presently have different land use designations under the county zoning ordinance. While one of the three land parcels is already properly zoned for the development of the KLIP, the other two land parcels require a change of zoning before the development can commence. According to county statutes the required land use zone change is a major zone change, which triggers an environmental review process.

The EIS is prepared pursuant to Hawaii's environmental impact statement law (HRS 343), which is patterned after the National Environmental Policy Act (NEPA). The law requires that the government considers environmental, social and economic consequences of developments, which are not exempt under the law. Developments for which an environmental assessment (EA) or an environmental impact statement (EIS) has to be prepared require adequate opportunities for the public to participate in the review process.

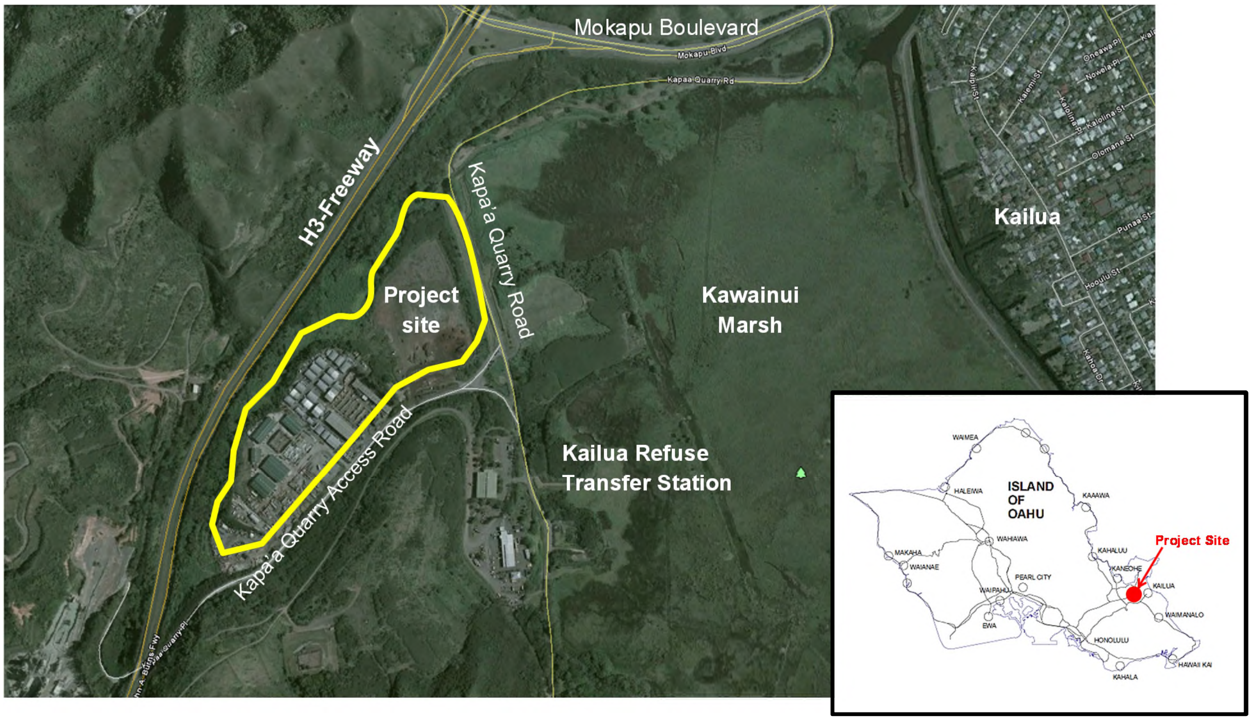
The following sections of Chapter 1 provide background, purpose and need of the proposed action as well as describe the EIS process for the proposed action and process steps that have been completed.

1.1 Project Background

The applicant is the owner of three contiguous land parcels on which the applicant intends to develop the Kapa'a Light Industrial Park (KLIP). The KLIP represents an expansion of an already existing warehouse development. The development plans call for adding 606,000 square feet of warehouse space to the already existing 283,000 square feet of warehouse space at the proposed site. The new warehouse space will be developed on all three land parcels owned by the applicant. These three land parcels are TMK 4-2-15:001 (portion of), 006 and 008. Land parcel 4-2-15:008 are already zoned to allow development of industrial warehouse space, whereas the other two land parcels, require zone change to allow the construction and operation of industrial warehouse space.

The project site is located on the windward side of the island of Oahu, at the western boundary next to the important Kawainui Marsh. The proposed project site is adjacent to Kapa'a Quarry Road and Kapa'a Quarry Access Road. The H3-Freeway passes the project site at a distance of about 300 feet to the north. The proposed project site and immediate surroundings are shown in Figure 1-1.

Figure 1-1 Vicinity map of project site and immediate surroundings



The development objective of the proposed KLIP is to provide the Kailua and Kaneohe region with additional industrial space, which is in short supply in this region. The Koolaupoko region, in which the proposed project is located, is significantly undersupplied with industrial space when compared to other markets on Oahu. Due to the shortage of industrial space, businesses that serve the region are often forced to locate within other regions on Oahu, resulting in long commutes and trip for employees and clients, which reside in the Koolaupoko region. Since there is virtually no other land within the Koolaupoko region to provide additional industrial space the proposed site is an important asset for the region to improve the economic infrastructure.

The project concept design has been developed over the past three years and has undergone several planning revisions. Due to the proximity of parts of the proposed site to important wetland area the development approach now includes low impact development measures that should help to mitigate impacts on the environment and the community.

1.2 Purpose and Need for the EIS

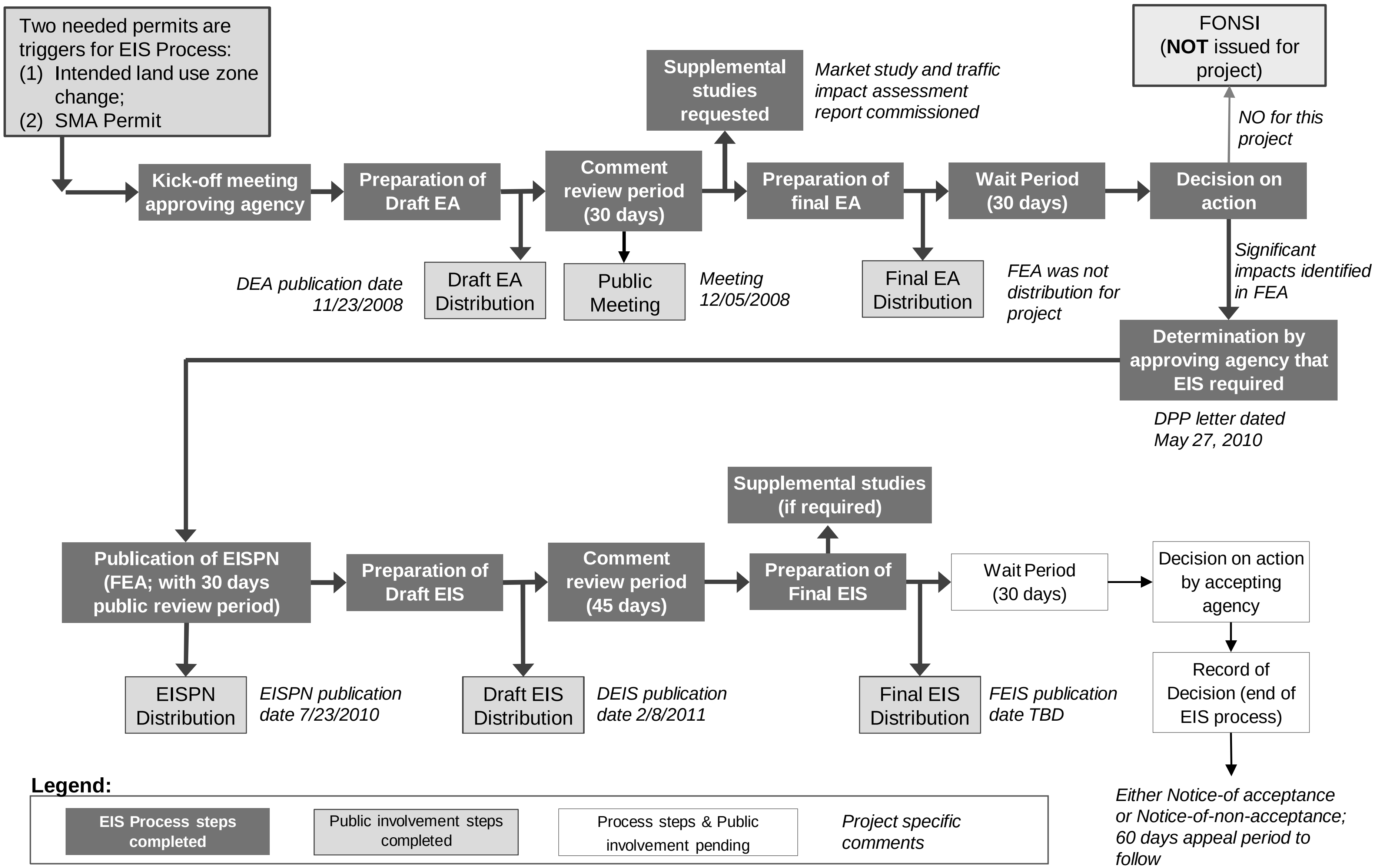
An environmental review is required for the anticipated major zone change for two of the three contiguous land parcels on which the proposed KLIP will be developed. The three land parcels are described by the tax map key (TMK) 4-2-15:001 (portion of), 006 and 008. Parcel 4-2-15:008 is currently within the Intensive industrial (I-2) county land use zoning district; parcels 4-2-15:001 (portion of) and 006 are currently within the General Preservation (P-2) district. The development of light industrial space, with the intended land use such as warehousing, base yards, minor repair, storage yards, light manufacturing or wholesale distribution, requires rezoning from preservation to industrial districts. In accordance with the county land use ordinances such land uses with few environmental impacts can be located with the Limited Industrial (I-1). Thus, the applicant will apply a major zone change from P-2 to I-1 for the two land parcels TMK 4-2-15:001 (portion of) and 006.

The EIS will identify and evaluate possible environmental, social and economic impacts of the proposed development. The EIS will specifically describe its evaluation of impacts, on the hydrology of the Kapa’a Stream and Kawainui Marsh, on traffic on roadways and highways affected by the project, on important viewplanes surrounding the Kawainui marsh, on the public services, on wildlife, as well as others. The EIS will also evaluate the effectiveness of mitigation measures for the impacts identified.

1.3 The EIS Process steps of the proposed action

Under Hawaii’s environmental impact review process, agencies are required to consider the impacts of their proposed major actions on the quality of the human and natural environment. The process is intended to make decisions on developments that are based on the understanding of impacts to the environment and community and identify and assess reasonable mitigation measures in order to avoid or minimize adverse effects. Figure 1-2 illustrates the generic process as prescribed by law. Figure 1-2 also shows the process steps that apply to the proposed action, including process steps that have been completed and those which are still pending completion.

The environmental review process has to be applied to certain types of projects and certain triggers call for the preparation of an EIS. The intent of the applicant to develop a light industrial park on his property will result in land uses and structures that are not permitted within present preservation districts, thus requiring a major zone change considering the size of the land to be rezoned. <u>In addition, a Special Management Area (SMA) Permit will be required since a part of the proposed site is located within the SMA. Therefore this environmental review process is triggered by two needed permits, the land use zone change and the SMA Permit for the proposed project.</u>



Sustainable Design & Consulting LLC
www.sustain-HI.com

Kapa'a Light Industrial Park
Final Environmental Impact Statement

Figure 1-2: Overview of environmental review process for project

In a kick-off meeting with the accepting agency, the City & County of Honolulu, Department of Planning and Permitting (DPP) it was decided that an environmental assessment (EA) would be required, at the minimum, to satisfy the environmental review process requirements for the intended zone change The Draft EA was completed and distributed in November 2008, in accordance with the guidelines State of Hawaii Office of Environmental Quality Control (OEQC), which includes publication of the Draft EA in *The Environmental Notice* as well as distribution of hard copies and data CDs to about 35 identified stakeholders. A public presentation about the project was given to the Kailua Neighborhood Board on December 4, 2008.

A total of 24 comments were received from governmental agencies and community groups. The comments and review of the Draft EA resulted in the request by DPP to conduct two supplemental studies, a market study to identify if the region could accommodate the intended size of industrial space and a traffic impact assessment to determine anticipated traffic volume resulting from the proposed project and assess the impact of level of service of affected roads and intersections.

All comments as well as the supplemental studies were included in the Final EA, which was submitted to DPP at the end of December 2009. In May 2010 the DPP determined that the project would have significant impact, and that a full Environmental Impact Statement (EIS) would be required.

The environmental impact statement preparation notice (EISPN) was prepared by publishing the document that was planned to be the FEA in *The Environmental Review* and by providing data-CDs and several hard-copies to stakeholders and public libraries. The publication in The Environmental Notice Nine started a 30 day public review period. Nine letters with comments and suggestions were received.

1.4 Determination Letter and EISPN Publication

This section presents the determination of the approving agency of the EA, the City & County of Honolulu, Department of Planning and Permitting, to require a full EIS as well as the content of, publication of and comments received to the EISPN.

1.4.1 Determination Letter by DPP dated May 27 2010

The letter by DPP stating the determination that a full EIS is required is presented hereafter (described as Figure 1-3)

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

2010/ELOG-209 (mw)

May 27, 2010

Dr. Marc M. Siah, President
Marc M. Siah & Associates, Inc.
820 South Beretania Street, Suite 201
Honolulu, Hawaii 96813

Dear Dr. Siah:

Subject: Final Environmental Assessment for Kapa'a Light Industrial Park, Kailua, Koolaupoko, Oahu, TMK 4-2-15: 1 (por.), 6 and 8

After reviewing the Final Environmental Assessment (FEA) for this project, submitted on December 30, 2009, we have determined that an **Environmental Impact Statement** (EIS) will be required. Thus, whichever consultant the developer selects to prepare the project's EIS should submit an EIS Preparation Notice, which we will forward to the Office of Environmental Quality Control for notice in The Environmental Notice.

The reasons for this determination are as follows.

We find that four possibly significant impacts have not been adequately studied: (1) the ability to locate an extremely heavy industry at the industrial park if I-2 zoning is granted, (2) impacts on the marsh from doubling heavy truck traffic, (3) unintended impacts on the marsh such as failing to enforce the LEED certification requirements or the proposed restrictions on tenant activities, and (4) the visual impacts on people looking across the marsh or looking at the site from nearby park lands.

The FEA also needs to make minor revisions to the EIS to address the following:
(1) statements in the FEA that are not supported by the project's market study, (2) whether a catastrophic septic tank failure is in fact possible, as some comment letters suggest, and (3) impacts from the pre-existing condition of contaminants leaching from the ground within the project site, which is not discussed.

We find that there is a chance that the proposed industrial park expansion could meet one or more of the following three Significance Criteria in the EIS rules:

"9. Substantially affects a rare, threatened, or endangered species, or its habitat"
"11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain..."

"12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies"

According to the EIS rules, we must require an EIS Preparation Notice if we determine "that a proposed action **may** have a significant effect" (emphasis added). Only if we determine "that a proposed action is not likely to have a significant effect" can we approve the FEA and issue a Finding of No Significant Impact. And, since the FEA still leaves several questions unanswered, it is clear that an EIS does in fact need to be prepared if this project is to move forward.

We did mention at every step in this process that the project might need an EIS. One reason for this is that your project will greatly expand an existing industrial park in an isolated setting that happens to be located within a large preservation-zoned valley as well as next to the largest wetland in the state, where four endangered waterbirds (the Hawaiian Stilt, Coot, Gallinule or Moorhen, and Duck) are found. Thus, there is a greater chance that your project will have significant impacts (such as affecting habitats and endangered species) than if it were located in the midst of a fast-growing suburban area.

Also, since the proposed development of the lower portion of the project (TMK 4-2-15: por. 6) will require a Special Management Area Use Permit (SMP), it would take a highly detailed full-disclosure document such as an EIS to meet the SMP's environmental review requirements. We anticipate that the processing of the SMP will result in a detailed public debate about the project's impacts on two natural features – Kawainui Marsh and the ditch area that fronts Kapaa Quarry Road, which falls within Flood Zone A. Thus, preparing a full EIS could provide the additional information needed to potentially reduce community concerns over this project, both at the zone change and SMP stages.

We suggest that the contents of your EIS Preparation Notice be a revised version of Volume I of the FEA plus the attachments at the back of Appendix B, along with simple revisions to address issues discussed below. Revisions which will require additional analysis should be listed at the beginning of the Notice. We also ask that the mailing list be expanded to include the U.S. Army Corps of Engineers and the State Department of Health.

In the following sections, we recommend a number of changes to the FEA as it becomes an EIS.

IMPACTS NOT ADEQUATELY ANALYZED

Noxious Industries

If the project's preferred alternative is to seek I-2 zoning for the expansion areas, then the EIS should discuss the impacts of all heavy industries. This is needed because a zone change runs with the land and thus applies not just to the current project but to any successor plans or operations, and so the EIS must account for the eventuality that another developer might later take over the project and add uses or build a conventional industrial park.

Noise, Air and Water Quality Impacts from Traffic on Kawainui Marsh
The analysis of impacts on Kawainui Marsh fails to evaluate one possible impact. Specifically, discuss the noise impacts and the air and water quality impacts of doubling heavy truck traffic on the northern section of Kapaa Quarry Road, as evident from the data in Appendix B's Figure 9. This route circles the north end of the marsh as it connects the industrial park to Mokapu Saddle Road, and nearly all heavy trucks will also presumably double back near the marsh, following Mokapu and probably the H-3 Freeway as well. Thus, even if these impacts are shown to be insignificant compared to all the rest of the traffic along these same routes, they still need to be evaluated. This is because marsh impacts do not need to be substantial in order to qualify as a significant environmental impact; they merely need to **affect** an environmentally sensitive area.

Unintended Impacts on Kawainui Marsh from the Industrial Park
A sensitivity analysis needs to be conducted on several proposed mitigation measures to see if actions by industrial park tenants could totally negate the needed mitigations and thus result in significant impacts. Of special importance are hazardous wastes, litter, excess noise, and light pollution.

Scenic Vistas and Viewplanes
Much more work is needed on the visual impacts of the project's lower area, next to the marsh. This includes: (1) an after-mitigation version of Figure 3-22, the key visual impact illustration, and (2) additional pairs of similar illustrations from vantage points looking across the marsh, such as the end of Kaha Street in Coconut Grove and the eastern edge of the Kawainui Model Airplane Park, just across Kapaa Quarry Road from the project. All of these "after" illustrations should show how the proposed mitigation – including the new idea of a landscaped earthen berm at the front of the project – would soften the visual impact of constructing this large cluster of warehouses next to the marsh. The accompanying text should also: (1) acknowledge that the future presence of the warehouse complex will not be totally hidden by the proposed mitigation measures, especially from higher elevations (H-3 and Mokapu Saddle Road), (2) be more exact in describing the view up Kapaa Valley on page 3-13, since the valley has more of an undeveloped open space appearance than an industrial appearance, and (3) discuss how the lower part of the valley near Kapaa Quarry Road currently has an undeveloped look, with the City's Refuse Transfer Station next to the project's lower area blending naturally into its hillside and with the lower area's current greenwaste operation having an agricultural look.

<u>STATEMENTS CONTRARY TO THE MARKET STUDY</u>

Substantial Secondary Impacts
The FEA does not properly analyze the project's secondary impacts, since it assumes that the project will attract few businesses and employees to the region. Yet the project's market study (Appendix D, especially Table 10 and prior pages) suggests that over 90 percent of the region's future demand for industrial space will result from either new or expanding businesses ("natural trade area evolution") or relocations from the urban core. Thus, assuming that the project is the only major supplier of this demand, then almost all businesses occupying its newly built floor

space would be new to the region, and possibly half of all new employees would be new to the region as well. If so, then the project might result in "substantial secondary impacts" – one of the 13 criteria for declaring a project to have significant environmental impact. Thus, careful analysis is needed of how the project's new floor space, businesses, and employees will impact public facilities, population, and all of the services that will be needed, including services needed by future employees who move into the area.

That questionable assumption in the FEA occurs in Sections 3.8, 3.9, and 9.1. The two clearest statements which we question are as follows:

> "These findings therefore argue against concerns that the planned addition of industrial space within the proposed Kapa'a Light Industrial Park would attract businesses to the Koolaupoko region and would therefore significantly impact the local infrastructure." (Page 3-47)
>
> "In summary, it is anticipated that the proposed development would not significantly and adversely impact socio-economic conditions in the region. This is mainly due to the fact that proposed development would not create a large pool of new employment converging to the windward areas and placing new and heavy burden on housing, day-care center, schools, hospitals and other institutions in the region." (Pages 3-48 to 3-49)

However, it should also be noted that the DPP projects that this region will see a small population decline in the future, which might help to offset the project's likely socio-economic impacts.

We also question the market study's finding (repeated in Section 3.8) that this region is unique in having little industrial floor space per person. In fact, this is also the case in East Honolulu, Waianae, the North Shore, and Koolauloa. See the jobs data published in Table I-3 of the DPP's Annual Report on the Status of Land Use on Oahu, Fiscal Year 2008. The EIS should make use of this data, which is broken down into the island's eight development plan areas, instead of just relying on the market study's breakdown of Oahu's industrial floor space into the following four trade areas: greater Honolulu, Ewa/Waianae, Central Oahu, and Koolaupoko.

Substantial Energy Consumption

Sections 3.4.1 and 9.1 need to provide a better explanation of why the project will not require substantial energy consumption. We suggest a review of comparable projects such as the Ewa Industrial Park FEA (July 2008). Also, the market study contradicts the statement on page 9-6 of the FEA that almost all of the project's new floor space would be replacement space from elsewhere on Oahu, and thus "would result in a net reduction of energy consumption on Oahu", partly as a result of the project's planned energy conservation measures. Our interpretation of the market study's findings, as applied to this project, is that approximately 22 to 37 percent of the project's new industrial floor space is likely to be occupied by relocating businesses, which means that new or expanding businesses would occupy all the rest of the floor space and thus would be new sources of energy consumption. We also request a table and a graph comparing the current industrial park's existing energy usage with the project's projected additional usage – using LEED measures – so that the reader can see just how much of the ultimate industrial park's total future energy usage will be due to the project.

NEEDED BACKGROUND INFORMATION

Total Size of the Industrial Park
The EIS needs to state: (1) how many of the existing warehouses will remain, and (2) how large the ultimate industrial park will be at full buildout, in terms of floor space and land area. This will help us to compare this project with other industrial parks and to make other analyses.

Alternatives Considered
If a new preferred alternative is developed, then the old one should be included in Chapter 8. Also, Chapter 8 should include any new alternatives that the applicant seriously considers but rejects, such as the I-1 zoning alternative which we have discussed under "Noxious Industries", above.

Should you have any questions, please contact Mike Watkins of our staff at 768-8044.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:js

cc: OEQC
Kapa'a I, LLC

FEA response

1.4.2 Environmental Impact Statement Preparation Notice (EISPN)

The EISPN was published in July 23, 2010 issue of *The Environmental Notice*. A copy of the electronic version of the July 23, 2010 issue is presented in Appendix 1 and the section of this issue that addresses the proposed action is reprinted hereafter. The publication date initiated a 30-day public review period upon which nine responses to the EISPN were received. The comment letters are presented in this DEIS.

Below is a reproduction of the Section of *The Environmental Notice,* July 23, 2010 issue that announced the EISPN of the proposed project.

The Environmental Notice
Office of Environmental Quality Control
July 23, 2010
Pages 3 and 4 (selected section of the publication)

3. Kapa'a Light Industrial Park (EISPN)

Island:	Oahu
District:	Koolaupoko
TMK:	(1) 4-2-15: 1 (por.), 6 and 8
Applicant:	Kapa'a I, LLC, 905 Kalanianaole Highway, Kailua, HI 96734. John King, 853-4768
Accepting Authority:	City and County of Honolulu, Dept of Planning and Permitting, 650 South King Street, 7th Floor, Honolulu, HI 96813. Mike Watkins, 768-8044
Consultant:	Sustainable Design & Consulting LLC, P.O. Box 283267. Honolulu, HI 96828. Dr. Manfred Zapka, 265-6321
Permits:	Zone Change, SMA, NPDES, Grading, Building
Comments:	EISPN 30-day comment period starts from the date of this Notice. Address comments to the Applicant, with copies to the Accepting Authority and Consultant.

This project's Draft EA was listed in the January 8, 2009 issue of the Environmental Notice. The Department of Planning and Permitting has reviewed this project's Final EA, and has determined that an EIS Preparation Notice needs to be issued, rather than a Finding of No Significant Impact. The project's Final EA can be viewed on OEQC's web site.

The applicant, Kapa'a I, LLC, is proposing to expand its existing 22-acre light industrial park in Kapa'a Valley on the windward side of Oahu. This area is zoned I-2 Intensive Industrial District. The applicant is seeking I-2 zoning for two adjacent areas now within the P-2 General Preservation District – an 11-acre area to the west, by the H-3 Freeway, and a 44-acre parcel to the east, just across Kapa'a Quarry Road from Kawainui Marsh.

The proposed Kapa'a Light Industrial Park would be developed incrementally over a span of 15-17 years. Short-term construction impacts during this period would include increased vehicular traffic and heavy machinery operation, soil erosion, noise and air pollution, and water runoff. There would also be long-term impacts, mainly on vehicular traffic, utility systems, utilization of resources, noise levels, local social services and businesses, and visual character and ambiance. Potential project impacts that were not clearly shown in the FEA to be insignificant include: (1) possible effects on Kawainui Marsh, (2) the potential inclusion of noxious industries within the industrial park, and (3) visual impacts. The applicant plans to expand its coverage of these issues in the Draft EIS. See also the Appendix.

In addition to being available on the OEQC website for download, the EISPN document, the document that was intended to be the FEA, was distributed on data-CD to 30 agencies and the public stakeholders and the Kaneohe public library. One hard copy of the EISPN document was provided to the Kailua public library. The distribution list of the data CDs, as well as one sample letter that accompanied each distributed data CD and hard copy, are presented in Appendix 1.

1.5 Scoping of the DEIS

This section presents the basis of scoping of the DEIS. The determined scope of the DEIS considered all comments and recommendation by the accepting agency, the comments received from the EISPN as well as changes in the design and planning documents. Building on the previous content and analysis of the FEA, the DEIS conducts a more thorough analysis and consideration of possible impacts, to meet requirements of the accepting agencies' comments received during the EISPN, and by the natural evolution of the project. With respect to the evolving project design, the DEIS strategically uses low impact development approaches and building technologies to mitigate the impacts that are considered most important for the adjacent wetland areas and water bodies. In particular, the DEIS contains a comprehensive sustainable design approach to achieve LEED Silver certification for the proposed industrial development within the lower portion of the site and uses the LEED Silver design approach to propose mitigation measures which are not hypothetical but will be verifiable.

The following sections present the responses to the determination of DPP and to the EISPN, as well as a description how the content of the DEIS differs from the document that was used for the EISPN, which represents the intended FEA.

1.5.1 Response to Determination Letter by DPP dated May 27, 2010

The determination by DPP of requiring an Environmental Impact Statement (EIS) rather than issuing a Finding of No significant Impacts (FONSI) for the Final Environmental Assessment

(FEA) is based the decision that certain impacts were either not evaluated in the FEA or that the evaluation needed further analysis and discussion.

This Draft Environmental Impact Statement (DEIS) has incorporated all required changes and additions to the content and analysis of the FEA. The following briefly delineates the approach that was taken in the DEIS to address the comments in the DPP determination letter. Comments are underlined with brief approach to respond following.

<u>Ability to locate an extremely heavy industry at the industrial park:</u> The applicant has changed the goal of obtaining a zone change from General Preservation (P-2) to Intensive Industrial (I-2) to a zone change from P-2 to Light Industrial (I-1). The type of land use which is desired under the changed zoning would be mainly industrial warehouses and related light industrial businesses but could also include base yard operations. All of the intended land uses will be permissible under the light industrial land use designation and no intensive industrial land use designation will be needed. This change in future land use would exclude the possibility of locating extremely heavy industry in the proposed industrial development and thus would avoid the possible impact resulting from very heavy industry.

<u>Impacts on the marsh from doubling heavy truck traffic:</u> The impacts of heavy truck traffic on the marsh have been analyzed, and possible mitigation measures are discussed in the text of the DEIS.

<u>Unintended impacts on the marsh such as failing to enforce LEED certification requirements or the proposed restrictions or the tenant activities:</u> While the FEA described the LEED certification goals of the applicant only in general terms, a detailed sustainable design approach has been developed which clearly describes the design measures which will be implemented by the applicant to obtain LEED Silver certification upon construction of the project. The sustainable design approach is presented in Appendix 4. The document provides a detailed technical and contractual strategy to obtain LEED Silver certification and implement comprehensive measures that minimize possible impacts by the project.

The LEED Core and Shell certification system will be used for the proposed project. This means that the applicant will implement measures that address impact mitigation for the site development as well as for the buildings, such as stormwater treatment, wastewater treatment, energy and water supply, building shell of the warehouses, waste collection and litter control, landscaping, energy and water supply systems for the warehouses, as well as ensuring healthy indoor environmental for the core and shell portions of the buildings. The operator of the industrial park is responsible for maintaining the industrial park in a manner that reflects the nature and objectives of the LEED certification, in the case of the proposed industrial park the LEED Silver certification.

The indoor leasable space is typically configured by tenants according to the special needs of the tenants, who will be provided guidelines regarding acceptable methods to operate the leasable space. The impacts of the leasable spaces are basically limited to the vicinity of the buildings as well as possible impacts that could be beyond the immediate proximity. These would be regulated by contractual terms in the lease agreement. For example, the LEED credit approach of the project will attempt regular and exemplary performance credits by contractually obliging the tenants to reduce noise, air and light pollution from interior lighting. Since the LEED approach will implement certain measures to obtain certification credits as mitigation of impacts on the marsh and the adjacent land around the site, it is important that the tenants will abide by the guidelines and regulations of the park operator.

<u>Visual impacts on people looking across the marsh or looking at the site from nearby park lands:</u> A comprehensive visual impact analysis has been conducted for the DEIS that includes investigating a number of viewplanes that were identified as significant by previous environmental reviews and the specific requirements of DPP. A total of eight significant viewplanes were identified for the visual impact analysis, and of these eight viewplanes, four were studied in more detail with the help of virtual visualization of the future development. The visualizations were created by constructing a virtual 3D-CAD model of the proposed development (including typical site features such as roads, landscaping, cars, trucks as well as buildings) with dimensions that fit the proposed site layout and rendering the 3D-model using the same camera setting as the photographic images of the site from the elected viewplanes. Hybrid visualization mages were then obtained by merging current photographic images with the anticipated future virtual rendering to assess the visual impact of the proposed industrial development.

The visual impact assessment also investigated preferred color schemes for future structures, and preferred placement of trees around and within the development for effective visual impact mitigation. The analysis determined the effectiveness of the proposed vegetative buffer zones around the development, as well as between the upper and lower portions of the site, to mitigate near-distance and long-distance views that are impacted by the proposed project. The comprehensive visual impact analysis is presented in Appendix 8.

<u>Revisiting the market study and amending or updating the pertinent conclusion drawn in the FEA:</u> The DEIS has revisited the market study, conducted an updated analysis of the data presented and discussed the findings of the study in light of the new data or findings. The DEIS includes a survey of the businesses which lease space in the existing light industrial park (e.g. within TMK 4-2-15:008) in order to quantify the percentage of employees of these businesses who come from Kailua or Kaneohe as well as characterize the size and type of the businesses. This survey is presented in Appendix 3: Survey of Existing Businesses at the Project Site

<u>Analyze whether a catastrophic septic tank failure is in fact possible:</u> The preparation of the DEIS has included a review of the technical literature to identify cases of and reasons for septic tank failure, or for failure of the overall septic systems. The results of the review

suggest that given proper design, material selection and installation procedures, failures of septic tanks are very uncommon. Reported cases of tank failures typically suggested corrosion of the tank, improper foundation of the tank and external damages, e.g. exceeding of the design loads by trucks or damages due to construction activities. It was identified that regular inspection by certified pumpers or wastewater professionals can detect modes that would lead to structural failure. Good management of the septic tank, which includes regular pumping of the solids when a certain volume of solids in the tanks are surpassed and vigilant inspection of the area around the septic tank, is the best measure against tank failure.

The technical review also identified that the failure of the leach field (or subsurface injection field) can have an equally detrimental effect on the performance of the septic system. Failure of the leach field occurs when part of the infiltration field becomes clogged by exceeding the designed organic loading of the field, from problems resulting from incorrect distribution of the wastewater discharge from the septic tank, or from insufficiently treated sewage reaching the ground water table, to name the most common failure modes. Failure of the septic system can also be attributed by insufficient removal of BOD loads and insufficient removal of total suspended solids (TSS) as well as nutrients (e.g. nitrogen and phosphorus). Part of the sustainable design approach will use advanced onsite wastewater treatment to lower the organic loading of the leach field, increase the rate of nutrient removal and prevent groundwater from being impacted by insufficiently treated wastewater.

<u>Impacts from the pre-existing conditions of contaminants leaching from the ground within the site:</u> The DEIS includes a discussion of a review of the technical literature regarding mechanisms that affect leaching contaminants from landfills. The DEIS discusses reported procedures of reducing leaching by sealing the landfill surface in what is referred to as a “sealed tomb” approach. In this approach, creating impermeable surfaces and using collected rainwater for landscaping would reduce the amount of water that infiltrates into the former landfill body found at the site.

<u>Alternatives considered:</u> Following the recommendations and requirements in the DPP letter, the DEIS is presenting additional alternatives and design alternatives considered by the applicant in more detail. The DEIS discusses the merits and disadvantages of alternative approaches and then selects two alternatives plus the “no action alternative” for a more detailed discussion of possible impacts.

<u>General requirements to use low impact development technologies:</u> The DPP letter addresses the need to effectively mitigate impacts of the project, since the proposed project site is located within a large preservation-zoned valley as well as next to the largest wetland in the state, where four species of endangered water birds are found. While the applicant needs to ensure the commercial viability of the development goals of the project, which are to provide modern and secure industrial space to the Koolaupoko region, the applicant is committed to

develop the project with a significant number of low impact development measures, in order to reduce and mitigate any possible impacts on the community and environment.

In due process, the design of the project has evolved and has planned for specific low impact development technologies and procedures to effectively reduce impact. Since the applicant is fully committed to develop the proposed project in the most environmentally responsible way, he has specified developments goals and procedures that will earn a LEED Silver certification upon completion of the project.

1.5.2 Responses to the Comments Received from the EISPN

There were eight comments received from the published EISP by the following agencies:

1. Department of the Army, Corp of Engineers, District Honolulu, dated July 28, 2010
2. Oahu Metropolitan Planning Organization (Oahu MPO), dated August 2, 2010
3. State of Hawaii, Department of Health, Clean Water Branch, dated August 5, 2010
4. State of Hawaii, Department of Health, Safe Drinking Water Branch, Environmental Management Division, dated August 11, 2010
5. State of Hawaii, Department of Health, Indoor and Radiological Health Branch, dated August 11, 2010
6. United States Department of the Interior, Fish and Wildlife Services, Pacific Islands Fish and Wildlife Office, dated August 20, 2010
7. State of Hawaii, Department of Land and Natural Resources (DLNR), Land Division, dated August 24, 2010
8. State of Hawaii, Department of Transportation, dated September 1, 2010
9. Hawaiian Electric Company, Inc, dated October 12, 2010

The scanned letters by the agencies containing the comments are presented in Appendix 1.

<u>Response to the letter No. 1 by the Department of the Army, Corp of Engineers:</u>

The development work of the proposed project will not include any construction, dredging or other activities in, over or under navigable waters of the U.S. as well as any wetland areas. According to the recommendations of the U.S. Army Corp of Engineers (USACoE), a Water Resources Investigation (refer to Appendix 7) was conducted, describing wetlands, drainage ditches, gulches, gullies, streams, on or adjacent to the proposed site, that may be impacted by the proposed project. The Water Resources Investigation found that there is one stream, one drainage ditch, one flood control and sedimentation basin, several acres of wetland and one percolation field within the property. With the exception of the percolation field, which receives stormwater runoff from an adjacent street, all of the identified water resource components are outside the development footprint and will not be impacted by project. The percolation field would be basically maintained adjacent to the graded development and would be improved, in conjunction with a restoration of vegetated area around the discharge point of the culvert through which the storm runoff from the adjacent road enters the site.

As recommended in the letter, the proposed project will employ efficient Best Management Practices to curb any polluted runoff into the adjacent receiving waters. The comments and recommendations were discussed with the staff of the USACoE.

<u>Response to the letter No. 2 by the Oahu Metropolitan Planning Organization:</u>

The letter indicates several long-range transportation issues, needs, goals and objectives which are in the same general vicinity of the proposed light industrial park. The list provided in the letter indicates that no transportation improvements are planned in the direct vicinity of the project.

<u>Response to the letter No. 3 by the State of Hawaii, Department of Health, Clean Water Branch:</u>

The recommended review of DoH guidelines were followed to ensure that the proposed project would comply with all water quality and land use related issues.

The project will abide by the statues and laws pointed out in the letter, specifically as it relates to antidegradation policies, designated use and water quality issues. The project will obtain all permits required under the National Pollutant Discharge Elimination System (NPDES), both during construction and operation. Based on the specifics of the project and the planned stormwater mitigation as well as onsite wastewater systems, it is not anticipated that the project would require NPDES individual permits. The USACoE has been contacted to ascertain that construction work for the proposed project would not be carried out in, over and under navigable water of the U.S., which would require a section 401 water Quality certification.

The proposed project will implement sound measures to avoid any negative impacts on the water quality of the receiving waters. As part of the LEED certification requirements the project will be implementing sustainable design and construction measures for the portions of the site that are in close proximity to wetlands, streams and drainage canals. The proposed sustainability design approach (see Appendix 4) delineates that the water resources approach of the proposed project section, including stormwater quantity and quality runoff treatment as well as wastewater treatment, is outperforming the already high LEED requirements.

<u>Response to letter No. 4 by State of Hawaii, Department of Health, Safe Drinking Water Branch</u>

The DoH letter indicates that the agency does not object to the project plans of obtaining drinking water from the Board of Water supply system. Since the project proposes the use of non-potable for irrigation, wastewater conveyance and, possibly, some custodial uses, the letter indicates the need to design and operate the dual water system in such a way to avoid cross-connection and backflow conditions. The project intends to follow strict guidelines for the design and operation of non-potable water, such as properly labeling of water faucets with signs of non-potable water, using below-ground irrigation for graywater, and using a separate system for use of harvested water in the buildings (i.e. for toilet flushing), among other measures.

The recommended water system management plan is part of the sustainable design approach for obtaining LEED Silver certification upon construction of the development. The water system management plan will be maintained and enforced by the industrial park operator.

Response to letter No. 5 by State of Hawaii, Department of Health, Indoor and Radiological Health Branch:

Following the request by letter, the project will comply with the Administrative rules of the Department of Health, Chapter 11-46, Community Noise Control.

Response to letter No. 6 by United States Department of the Interior, Fish and Wildlife Services, Pacific Islands Fish and Wildlife Office:

The project will follow the requirements, guidelines and recommendations of the letter in order to preserve the habitat conditions of the indicated federally endangered Hawaiian stilt, Hawaiian moorhen, Hawaiian coot and Hawaiian duck as well as populations of migratory waterfowl and shore birds protected under the Migratory Bird Treaty Act (MBTA).

The letter states the previous plans of the developer of the proposed light industrial park to develop a 15-acre wildlife habitat and wetland restoration project on land adjacent to the project site and within the land parcels owned by the developer. The developer (in a change from the FEA) is no longer pursuing plans for the wetland restoration project that would develop a 15-acre wildlife habitat. The wetland area that would have been restored by removal of vegetation to create a series of about 15 of shallow ponds and mud flats will remain in its original state. The developer might revisit the plans for an improvement of the 15-acre wetland site, but such improvement would be to improve water quality in the wetland area, not to create a wildlife habitat.

Therefore the requirements and recommendations in the letter, which address the concerns of the development of the wildlife habitat and wetland restoration, are no longer directly applicable to the project. One of the comments, which address the need to minimize water bird attraction to detention ponds, remains a concern, even though the wildlife habitat project is no longer pursued. The detention ponds are required to manage stormwater runoff quantity and quality issues in the case of intensive precipitation events. Rainwater from less intense events will be harvested in underground cisterns to be used for irrigation. Therefore the detention ponds will be typically completely empty and will only be filled or partly filled on rare occasions. There will be no permanent large residual water surface in the detention ponds which could attract a permanent habitat for the endangered water birds that were mentioned in the letter.

Response to letter No. 7 by State of Hawaii, Department of Land and Natural Resources (DLNR), Land Division:

The letter posted a number of comments to which we respond in the order that they are presented in the letter:

1. The Board of Water Supply has been advised of the project and has indicated that the project can be supplied by the existing water supply infrastructure. As a change from the FEA, the project now will implement significant water savings for a portion of the project.

4. Water efficient fixtures, as recommended in the letter, will be installed and water efficient practices will be incorporated in the project in all phases. These measures are part of the LEED certification goal for a portion of the development.

5. Best Management Practices (BMP) will be implemented as are required by applicable codes and laws. In following the Sustainable Design Approach and LEED certification goals the BMP selected will adhere to more stringent requirements than those required by codes and laws.

7. The developer will adhere to all required measures to ensure the water quality of the receiving waters and the ground water at the project site.

11. The developer does not plan to use the indicated wells and no infrastructure has been installed to pump water from these wells. If these wells are affected by the proposed construction they will be properly abandoned and sealed and a permit for well abandonment will be obtained.

13. Stream channel alterations are not planned in conjunction with the project, but if they become necessary the applicable permits will be obtained before start of construction.

Others: Planned construction will not affect the stream bed of the Kapa'a Stream. If any alterations of the stream bed become necessary, the applicable permits will be obtained before start of construction.

Response to letter No. 8 by State of Hawaii, Department of Transportation:

The letter suggests that State highway facilities, Mokapu Saddle Road, and Kalanianaole Highway will impacted by the project. The comments were discussed with the DoT project team. As recommended in the letter, the traffic and roadway impacts will be addressed in the DEIS and mitigation measures will be recommended. The traffic impact assessment report which was developed for the FEA is also part of the DEIS. The TIAR presents a quantitative assessment of the future traffic resulting from the development and provides several mitigation measures.

The LEED approach developed for a portion of the proposed development will implement measures to promote alternative modes of transportation such as incentivized carpooling, use of low emitting cars, a private shuttle between the site and public transportation, as well as promoting bicycles, which will reduce future traffic impacts. The objective of all of these measures are to incentivize or promote alternative modes of transportation in order reduce the traffic volume to and from the proposed development.

Response to letter No. 9 by Hawaiian Electric Company, Inc:

According to the request, more design specifics will be communicated with Hawaiian Electric Company, Inc. (HECO) as the project develops and construction plans are finalized. The DEIS reports on anticipated electric consumption and load requirements and suggests some strategies to lower demand by energy conservation measures (e.g. delineated in the sustainable design approach in Appendix 4).

1.5.3 Changes of Content and Development Approach from FEA Document

The following analyses and discussions of possible impacts and issues are presented in the DEIS, which are different from the content of the FEA document:

Change in land use zone change intent from I-2 to I-1: The applicant will seek a zone change from General preservation (P-2) to Light industrial (I-1), rather than to Intensive Industrial (I-2). This change in requested land use zoning of the two land parcels TMK 4-2-15:001 (portion of) and 006 (portion of) mitigates concerns of the possibility of extremely heavy industries moving into the Kapa’a Valley. The intention of the applicant of developing a light industrial park on the three contiguous land parcels in the Kapa’a Valley has not changed, but the type of businesses that will be leasing the newly developed industrial space can conduct their businesses in space that is zoned I-1. The reason that the applicant originally sought a zone change for the two parcels to I-2 was that the land parcel TMK 4-2-15:008, which is located between the parcel TMK 4-2-15:001 and 006 (portions of), is already zoned as I-2, and therefore a land use zoning of I-2 for all three contiguous and parcels seemed the preferred approach in the initial design phase.

Discontinuation of the proposed 15-acres wildlife habitat and wetland restoration project: The 15-acre wildlife habitat and wetland restoration project which was envisioned by the applicant in the lower stretches of the Kapa’a Stream corridor and within land parcel TMK 4-2-15:006 will not be developed as described in the FEA. The original plans of the applicant were to establish a 15-acre large wildlife habitat, surrounded by a special wildlife fence to keep non-native predators of water birds out, within a restored wetland area. The applicant intended to develop the wildlife habitat and wetland restoration in cooperation with and with partial funding by the U.S. Department of Agriculture Natural Resources conservation Service (NRCS). The applicant commissioned a concept design study that delineated a suitable configuration of the wildlife park and the envisioned system of 15 cascading ponds, which would provide habitat for the endangered water birds (e.g. shallow ponds that are dry through the summer months, mud flats that are preferred by the Hawaiian stilt). One or two public observation sites were planned to allow the public opportunity for bird watching inside the wildlife habitat).

The concept design study was presented to the State of Hawaii Department of Health and it was determined that the removal of the thick wetland vegetation, which was required to establish the desired habitat for the water birds, might negatively impact the ability of the wetland area to remove pollutants carried and deposited in the area by the Kapa’a Stream. A degradation of the water quality in the Kapa’a Stream, which is listed on the State list of impaired water bodies, could therefore be a result of the habitat project. The 15-acre wildlife habitat and wetland restoration project was therefore terminated. The applicant might, at a future point in time, initiate a wetland restoration project that would increase the water treatment capacity of the wetland area on his property rather than developing a wildlife habitat.

<u>Existing drainage ditch (canal) along the quarry road:</u> The previous planned development approach intended to develop the new site directly adjacent to the drainage ditch along the quarry road. Previous proposals suggested a change to this plan for the drainage ditch, e.g. partly filling the ditch with pervious gravel and placing a drainage pipe inside the filled ditch to allow drainage of surface and seepage water towards the Kapa’a Stream. It was proposed to develop the established area with native or adaptive plants and provide a shoulder for the quarry road, which at this point does not have a shoulder (or an insufficiently wide shoulder) between the road and the drainage ditch. In conjunction with these development strategies the applicant further proposed to locate a portion of the envisioned marsh perimeter trail (combined walkway and bikeway) on the area that would be established by filling the canal.

The DEIS presents a change in the design of the development adjacent to the drainage ditch along the quarry road. In the new design approach the development would be set-back from the drainage ditch by about 15 to 20 feet, and an existing service dirt road would be retained that is used for maintenance of the drainage ditch. The earth berm with the vegetative buffer around the eastern side of the lower portion of the site would commence on the mauka side of the maintenance road. Therefore, in the new design the drainage ditch would remain in the current state and the development would not impact on the stream channel or the banks of the ditch.

The applicant might at a point in the future revisit plans of improving the canal if such an initiative would be supported by the community and the federal, state and county agencies which are responsible to approve such changes to the drainage ditch.

Distinction between impacts and mitigation measures between the lower and the upper portion of the project site: The lower portion of the site encompasses the part of the land parcel TMK 4-2-15:006 created by a former land fill. The lower portion of the site may impact the surrounding wetland areas, the Kapa'a Stream and the surrounding environment more significantly than the upper portion of the proposed site. The upper portion of the site is a quasi-level plateau with elevations about 40 to 60 feet higher than the lower portion of the site, thereby providing a natural buffer zone between the industrial development and the surrounding wetland and open space.

The development approaches of the upper and lower portions of the site will therefore be significantly different. The upper portion of the site will be developed following conventional building technologies and site development procedures, resulting in impact mitigation measures that are equal to applicable codes or laws. The lower portion, however, will be developed in accordance to sustainable building technologies which will go beyond the basic requirements of applicable codes and laws, in order to minimize impacts to the environment and the community. When discussing impact mitigation in the text a clear distinction is drawn between mitigation strategies applying to the lower and upper portions of the site.

Commitment to develop the lower portion of the site in accordance with the requirements for LEED Silver: While the FEA generally mentioned the intention of the applicant to use a development methodology that included sustainable building technologies, and mentioned the goal to be "LEED certified", the DEIS contains the specific sustainable design approach (refer to Appendix 4) with a detailed description of which credits will be attempted to attain the LEED Silver certification goal. The FEA presented a list of possible credits that the project would be choosing from, without committing to the concrete LEED certification strategy. The DEIS lists and describes the credits that will be attempted to achieve LEED Silver certification.

Strategic choice of the LEED certification strategy to effectively mitigate possible impacts that are important for the site: The approach to achieve sufficient LEED credits for the certification goal gives the project team the ability to choose which credit categories best apply. For example, of the 110 possible credits under the LEED V.3 Core and Shell certification system, the project team has to achieve at least 51 points for Silver certification. In general circumstances, a project team may choose to attempt those credits which offer a comparatively moderate investment for the number of credits achieved. However, for the proposed Kapa'a Light Industrial Park, the choice of the credit categories is according to the mitigation measures that are most important at the site. For the proposed project the Water Efficiency (WE) credit category was given the highest significance, due to the close proximity of the project site to important wetlands and the Kapa'a Stream. The sustainable design approach seeks all possible credits of the WE category, and in addition an exemplary performance credit is also attempted for innovative wastewater systems. In order to achieve the attempted certification of the WE category, highly effective mitigation measures have been selected for water savings, onsite wastewater treatment and efficient irrigation. Thus, by choosing the appropriate sustainable design solution to achieve certain LEED credits, many verifiable impact mitigation measures will be implemented at the site. In many EIS reports mitigation is reported as "desirable" or "preferred", but by mapping the LEED credits to the strategic impact mitigation goals of the project, a mitigation strategy emerges that is much more tangible and conclusive, and is based on committed actions. The DEIS discusses what important impacts are mitigated by the specific LEED credits.

<u>Water resources analysis and survey:</u> The DEIS presents a survey and discussion of water resources on and adjacent to the site. Background information was assembled that reports on the development of water resources in the Kapa'a valley and a field investigation was conducted to document the current water resources and to identify how the proposed project would impact these water resources. The comprehensive water resources assessment is presented in Appendix 7.

<u>A comprehensive visual impact analysis:</u> The FEA contained a brief description of the anticipated visual impact of the project on views from one location in the vicinity of the project. The FEA used a single, simple visualization of the anticipated future view by superimposing an approximated rendering of the future development on a current photographic image. The DEIS presents a comprehensive visual impact analysis, comprised of eight important viewplanes that were identified as significant. For four of these viewplanes, a more detailed visual analysis was conducted by creating refined 3D-CAD models and generating more comprehensive virtual renderings of the future development. In stronger fashion than the FEA, the DEIS contains several virtual renderings showing a range of visual impact mitigation; thus creating realistic estimates of the anticipated visual impact of the proposed project. The comprehensive visual impact assessment is presented in Appendix 8.

<u>Changed systems for energy and water supply:</u> The design approach for the energy and water supply systems of the lower portion of the site has changed. Part of the electricity will be furnished by onsite Photovoltaic (PV) panels. The electricity demand of the buildings within the lower portion of the site will be at least 30% lower than the baseline consumption of conventional industrial warehouses. Likewise, the water supply methodology has been changed, since the water savings under the LEED certification approach needs to be at least 40% below a conventional commercial building baseline consumption rate.

Changed stormwater treatment system: The stormwater treatment system used in the DEIS design has changed from the design presented in the FEA. In the updated design of the lower portion of the site stormwater will be collected and harvested for irrigation and certain recycled water uses inside the buildings. The stormwater to be used for irrigation will be collected not only from the roofs but also from sections of the roadways, and conveyed to underground cisterns, and from there pumped to irrigation systems.

More advanced onsite wastewater treatment systems: The FEA considered the use of conventional septic systems, each consisting of one septic tanks and one underground injection fields (leach fields), for all of the onsite wastewater treatment systems.

The design approach considered in the DEIS uses advanced onsite wastewater treatment for the lower portion of the site. As pointed out, the lower portion of the site requires a more thorough impact mitigation process than the upper portion of the project site, due to the proximity to wetland areas, the Kapa'a Stream and groundwater table. The advanced wastewater treatment scheme selected includes aerobic treatment, anaerobic de-nitrification and filtration process steps. These steps significantly increase the removal rates of biological oxygen demand (BOD), total suspended solids and nutrients from the wastewater. The high level of treatment will make it possible to use the treated wastewater for irrigation (e.g. drip irrigation and percolation fields for below ground irrigation). The high efficiency in nutrient (mostly nitrogen) removal from the wastewater is an especially effective measure which will protect the adjacent wetlands and receiving waters from excess nutrient loads. The selected onsite wastewater treatment approach is part of the sustainable design approach (see Appendix 4) and the wastewater treatment will be submitted to receive exemplary performance credit under the LEED project approach.

Discussion of possible catastrophic failure of septic systems: As requested the DEIS discusses the possibility of a catastrophic failure of septic tank system. In addition, the DEIS includes discussion of the possibly more potent impact of failure of the underground infiltration system.

Impact potential of leaching of the former landfill area which constitutes the site: The DEIS presents the results of a technical literature review about mechanisms associated with leachate from older landfills. The DEIS discusses the impact of the planned development schemes on the potential of leachate quantity and quality.

Alternatives considered for the development methods of the proposed project: The DEIS expands on the alternatives considered in the FEA. Several alternative development and design approaches for the entire site or parts of it are discussed. For the assessment of impacts of the proposed project, two alternatives are selected, incorporating the candidate design measures for the proposed project. A No-action alternative, under which no construction occurs, is analyzed and discussed to serve as a baseline against which the anticipated impacts of the action alternatives are compared. In addition, since "no action" could also infer to a scenario under which a land zone change is denied, the DEIS also briefly discusses possible scope of construction and development in only parcel TMK 4-2-15:008, which is already zoned as I-2 and therefore does not require a zone change.

Presentation of findings of the market study: As requested, the DEIS is revisiting the findings about the impact of the proposed Kailua Light Industrial Park project on the economy and the public services in the Kailua and Kaneohe region. A survey of companies presently doing business at the existing industrial development was conducted for the DEIS, to provide baseline data for the estimate of how many employees of new businesses would move towards the Kailua and Kaneohe region, thereby impacting the public services in the region.

Analyzing a broader range possible impacts on the Kawainui Marsh: While the FEA identified a range of possible impacts of the proposed project on the Kawainui Marsh, the DEIS expands the list of possible impacts, discusses the degree of impacts and recommends mitigation procedures.

Impacts on the marsh from increased volume of heavy truck traffic: As requested in the DPP determination letter, the DEIS discusses impacts from increasing traffic of heavy trucks on the marsh and recommends mitigation measures.

1.6 Responses received to the DEIS

A total of 20 letters containing comments and recommendations were received following the publication of the DEIS. Copies of the letters received and the responses are presented in the amended Appendix 1.

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CHAPTER TWO - PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed action, and identifies the design and development alternatives that have been considered during the concept design phase of the project.

2.1 Proposed Action

The specific recommendation is to develop a light industrial park on three contiguous land parcels in the lower stretches of the Kapa'a Valley to provide much needed industrial space to businesses within the Koolaupoko region.

To implement the action, the applicant proposes to implement the following measures and provide:

- About 23 acres of newly rezoned land that will support businesses to expand or relocate light industrial activities within the Kailua and Kaneohe regions.
- A new light industrial park that will be developed as an expansion of an already existing industrial warehouse development, taking advantage of already existing infrastructure and expanding the light industrial land use at the site.
- Land for industrial activities that are located on former landfill area. The development of the landfill area will reduce problems of soil erosion and resulting runoff.
- A total of 625,000 square feet of newly constructed industrial zoned space in modern warehouse structures or, as an alternative, several acres of base yard space which would replace a specific amount of warehouse space. Since 19,000 square feet of existing warehouse space planned to be demolished, this results in a net addition of 606,000 square feet of warehouse space at the proposed site.
- Infrastructure to supply the new industrial space with water and electric power by interconnecting with municipal water and power infrastructure.
- Onsite wastewater treatment. Since the project site as well as the entire Kapa'a Valley is presently not connected to the municipal sewage system, and a connection would require a forced sewer system.
- A comprehensive stormwater system that avoids high peak discharge rates during heavy storm events and avoids polluted runoff from the site into the receiving waters. The stormwater system would comprise runoff conveyance in swales, channels and pipes, detention ponds, stormwater treatment units to eliminate floatables and significantly reduce sediments, oil and nutrients content in the stormwater, and rainwater harvesting systems. The measures of quality and quantity control of stormwater differ between the parts of the proposed industrial park.

- Sufficient on-site (off road) parking for the additional employees and visitors of the development on site as well as facilities for parking and loading of heavy trucks within the development.
- Development of the larger part of the rezoned land in accordance to low impact development technologies and principles. The lower portion of the proposed site, which comprises the larger part of the land to be rezoned, is located in close proximity to environmentally and culturally important wetland.
- In accordance with the recognized need for low impact development approaches, the lower portion of the site would implement design, construction and operational measures to achieve Leadership in Energy and Environmental Design (LEED) Silver certification upon completion of the project. The LEED development approach for the development involves measures to limit impacts derived from the site, efficient use of water and energy, material reuse and recycling as well as lowering indoor environmental impacts. The LEED Silver certification is a quantifiable measure for the environmentally friendliness and energy effectiveness of the proposed

2.2 Ability of Region to Absorb Amount of Planned Additional Industrial Space

A market study was conducted for the project and is presented in Appendix 2. The main conclusions of the market study corroborate the ability of the region to absorb the planned amount of added industrial space, as is summarized in the following:

- The Koolaupoko region, also characterized as “Greater Kailua/Kaneohe” from the trade area perspective, has a significantly undersupplied industrial sector, when compared with any urban regions on Oahu. The area currently only supplies about 21 percent of the industrial space demand created by the size of its resident population.
- The market study predicts that over the next 20 years (through 2030) the Koolaupoko region will readily support an additional about 1,000,000 gross square feet of industrial-type floor area or about 96 acres of vacant industrial zoned. The 606,000 square feet of new floor space that the proposed project will provide would therefore only provide some 63% of the predicted demand. Currently there is limited available land in the region that is appropriately zoned for industrial-type activities and industrial lands in the region are being diminished by ongoing or planned transformation to higher return commercial or residential development. Due to this very limited alternative availability of industrial-type floor space in the region, it can be assumed that the proposed project will be able to lease all of its planned space.
- Based on historical trends it is forecasted that it would take from 15 to 17 years for the proposed 606,000 square feet of expanded floor space in the Kapa’a Light Industrial Park to reach full adsorption. For the subsequent analysis in this DEIS a development time of 15 years is assumed.

2.3 Identification of Alternatives

To implement the Proposed Action, the applicant has identified two action alternatives. These alternatives are identified in the DEIS as the Preferred Alternative and Alternative B.

The two action alternatives differ in their use of construction technologies and the use of the open space that directly surrounds the proposed site. The Preferred Alternative uses a low impact development approach for the area that is closest to the adjacent wetland area. The Preferred Alternative implements sustainable building technologies and utilizes the surrounding open space as restored habitat in order to effectively mitigate impacts and to lower the energy and water demand. Alternative B follows a conventional construction and development approach of the buildings and the site. While Alternative B satisfies applicable local, State and federal codes, the Preferred Alternative far exceeds this basic code requirement in order to derive a significantly lower environmental foot print. The Alternative B results in less development costs than the Preferred Alternative, due to the additional costs for sustainable building technologies and site development approaches.

In addition, the No-Action alternative is evaluated. The No-Action alternative is required by statute and describes the impact at the proposed site and for the region if no additional industrial space is added to the existing space. The three alternatives which are evaluated in this DEIS are briefly summarized as follows:

Preferred Alternative:

The lower and upper portions of the site are developed, with the lower portion of the site, e.g. the part of the site adjacent to wetland area, developed with low impact development practices.

Alternative B:

The lower and upper portions of the site are developed, and all parts of the proposed industrial park are developed with conventional building technologies.

No-Action Alternative:

No further addition of warehouse space occurs on the portions of the site covered by this DEIS.

2.4 Siting of Facilities

General siting criteria include consideration of compatibility between the functions of the proposed industrial development and the sought land use zone designation for the site, adequacy of the site for the function required, proximity to related activities, availability and capacity of roads, efficient use of property and resources, development approaches and special site characteristics, including environmental compatibilities.

Specific siting criteria include considering possible migration to the region of the future workforce which will be employed by companies leasing space in the proposed development, the ability of the region to absorb the added industrial space, and the possible impact on public services by the project.

The following list presents constraints, considerations and criteria for the evaluation of the proposed site, which are derived from the overall impact on the environment and community:

- Business objectives and measures to implement business objectives
- Topography
- Areas of no-constructability, preservation of open space and habitat
- Wetlands and Buffer zones (specifically impacts on the adjacent marsh)
- Drainage and stormwater treatments
- Soil considerations
- Orientation (i.e. sun and wind exposure)
- Visual impact
- Accessibility with alternative transportation
- Utilities availability
- Site work
- Environmental aspects
- Watershed considerations and effects on water quality receiving waters
- Restoration of habitat
- Permitting
- Historical and cultural considerations
- Regional, State, and Federal planning
- Building and fire codes
- Parking requirements
- Acreage/height limitations
- Land use
- Waste management
- Traffic (level of service, emissions, safety, flow capacity)
- Public relations
- Disruptions due to construction
- Outdoor lighting

- Phasing
- Economics (life cycle cost, construction cost, operations and maintenance costs)
- Improvement of regional economic base (tax revenues, added employment, growth of regional economy)
- Impacts on utilities and resource capacity
- Local/Regional planning regulations and guidelines
- Impact on endangered species

Figures 2-1 and 2-2 show the property boundaries and the existing land uses at the proposed site, respectively.

As illustrated in Figure 2-1, the proposed site comprises three land parcels, TMK 4-2-15:001 (portion of), 008 and 006. The land parcel 4-2-15:001 has a listed total area of 378 acres, but only 13 acres of the parcel is included in the evaluation of this DEIS, since the rest of the parcel is not located adjacent to the project site and is not part of the proposed action. The proposed site is located south of the H3- Freeway. The site is accessible from the Kapa’a Quarry Access Road. The proposed site includes sections of the Kapa’a Quarry Road, which is the roadway that connects the existing land uses in Kapa’a Valley with Kailua and Kaneohe.

Figure 2-2 shows the existing land uses at the proposed site. The figure categorizes the existing land use in four functions:

- Open space, which is vegetated and pervious, includes areas such as the Kapa’a Stream corridor with delineated wetland, a flood control area which was a settling pond for an upstream landfill area, the vegetated area between the lower and upper portions of the project site and the vegetated area that borders the quarry road. Open space is located only within the parcels TMK 4-2-15:001 and 006.
- Graded and non-vegetated land, that is pervious. This area is used by land tenants for exterior storage as well as processing of inert building material and green waste processing. Graded land is located in all three parcels.
- Developed land, which is impervious. The area includes existing warehouses and other structures and surrounding paved area. Developed and paved area is presently only located in parcel TMK 4-2-15:008.
- Other areas, comprising land use such as publicly accessible roadways, maintenance roads and drainage facilities. The parcel TMK 4-2-15:001 includes a portion of the Kapa’a Quarry Access Road. The parcel TMK 4-2-15:006 includes some portions of the Kapa’a Quarry Road, the drainage canal next to the quarry road, and the gravel maintenance road for the drainage canal.

Aerial photographic image shows the situation at the site at the beginning of 2008

Scale 1" = 500 feet

	TMK 4-2-15:001 (port. of)	TMK 4-2-15:008	TMK 4-2-15:006
Parcel in upper or lower portion of site	upper portion	upper portion	lower portion
Size of land parcel (acres)	13.0 (note A)	22.3	43.8
Current State land use district	Urban	Urban	Urban
Current County land use district	P-2 General Preservation	I-2 Intensive Industrial	P-2 General Preservation

Note A:
total size of parcel TMK 4-2-15:001 is 378 acres; only 13.0 acres are located close to the by project, the remaining acres of the parcel are located beyond the H3-freeway

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Figure 2-1:
Property boundaries of project site

Aerial photographic image shows the situation at the site at the beginning of 2008

Scale 1" = 500 feet

	TMK 4-2-15:001 (port. of)	TMK 4-2-15:008	TMK 4-2-15:006
Open vegetated space, pervious (acres)	Open space, including Kapa'a Stream corridor and flood basin for landfill runoff (8.1)	Small open vegetated space, permeable, along quarry access road (0.2)	Open space, including Kapa'a Stream corridor and exist. earth berm at quarry road (20.1)
Graded non-vegetated, pervious (acres)	Graded non-paved area, land tenants, outside storage for inert construction material (4.4)	Graded non-paved area, land tenants, outside storage for inert construction material (6.2)	Graded non-paved area, land tenants, green waste processing, bldg. material storage (18.9)
Developed non-vegetated area, impervious (acres)	No developed paved area with permanent structures (0 acres)	Developed area with permanent structures, paved around builings (16.0 acres)	No developed paved area with permanent structures (0 acres)
Other area; not affected by development (acres)	Kapa'a Quarry Access road in on propety (0.5 acres)	none (0.0)	Kapa'a Quarry road and drainage canal is on property (4.8 acres)

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Figure 2-2
Current land use at project site

2.5 Summary Description of Alternatives

The three alternatives are briefly described in the following sections. It should be noted that only two of the alternatives, the Preferred Alternative and Alternative B, represent action alternatives since they consider that the required land use zone change of two of the three parcels comprising the project site has been approved. The remaining alternative, the No-Action Alternative, represents a situation with no further development at the site and the development limited to the already industrial zoned parcel TMK 4-2-15:008. While a No-Action alternative is typically evaluated to serve as a baseline for the added environmental impact by the proposed actions, the No-Rezone Alternative depicts a realistic scenario, where the applicant would continue development of industrial land on limited available land if the zone change is denied.

2.5.1. Preferred Alternative

In this section the Preferred Alternative is described in general terms in order to allow comparison with the remaining three alternatives. A more detailed description of the Preferred Alternative is described in Section 2.6. The major design differentiation of the Preferred Alternative is the use of a low impact development approach for the lower portion of the site, in order to significantly minimize possible impacts on the community and environment.

Figure 2-3 shows the schematic layout of the Preferred Alternative. The existing buildings in parcel TMK 4-2-15:008 would remain, with several older structures, accounting for about 19,000 square feet of floor space, to be demolished to make room for two new buildings. Under the Preferred Alternative 625,000 square feet of new buildings would be developed. Considering that about 19,000 square feet of existing building space would be demolished the net added floor space will be 606,000 square feet. This results in a total floor space area of 889,000 square feet at full build out, including the already existing structures at the site. In addition, Figure 2-3 shows the areas within parcels TMK 4-2-15:001 (por.) and 006, which would be rezoned from P-2 to I-1 under the Preferred Alternative.

New buildings would be constructed in all three land parcels, with the largest addition of floor space being added in the lower portion of the site, e.g. TMK 4-2-15:006. The construction of new buildings is limited to area that is currently graded. No current open space area would be used for the construction of buildings, roadways, parking areas and ancillary facilities. All new development would only occur on already disturbed land.

In parcel TMK 4-2-15:006, which represents the lower portion of the site, open space would be increased by about two acres due to conversion of currently graded and non-vegetated land into restored habitat or open space area. In the lower portion of the site a total of 16.7 acres of presently pervious land would be converted to serve as a development foot print for the proposed warehouse development; 11.1 acres of the development footprint would be converted to impervious surface.

In the upper portion of the site, the currently 10.6 acres of graded and pervious area is converted to impervious area, which includes all areas within the development footprint, such areas as impervious pavement around the buildings, impervious pavement of roadways, impervious parking space and the roofs of the buildings. In the Preferred Alternative, not all land within the development footprint in the lower portion of the site is converted to impervious land. Some areas within the development footprint remain pervious. (see a more detailed description of the preferred Alternative in Section 2.6.)

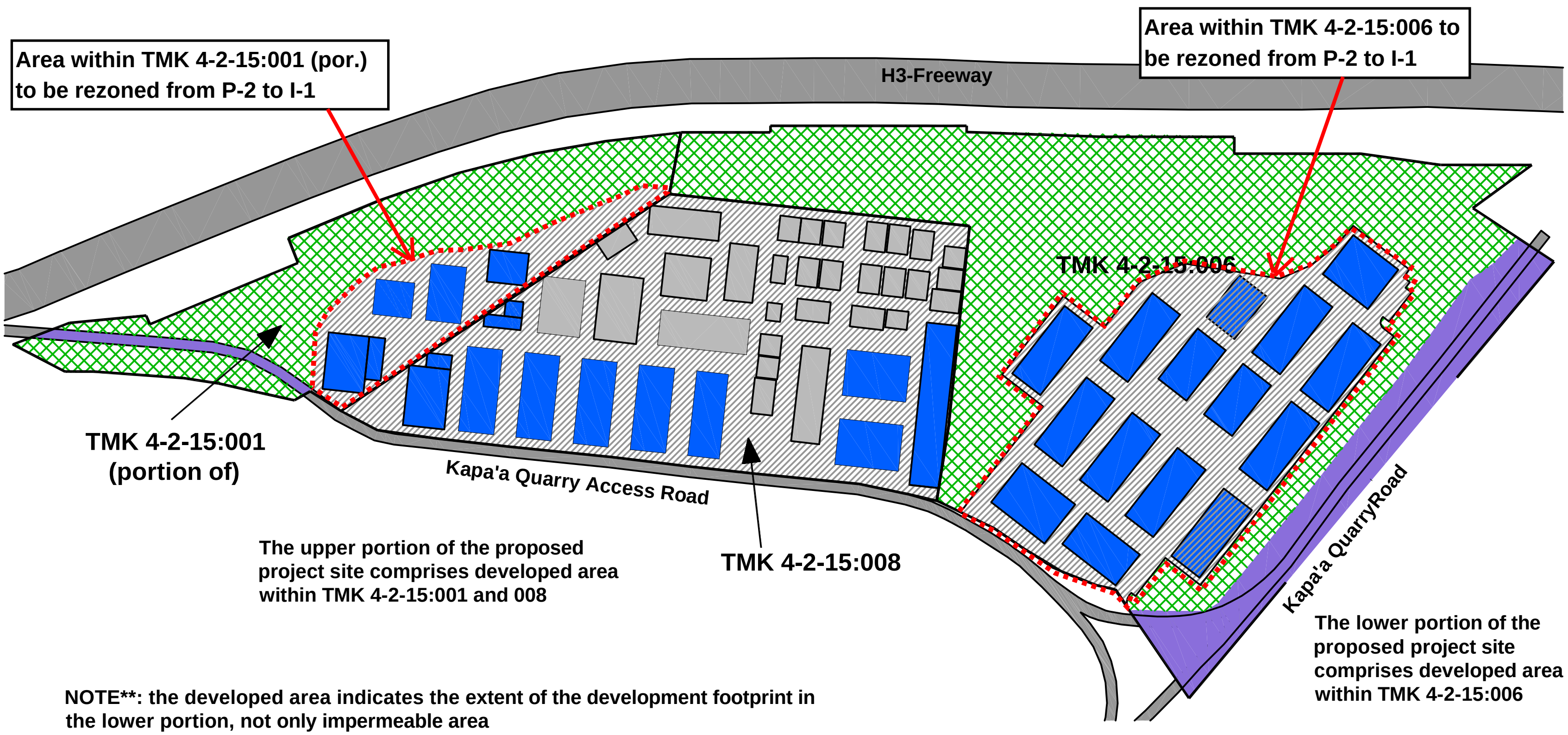
2.5.2 Alternative B

Alternative B differs from the Preferred Alternative in the approach the development footprint in the lower portion of the site (the landfill area within TMK 4-2-15:006) is developed. Alternative B would be built using conventional development approaches and technologies.

Figure 2-4 shows the schematic layout of the Alternative B. The existing buildings in parcel TMK 4-2-15:008 would remain, with several older structures, accounting for about 19,000 square feet of floor space, to be demolished to make room for two new buildings. Similar to the Preferred Alternative, in Alternative B, 625,000 square feet of new buildings would be developed. Considering that about 19,000 square feet of existing building space would be demolished the net added floor space will be 606,000 square feet. This results in a total floor space area of 889,000 square feet at full build out, which includes the already existing structures at the site.

New buildings would be constructed in all three land parcels, with the largest addition of floor space being added in the lower portion of the site, e.g. TMK 4-2-15:006. The construction of new buildings is limited to area that is currently graded. No current open space area would be used for the construction of buildings, roadways, parking areas and ancillary facilities. All new development would only occur on already disturbed land.

The open space in parcel TMK 4-2-15:006 would remain the same as the open space area at the present. A total of 28.6 acres of presently pervious land would be converted to impervious area within the proposed development foot print.



NOTE: the developed area indicates the extent of the development footprint in the lower portion, not only impermeable area**

	Open vegetated space, pervious (acres)	Graded non-vegetated, pervious (acres)	Developed non-vegetaed area, impervious (acres)	Existing building footprint (sqft)	Added building footprint (sqft)	Other area; not affected by development (acres)
TMK 4-2-15:001 (port. of)	8.1	0.0	4.4	None	61,000	0.5
TMK 4-2-15:006	**22.3**	0.0	16.7 (NOTE**)	None	337,000	4.8
TMK 4-2-15:008	0.0	0.0	22.4	283,000	208,000	0.0

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Figure 2-3:

Preferred Alternative, areas of TMK 4-2-15:001 (por.) and 006 to be rezoned from P-2 to I-1

The warehouses would be constructed in a high density manner with paved, most likely concrete pavement, surfaces surrounding the buildings. Parking would be along the warehouses on the continuous pavement. Areas that function as internal roadways would be constructed with concrete pavement. Shallow open swales and underground channels would provide drainage conveyance to one or more detention ponds.

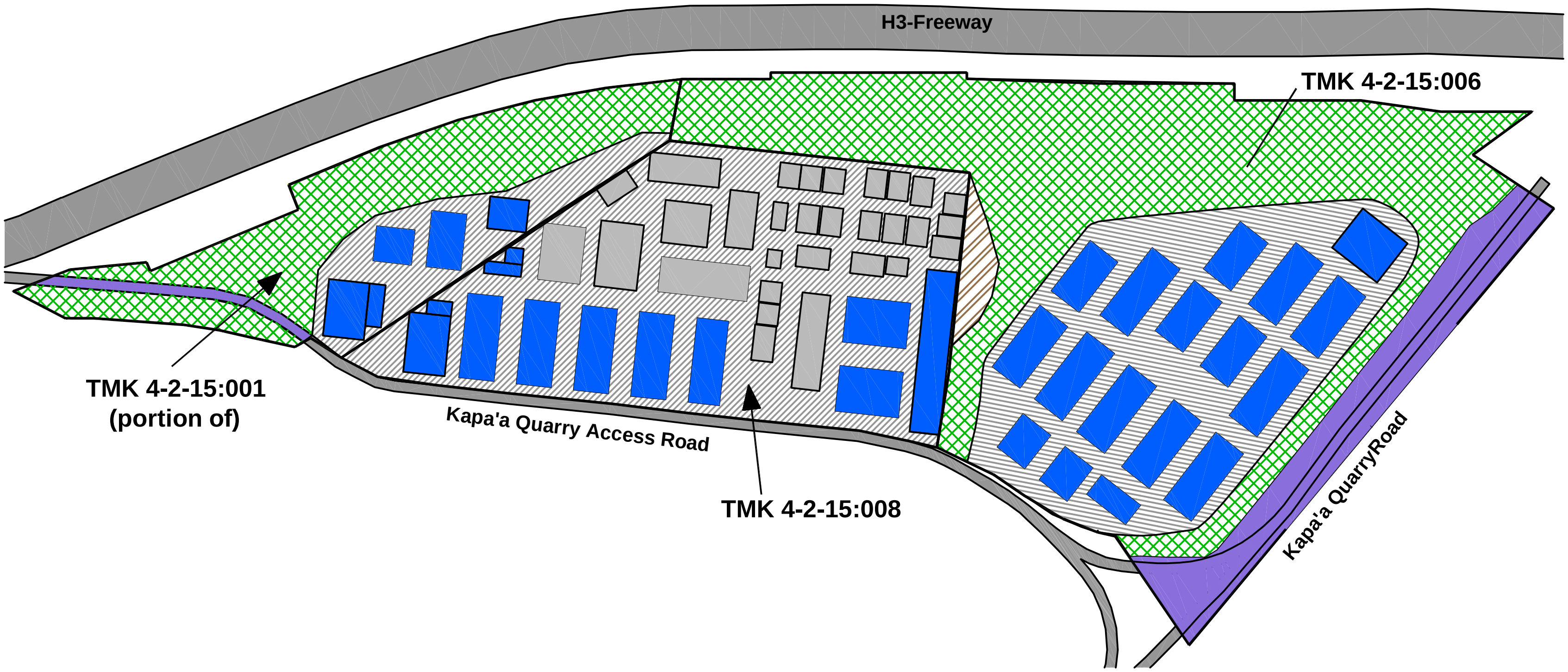
In the upper portion of the site, the currently 10.6 acres of graded and pervious area would be converted to impervious area. This includes all areas within the development footprint, such as impervious pavement around the buildings, impervious pavement of roadways, impervious parking space and the roofs of the buildings. Likewise, 18.0 acres of graded and pervious area would be converted to impervious area in the lower portion of the site.

2.5.3 No-Action Alternative

For the purpose of this DEIS, the No-Action Alternative would maintain the status quo. Under the No-Action Alternative no floor space would be added to space currently available at the site.

Figure 2-5 shows the existing facilities at the project site under the No Action alternative. The parcel TMK 4-2-15:008 has a total of 33 permanent warehouse structures on 16 acres and 6.2 acres of graded, non-vegetated and pervious land used by land tenants. The 16 acres containing the warehouses is paved and non-pervious land. The existing warehouses have a total area of 283,000 square foot; 24 of the warehouses are older types (built prior to 2001) with an average building footprint of 5,000 square foot and seven newer warehouses with an average footprint of 16,700.

The remaining parcels TMK 4-2-15:001 (portion of) and 006 have only areas of graded non-vegetated and un-paved area with a size of 4.4 and 18.9 acres, respectively. In the environmental review analysis, the No Action Alternative performs the important function of an environmental baseline against which the environmental consequences of the other alternatives are measured.



	Open vegetated space, pervious (acres)	Graded non-vegetated, pervious (acres)	Developed non-vegetaed area, impervious (acres)	Existing building footprint (sqft)	Added building footprint (sqft)	Other area; not affected by development (acres)
TMK 4-2-15:001 (port. of)	8.1	0.0	4.4	None	61,000	0.4
TMK 4-2-15:006	**20.2**	0.7	**18.0**	None	337,000	4.8
TMK 4-2-15:008	0.0	0.0	22.4	283,300	208,000	0.0

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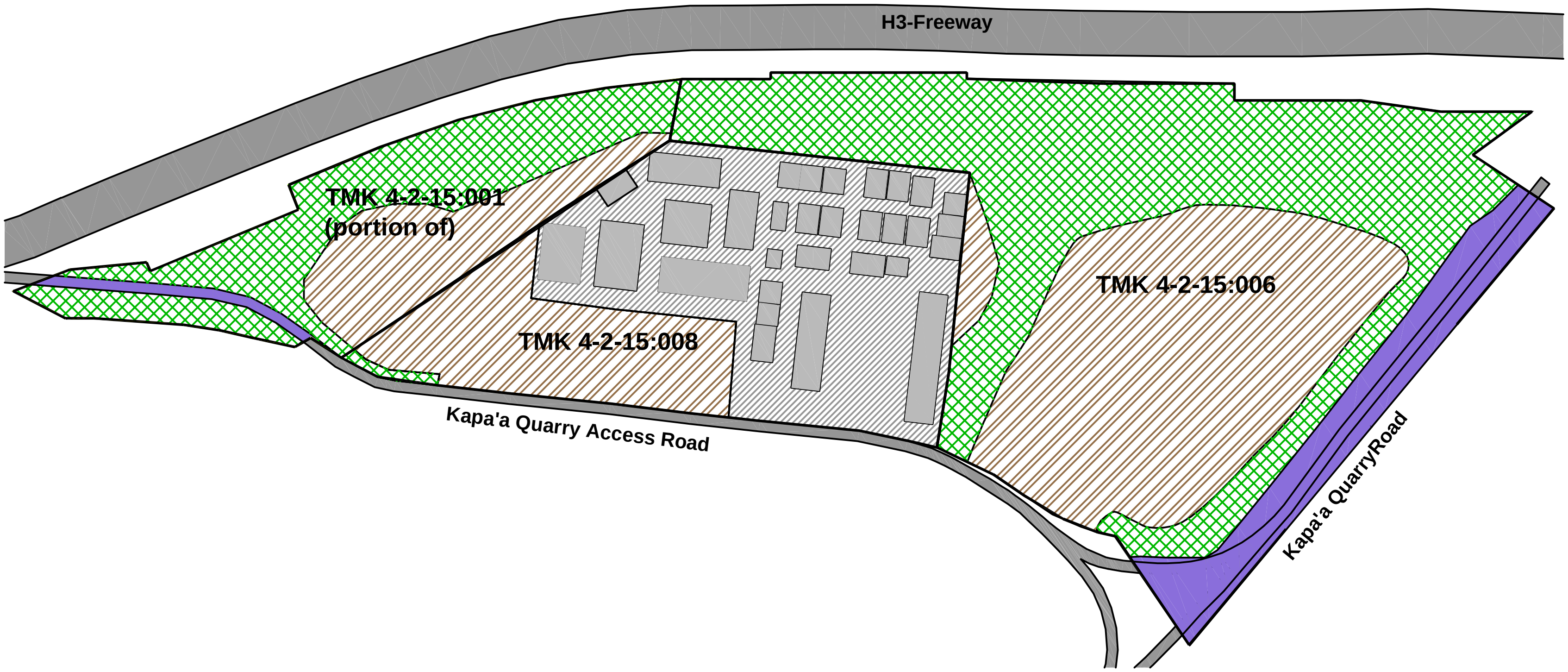
Figure 2-4
Alternative B - conventional high density development in upper and lower portions of project site



	Open vegetated space, pervious (acres)	Graded non-vegetated, pervious (acres)	Developed non-vegetaed area, impervious (acres)	Existing building footprint (sqft)	Added building footprint (sqft)	Other area; not affected by development (acres)
TMK 4-2-15:001 (port. of)	8.1	4.4	None	None	N/A	0.5
TMK 4-2-15:006	20.1	18.9	None	None	N/A	4.8
TMK 4-2-15:008	0.2	6.2	16.0	283,000	N/A	0.0

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Figure 2-5:
No-Action alternative

2.5.4 Comparison of Alternatives for Land Use and added Building Footprint

Table 2-1 and 2-2 show comparisons of the three alternatives for areas of land use categories and for building footprints, respectively.

Table 2-1 Comparison of alternatives evaluated - land use

Comparison of alternatives - land use	No-Action Alternative acres	Alternative B acres	**Preferred Alternative** acres
Upper portion:			
TMK 4-2-15:001 (portion of)			
Open space vegetated (outside development footprint)	8.1	8.1	8.1
Graded and pervious but not vegetated	4.4	0.0	0.0
Development area, impervious	0.0	4.4	4.4
Other area (i.e. roadway, drainage canal)	0.5	0.5	0.5
sum	13.0	13.0	13.0
TMK 4-2-15:008 (portion of)			
Open space vegetated (outside development footprint)	0.2	0.0	0.0
Graded and pervious but not vegetated	6.2	0.0	0.0
Development area, impervious	16.0	22.4	22.4
Other area (i.e. roadway, drainage canal)	0.0	0.0	0.0
sum	22.4	22.4	22.4
Lower portion:			
TMK 4-2-15:006 (portion of)			
Open space vegetated (outside development footprint)	20.1	20.2	22.3
Graded and pervious but not vegetated	18.9	0.7	0.0
Development area, impervious (development footprint)	0.0	18.0	16.7
Other area (i.e. roadway, drainage canal)	4.8	4.8	4.8
sum	43.8	43.8	43.8

Note: the 16.7 acres of development footprint under the Preferred Alternative is composed of 11.1 acres impervious and 5.6 acres pervious land.

2.6 The Preferred Alternative

This section provides a more detailed description of design approach and other features of the Preferred Alternative.

As described in Section 2.5.1 the main differentiator of the Preferred Alternative is the use of low impact development approaches and technologies for the lower portion of the site. The lower portion of the site is in close proximity to surrounding wetland areas, thus a development approach for the proposed project that minimizes environmental impact has been designed. The lower portion of the site furthermore is entirely located within the Special Management Area (SMA) and therefore requires a significant degree of impact mitigation to satisfy the SMA permit requirements.

Table 2-2 Comparison of alternatives evaluated – building footprint

Comparison of alternatives - building footprint	No-Action Alternative sqft	Alternative B sqft	**Preferred Alternative** sqft
Upper portion: TMK 4-2-15:001 (portion of) and 4-2-15:008			
Existing buildings	283,000	283,000	283,000
Added buildings	0	269,000	269,000
Lower portion: TMK 4-2-15:006			
Existing buildings	0	0	0
Added buildings	0	337,000	337,000
Total space added to current space in upper and lower portion of the site	0	606,000	606,000
Total building floor space at the site	283,000	889,000	889,000

building footprint rounded to the next thousand

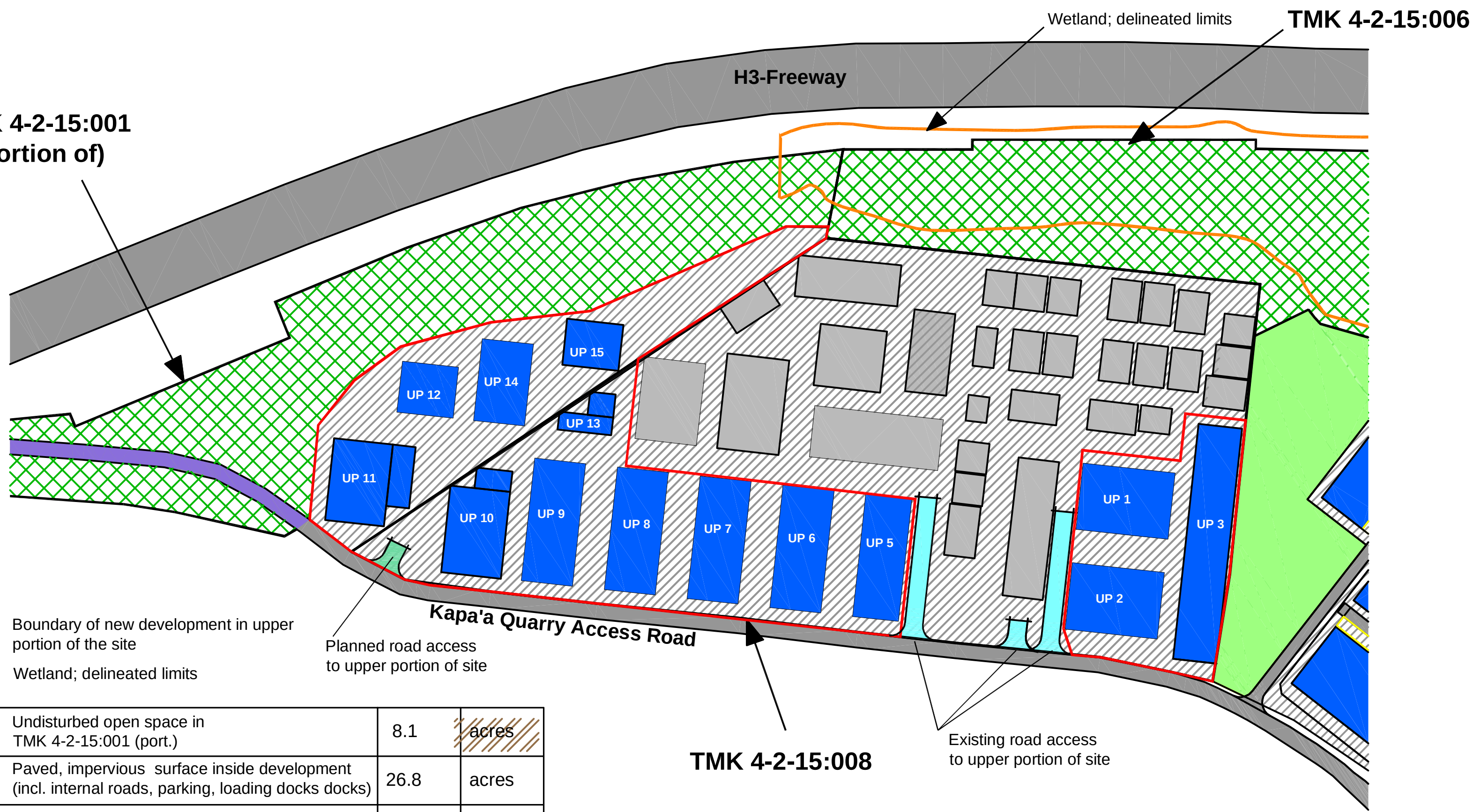
The applicant has therefore decided to develop the lower portion of the project site using design, construction and operational measures that will qualify for the level of certification credits to receive LEED Silver certification upon the completion of the development. In contrast, the upper portion of the site would be developed using conventional design approaches and building technologies. Selecting a different development approach for the upper and lower portions of the site enables the project to allocate additional funds for low impact development to the parts of the project site that have a more stringent need for a low impact approach, e.g. the lower portion of the site.

2.6.1 Conceptual Layout and Areas of Development of the Upper Portion

Figure 2-6 shows the conceptual layout of the upper portion of the site, which is the part of the proposed project site within TMK 4-2-15:001 (portion of) and TMK 4-2-15:008. Table 2-3 indicates the scope of development of the upper portion of the project site.

Table 2-3 Extent of development in upper portion of the project site

Description	acres	acres	pervious acres	impervious acres
Existing conditions				
TMK 4-2-15:001 (portion of)		**13.0**	12.5	0.5
			96%	4%
TMK 4-2-15:008		**22.4**	6.4	16.0
			29%	71%
sum of TMK 4-2-15:001 and 008		**35.4**	18.9	16.5
			53%	47%
With proposed new development:				
TMK 4-2-15:001 (portion of)		**13.0**	8.1	4.9
			62%	38%
open space (remaining undeveloped)	8.1			
developed area, paved and with buildings	4.4			
"Other land" area for roadways outside development foorprint	0.5			
sum	13.0			
TMK 4-2-15:008		**22.4**	0.0	22.4
			0%	100%
developed area, paved and with existing buildings	16.0			
developed area, paved and with new buildings	6.4			
sum	22.4			
sum of TMK 4-2-15:001 and 008		**35.4**	8.1	27.3
			23%	77%



Boundary of new development in upper portion of the site

Wetland; delineated limits

	Undisturbed open space in TMK 4-2-15:001 (port.)	8.1	acres
	Paved, impervious surface inside development (incl. internal roads, parking, loading docks docks)	26.8	acres
	Existing buildings (only in TMK 4-2-15:008)	283,000	sqft.
	New buildings	208,000	sqft.

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Figure 2-6:
Preferred Alternative, Upper portion of the site; design details

The construction of the warehouses within the upper portion of the site and paving of the areas around the warehouses increases the imperviousness of the total land of the two parcels TMK 4-2-15:001 (portion of) and TMK 4-2-15:008 from 47% to 77%, by converting 10.8 acres from pervious to impervious land.

It is planned to add 15 warehouse structures in the upper portion of the site. Table 2-4 lists the planned building footprint of the warehouse structures

Table 2-4 Planned warehouse structures in the upper portion of the site

ID	Building footprint sqft.	Sqft in parcel TMK 4-2-15:001 (por.)	Sqft in parcel TMK 4-2-15:008
UP 1	23,400		23,400
UP 2	23,400		23,400
UP 3	15,440		15,440
UP 4	N/A		N/A
UP 5	21,600		21,600
UP 6	24,000		24,000
UP 7	24,000		24,000
UP 8	24,000		24,000
UP 9	24,000		24,000
UP 10	22,700		22,700
UP 11	23,800	23,800	
UP 12	11,000	11,000	
UP 13	6,000		6,000
UP 14	16,000	16,000	
UP 15	9,900	9,900	
sum **	**269,000**	**61,000**	**209,000**

Note: sum ** is rounded to next 1,000 square feet area
area for building UP3 is the net increase, considering demolition
the designation pf Building UP 4 was abandoned is only indicated as "N/A"

The new development in the upper portion of the site includes the following construction measures:

The area that is presently graded will be used for the construction of the 15 planned warehouses. The warehouses will be steel structures and will have a height of about 30 to 35 feet. The roof will be insulated and/or will have a high performance exterior coating. The walls of the warehouses will be built using prefabricated, aerated concrete panels that have high thermal performance and good acoustic performance. The warehouses will have skylights to supply daylight and reduce energy consumption for lighting. Exterior lighting will be with fully shielded fixtures to reduce light transmittance.

Site pavement: A total of 2.6 acres (114,000 sqft) of impervious concrete pavement will be placed around the warehouses to establish one continuous paved working space in the upper portion of the site.

Parking: Paved areas close to the warehouse will be allocated to parking stalls to accommodate a number of parking stalls that exceeds the land use ordinance requirement for off-road parking for the all the new warehouses, which amounts to a minimum total number of 194 parking stalls. A suitable number of loading spaces for light trucks (surface marked properly) will be made available. It is planned to construct one detached loading dock that can service two heavy trucks. The detached loading docks for large trucks will have a staging area and ramps for forklift access to the loading platform.

Roadways: Internal traffic servicing the warehouse development will use the continuous pavement in the upper portion as roadways. There is an existing internal concrete roadway between adjacent to the new buildings UP 5 through UP 9, which will connect the new warehouses with the road access to the Kapa’a Quarry Access Road. The new internal traffic areas will have paved access from the existing internal concrete road to the individual warehouses.

Utilities: Electric and water utilities will be placed below ground.

Site Drainage: Site drainage will be by shallow swales in the roadways, below ground pipes and channels. There will be two detention ponds, sized according to code, which will drain the stormwater after primary treatment in the detention ponds into the open space north of the existing development.

Wastewater treatment: Since the proposed site is not connected to the municipal sewer system, onsite wastewater treatment will be carried out with an approximately 6 to 8 conventional septic systems, each consisting of one 1,250 gallon septic tank and one approximately 2,000 sq. ft. underground injection field (leach field).

2.6.2 Conceptual Layout and Areas of Development of the Lower Portion

Figure 2-7 shows a more detailed layout plan of the lower portion of the site. The development footprint of the lower portion layout in Figure 2-7 has the same size as in Figure 2-3, which shows the overall schematic overview of the site under the Preferred Alternative.

The LEED project boundaries, as indicated in Figure 2-7, include the present graded landfill areas of TMK 4-2-15:006 and a part of the presently open space adjacent to the development footprint. The presently open space between the development and the boundary of TMK 4-2-15:008 will be upgraded to restored habitat using native or adaptive plants to replace the present vegetation cover, mainly wild grown vegetation containing many invasive plants. Restored habitat will furthermore be established within the vegetative buffer zones, which are along the Kapa’a Stream corridor and the Kapa’a Quarry Road. The development footprint includes roadways, parking areas, landscaped areas around the warehouses and the warehouse structures. The different areas of the development in the lower portion of the site and the rest of the parcel TMK 4-2-15:006 are shown in Table 2-5.

Presently, the parcel TMK 4-2-15:006 has 98 percent perviousness, with the remaining 2 percent imperviousness being the quarry road inside the parcel, but outside the project boundary. The development will convert about 5.6 acres of land to what can be considered impervious surface in terms of being a barrier to water infiltration into the ground. The actual impermeable paved area will comprise 11.7 acres, but a minimum of 50 percent of the warehouse roofs and impervious roadway areas inside the development footprint will be used for rainwater harvesting to supply irrigation of the vegetated areas. Therefore, although impervious, the roadway and roof surfaces, which are used for rainwater catchment, are ultimately supplying the rainwater back to the soil via infiltration from the vegetated areas. In this context, the overall perviousness percentage inside the parcel TMK 4-2-15:006 decreases from 98 to 86 percent.

The development footprint will occupy the area that is presently landfill area. Present existing open space will not be used for the development footprint. The LEED project boundary has a 30 feet setback from the NRCS delineated wetland area. Therefore no development, including grading, landscaping, habitat restoration and associated filling will occur inside designated wetland areas and within the Kapa’a Stream corridor. Likewise no development will occur that affects the drainage canal along the quarry road. Consequently, no wetland or navigable waters will be affected by the development and no Section 404 Clean Water Act permit will be required.

		acres
	LEED certification project site boundaries (area)	24.5
	Restored habitat area (with native & adapted plants)	7.8
	Undisturbed open space in TMK 4-2-15:006	14.6
	Wetland; delineated limits	
	Landscaped area around buildings & at site boundaries	3.7
	Parking areas, gravel bed	1.9
	Roadways, paved (incl. loading docks)	2.7
	Building (e.g. warehouses) onlyin lower portion of site	7.7

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Figure 2-7:
Preferred Alternative, lower portion of the site; design details

Table 2-5 Extent of development in lower portion of the site

Description	acres	acres	acres	% of area considered pervious (Note**)	pervious acres	impervious acres
TMK 4-2-15:006 total area			**43.8**		43.1	0.7
					98%	2%
Open space remaining		14.6			14.6	
LEED project site for certification		24.5				
"Other land" inside parcel but outside LEED project area		4.8		85%	4.1	0.7
sum TMK 4-2-15:006		43.8				
LEED project site for certification			**24.5**			
Restored habitat around development footprint		7.8			7.8	
development footprint		16.7				
landscaped area (pervious)	3.9				3.9	
parking (pervious)	1.9				1.9	
loading dock (paved, impervious)	0.4					0.4
roadways (paved, impervious)	2.7			50%	1.4	1.4
building roofs (impervious)	7.7			50%	3.9	3.9
sum development footprint	16.7					
sum LEED project site for certification		24.5				
				sum	37.5	6.3
					86%	14%

Note ** : About 50% of the streets and building roofs will be used for rainwater catchment for irrigation

Table 2-6 shows the building footprint of the planned warehouses in the lower portion of the site. The identifiers of the warehouses are listed in Figure 2-7.

The new development in the lower portion of the site comprises the following construction measures:

The area that is presently graded will be used for the construction of the 15 planned warehouses. The warehouses will be steel structures with envelopes that have a high thermal performance. The roof will be insulated and/or will have a high performance exterior coating. The walls of the warehouses will be built using prefabricated, aerated concrete panels that high thermal performance and good acoustics. The warehouses will have between 5 and 7 percent of roof area with skylights, to supply daylight and reduce energy consumption for lighting. Interior lighting design and controls will abide the strict light pollution requirements of the LZ1 zone. Exterior lighting will be with fully shielded fixtures and a minimum amount of light will be used to reduce light pollution.

The height of the warehouses will be between 30 and 35 feet. There will be trees around the warehouse structure to reduce visual impact and to provide shade for the building shell and parking areas for improved thermal performance of the buildings and reduce heat island effect.

Table 2-6 Planned warehouse structures in the lower portion of site

ID	Building footprint sqft.
LO 1	26,600
LO 2	20,900
LO 3	24,000
LO 4	24,000
LO 5	24,000
LO 6	24,000
LO 7	24,000
LO 8	18,000
LO 9	18,000
LO 10	24,000
LO 11	24,000
LO 12	15,000
LO 13	24,000
LO 14	24,000
LO 15	22,400
sum **	**337,000**

Note: sum ** is rounded to next 1,000 square feet area

Internal roadways: a total of 5,400 linear feet of 22 feet wide internal roadways with impervious concrete pavement will be installed. There will be two road accesses to the Kapa’a Quarry Access Road. Only the roadway access closest to the existing warehouses will be used for regular traffic. The other roadway access closest to the quarry road will only be used as an emergency exit and entrance, since the roadway access is located near a sharp curve of the quarry access road.

Parking: Pervious areas close to the warehouse will be allocated to parking stalls to accommodate a number of parking stalls that exceeds the land use ordinance requirement for off-road parking for the all the new warehouses, which amounts to a minimum total number of 225 parking stalls. The surface of the parking stalls will be pervious gravel bed or open grid. Trees will be planted in suitable planting wells within the pervious parking areas to provide canopy shade for the parking stalls as well as provide a “green barrier” for visual impact mitigation.

A suitable number of loading spaces for light trucks (surface marked properly) will be made available. It is planned to construct one detached loading dock that can service three heavy trucks. The detached loading trucks will have a staging area and ramps for forklift access to the loading platform.

Landscaped areas: The size of the planned landscaped areas around the warehouses and at the perimeter on the development footprint is 3.7 acres. It is planned to plant native or adaptive plants including larger trees that will supply shade to the building and will provide a visual “green barrier” around the warehouses for visual impact mitigation. The irrigation of the landscaped areas will be done with rainwater that is collected and harvested from the roofs of the warehouses.

Restored habitat / vegetative buffer zones: As an important component of the sustainable development approach, it is planned to restore 7.8 acres of presently open space as habitat, using native or adapted plants. All of the open space for the restored habitat is outside the designated wetland area and outside the drainage canal along the quarry road, with setbacks of 30 and 20 feet from the wetland boundary and the drainage canal, respectively. As illustrated in Figure 2-8, the habitat will surround the development footprint of the lower portion of the site at three sides:

1. At the side of the development bordering the quarry road the habitat will comprise an earth dam of about 10-12 feet height on which bushes and large trees will be planted for visual impact mitigation as well as noise abatement and air pollution mitigation. The habitat will provide living environment for wildlife. However, it is not planned to establish water bodies with permanent surfaces, to avoid attracting endangered water birds that might be subject to predation by non-native predators.
2. At the side of the designated wetland inside the Kapa’a Stream corridor, to the north of the development, the habitat will contain trees and bushes inside the vegetative buffer zone. As noted before all grading and site development will be outside the delineated wetland.
3. At the side of the existing warehouse development, the restored habitat area will be developed on the land between the upper and lower portions of the site.

Utilities: Electric and water utilities will be placed below ground.

Site Drainage: Site drainage will be by shallow swales in the roadways, below ground pipes and channels. There will be one extended detention pond, sized according to code, which will drain the stormwater after advanced treatment into the drainage canal along the quarry road. The stormwater treatment will be advanced with respect to quantity and quality of the stormwater. Refer to the Section 2.8 for a brief description of the stormwater treatment as part of the sustainable design approach for the lower portion of the site.

Rainwater harvesting: The lower portion of the site will use rainwater catchment to provide all of its irrigation water and a significant amount of the water for sewage conveyance and/or custodial water from harvested rainwater. The rainwater catchment will be from roof tops and sections of the internal roadways. The rainwater that is collected from section of the road will drain laterally to shoulders which are gravel filled shallow trenches that provide an initial filtering of the rainwater. The collected rainwater is then conveyed to underground taverns for storage and use in irrigation. The rainwater collected from the roof tops will flow directly to the underground taverns or to smaller tanks next to the warehouses. The rainwater from the smaller storage tanks, after being filtered, is used in the warehouses for sewage conveyance and suitable custodial uses.

Wastewater treatment: Since the proposed site is not connected to the municipal sewer system, onsite wastewater treatment will be carried out with approximately eight alternative septic systems. The onsite wastewater treatment goes beyond the treatment effectiveness of conventional septic systems, and will use advanced treatment process steps to significantly improve the quality of the wastewater that is infiltrated on the site. Refer to the Section 2.8 for a brief description of the wastewater treatment as part of the sustainable design approach for the lower portion of the site.

2.7 Project Schedule and Milestones of Preferred Alternative

The project will be implemented over a period of about 15 – 17 years. The market study conducted for the environmental review of the proposed industrial park suggests that the planned approximately 600,000 sqft. of gross leasable space will be easily absorbed by the region within this time range.

Table 2-7 shows the progress of adding new warehouse space to the development based on an assumed project completion within 15 years after start of development. The 15 years of project completion would represent the “fast track” development. Table 2-7 and Figures 2-8 and 2-9 describe the planned development pace at which warehouse space is added in the upper and lower portions of the site. Table 2-7 and Figures 2-8 and 2-9 suggest the planned development approach, in which case after the first six years the upper portion of the development will be full-built, and in the following nine years warehouse space will be added in the lower portion of the site. The warehouse buildings are identified in Figures 2-7 and 2-8 for the upper and lower portions of the site, respectively.

Table 2-7 Estimated schedule - additions of warehouse space to site

Year	Building added	Building added	Building added	Building added	Total Space added in year	Cumul. Space added	Space absorbed in year	New Space available at end of year
	refer to Figure 2-6 and 2-7 for bldg. ID				[sqft]	[sqft]	[sqft]	[sqft]
2010					0	0	0	0
2011	UP 1	UP 2			46,800	46,800	40,400	6,400
2012	UP 3		UP 5	UP 6	61,000	107,800	40,400	27,040
2013	UP 7				24,000	131,800	40,400	10,640
2014	UP 8	UP 9			48,000	179,800	40,400	18,240
2015	UP 10	UP 11			46,500	226,300	40,400	24,340
2016	UP 12	UP 13	UP 14	UP 15	42,900	269,200	40,400	26,840
2017	LO 1				26,600	295,800	40,400	13,040
2018	LO 2	LO 3			44,900	340,700	40,400	17,540
2019	LO 4	LO 5			48,000	388,700	40,400	25,140
2020	LO 6	LO 7			48,000	436,700	40,400	32,740
2021	LO 8	LO 9			36,000	472,700	40,400	28,340
2022	LO 10				24,000	496,700	40,400	11,940
2023	LO 11	LO 12			39,000	535,700	40,400	10,540
2024	LO 13	LO 14			48,000	583,700	40,400	18,140
2025	LO 15				22,400	606,100	40,400	N/A
						sum	**606,000**	

Note: Yellow schaded area indicates that warehouses in **lower portion** of site are added

Cyan schaded area indicates that warehouses in **upper portion** of site are added

Table 2-7 suggests that at the projected pace of adding warehouse space the development will be at full-built in the year 2025, e.g. 15 years after start of construction. The gradual pace of development over a stretch of 15 to 17 year helps to mitigate certain impacts, such as construction related traffic due to construction on the site.

Figure 2-8 Warehouse space added and absorbed per year over the project duration

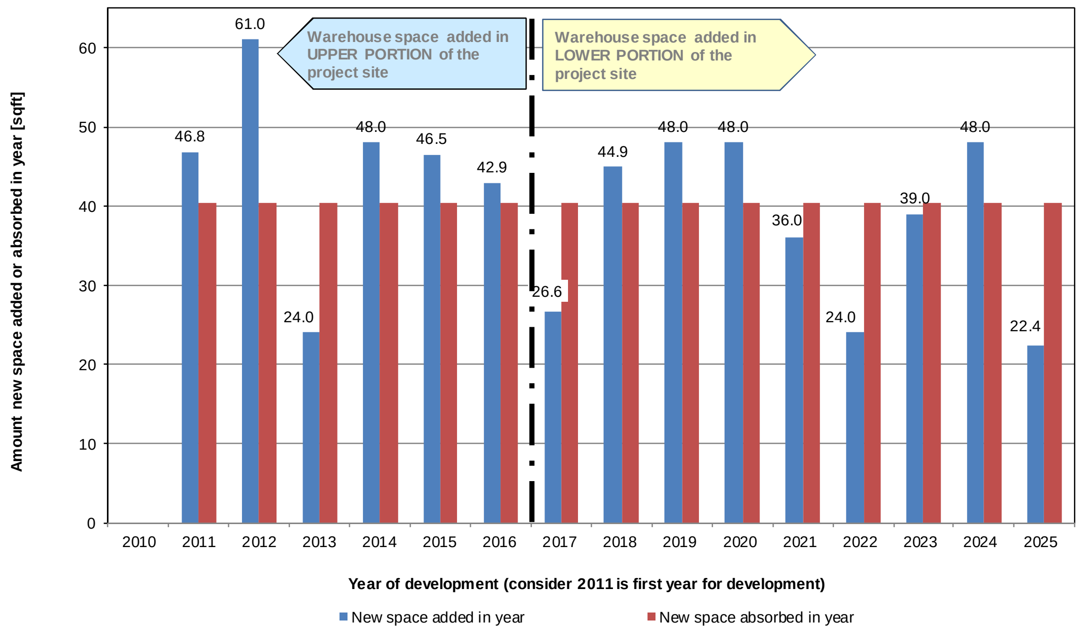
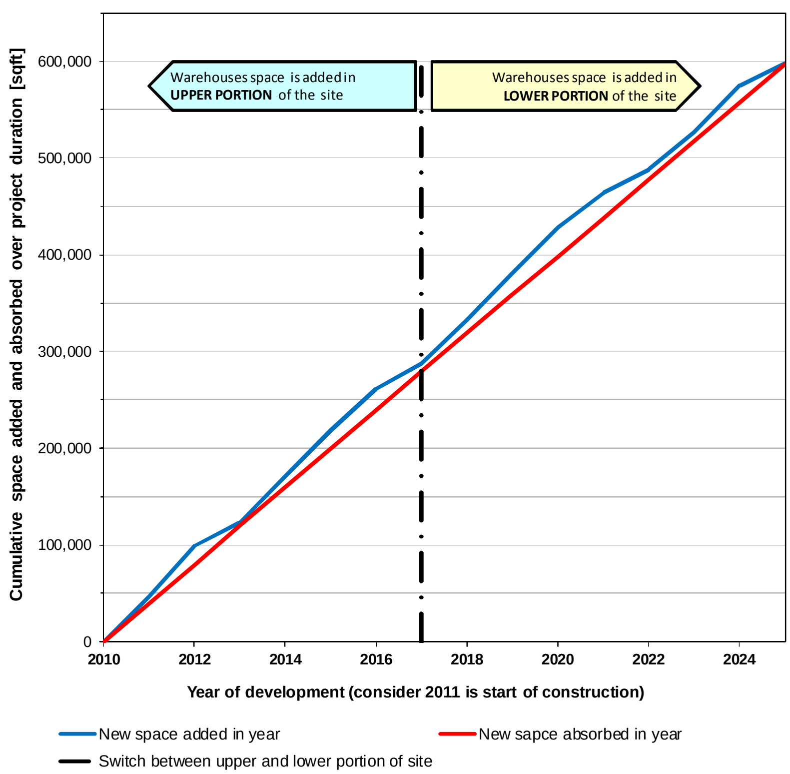


Figure 2-9 Warehouse space added and absorbed over the project duration



The development schedule of 15 to 17 years describes the overall progress of first developing the site, and then adding a certain amount of warehouse space each year for the entire project length. Construction of the warehouses added to the proposed industrial park will only occur over a part of the year. Figure 2-10 suggest the anticipated construction schedule for the warehouse structures and the site immediately surrounding the structures. It should be noted that the site grading and development of site infrastructure, including mass grading, roads, stormwater treatment and utilities, would occur at the beginning of the development of the upper and lower portions of the site. For the upper and lower portion, the length of the initial site development work is estimated at 3 and 6 months, respectively. The construction of the individual warehouses would occur after the site has been developed.

The following four major categories of construction work will occur for the construction of individual warehouses:

Grading of building footprint and adjoining land: Establishing the finished grade for the buildings and the surrounding traffic areas, parking areas and open-space.

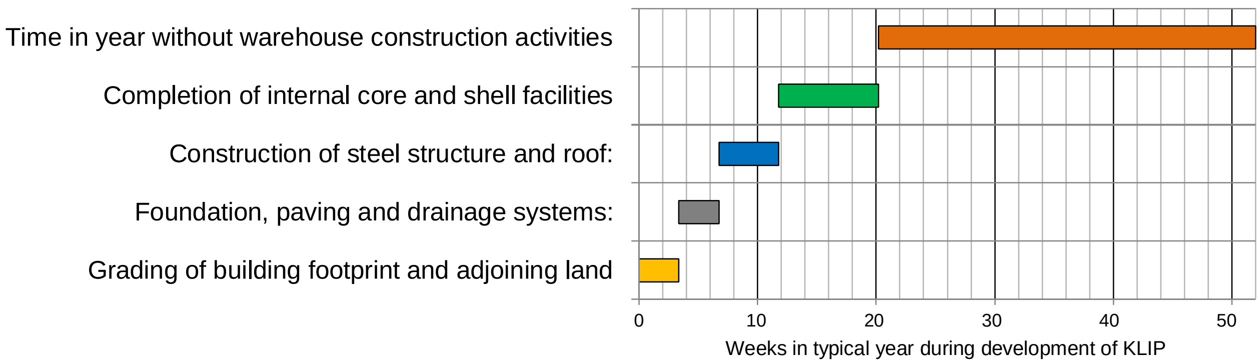
Foundation, paving and drainage systems: Installing the foundation for the structures, paving of the parking and traffic area around the buildings and connecting the site drainage system to the overall development stormwater system.

Construction of steel structure and roof: Construction of the outer building envelope.

Completion of internal core and shell facilities: Carrying out all internal building work relative to the core and shell facilities.

Figure 2-10 suggests the anticipated annual construction schedule for adding about 40,000 square feet of warehouse space. As suggested in Figure 2-10 the length of significant construction activities would be an average of 20 weeks in any year and the remainder of the year would see no significant construction activities at the site. It is estimated that the impact of additional heavy truck traffic during construction would be minimal, since the building envelope of the warehouses would be pre-fabricated and assembly of each warehouse on the site will be accomplished within a matter of three to five weeks, depending on the size of the warehouse. The completion of the core and shell facilities inside the warehouses would then be carried out inside an enclosed building envelope, resulting in less impact than the external construction activities.

Figure 2-10 Typical annual phasing of construction of warehouses



The following are major project milestones:

1. Completion of the Environmental Review process: It is anticipated that the environmental review of the proposed action will be completed by April 2011. If the FEIS is accepted the project will go forward; with filing the applications for the required permits.
2. Application for zone change: After the EIS has been accepted the applicant will apply for a zone change for the two land parcels, TMK 4-2-15:001 (portion of) and 006.
3. Special Management Area (SMA) permit: After the EIS has been accepted the applicant will apply for a Special Management Area permit for the development in the lower portion of the site.
4. Start of construction for proposed KLIP: The start of construction for the proposed Kapa’a Light Industrial Park is anticipated for the middle of 2011. Since most of the upper portion is already graded, the individual warehouses will be added and the concrete pavement will be added around warehouse to provide parking and space to support the activities inside the warehouses (e.g. unloading of trucks). The various components of the drainage system for the new warehouses will be installed, such as the detention ponds, swales, inlets, underground pipes and channels. Likewise the utilities for the new warehouses and the onsite wastewater treatment systems (e.g. conventional septic systems) will follow at the speed of construction of warehouses.
5. Continuous addition of warehouses in the upper portion of the site: Starting 2011 and through 2017 warehouses will be constructed on the prepared site within the upper portion of the site at the anticipated pace of absorption of warehouse space in the region.

6. Start construction vegetative buffer zones around the lower portion of the site: The start of the development of the lower portion of the site will start around the middle part of 2012 with the installation of the vegetative buffer zones around the development footprint. The first activities will be to construct the grading of the buffer zones, adding topsoil and planting trees and bushes. The early installation of the vegetative buffer zones has the significant advantage that trees and bushes, which will provide visual impact mitigation, will have already grown before the first warehouse is scheduled to be constructed.
7. Grading of lower portion of the site: After the vegetative buffer zones have had time to develop a stable vegetation cover, the grading and soil stabilization of the remaining development footprint will occur. Since the site will by then be completely surrounded by earth dams, it is anticipated that no significant untreated runoff will occur during mass grading. Appropriate best management practices (BMPs) will be used to minimize any impacts. It is planned to carry out the general grading of the site around two years after the vegetative buffers have been installed.
8. Soil stabilization: The graded site will be stabilized by seeding a vegetation cover and other soil stabilization methods.
9. Detailed grading for warehouse construction: The detailed grading of sites for the first several warehouses and adjoining parking areas will commence. It is planned that detailed grading, including the grading of site features immediate adjacent to the warehouses will be carried out as the construction of the site continues.
10. Electric and water infrastructure installation: Installation of the main parts of the electric and water infrastructure; the first parts of the electricity and water infrastructure will serve the first several warehouses, which will be constructed. The infrastructure for the warehouses still to be erected will be added as needed according to the development schedule.
11. Onsite wastewater systems: Installation of the first septic systems close to the warehouses and the installation of the first modules of the advanced septic system, including wastewater conveyance, aeration processes, denitrification, sand filter and infiltration fields, will occur at the perimeter of the development footprint (e.g. within the landscaped area or within the restored habitat areas). The remaining septic systems will be added as is required with the growing development within the lower portion of the site.
12. Installation of paved roadways: Installation will occur of the first sections of impervious concrete roadway pavement, along with rainwater catchments for these roadways, and installation of the first underground rainwater cistern and the system for irrigation.
13. Installation of the drainage system: Installation of the initial site drainage from impervious surfaces (e.g. roadways and warehouse roofs), installation of the detention pond, and installation the initial runoff treatment unit upstream of the detention pond.

14. Completion of all the warehouses in the upper portion of the site: The completion of all the warehouses in the upper portion of the site will occur by approximately 2017, at the anticipated pace of absorption of the leasable warehouse space.
15. Start of construction of warehouses in lower part of the site in 2017: Assuming that the upper portion of the site will be built out at that point in time, warehouse space will be begun in the lower portion of the site.
16. Continuous addition of warehouses in the lower portion of the site: Starting in approximately 2017 and through 2025, warehouses will be constructed on the prepared site at the anticipated pace of absorption of warehouse space in the region.
17. Completion of the development: It is anticipated that the entire planned leasable space, around 606,000 square feet, will be completed in 2026. This ends the development project

Table 2-8 lists major project milestones and their anticipated timing in the project schedule.

2.8 Summary of the Sustainable Design Approach for the Lower Portion of the Site

The development of the lower portion of the project site will be carried out in accordance with requirements to achieve LEED Silver certification upon completion of the project. The project team has developed a sustainable design approach, which is presented in Appendix 4 of this DEIS. The sustainable design approach contains a number of design and construction features for the development of the lower portion of the site to qualify for at a minimum of 50 LEED credit points, required for LEED Silver certification. In addition to laying the basis for LEED Silver certification, the sustainable design approach is formulated to mitigate the most relevant impacts of the proposed project.

As described in the sustainable design approach in Appendix 4 in more detail, priority was given to satisfy those LEED credit categories which would provide effective impact mitigation for the proposed site. More specifically, from the seven LEED credit categories, two categories, the water efficiency category (WE) and the sustainable site category (SS), were given special attention since they directly provide the type of impact mitigation that is most important for the Kawainui Marsh. Figure 2-11 illustrates the focus on certain LEED credit categories in the sustainable design approach for the proposed project.

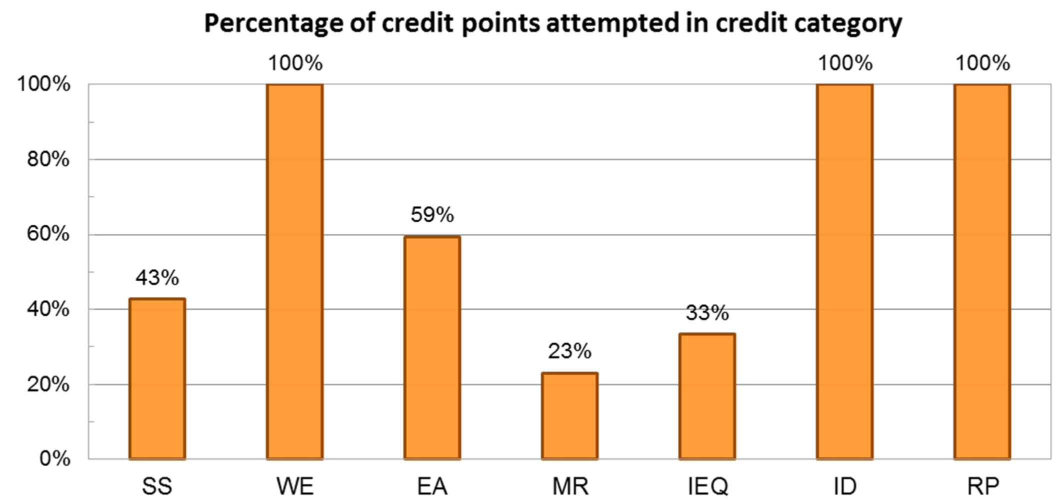
Table 2-8 Summary and timeline of major project milestones of preferred alternative

No.	Anticipated time in schedule (year)	Description of milestone / major project development step
1	April 2011	Completion of the environmental review process:
2	April 2011	Application for zone change:
3	October 2011	Special Management Area (SMA) permit:
4	July 2011	Start of construction for proposed KLIP in upper portion of the site
5	2011 through 2017	Continuous addition of warehouses in the upper portion of the site:
6	April 2012	Start construction vegetative buffer zones around the lower portion of the site:
7	Summer 2015	Grading of the entire development footprint in lower portion of the site
8	Summer 2015	Soil stabilization in lower portion of the site
9	Summer 2016	Detailed grading for warehouse construction in lower portion of the site
10	Summer 2016	Electric and water infrastructure installation lower portion of the site
11	Fall 2016	Onsite wastewater systems lower portion of the site
12	Fall 2016	Installation of paved roadways lower portion of the site
13	Fall 2016	Installation of the stormwater drainage system lower portion of the site
14	End of 2016	Completion of all the warehouses in the upper portion of the year:
15	Spring 2017	Start of construction of warehouses in lower portion of the site in 2017:
16	2017 though 2025	Continuous addition of warehouses in the lower portion of the site:
17	2025	Completion of the development:

Figure 2-11 Percentage of attempted out of available credit points for LEED credit categories

LEED credit categories:

SS	-	Sustainable Sites
WE	-	Water Efficiency
EA	-	Energy & Atmosphere
MR	-	Materials & Resources
IEQ	-	Indoor Environmental Quality
ID	-	Innovation in Design
RP	-	Regional priority



The following describes how design measures to achieve LEED Silver certification will be used to mitigate those environmental impacts which are of important concern for the proposed project.

SS - Sustainable Sites

The proposed site is within the State of Hawaii "Urban" land use district and is not a greenfield development. The proposed project will be developed on an area that was formed by landfill of quarry tailing, overburden and some municipal waste. The project therefore meets the goal to conserve previously undeveloped land. Land that is either zoned for industrial use or is well qualified for converting the industrial zoned land is in short supply in the greater Kailua and Kaneohe region, and consequently the region will benefit from developing land for industrial use at the proposed site.

The attempted credits address impacts and mitigation measures that are of significance to the environmentally important land surrounding the proposed site, such as:

- Incentivizing the use of alternative transportation by providing secure storage and changing / shower facilities for bicyclists and providing preferred parking for low emitting vehicles and carpools. *This measure will reduce traffic to and from the project site.*
- Restoring habitat and maximizing open space within the site, by planting open space with native or adaptive plants to provide as much vegetative area within the development footprint as possible. *This measure will reduce the visual impact on the project and will reduce air pollution and noise propagation. The open space around the development footprint will be used for infiltration of wastewater that is treated on-site. The open space will further lower the amount of stormwater runoff by using rainwater for irrigation.*
- Comprehensive stormwater treatment to control the quality and quantity of the stormwater runoff from the developed site, by providing pervious parking areas, harvesting stormwater from roofs and roadways for irrigation, removing pollutants from 100% of the runoff through a multistage treatment system, and providing flood control by means of an extended detention pond. The proposed design for a comprehensive stormwater treatment system far exceeds the basic credit requirements and **an exemplary performance credit will be attempted for the stormwater credit.** *This measure will significantly improve the quality and quantity (in terms of peak discharge rates) of the stormwater runoff from the site.*
- Reducing Light Pollution by controlling internal and external light sources during the night. *This measure provides an important impact mitigation since excessive light can impact the wildlife and birds in the adjacent marsh.*
- Providing guidelines to the tenants to build-out spaces along the green building approach that was used for the Core& Shell certification. In going beyond a non-binding guideline status the developer will make the compliance of certain green building measures contractually mandatory, such as strict compliance with the reduction of light pollution measures. **For the contractually binding measures the project team will attempt an exemplary performance credit.** *This measure ensures that the impact mitigation of the LEED credits is effectively applied for the project.*

WE - Water Efficiency

The close proximity of the proposed site to important wetland areas makes a high consideration for all water related issues imperative. Water relevant issues include stormwater runoff, water use for irrigation, water use in the buildings and wastewater treatment and disposal. While the stormwater control is treated under the Sustainable Site credit category all the remaining water related credits are grouped under the Water Efficiency credit category. The Water Efficiency (WE) credit category uses the following measures to mitigate impacts of the project:

- Water efficient landscaping will be applied through using harvested rainwater for irrigation instead of potable water. Landscaping will preferably use native and adaptive plants that have lower needs for irrigation, pesticides and fertilizers then introduced plant species. *This measure protects the adjacent wetland and receiving waters by recharging the aquifers and by stimulating evapotranspiration from plants in the vegetative buffers as stormwater treatment. This measure furthermore reduces the amount of fertilizer and pesticides which might be entrained in the runoff from landscaped areas.*

- Innovative wastewater technologies will include advanced onsite treatment systems that go far beyond the performance and effectiveness of conventional septic systems. Since the wastewater is treated onsite, because there is no connection to the municipal sewer system, and the wastewater discharge occurs in close proximity to important wetlands, advanced treatment steps are added to the septic systems on the site. Aerobic and anaerobic treatment process steps are added to the septic systems to remove significant BOD and TSS loads and to significantly reduce nutrients from the wastewater before it is infiltrated in irrigation or in leach fields. Since the proposed wastewater treatment system goes far beyond the basic credit requirements an exemplary performance point will be attempted for the innovative wastewater treatment systems. *This measure is important impact mitigation for the marsh since it drastically reduces any pollutants that are in the wastewater generated on the site. Specifically the selected onsite wastewater treatment drastically reduces nutrients and TSS in the wastewater, and avoids that pollutants are reaching the water table and the receiving waters, which include the Kawainui Marsh.*

- Water use reduction measures will result in a 40% water use reduction by installing only high performance water fixtures in the buildings. *This measure helps in reducing the burden of the project on the municipal water supply, and also reduces the amount of wastewater generated inside the buildings. Harvested rainwater is used for wastewater conveyance, thereby conserving precious potable water resources in the region and furthermore causing the rainwater to be distributed onsite rather than added to the site runoff.*

EA - Energy & Atmosphere

The energy and atmosphere credit category implies mitigation of impacts that are relevant to the island-wide environment and economy. The attempted credits involve efforts to save energy and impacts that result from energy generation, as well as verification that these measures are indeed implemented. Hawaii has very significant energy (oil) dependence, since at the present time, almost 90% of all its energy comes from oil. Efforts to save energy and generate energy from renewable energy sources will help the State of Hawaii on its declared effort to mitigate the high oil dependence and substitute it with indigenous energy forms. The relevant credits that also mitigate pertinent impact on the adjacent environment of the proposed project are as follows:

- Optimized energy performance by saving a minimum of 30% of the energy costs of a baseline. *This measure helps to reduce the burden of the proposed project on the electric supply system, and helps reducing burning fossil fuel for electricity generation.*

- Onsite renewable energy will be produced to offset energy derived from imported fossil fuel, especially oil. The onsite renewable energy will be derived from solar thermal/waste heat recovery and PV energy systems. *This measure helps to reduce the burden of the proposed project on the electric supply system, and helps to reduce burning fossil fuel for electricity generation.*

- Measurement and verification will be done on the core and shell part of the buildings as well as in the tenant spaces. Continuous measurement and verification will support the park management and the tenants to monitor the success of energy savings and intervene if the saving goals are not met. *The measure will help to ensure that the impact mitigation through reducing electricity consumption will be effectively adhered by the future tenants of the Kapa'a Light Industrial Park*.

MR - Materials & Resources

The materials and resources credit category addresses island-wide concerns, since it combines efforts to divert as much construction waste as possible from going to landfill, and to conserve virgin material by reusing and recycling waste. In addition, the credit category advocates the use of locally extracted or manufactured materials in lieu of imported material. The relevant credits that mitigate important impacts on the adjacent environment of the proposed project include:

- Construction waste management will be performed to reuse or recycle construction waste and therefore reduce disposal in landfills. *This measure helps to reduce the construction related traffic by reducing the hauling of construction waste from the site and bringing fill material to the site. In addition this measure helps to reduce the amount of material to be deposited in the landfills.*
- Recycled materials will be used in the construction and products will be purchased that have a higher percentage of pre- and post-consumer recycled content. Regionally extracted or manufactured material will be used to support indigenous resources and the

economy of Hawaii. *These measures help the environment, and also help the local economy*

IEQ - Indoor Environmental Quality

The Indoor environmental quality credit category addresses concerns about a healthy indoor environment for building occupants. IEQ impacts and their mitigation have only secondary significance to the exterior environment. In selecting what credits will be attempted, the project endeavors to create synergy between increasing the indoor environmental conditions and to mitigate impacts to the exterior environment. The relevant credits that also mitigate pertinent impacts on the adjacent environment of the proposed project are as follows:

- A construction indoor air quality (IAQ) management plan will be developed and implemented that ensures that the buildings will not have an endemic indoor air quality problem that could be avoided if best management strategies are followed during construction. The construction IAQ management plan will also be provided to the tenants as part of the construction guidelines for the build out of the leasable space. Low VOC emitting paints and coatings as well as adhesives and sealants will be used in the core and shell part of building. *These measures limit pollution impacts of the project.*

ID - Innovation in Design

The Innovation in Design credit category includes measures to step outside the conventional design paradigm and implement mitigation measures in excess of the basic credit requirements or use innovative project initiatives that create effective synergies to make the project more "green". The relevant credits that also mitigate pertinent impacts on the adjacent environment of the proposed project include the following:

- An educational program will be implemented that will inform the public about features of the adjacent Kawainui Marsh as well as how green building technologies such as those used in the proposed industrial park can avoid environmental impacts of industrial developments. The educational program will be a continuous public outreach initiative by the developer.
- The maintenance vehicles of the industrial park will use electric vehicles whenever the work tasks allow the use of smaller electric utility vehicles. The energy for the vehicles will come exclusively from renewable energy, either from onsite renewable energy or from offsite renewable energy sources (e.g. through the purchase of renewable energy certificates).
- Since some of the LEED credit measures will also be used as important environmental impact mitigation measures that the developer has guaranteed to implement, certain

measures that apply to core and shell will be part of the lease agreement and will be contractually binding. One important measure will be the need to reduce light pollution by controlling interior and exterior lights.

- Since water related impact mitigation measures are very important for the proposed project, the basic requirements for storm water treatment and for the onsite wastewater treatment will far exceed the basic credit requirements.
- The inclusion of at least one LEED-AP in the project team as a principal member will assist the facilitation of the LEED certification and help ensure that the ambitious Silver LEED goals for the green industrial development will be met.

RP - Regional priority

The credits of the regional priority category represent bonus points for the project to implement those credits that are most attractive to the region. Figure 2-11 (as well as Figures SDA 4-1 and SDA 4-2 presented in Appendix 4: Sustainable Design Approach) indicates that the project will quality for 4 out of 4 available credit points or 100 percent of the available credit points, respectively. This underlines the ability of the project team to select those credits that matter most for the region and Hawaii.

2.9 Alternative Design and Development Approaches considered and not further evaluated

This section discusses several designs and development approaches that were considered or initially proposed, but after initial evaluation, were not further pursued in the analysis of this DEIS.

2.9.1 Rezoning to Intensive Industrial (I-2)

The original goal of the applicant was to apply for a zone change from general preservation (P-2) to Intensive Industrial (I-2) land use for the two land parcels TMK 4-2-15:001 (portion of) and 006. Since the proposed site includes the three parcels TMK 4-2-15:001 (portion of), 006 and 008, whereby parcel TMK 4-2-15:008 is already zoned as I-2, a zone change to I-2 for all parts of the proposed light industrial park was preferred.

Concerns expressed by comments that the granting of an I-2 zone change could possibly bring about intensive industrial uses close to important and sensitive wetland has resulted in an adjustment of the rezoning goals of the applicant. The applicant now seeks a zone change from P-2 to Limited Industrial (I-1) rather than to I-2, as was stated in the Environmental Assessment for the proposed project.

Table 2-9 demonstrates the main differences of possible industrial land use between the I-1 and I-2 land use zone designation (in accordance with the Land use ordinance of the City & County of Honolulu). Table 2-9 only indicates if the particular land use is possible for I-1 and I-2, without differentiating if the land use is permitted, e.g. permitted subject to certain restrictions or permitted subject to a conditional permit. Table 2-9 furthermore presents only a selection of those land uses which are or would be potentially applicable at the proposed site.

Part 1 of Table 2-9 indicates industrial land uses which are possible (though subject to possible restrictions and conditional permits) within the I-2 district, but are not possible under within I-1. Some of the land uses under part 1 of Table 2-9 could result in significant impacts. None of these land uses are considered for the proposed project, in the present nor for the future, since the proposed warehouse development should first of all provide space for light industrial for a sub-regional market and not for the entire island market.

Part 2 of Table 2-9 shows some land uses that are currently occurring at the proposed site. For the future, these kinds of land uses will represent most of the tenants' businesses and operations of the proposed industrial development.

As is indicated, land uses listed in Part 1 of Table 2-9 would require an I-2 zone district, whereas land uses under Part 2 of Table 2-9 would only require an I-1 zone designation. Since the applicant does not intend to lease land for types of land uses under Part 1 of Table 2-9, a zone change from P-2 to I-1 for the two parcels TMK 4-2-15:001 (portion of) and 006 would be sufficient to support the development goals of the proposed light industrial park.

The DEIS therefore requests a zone change from P-2 to I-1 for the two parcels TMK 4-2-15:001 portion of) and 006 and the previously stated zone change to I-2 for these two parcels will no longer be pursued.

2.9.2 Making Changes to the Drainage Canal Along the Quarry Road

The FEA suggested that the project would impact the drainage canal along the quarry road by altering the banks or stream bed of the drainage canal. The design approach for the drainage canal was revisited after the completion of the FEA. Two design alternatives that were analyzed as well as the design alternative that was finally selected are discussed in the following paragraphs. Figure 2-12 shoes the present situation of the drainage canal along the Kapa'a Quarry Road and the two design alternatives considered.

Table 2-9 Lists of industrial land uses that are anticipated at the project site

Description of land use	Possible in I-1	Possible in I-2
Part 1 Industrial land uses NOT anticipated at project site		
Agricultural products processing, major	No	Yes
Agriculture, Composting	No	Yes
Sawmills	No	Yes
Hotels	No	Yes
Explosive and toxic chemicals manufacturing, storage and distribution	No	Yes
Petroleum processing	No	Yes
Repair establishment, major	No	Yes
Truck terminals	No	Yes
Heliports	No	Yes
Salvage, scrap, and junk storage and processing	No	Yes
Waste disposal and processing	No	Yes
Wholesale & retail establishments for bulk material with distribution by truck	No	Yes
Part 2 Industrial land uses anticipated at project site		
Warehouses	Yes	Yes
Building contracting, home improvements, etc.	Yes	Yes
Manufacturing, processing and packaging	Yes	Yes
Repair establishment, minor	Yes	Yes
Base yards	Yes	Yes

Present situation: The present situation is depicted in the aerial photos and the typical section A-A. As can be seen in the aerial photos, there are two drainage canals along the quarry road, one mauka (on the mountainside) and one makai (on the ocean side) of the canal. The mauka drainage canal is entirely on the property of the applicant and the makai canal is partly on the applicant’s property. The makai canal is larger and a free water surface of the makai canal can be observed over the year for a longer time than for the mauka canal. The makai drainage canal will not be impacted by the development and therefore the makai canal will not be considered hereafter.

As is depicted in typical section A-A the (mauka) drainage canal runs along the quarry. For some sections of the quarry road, there is no or a very narrow shoulder between the drainage canal and the road. On the mauka side of the canal, towards the proposed site, there is an approximately 15 foot wide gravel road, which is used by county service teams for the maintenance of the canal. Beyond the gravel road, a barren to lightly vegetated strip of about 8 feet continues until the foot of the existing earth mound. The present earth mound has a height of approximately 6 to 7 feet above the gravel road and has a vegetation of mostly wildly grown shrubs, grasses and small trees.

<u>Alternatives to the present situation of the drainage canal:</u> The present situation of the drainage canal led to the search for alternatives of how to improve it. The canal at times has no free surface and is basically filled only with mud (observed in a field survey in September 2010 and depicted in Appendix 7 - Water Resources Assessment for the Project Site). Based on narratives of local observers the canal is often, if not most of the time, totally covered with algae and no free water surface can be seen. In addition, the canal has at times small and large debris in it, such as abandoned cars, refrigerators, larger pieces of trash, etc. Since the county is maintaining the drainage canal, public money has continuously being spent to improve its appearance.

Alternatives that have been considered to improve the present state of the drainage canal include altering the canal geometry by changing the banks, or closing the canal with permeable fill and draining the canal trough with a drainage pipe. The alternative of modifying the canal, e.g. changing its geometry and size, while basically keeping it in its present state, have been evaluated but is not considered to provide a viable alternative and improvement.

The <u>alternative of filling the canal</u> and using the area created to install a shoulder along the mauka side of the quarry road and to provide room for public use would create more benefits than the alternative under which the geometry of the canal is changed and the canal is kept. This alternative is depicted in Figure 2-12. Under this approach, the drainage canal would be filled with permeable gravel or rocks fill. A drainage pipe would be installed at the bottom of the canal trough to collect and convey drainage water towards the Kapa'a Stream, therefore maintaining drainage characteristics.

As illustrated in Figure 2-12, the area that is created above the present canal could be used to install a shoulder for the road, thereby improving traffic safety. Furthermore, the area created could be used for a section of the planned marsh perimeter path, a combined bikeway and pedestrian path around the Kawainui Marsh. The proposed project incentivizes the use of bicycles for future employees or visitors of the development, but at present bicycling on Kapa'a Quarry Road is far from secure. A perimeter path, as planned for the Kawainui Marsh, could be used by people working in or visiting the proposed light industrial park.

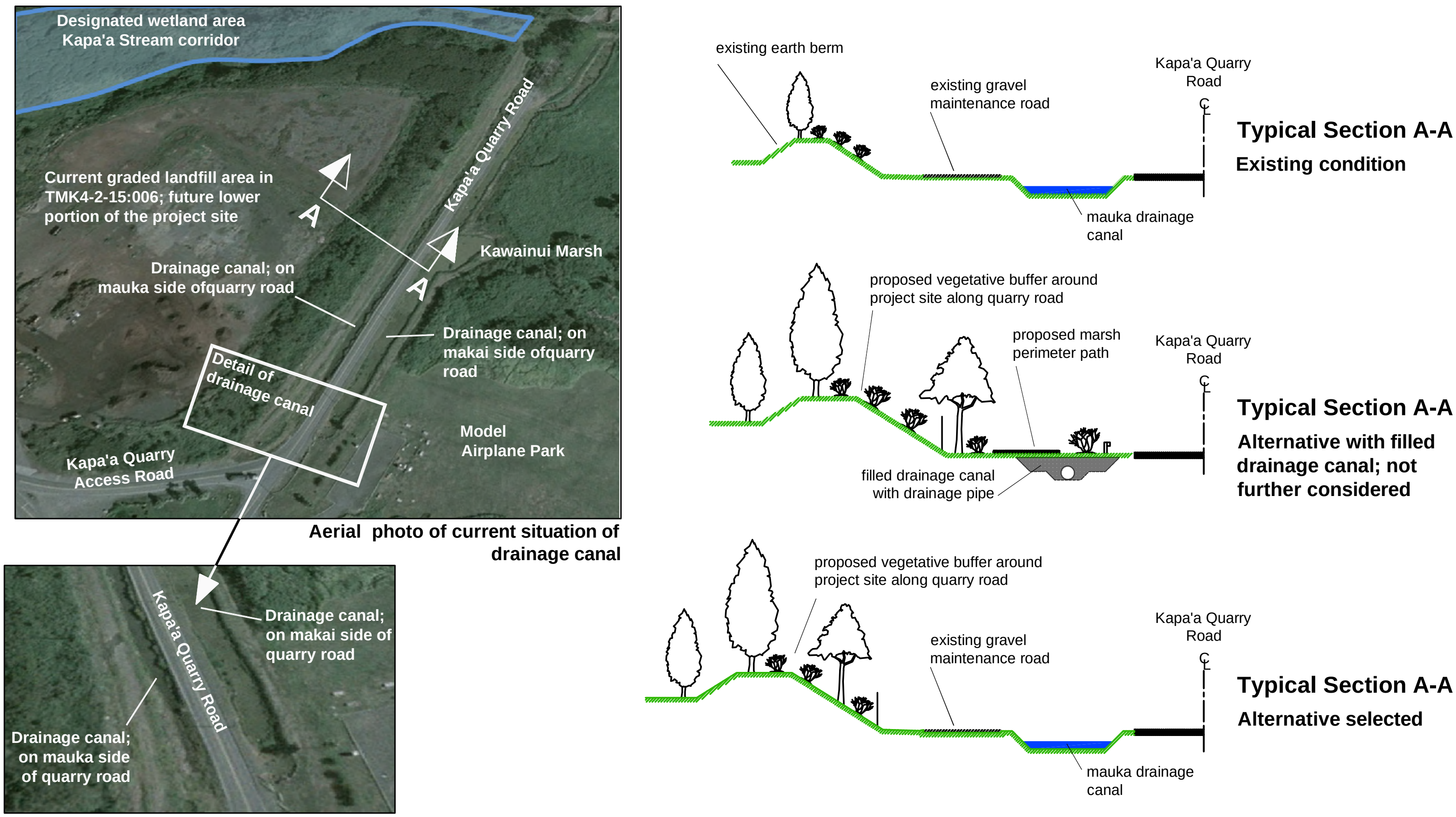
As indicated in Figure 2-12, a higher and more extensive vegetative buffer zone would be installed along the quarry road boundary of the proposed site. The proposed buffer zone would include an earth mound of 10 to 12 feet height. The berm would have a range of suitable native or adaptive plants, including shrubs and larger trees. The berm and the planted trees play an important role in mitigating visual impact of the development in the lower portion of the site. As indicated in Figure 2-12 by creating usable area on top of the filled canal bed, the development could be expanded by about 8 to 10 feet beyond the present foot of the existing earth mound. The additional space for the development would increase the size of the vegetative buffer zone by approximately one quarter of an acre.

Although this alternative appears to render tangible benefits in terms of land use and improved traffic conditions on the quarry road, this alternative was not selected for immediate realization. Rather, in the event that the area above the present stream bed would become required for the proposed perimeter path, the proposed fill and installation of the perimeter path could still be implemented under the selected alternative, which is described next.

<u>Alternative selected for the drainage canal:</u> The selected alternative for improving the drainage canal along the quarry road is depicted in Figure 2-12. Under the selected design alternative, the existing earth mound would be expanded in height and in width to accommodate the planned planting of a thick cover of trees and shrubs. This will leave the drainage canal and the maintenance road in its present state, e.g. the canal would not be directly affected by the development.

The existing setback of about 20 feet would be maintained from the bank of the canal to the boundary of the development, which is the vegetative buffer zone including the earth dam. Therefore the project site would not encroach on the canal, and the space between the canal and the fence that encircles the site of about 20 feet could still be used as a maintenance road for the canal.

This design decision defuses concerns that were raised about any changes to the drainage canal, since the drainage canal directly drains into the Kapa'a Stream, just up-stream of the culvert under the quarry road. The applicant continues to prefer that the canal will be somehow improved in the future and he wants to work with the community to provide support if the alternative of filling the canal becomes a preferred alternative for the public.



Aerial photo of current situation of drainage canal

Detail of drainage canal

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Figure 2-12:
Alternatives considered for drainage canal along Kapa'a Quarry Road

2.9.3 Development of a 13-acre Wildlife Habitat

The FEA described the plans of the applicant, in cooperation with the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), to develop a 13-acre wildlife habitat and restored wetland area in the lower stretches of the Kapa’a Stream, on land directly adjacent to the proposed site and within the parcel TMK 4-2-15:006. In the time following publishing of the FEA, the applicant had commissioned a design study to establish the basic design for the 13-acre wildlife habitat and wetland restoration and to evaluate possible impacts on the environment and water quality in the Kapa’a Stream. The design team cooperated with the State Department of Health in determining the water quality related issues of the project since a 401 Clean Water Act water certification would be required (sine the construction activity would be carried out inside a wetland area). The design process for the 13-acre wildlife habitat and wetland restoration concluded the following:

The main development objective for the wildlife habitat and wetland restoration project was to provide an appropriate environment for water birds, including endangered water birds which populate the areas inside and around the Kawainui Marsh. Preferred habitat conditions include shallow and deeper ponds, areas with exposed soil and mud flats, and low vegetation with occasional larger trees or shrubs. Figure 2-13 illustrates the type of such habitat conditions. Figure 2-14, alternatively, shows the present vegetated condition of the wetland area in the Kapa’a Stream corridor, which would be the site of the proposed wildlife habitat and wetland restoration project (refer to Figure 2-15 for the location and orientation of the camera for the picture shown in Figure 2-14). Figure 2-15 shows a schematic depiction of the final design concept of the formerly proposed wildlife habitat.

Figure 2-13 Type of habitat conditions planned for the proposed but cancelled wildlife habitat

Figure 2-15 illustrates major design components of the now abandoned wildlife habitat and wetland restoration project:

- An area of approximate 13-acres within the lower stretches of the Kapa’a Stream where area would be cleared of vegetation and planted with native wetland plants to create the landscape dominated by mudflat and shallow ponds, as depicted in Figure 2-14. By comparing Figures 2-13 and 2-14 it can be noted that the development of the wildlife habitat would have to involve clearing a significant area of wetland of existing vegetation.
- A 6,000 linear feet of special small mammal-deterrent fence was planned to surrounding the developed habitat. The fence had the purpose to control the movement of small non-native predators, such as feral cats, which prey on the birds.
- A total of 15 shallow cascading ponds to provide habitat for water birds. The ponds would have obtained water from runoff and no water would have been diverted from the Kapa’a Stream to fill the ponds.
- A bird watching platform or site was planned to give the public opportunity to engage in bird watching.
- After construction, a park preservation program was planned, which called for cooperation with local community groups in the park maintenance and educational offerings.

Figure 2-14 Present vegetation at the site of the proposed habitat
(See Figure 2-15 for definition of view)

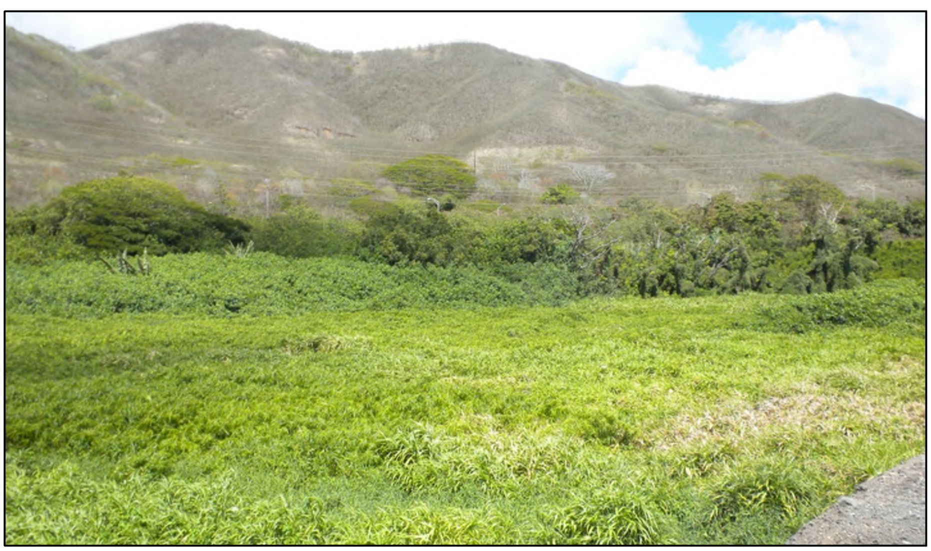
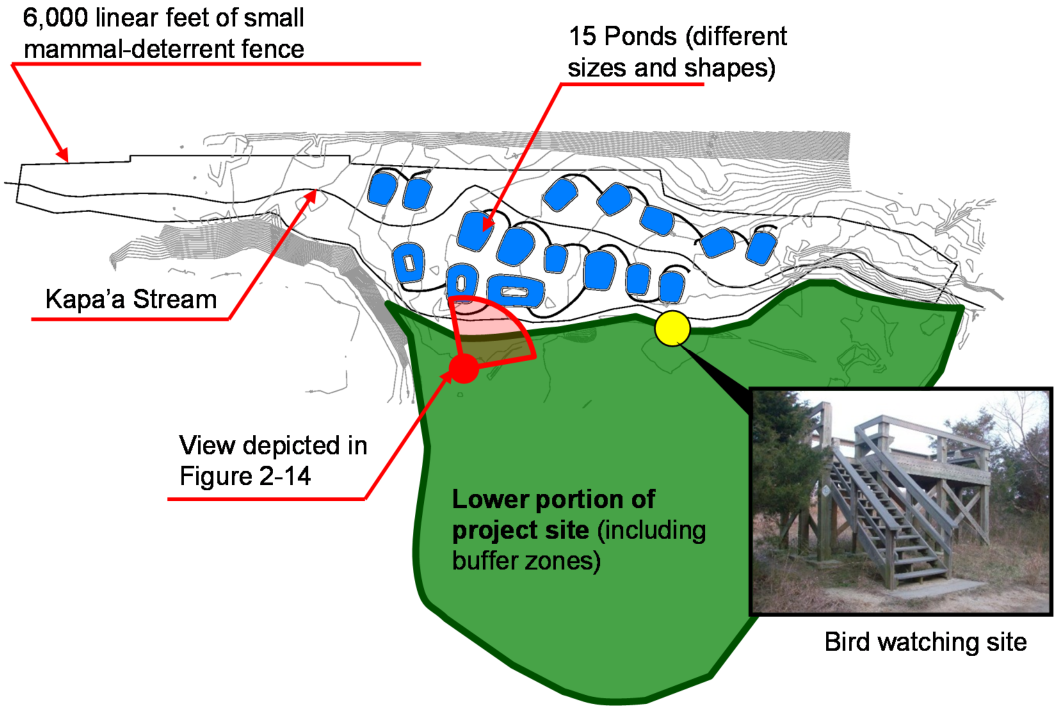


Figure 2-15 Schematic layout of the planned but cancelled 13-acre wildlife habitat project



One significant requirement for obtaining the required State and federal permit was the proof of no deterioration in water quality after the vegetation in the area was cleared. In general a wetland with thick vegetation, such as the one adjacent to the proposed site and in the Kapa'a Stream corridor, contributes to the removal of pollutants from water by a filtering function and aerobic as well as anaerobic treatment processes. Based on existing cases reviewed in the technical literature and on an analytical flow model created for the area, it could not be conclusively established that the Kapa'a Stream capacity of removing organic and inorganic loads in its water would not be negatively affected by constructing the wildlife habitat.

Although the applicant had committed significant funds for the development of the habitat and applied for supplemental funding of NRCS. The applicant <u>decided to stop the plans to develop the habitat</u> as a result of the uncertainties of water quality issues. The applicant still believes that the wetland area could be improved from its present state and could add more value to the region and community as it does at the present time and in its present state. Therefore the applicant will restart efforts in the future that will evaluate how to improve the wetland area, not as a wildlife habitat as planned, which requires large scale clearing of the vegetation, but in an improved water treatment function. The applicant will commit funds that were planned for the 13-acre wildlife habitat to the restoration of open space around the lower portion of the proposed project site. The open space that will be restored to a habitat surrounds the development footprint in the lower portion of the proposed site and excludes a delineated wetland and surface water area. Future references in this DEIS to “restoring habitat” reflect this new approach.

2.9.4 Development of Only the Upper Portion of the Proposed Site

The development of only the upper portion of the site would involve building out the already I-2 zoned parcel TMK 4-2-15:008 and applying for a zone change for the parcel 4-2-15:001 (portion of). Limiting the development to only the upper portion would reduce the amount of new industrial space in the proposed light industrial park by 337,000 square feet, which represents 56% of the planned total new area under the Preferred Alternative. As stated, the objective of the proposed action is to provide a significant amount of space that is properly zoned for limited industrial use. As the results of the market study have revealed, there is a significant undersupply of industrial zoned land in the Koolaupoko region and the proposed site is one of the very few parcels in the region that could be rezoned to industrial land use. In fact, industrial land within the Koolaupoko region is increasingly lost due to conversion to higher yield residential and commercial land uses.

Developing only within the upper portion of the site would reduce impacts such as reducing traffic volume, reducing demand on municipal utilities infrastructure (e.g. electricity and water), reducing the volume of wastewater for onsite treatment, reducing noise and air pollution sources, reducing the amount of converting pervious to impervious land, to name the most important impacts that are typically generated by the proposed type of industrial development.

A reduction of impact created by stormwater runoff by not developing the lower portion of the site cannot, however, be inferred by only looking at the areas that are not being developed. The present runoff situation at the lower portion of the site is characterized by a former landfill are where the rainwater readily percolates into the soil and soil erosion happens in significant quantities, since most of the former landfill area does not have any seeding or other surface vegetation. Under the Preferred Alternative, the development of the lower portion of the site would include implementing a comprehensive system for stormwater treatment, both in terms of quantity and quality improvement of the runoff, and establishing a complete system of measures to avoid for soil erosion. The Preferred Alternative furthermore would use a range of mitigation measures for light pollution mitigation, advanced wastewater treatment to effectively remove nutrients from the wastewater, and add extensive vegetative buffer zones around the development.

It cannot be denied that some environmental impacts would be avoided by not developing the lower portion of the site; however, under the Preferred Alternative much of the impact would be effectively mitigated, and as stated, soil erosion would be reduced. Furthermore, the present state of the lower portion of the site, which basically represents a large area of barren land that was created by a former landfill, is not satisfactory. The appearance of this land is not agricultural in nature nor does it have a favorable appearance of a vegetated open space.

The land use within the lower portion of the site can be converted to serve the community in a better way, such as developing the area for light industrial uses, which fits the regional demand for small, local industrial service. Leaving it undeveloped, i.e. unimproved from its present state, would not be a viable alternative. The alternative of only developing the upper portion of the site was therefore not considered further.

The key to a successful realization of the proposed action lies in implementing a comprehensive approach of effective impact mitigation for the development, especially for the lower portion of the site. The approach under the Preferred Alternative of using low impact development and designing the proposed light industrial park in accordance to LEED Silver certification requirements offers an effective environmentally sensitive approach.

2.9.5 Developing the Entire Development in Accordance to LEED

The alternative of developing the entire proposed light industrial in accordance to LEED certification requirements was evaluated but not further considered. Instead it was decided to focus efforts of building “green” on a comprehensive and effective low impact approach for the lower portion of the site. The lower portion of the site is closer to the important wetland area than the upper portion of the site, and the proposed development footprint of the lower portion of the site is within the Special Management Area district, a condition that by itself necessitates an environmentally sensitive development approach. In accordance with this design decision, the approach selected is to develop the lower portion of the proposed site to LEED Silver certification requirements (e.g. an advanced level to develop with sustainable design and technology) and develop the upper portion along conventional industrial park standards, but still implementing certain low impact technologies.

When considering the planned development approach for the <u>upper portion</u> of the site, much of the planned building design, construction and outfitting features would contribute to a basic LEED certification, such as the following:

- Abiding by all requirements to minimize impacts on the environment during effective construction activity pollution prevention.
- Brownfield Redevelopment - the area that is used for the development of the proposed park can be considered a Brownfield since it is a former landfill area. The development of the light industrial park will therefore use not use any green field

that was previously undeveloped, thereby conserving precious land for open space or agricultural uses.

- Effective stormwater design that includes the collection and responsible drainage of stormwater. Installing a stormwater drainage system and detention ponds for flood control and basic treatment of the runoff (e.g. removal of sediments and all floatables from the stormwater before discharge)
- Incentivizing alternative transportation by providing bicycle racks and preferred parking for low emitting cars and car pools.
- Reduction of the heat island effect by using high solar reflective index (SRI) pavement around the warehouses. Light colored concrete will be used in lieu of dark bituminous pavement. The building envelope will have a high SRI finish to increase the building thermal performance and reduce the heat island effect.
- Water Use Reduction through the use of high performance faucets - The lower water consumption will result in smaller wastewater volume to be treated onsite.
- Effective energy performance of the warehouses by following the prescriptive recommendation of energy efficient warehouses - A comprehensive energy modeling and verification program would be created for the lower portion of the site, resulting in verifiable energy savings of at least 30% for these warehouses. For the upper portion, a comprehensive verification will not be performed, and therefore the resulting energy savings of the upper portion warehouses will be less, though still more efficient than typical industrial warehouses.
- On-Site Renewable Energy has been installed on some of the existing warehouses. The applicant plans to install more PV panels, thereby lowering the peak electricity demand.
- Storage and Collection of Recyclables will be implemented in both portions of the site.
- Construction Waste Management will be performed and recycled, and inert building material will be used to the extent possible
- Recycled content and Regional Materials will be used to the extent possible.
- Low-Emitting construction materials will be used for the construction of the warehouses.
- Light Pollution Reduction will be implemented in accordance to the lighting zone LZ2, rather than LZ1 (“dark”) that will be used for the lower portion of the site.

Adopting low impact development practices for the upper portion of the site will result in efficiency and reduced impact. The scope and level of the planned low impact development measures for the upper portion of the site might not fulfill all the credit thresholds to obtain LEED certification, but it will be directionally consistent with LEED. And, if it can be shown upon completion that the development in the upper portion of the site does indeed fulfill basic LEED certification, the applicant plans to seek basic LEED certification.

2.9.6 Development of the upper portion without approved zone change

An additional alternative, the No-Rezoning Alternative was considered but not further evaluated. This alternative describes the hypothetical development scenario of the proposed site in the absence of the sought land use zone change for two of the three parcels.

The No-Rezone (for “no rezoning”) Alternative describes a second “non-action” alternative. For this alternative the term “non-action” refers to a more limited scope of development only in the parcel TMK 4-2-15:008, which is already zoned I-2 (Intensive Industrial), and thus would not require a zone change as a prerequisite for the construction of warehouses. Therefore this second “non-action alternative” would entail adding a certain amount of floor space to the existing warehouse space. While the No-Action Alternative represents a baseline for the environmental impact of the status quo, the No-Rezone Alternative represents a baseline of a realistic development outcome, even if the zone change is denied.

Figure 2-16 shows the schematic site plan of the No-Rezone Alternative. The 6.2 acre area that is presently graded, non-vegetated and pervious land would be converted to impervious and paved land on which approximately nine new warehouses with a total added floor space of 182,000 square feet would be constructed. The entire 22.4 area developed area within parcel TMK 4-2-15:008 would be impervious area, containing the buildings, roadways, parking and all ancillary facilities.

The two other parcels of the proposed site would remain in the current state, e.g. graded, not vegetated and pervious. The present land uses, such as exterior equipment storage, inert building material storage and processing as well as green waste processing would continue, if consistent with the county land use ordinances or any land use variances that could be granted in the future. The No-Rezone Alternative differs from the No-Action Alternative since under the No-Action Alternative no further development of the site would occur.

The proposed action is to develop the Kapa’a Light Industrial Park on three contiguous land parcels, which will require a zone change from General preservation (P-2) to Limited Industrial (I-1) for two of the parcels, TMK 4-2-15:001 (portion of) and 006, while the parcel TKM 4-1-15:008 is already zoned as I-2. In the event that zone change is not granted for parcels TMK 4-2-15:001 (portion of) and 006, the applicant plans to continue developing the parcel TMK 4-2-15:008 with industrial warehouses and use the parcels TMK 4-2-15:001

(portion of) and 006 in a way that is consistent with county land use ordinances and any variances that will be applied in the future.

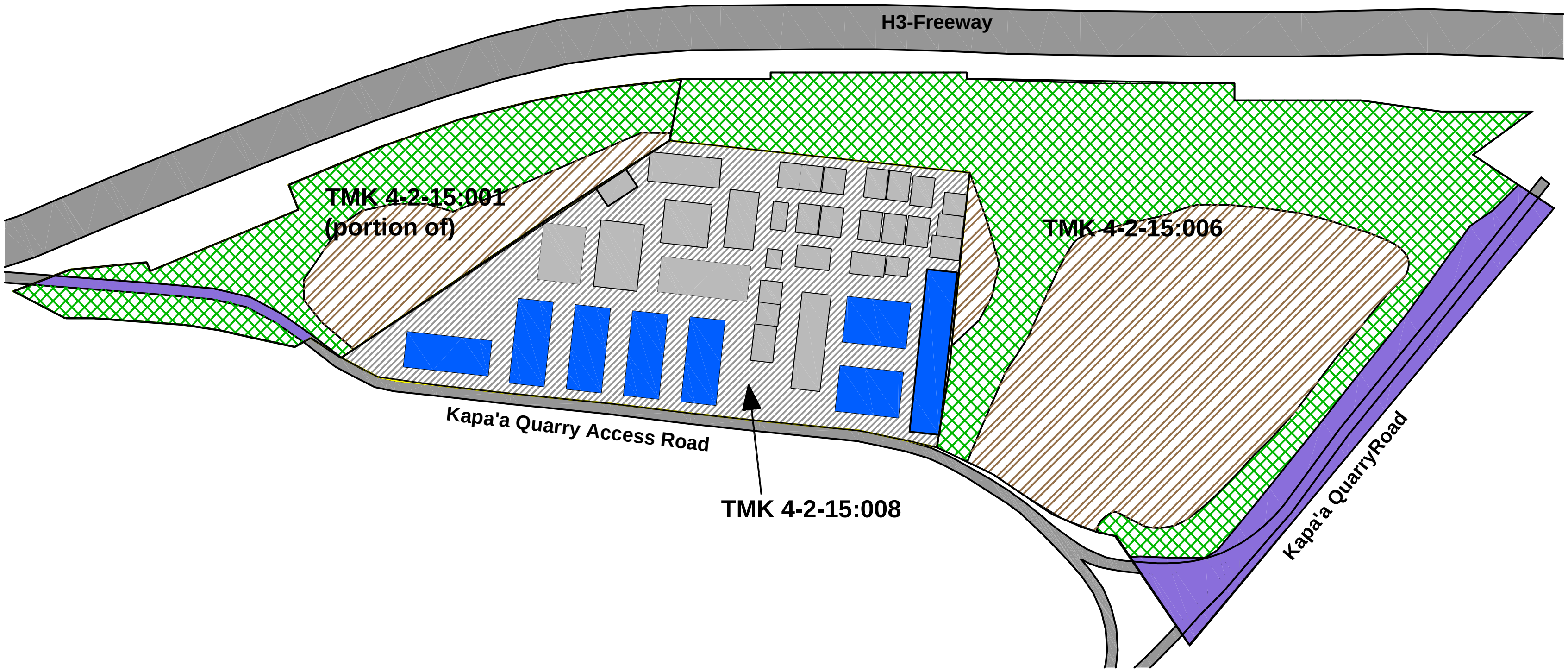
Table 2-10 and 2-11 compare the No-Rezone Alternative with the three alternatives that are evaluated in this DEIS in terms of land use and warehouse space added.

Figure 2-16 and Table 2-10 indicate that the entire parcel TMK 4-2-15:008 would be developed to the extent possible. The current 6.2 acres of graded but not paved area would be paved and warehouses would be added at this location. Table 2-11 indicates that in the “No-Rezone” situation for the parcels TMK 4-2-15:001 (portion of) and 006, 182,000 sq. ft. of warehouses would be added in the current zoned I-2 sections for a total planned square footage of 465,000 including current buildings.

The No-Rezone Alternative is therefore a more differentiated baseline of a “no-action” alternative. For the evaluation of impacts in this DEIS, the Re-zone Alternative will not be further evaluated.

Table 2-10 Comparison of No-Rezone with three alternatives

Comparison of alternatives - land use	No-Action Alternative acres	**No-Rezone** acres	Alternative B acres	Preferred Alternative acres
Upper portion:				
TMK 4-2-15:001 (portion of)				
Open space vegetated (outside development footprint)	8.1	8.1	8.1	8.1
Graded and pervious but not vegetated	4.4	4.4	0.0	0.0
Development area, impervious	0.0	0.0	4.4	4.4
Other area (i.e. roadway, drainage canal)	0.5	0.5	0.5	0.5
sum	13.0	13.0	13.0	13.0
TMK 4-2-15:008 (portion of)				
Open space vegetated (outside development footprint)	0.2	0.0	0.0	0.0
Graded and pervious but not vegetated	6.2	0.0	0.0	0.0
Development area, impervious	16.0	22.4	22.4	22.4
Other area (i.e. roadway, drainage canal)	0.0	0.0	0.0	0.0
sum	22.4	22.4	22.4	22.4
Lower portion:				
TMK 4-2-15:006 (portion of)				
Open space vegetated (outside development footprint)	20.1	20.1	20.2	22.3
Graded and pervious but not vegetated	18.9	18.9	0.7	0.0
Development area, impervious (development footprint)	0.0	0.0	18.0	16.7
Other area (i.e. roadway, drainage canal)	4.8	4.8	4.8	4.8
sum	43.8	43.8	43.8	43.8



	Open vegetated space, pervious (acres)	Graded non-vegetated, pervious (acres)	Developed non-vegetated area, impervious (acres)	Existing building footprint (sqft)	Added building footprint (sqft)	Other area; not affected by development (acres)
TMK 4-2-15:001 (port. of)	8.1	4.4	None	None	N/A	0.4
TMK 4-2-15:006	20.1	18.9	None	None	N/A	4.8
TMK 4-2-15:008	0.0	0.0	22.4	283,000	182,000	0.0

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Figure 2-16
Likely layout of the industrial development under the No-Rezone Alternative

Table 2-11 Comparison of No-Rezone alternative with three Alternatives – building footprint

Comparison of alternatives - building footprint	No-Action Alternative sqft	No-Rezone sqft	Alternative B sqft	Preferred Alternative sqft
Upper portion: TMK 4-2-15:001 (portion of) and 4-2-15:008				
Existing buildings	283,000	283,000	283,000	283,000
Added buildings	0	182,000	269,000	269,000
Lower portion: TMK 4-2-15:006				
Existing buildings	0	0	0	0
Added buildings	0	0	337,000	337,000
Total space added to current space in upper and lower portion of the site	0	182,000	606,000	606,000
Total building footprint at the site	283,000	465,000	889,000	889,000
Total building footprint at the site added to the No-Rezone Alternative	N/A	N/A	**424,000**	**424,000**

building footprint rounded to the next thousand

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CHAPTER THREE - CURRENT (EXISTING) ENVIRONMENT

The proposed project site is located on the windward site of the Island of Oahu. The project site is composed of three contiguous land parcels, TMK 4-2-15:001 (portion of), 006 and 008, all of which are owned by the applicant. The project site is located in the lower stretches of the Kapa’a Valley, directly adjacent to the H3-Freeway and the Kapa’a Quarry Road. The environmentally and culturally important Kawainui Marsh is located to the east and adjacent of the project site. Figure 3-1 shows the vicinity map of the project site. The following sections evaluate and discuss the existing environment at the proposed project site.

3.1 Geology, Topography, and Soils Existing Environment

3.1.1 Geology and Topography

The proposed industrial park site is situated in the Kapa’a valley, flanked by the Ulumawao mountain ridge in the southeast and the Mahinui mountain ridge in the northwest. The geological formations of the hills surrounding the valley are mainly defined by very dense rock formations of volcanic origin. A geologic map of Oahu depicted in Figure 3-2 shows that at higher elevations, the geology is mostly defined by volcanic rock of Kailua volcanic series characterized by massive basaltic flows which contain numerous dike structures filled with secondary minerals. In contrast, in the proposed project site, located in the lower reaches of Kapa’a Stream, the geology is defined by terrigenous alluvium and fine organic mud. In this lower part of the watershed much of the surface has been impacted by quarry and land filling operations, which have resulted in deposits of more than 20 feet of quarry tailings and municipal solid wastes.

The existing topography at the proposed site is characterized by gently sloping terrain from southwest to the northeast and towards the Kapa’a Stream. The natural topography at the site has historically been heavily impacted by quarry and landfill operations from the 1940’s through the 1960’s. The topographic map of the proposed site is depicted in Figure 3-3. The site topography is characterized by a relatively flat eastern section of the site separated from the lower section by a narrow sloped section with a 25 to 30 foot drop. Ground elevations in the western section of the site range from 80 to 95 feet above Mean Sea Level (MSL), and gently slope towards the Kapa’a Stream. The northern section of the site is formed by a relatively flat plateau bounded in the north by Kapa’a Stream and in the west by a drainage ditch which runs along Kapa’a Quarry Road and drains into the stream. Ground elevations in this section range between 20 and 50 feet above MSL with a gentle slope in the easterly direction.

Figure 3-1 Vicinity map

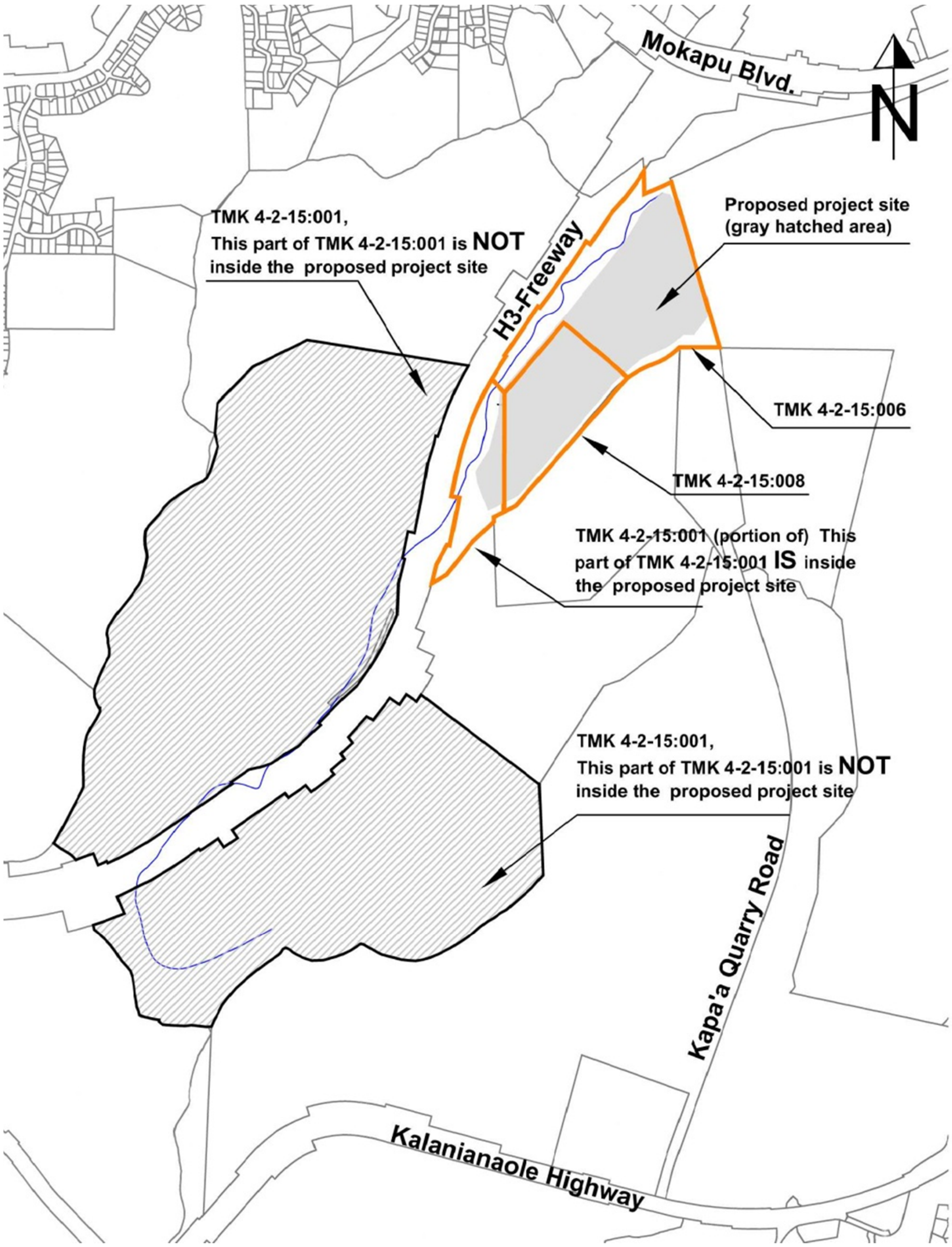
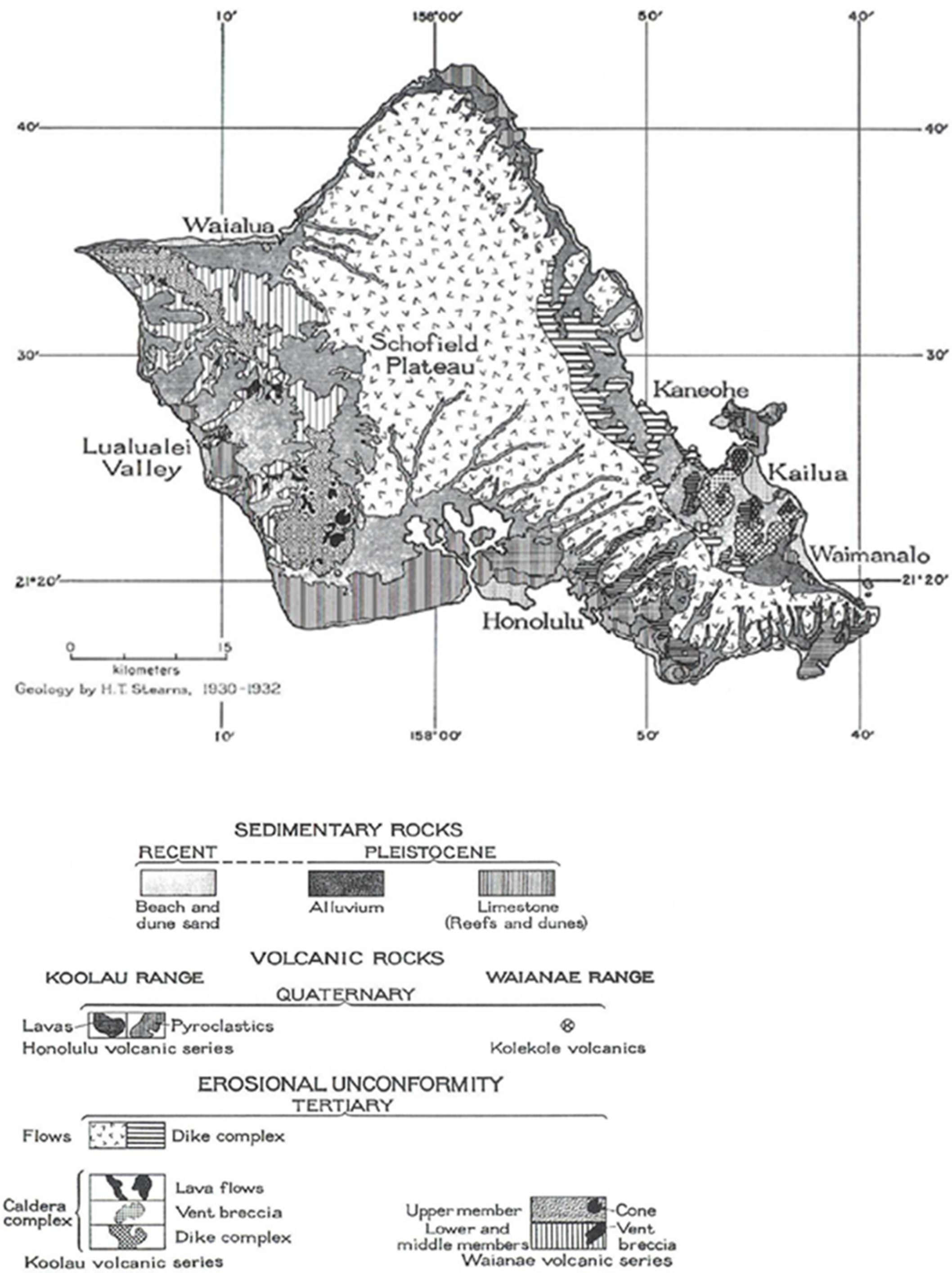


Figure 3-2 Main geological formations of Oahu



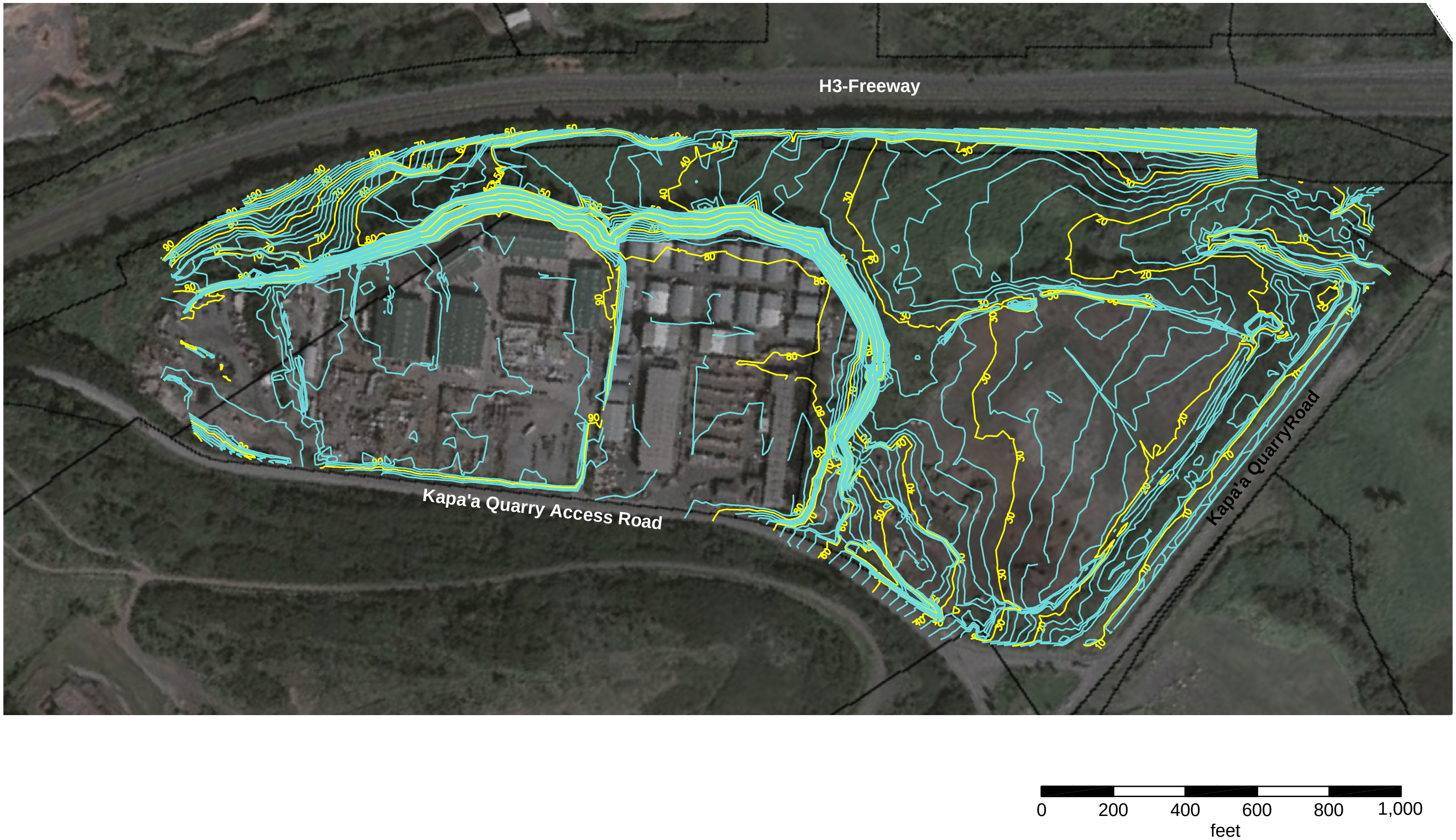


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Figure 3-3
Topography at project site

3.1.2 Soils

A description of the soils within the project area was obtained by using the web Soil Survey of the U.S. Natural Resources Conservation Service (NRCS). (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx). The soil map obtained represents an area dominated by one or more major kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soils. In the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Soils with profiles that are almost alike make up a soil series. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in the texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics.

The following soils are represented at the proposed site:

ALF—Alaeloa silty clay:

Parent material: Basic igneous rock

Properties and qualities; Slope: 15 to 35 percent; depth to restrictive feature > 80 inches; Well drained; Permeability moderately low to moderately high (0.06 to 0.20 in/hr); depth to water table > 80 inches

KlaB—Kawaihapai stony clay loam:

Landform: Alluvial fans; Parent material: Basic igneous rock

Properties and qualities: Slope: 2 to 6 percent; Depth to restrictive feature > 80 inches; Well drained; Permeability moderately high to high (0.60 to 6.00 in/hr); depth to water table > 80 inches; Occasional flooding; no ponding.

Ph—Pearl Harbor clay

Landform: Coastal plains; Parent material: Alluvium

Properties and qualities: Slope: 0 to 2 percent; depth to restrictive feature > 80 inches; Poorly drained; Permeability Very low to moderately low (0.00 to 0.06 in/hr); depth to water table: About 18 to 48 inches; occasional flooding: frequent ponding.

QU—Quarry:

No description for generic quarry soil

rSY—Stony steep land:

Landform: Valleys; Parent material: Mass movement deposits

Properties and qualities; Slope: 40 to 70 percent; Depth to restrictive feature > 80 inches; Well drained; Permeability High (2.00 to 5.95 in/hr); Depth to water table > 80 inches; no flooding; no ponding.

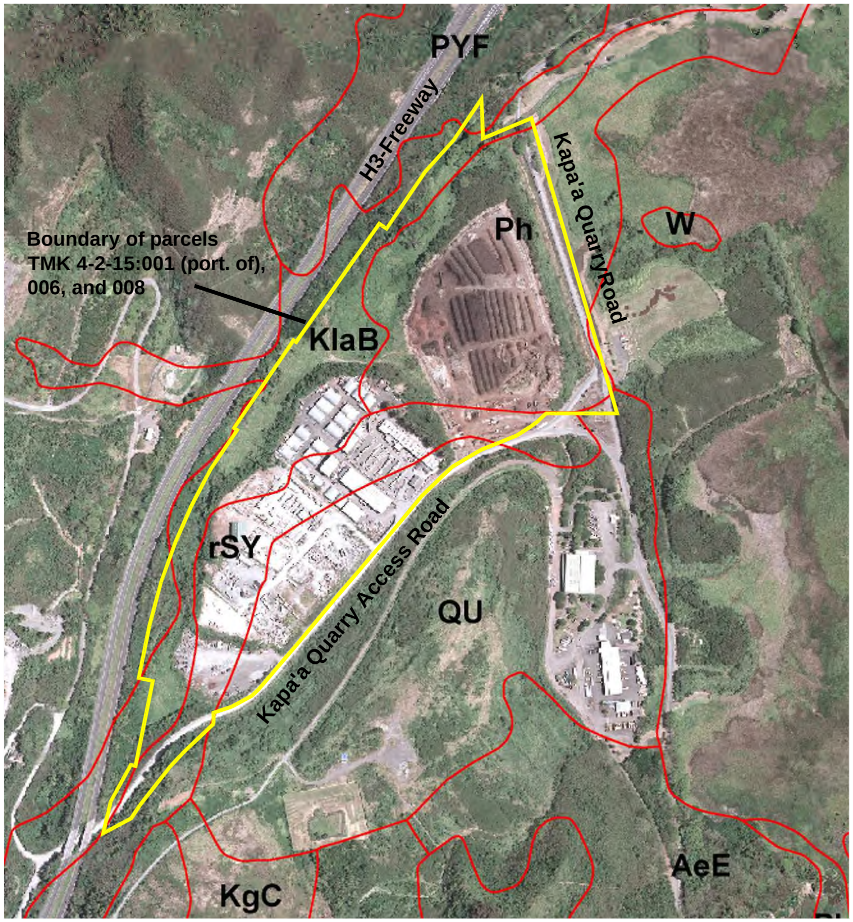
Table 3-1 shows the area of representative soils for the three contiguous land parcel s (TMK 4-2-15:001 (portion of), 006 and 008), within the development boundary of the upper portion of the project site (development TMK 4-2-15:001 (portion of), 006 and 008) and within the development boundary of the lower portion of the project site (TMK 4-2-15:006).

The intensive quarry and landfill operations in the area dating back to early 1950s have resulted in significant changes from the original soils at the site. Extensive deposits of quarry tailings and overburden materials, as well as residential solid wastes, have significantly changed the original soils at the site.

Table 3-1 Soils represented at project site

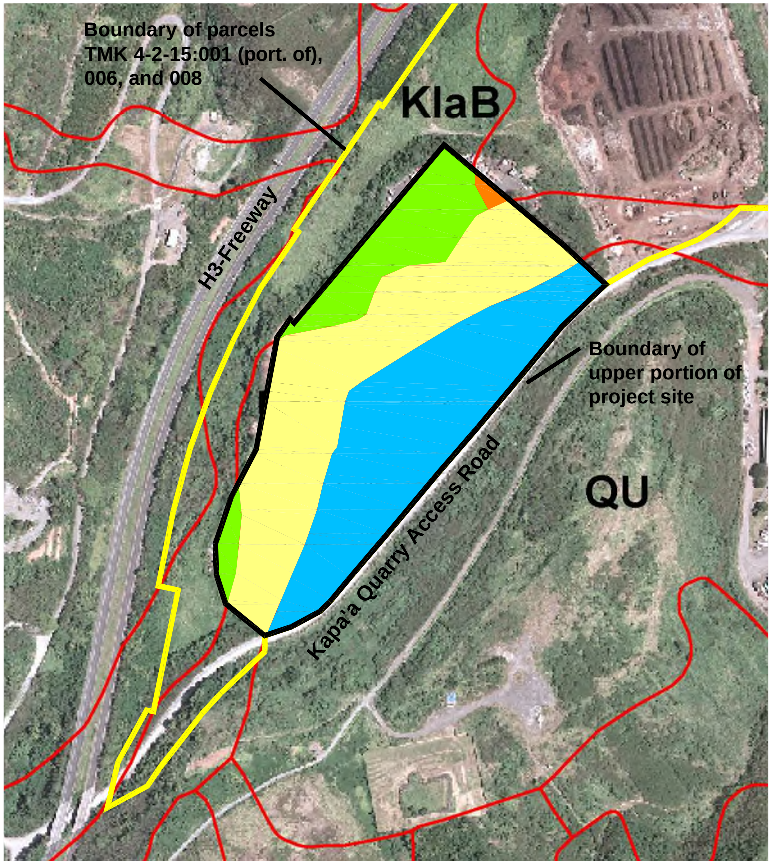
Map symbol	Map unit name	Three parcels of site TMK 4-2-15:001 (p.o.), 006 & 008		Upper portion of the site TMK 4-2-15:001 (p.o.) & 008		Lower portion of the site TMK 4-2-15:006	
		acres	% of total	acres	% of total	acres	% of total
AFL	Alaeloa silty clay	1.1	1.3%	0.0	0.0%	0.0	0.0%
KlaB	Kawaihapai stony clay loam	19.2	24.3%	4.4	16.2%	0.3	1.0%
Ph	Pearl Harbor clay	30.0	37.9%	0.2	0.6%	20.9	85.6%
QU	Quarry	11.4	14.4%	10.7	40.1%	0.6	2.4%
rSY	Stony steep land	17.5	22.1%	11.5	43.0%	2.7	11.0%
	sum	79.2	100.0%	26.8	100.0%	24.5	100.0%

Figure 3-4 depicts the soil map for the three land parcels that enclose the proposed project site. The figure is based on the current soil survey information obtained from the NRCS. The extent of the soil is indicated as actual area and percentage of total area. Figure 3-5 and 3-6 show the spatial distribution and relative size (e.g. in percentage of total area) of the representative soils for the development boundaries of the upper and lower portion of the site, respectively. Table 3-1 and Figures 3-4 through 3-6 suggest that the Pearl Harbor and the Kawaihapai soil series were the main original soils found at the site prior to quarry operations in the valley. The Pearl Harbor and the Kawaihapai soil series represent poorly and well drained soils, predominately found in the lower and upper portion of the project site, respectively.



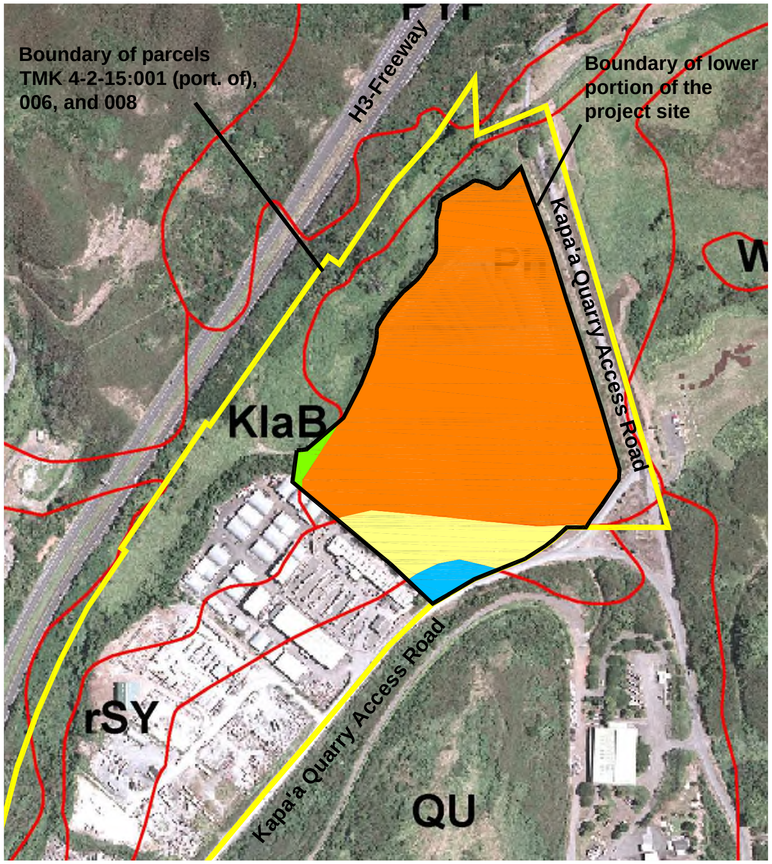
Soil symbol	Area in parcels	Acres in parcels	% of total area in parcels
ALF	Alaeloa silty clay	1.1	1%
KlaB	Kawaihapai stony clay loam	19.2	24%
Ph	Pearl Harbor clay	30.0	38%
QU	Quarry	11.4	14%
rSY	Stony steep land	17.5	22%
	Sum in 3 parcels	79.2	100%

Figure 3-4
Soil map for three contiguous parcels of project site



Soil symbol	Title of soil series	Acres in upper portion	% of total area in upper portion
ALF	Alaeloa silty clay	0	0%
KlaB	Kawaihapai stony clay loam	4.4	16%
Ph	Pearl Harbor clay	0.2	1%
QU	Quarry	10.7	40%
rSY	Stony steep land	11.5	43%
Sum in upper portion of project site		26.8	100%

Figure 3-5
Soil map for UPPER portion of the project site



Soil symbol	Title of soil series	Acres in lower portion	% of total area in lower portion
ALF	Alaeloa silty clay	0	0%
KlaB	Kawaihapai stony clay loam	0.3	1%
Ph	Pearl Harbor clay	20.9	86%
QU	Quarry	0.6	2%
rSY	Stony steep land	2.7	11%
Sum in lower portion of project site		24.5	100%

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Figure 3-6
Soil map for LOWER portion of the project site

3.2 Water Resources Existing Environment

The following sub-sections provide a description of the general conditions and characteristics of water resources found at the project site. Types of water resources investigated include surface water, wetlands, floodplains, watershed considerations and current stormwater management. Appendix 7 presents the results of a literature review and a field survey of relevant water resources at the project site and a discussion of whether the proposed action will impact navigable waters under the jurisdiction of the United States.

3.2.1 General Climate and Rainfall

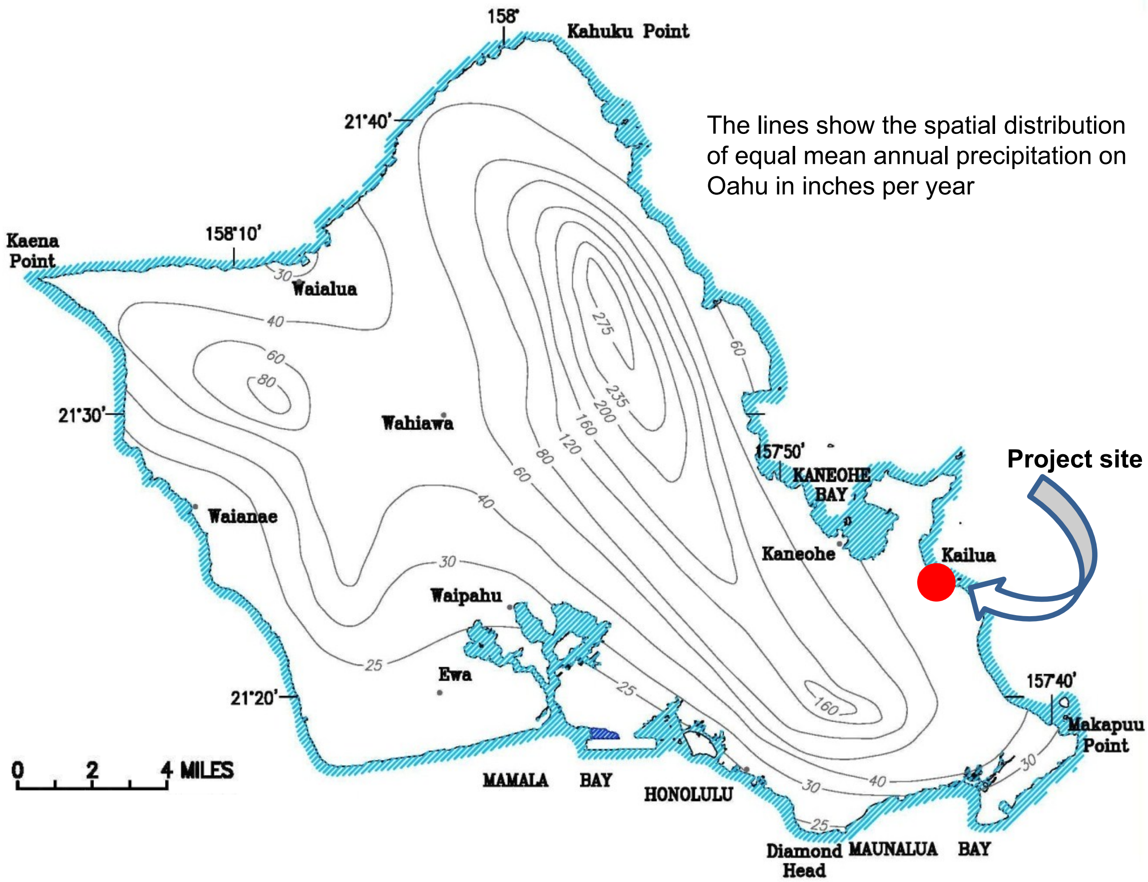
The proposed site for the Kapa'a Light Industrial Park is located on the windward side of Oahu, approximately one mile from the ocean. With the exception of a few months in the winter, like most areas of windward Oahu, the climate in the project area is characterized by its elevation above sea level, distance from the ocean and exposure to the prevailing trade winds. The general climate is sunny and relatively uniform year-round. Day time temperatures range between 73 to 80 ºF, whereas at night the temperatures can dip into 60's ºF.

The rainfall map of Oahu as shown in Figure 3-7, depicts the spatial distribution of mean annual precipitation on Oahu. The figure indicates mean annual precipitation for the Koolaupoko region ranging between 60 and 120 inches. Higher rainfall occurs in higher elevations of the Ko'olau range due to orographic lift caused by the Koolau mountain ranges. The rainfall at the project site is due mostly to non-thermally induced trade wind showers or large weather systems over the entire island. Figure 3-7 shows mean annual rainfall at the project site is between 40 and 50 inches.

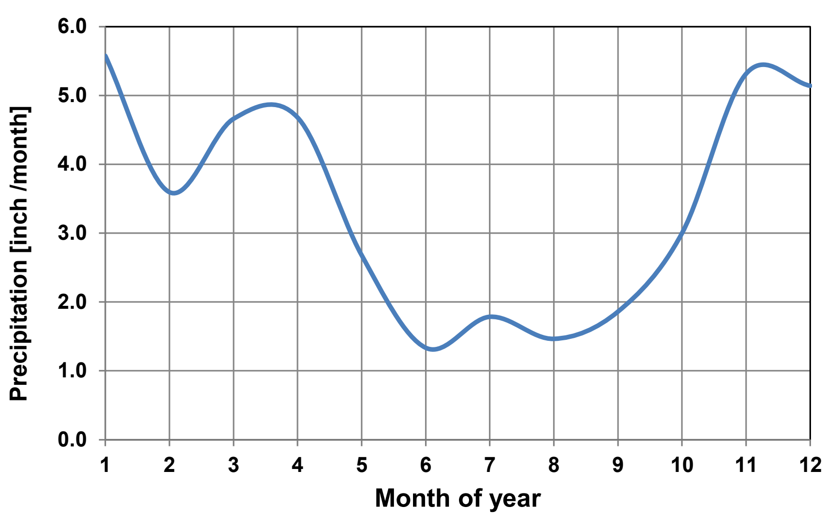
Figure 3-7 also shows the annual distribution of mean monthly precipitation values. The representative (e.g. average) monthly precipitation data was calculated from a 30 year record (1961-1990) obtained at Kailua Weather Station 791, Hawaii (512683). Most of this rainfall occurs during the "wet season", e.g. November through April.

3.2.2 Surface Waters

Figure 3-8 shows four main surface water features on or adjacent to the project site. With the exception of drainage culvert discharging to a percolation field on the site (No. 4 in Figure 3-8), all the surface water features are outside the development boundary and are therefore not directly affected by the proposed action. The results of a water resources assessment are presented in Appendix 7. The four identified main surface water features are as follows:



The lines show the spatial distribution of equal mean annual precipitation on Oahu in inches per year

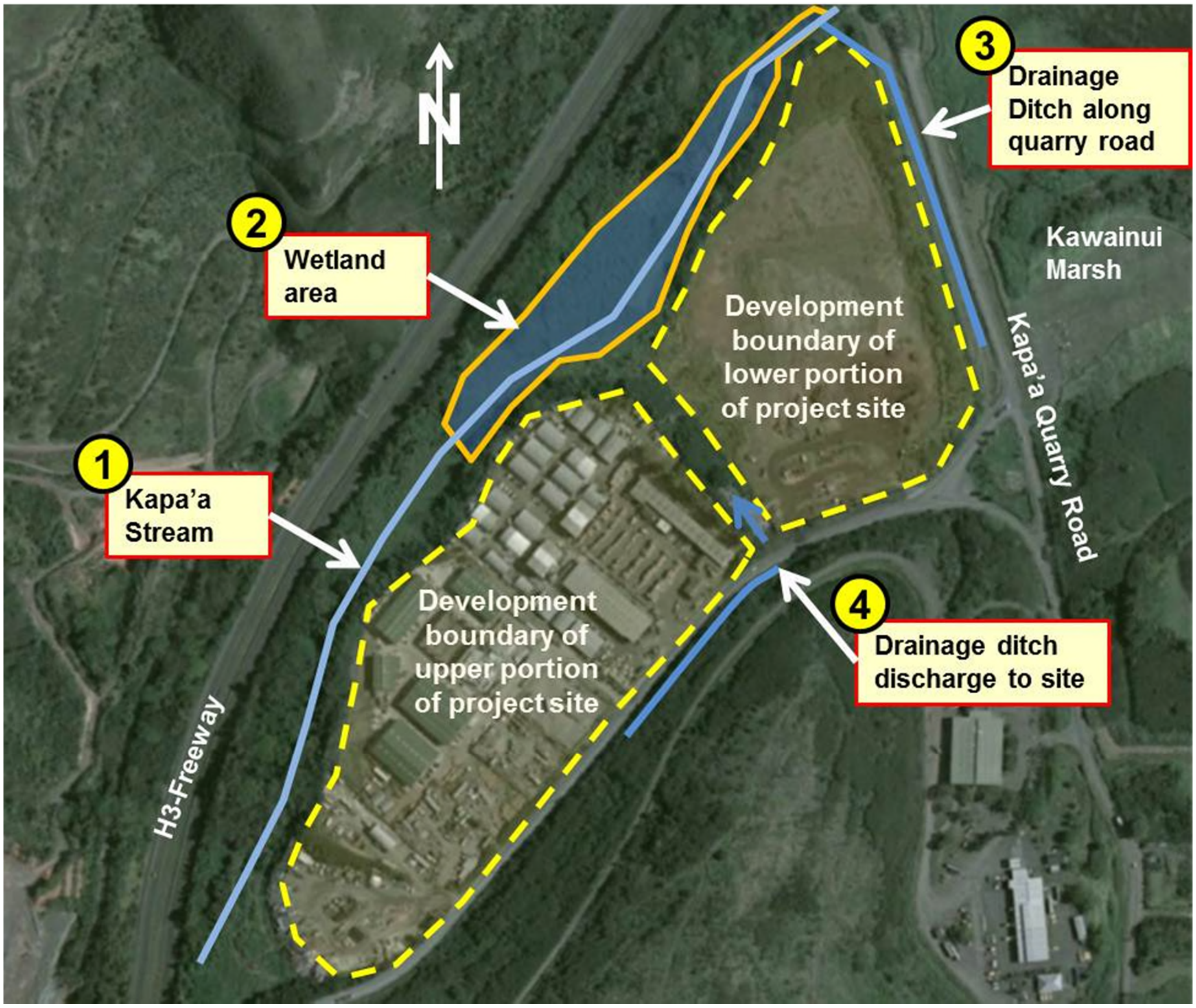


Average monthly precipitation values; based on a 30 year record (1961-1990) obtained at Kailua Station 791, Hawaii (512683)

Figure 3-7

Average yearly and monthly precipitation on Oahu and at project site

Figure 3-8 Description of surface water features at project site



Description of surface water features:

1. **Kapa'a Stream:** runs through the property boundaries but remains outside the development boundary of project; total stream length is 1.9 miles with about 0.7 mile on the property of the applicant.
2. **Wetland area**: approximately 15 areas of delineated wetland outside the development boundary; Kapa'a Stream flows through wetland area
3. **Drainage Ditch along quarry road:** mostly stagnant water from surface runoff and seepage, drainage canal is outside development boundary
4. **Drainage ditch along quarry access road with discharge on to the site:** discharge from ditch through culvert under the quarry access road to a percolation field on project site, no surface flow downstream of discharge point of culvert

1. **Kapa'a Stream:** The relatively short Kapa'a Stream is the main drainage way for the Kapa'a Valley watershed. The stream drains into Kawainui Marsh and ultimately to the Pacific Ocean via Oneawa Canal and Kailua Beach. The stream's total length is approximately 1.9 miles, of which the stream flows through the property of the applicant for 0.7 miles. The average base flow at the confluence of the stream with the Kawainui Marsh is 1.2 cbft/sec during the wet season (Nov. 1 to April 30) and .9 cbft/sec during the dry season (May 1 to Oct. 30). During the rainy season and after heavy storms, the base flow increases significantly and during rare storm events, the stream level raises high enough to inundate the quarry road in the vicinity of the culvert under the quarry road. Kapa'a Stream is on the List of Impaired Waters of Hawaii. The list was prepared under provisions of the Clean Water Act §303(d). The Kapa'a Stream exceeds the dry season turbidity standard and nutrients; where turbidity, suspended solids and metals are stated as predominant pollutants. Figure 3-9 shows the lower reaches of the Kapa'a Stream with the only wider perennial stream sections (just upstream of the culvert under the quarry road through which the stream flows into the Kawainui Marsh). For a significant part of the year the stream is covered with Salvinia Molesta and has none, or very small patches of free water surface.

Figure 3-9 Lower Reach of Kapa'a Stream corridor covered with Salvinia Molesta

2. **Wet land area:** An area of about 15 acres has been delineated wetland following the criteria of wetland soil, vegetation and flooding conditions. The Kapa’a Stream flows through the wetland area. At present the wetland area has a dense cover with California grass and no apparent larger open water surfaces. The wetland area is entirely outside the development boundary of the proposed industrial park. The applicant has worked with the NRCS on the design of a 13 acre wetland restoration and wildlife habitat project; this project is now put on hold indefinitely. The goal of the wetland restoration and wildlife habitat project was to create a wetland environment specifically for endangered water birds that populate the Kawainui Marsh and adjacent land through wetland restoration measures. Based on findings of an initial master plan design study of the 13-acre wildlife habitat the applicant has decided to defer the and wildlife habitat project pending a conclusive evaluation into how the removal of large quantities of wetland vegetation would affect water quality in the Kapa’a Stream and what mitigation measures would be acceptable to the State agencies responsible for wetlands.

3. **Drainage ditch along Kapa’a Quarry Road:** There are two drainage ditches, one on each side of the quarry road over the length of the section of the quarry road that is adjacent to the proposed project (e.g. the lower portion of the proposed site). Only the mauka (e.g. on the mountainside) ditch is considered at this point. The mauka drainage ditch is typically stagnant water, which originates from surface runoff and seepage of water from the lower portion of the proposed site. For much of the year the ditch is completely covered with algae and/or water plants. During a field survey in September 2010 (see Appendix 7 for the results of a water resources assessment of the site) the ditch had no free water surface and the canal was basically filled with mud. During severe stormwater events the canal drains into Kapa’a Stream and subsequently into the Kawainui Marsh. The proposed layout of the industrial park would not affect the canal since the development boundary is set back about 20 feet from the top of bank of the canal. Figure 3-10 shows the canal on the mauka side of the quarry road. The drainage canal is shown with a continuous cover of Salvinia Molesta (green water plant floating on the water surface). The vegetative buffer around the lower portion of the proposed site would commence at the foot of the existing earth mounds about 20 feet mauka of the top of bank of the canal.

4. **Drainage ditch along quarry access road with discharge on to the site**: The drainage flow in the ditch along the Kapa’a Quarry Access Road enters the project site through a culvert under the access road and is then distributed in an existing percolation filed in the lower portion of the site. A portion of the drainage volume in the ditch along the access road originates from runoff of the project site. The ditch conveys runoff eastwards towards a marsh until the flow in the ditch enters a drain inlet structure and from there the runoff is conveyed through a culvert under the access road to the site. Downward of the discharge

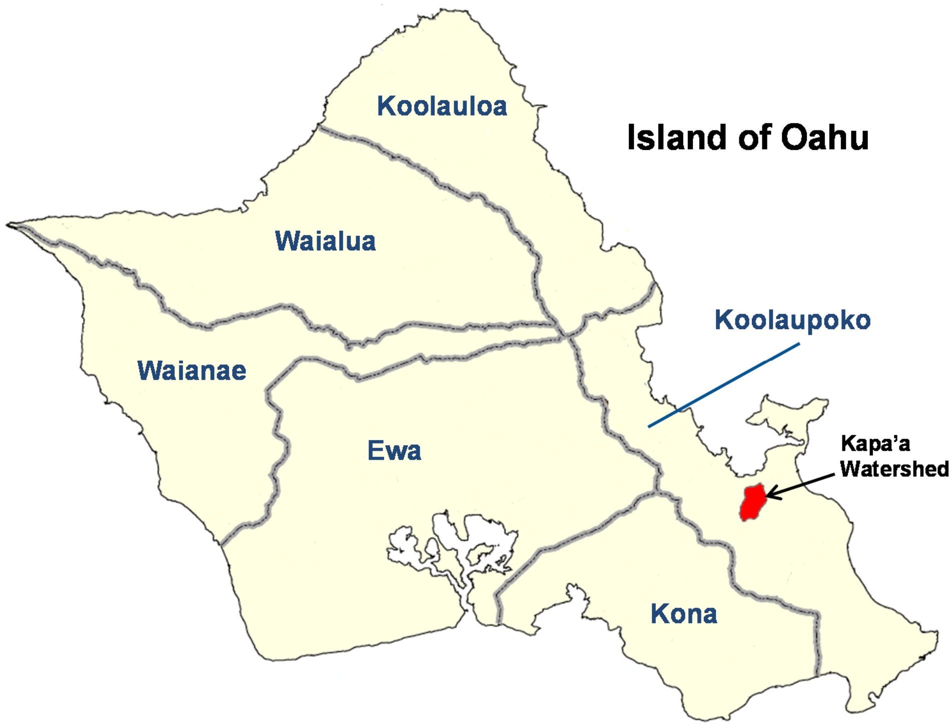
point of the culvert water readily infiltrates within a percolation field, which is located within the lower portion of the site, but outside the development footprint.

Figure 3-10 Existing drainage canal alongside Kapa’a Quarry Road

3.2.3 Kapa’a Watershed Considerations

The Kapa`a watershed is an area of approximately 850 acres on the windward side of the Island of Oahu. Figure 3-11 illustrates the location of the Kapa’a watershed. Figure 3-11 shows Oahu divided into six districts. Based on early Hawaiian land division and governance, the islands of Hawaii are divided into *moku*, or separate districts. Mokus are further subdivided into smaller sections called *ahupua’a,* which are fundamental unit of community subsistence and political organization. An ahupua’a basically indicates a section of land running from the mountain (mauka) into the sea (makai). With resources extending from the mountains to the ocean, an ahupua’a provided the community with the life's essentials such as wood for canoes and housing, food grown in irrigated fields in the valley and seafood obtained from the near shore waters. Streams formed the center of many ahupua’a. Streams are the most important and protected resource of the ahupua’a, revered as sustainers of life and sacred to the land. The Kapa’a watershed is located in the Koolaupoko district.

Figure 3-11 Location of Kapa’a watershed on the Island of Oahu



The Kapa’a Stream is the main drainage pathway for the Kapa’a watershed and drains directly to Kawainui Marsh, while infiltrated water from the Kapa’a watershed drains indirectly to the marsh. The Kawainui Marsh, with a total area of about 1,000 acres, is the largest freshwater wetland in the State, habitat for four of Hawaii’s endemic and endangered water birds, and a place sacred to Native Hawaiians. Kawainui, with its adjacent Hamakua Marsh, is a designated “Wetland of International Importance”.

The Kapa’a Stream has a total length of approximately 1.9 miles. Along its way through the watershed it meanders through different parts of the Kapa’a Valley that been significantly altered by industrial and other developments in the past 60 years. From its source the stream flows through several pools until the stream enters a perennial stream section not far from where it flows into the Kawainui Marsh.

In 2007 the Hawaii State Department of Health (DoH) performed an evaluation of the water quality in the Kapa'a Stream (DOH, 2007). The evaluation involved a model of the water discharge and pollutant loads of the stream, for both typical wet and dry seasons. The hydraulic model comprised 13 sub-basins, which were characterized by different hydrographical properties, drainage characteristics and land uses. The sub-basins had various sizes. With the applied assumptions of rainfall, infiltration rates, runoff rates and stream morphology assimilation rates, the sub-basins produced different flow rates and loads of various pollutants in the Kapa'a Stream.

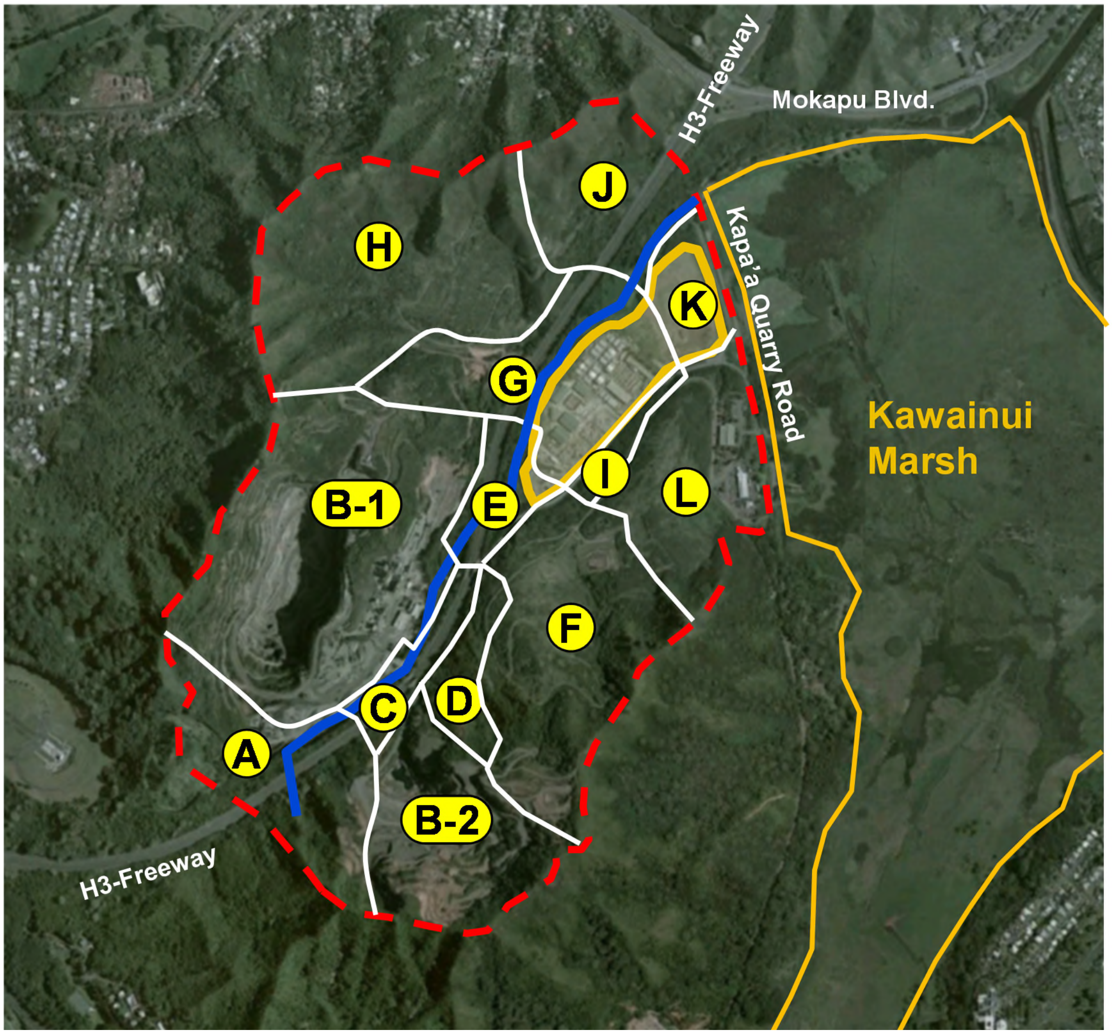
Figure 3-12 shows the extent of the Kapa’a watershed, and the location and size of the 13 sub-basins used in the DoH model. Table 3-2 delineates the 13 sub-basins used in the DoH hydraulic model. It should be noted that in the DoH model all sub-basins, with the exception of sub-basin L, drain into the Kapa'a Stream. Runoff from Sub-basin L drains directly into the Kawainui Marsh through an outlet under the Kapa'a Quarry Road. In addition to surface drainage through the Kapa'a Stream and the different direct outlets into the Kawainui Marsh, underground flow contributes to the total drainage of the watershed to the marsh.

The sub-basins in the DoH model are further subdivided into areas of different land uses, such as forest/brush, industrial, roads, highway, quarry and landfill. The area with different land uses within the sub-basins have their individual impervious factors, such as roads, highways and industrial, with respective imperviousness factors of 0.4 to 0.75, 0.57 and 0.80. Furthermore, each sub-basin has its own dry and wet season and annual precipitation rate, with the lower stretches in the east of the valley having lower precipitation rates than the west end of the valley where there is higher elevation. The differences between maximum and minimum precipitation values in the east and west of the Kapa’a watershed is 4.7 and 6.9 inch per annum for the dry and wet season, respectively.

Of the 825 acres of the Kapa’a watershed considered in the DoH model, 94 acres of land within the sub-basins have imperviousness greater than 40%, and about 20 acres are connected to existing drainage systems. Table 3-2 lists the average imperviousness of the entire watershed and the individual sub-basins, which are calculated as the weighted mean of the areas with different land uses. The model suggests that the proposed site, which is composed of portions of sub-basins E, G and K, has a compound imperviousness of 42%

The DoH analysis considered a wet season baseline scenario and a 2% flow event scenario, with the resulting flow rates and pollutant load levels in the Kapa’a Stream. The baseline case refers to drainage conditions, where the flow rate and resulting pollutant load level in the stream is caused by the release of groundwater from the watershed. The 2% event refers to the highest 2% of the average rainfall events in the dry or wet season. The 2% data suggests water quality effects due to high flow rates and resulting high loads of pollutants discharged into the Kapa’a Stream.

Figure 3-12 Kapa'a Watershed with sub-basin definition for hydrological model



Proposed site of KLIP

Boundary of Kapa'a watershed

Kapa'a Stream

X Sub-basin of watershed area in DOH 2007 study

Table 3-2 Description of sub-basins used in DoH Kapa’a watershed model

Sub-basin ID	Area (acre)	Avg. Impervious-ness (%)	Description of Sub-basin
A	96	3%	Sub-basin A is the headwater tributary drainage area for Kapa’a Stream.
B (I) and B(II)	218	9%	Sub-basin B is divided into sub-basin B(I) and B(II). The sub-basins B(I) and B(II) represent the Ameron Phase I and Phase II quarry operations. The two sub-basins are divided by the H3-Freeway. The run-off from Sub-basin B(II) is conveyed to the sub-basin B(I). Sub-basin B(I) has a retention pond that accommodates a 10-year, 24-hour rain event.
C	17	13%	Sub-basin C consists of the right-of-way for the H-3 highway and is located between the sub-basins B(I) and B(II).
D	29	3%	Sub-basin D is a steeply sloped area that drains toward the H-3 highway. Runoff from this area is collected and point-discharged into the Kapa’a Stream through a culvert.
E	24	25%	Sub-basin E is an immediate tributary drainage area for the Kapa’a Stream. The sub-basin is divided by the H3 Freeway. This sub-basin is directly to the south of the Kapa’a Light Industrial Park.
F	98	2%	Sub-basin F drains the City & County of Honolulu Kapa’a Landfill (Phase II) and relatively undisturbed slopes up to the ridgeline. Drainage is collected in a circumferential drainage swale constructed around the inner landfill. Drainage is conveyed to sub-basin E.
G	60	41%	Sub-basin G is an immediate tributary drainage area for Kapa’a Stream. The sub-basin encompasses area to both sides of the H3-Freeway and the Kapa’a Stream. Sub-basin FG is divided into an eastern and western part. The western part drains through several culverts under the freeway. The eastern part includes a part of the proposed Kapa’a Light Industrial Park.
H	126	1%	Sub-basin H includes the Kalaheo Landfill, which is surrounded by larger sloped scrub-covered areas. The municipal landfill is no longer in operation. The sub-basin drains into the Kapa'a Stream through a large

Sub-basin ID	Area (acre)	Avg. Impervious-ness (%)	Description of Sub-basin
			culvert under the H3-Freeway. The sub-basin has a retention pond to control the drainage and sedimentation discharge.
I	8	23%	Sub-basin I is a small area that drains into the Kapa'a Stream through a pipe that passes under the Kapa'a Quarry Access Road and terminates in Sub-basin K
J	59	5%	Sub-basin J drains slopes to the west of the H3-freeway and the stream valley adjacent to sub-basin K. The area west of the H3-Freeway is drained into the Kapa'a Stream through several culverts under the freeway.
K	28	2%	Sub-basin K is a landfill area that consists of quarry deposits. The sub-basin drains into a drainage canal that separates Sub-basin K from the Kapa'a Quarry Road. Sub-basin K is the area that will be used for the lower portion of the Kapa'a Light Industrial Park.
L	62	33%	Sub-basin L contains the lower Phase I part of the Kapa`a landfill, which is also the site of the old first Ameron quarry. A drainage swale collects the runoff and conveys it to a retention pond. The Sub-basin L is the only sub-basin of the Kapa'a watershed that drains directly into the Kawainui Marsh and not into the Kapa'a Stream.
Sum	**825**	**10%**	Total area of Kapa'a watershed considered in the model; with 763 acres of sub-basins A through K draining into the Kapa'a Stream through Kapa'a Stream and 62 acres draining through sub-basin L into the Kawainui Marsh.

Using wet season flow rates and pollutant loads in the Kapa'a Stream provides a conservative representation of the contribution of the proposed project site to the overall water quality of the Kapa'a Stream. The amount of total suspended solids (TSS) is used to describe the water quality of the stream in different scenarios.

The resulting flow rates and pollutant load rates for the wet season baseline and 2% event are presented for the existing conditions at the proposed site. Twelve of the 13 sub-basins contribute to the water quality of the Kapa’a Stream; Sub-basin L does not drain into the Kapa’a Stream, but drains directly into the Kawainui Marsh through culverts under the Kapa’a Quarry Road.

Table 3-3 and Figure 3-13 indicate estimated average flow rates and Total Suspended Solids (TSS) loads for the wet season baseline case as percentages of total flow and loading. Under baseline conditions, Sub-basins B (sum of B(I) and B(II)) combined are the largest contributors to both the water flow rate and the pollutant loading in the Kapa’a Stream. Other large contributors are sub-basins A, F, G and H, though sub-basin A contributes less TSS than the other three sub-basins in this group of four. The sub basins E, G, I and K, which include the flows and pollutant loads under existing conditions at the proposed site, contribute more TSS than water flow. This is due to the high TSS contributions of the industrial part of sub-basin G, which represents the existing warehouse development on parcel TMK 4-2-015:008, and the sub-basin K, which is the landfill area with Green Waste processing, both of them having either no or partially stabilized soil sections or pavement.

Table 3-4 and Figure 3-14 indicate estimated average flow rates and Total Suspended Solids (TSS) loads for the wet season 2% event as percentages of total flow and loading. The contributions of sub-basins B and H are significantly reduced due to the effect of sedimentation ponds, which hold back TSS loads from these two sub-basins. In the DoH analysis, the runoff from sub-basin B and H does not contribute to the water flow and TSS loading of the Kapa’a Stream is greatly reduced, respectively. Sub-basin D is by far the biggest contributor in regard to TSS loading, followed by Sub-basin F. The proposed site, in the present condition, contributes more water flow than TSS. This is partly due to the fact that in the 2%-event the industrial part of sub-basin G discharges more flow than TSS. It can be seen that the TSS loading of the lower part of the proposed site, the landfill area of sub-basin K, contributes most of the TSS loading. This suggests that the landfill area in sub-basin K, which currently does not have sufficient measures against surface erosion, is a main contributor of TSS loading to the Kapa’a Stream from land that represents the proposed project site.

Table 3-3 Wet Season base flow and pollutant load; present contribution from proposed site

Subbasin	Flow (cfs)	TSS (kgd)	Flow % of total	TSS % of total
A	0.17	20	14%	8%
B	0.40	91	33%	34%
C	0.03	4	2%	2%
D	0.04	5	3%	2%
E	0.04	8	3%	3%
F	0.14	38	11%	14%
G	0.12	36	10%	14%
H	0.18	33	15%	12%
I	0.01	4	1%	2%
J	0.07	16	6%	6%
K	0.03	11	2%	4%
sum	1.23	266	100%	100%
Proposed site contribution from:				
subbasin E; Industrial	0.00	2	0%	1%
subbasin G; Industrial	0.08	30	7%	11%
subbasin I; Landfill	0.01	3	1%	1%
subbasin K; Landfill	0.03	10	2%	4%
sum	**0.12**	**45**	**10%**	**17%**

Note: Subbasin L does not contribute to flow and pollutant load of Kapa'a Stream

Figure 3-13 Wet Season Base flow and Pollutant Load; Present Contribution from Proposed Site

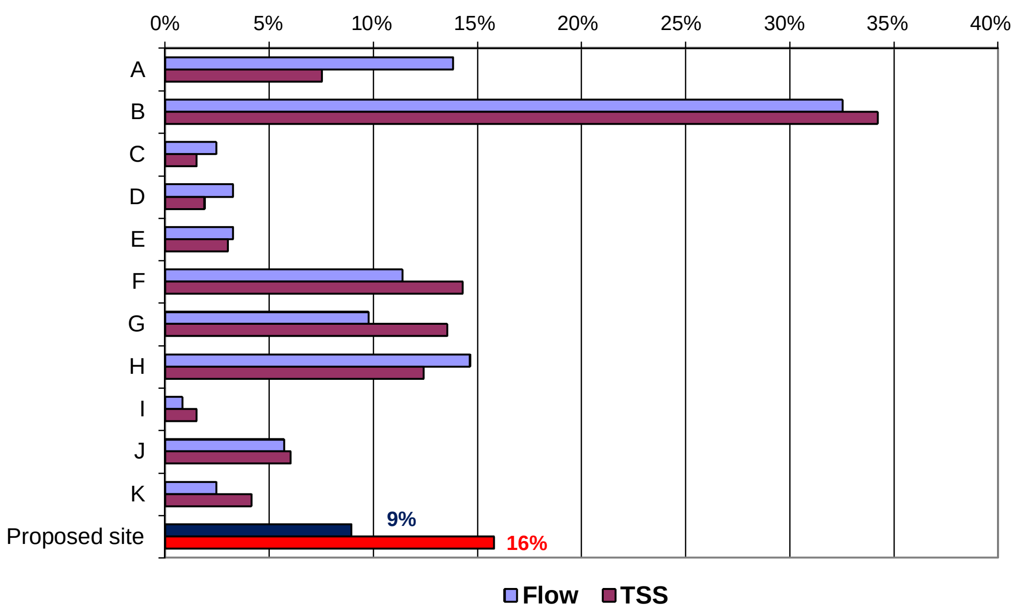
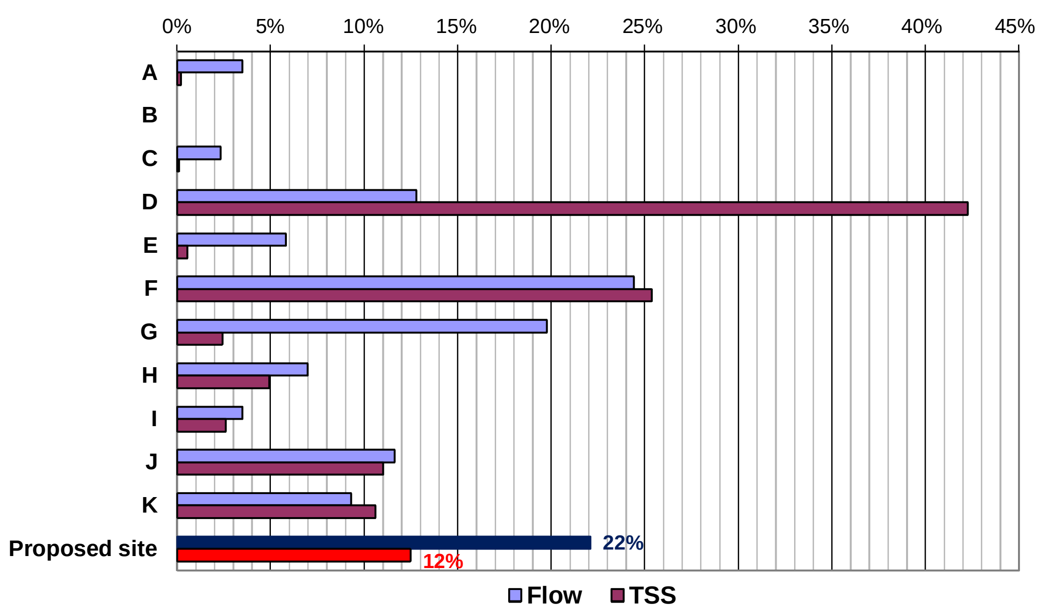


Table 3-4 Wet season 2% Event and pollutant load; present contribution from proposed site

Subbasin	Flow (mcf)	TSS (kgd)	Flow % of total	TSS % of total
A	0.03	140	3%	0%
B	0	0	0%	0%
C	0.02	61	2%	0%
D	0.11	27,031	13%	42%
E	0.05	344	6%	1%
F	0.21	16,212	24%	25%
G	0.17	1,538	20%	2%
H	0.06	3,155	7%	5%
I	0.03	1,659	3%	3%
J	0.1	7,044	12%	11%
K	0.08	6,779	9%	11%
sum	0.86	63,963	100%	100%
Proposed site				
contribution from:				
subbasin E; Industrial	0.01	60	1%	0%
subbasin G; Industrial	0.1	1179	12%	2%
subbasin K; Landfill	0.08	6728	9%	11%
sum	**0.19**	**7967**	**22%**	**12%**

Note: Subbasin L does not contribute to flow and pollutant load of Kapa'a Stream
mcf = million cubic feet

Figure 3-14 Wet Season 2% Event and Pollutant Load; Present Contribution from Proposed Site



For the assessment of the contribution of different sub-basins to the total flow and pollutant loading in the Kapa’a Stream, it is helpful to compare the relative size of the sub-basin, e.g. its percentage of the total size of the watershed, to the relative flow and pollutant loading which originates from that sub-basin. As can be seen from the data, different sub-basins contribute more than can be expected if only relative to their size.

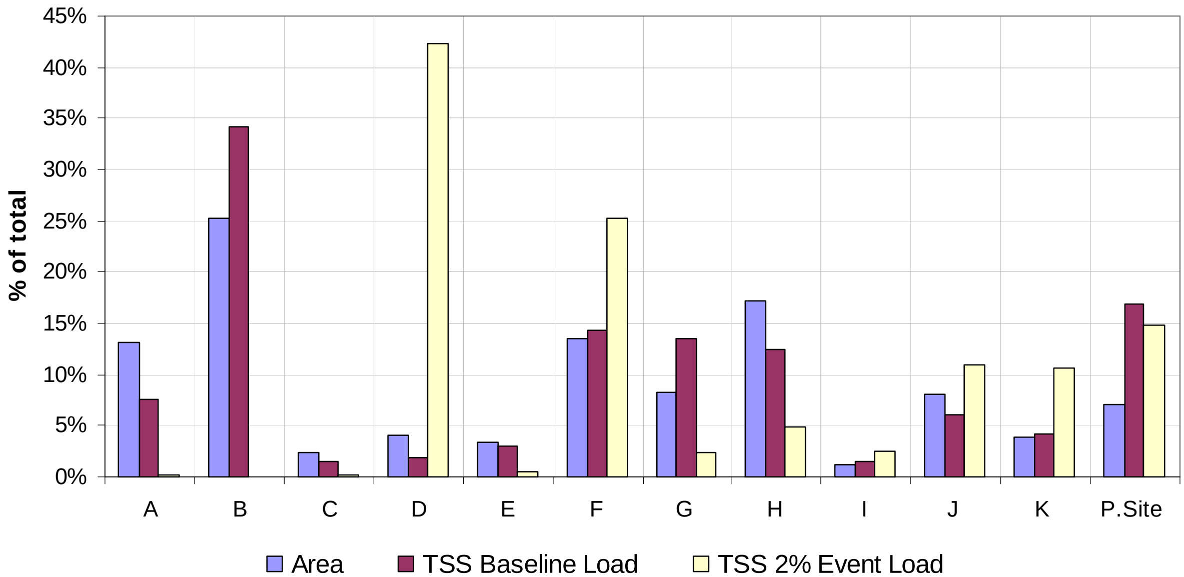
Figure 3-15 depicts a correlation of the percentage contributions of size of sub-basins and TSS loadings for the wet season baseline and 2%-event scenario. Figure 3-15 shows that the DoH study concluded sub-basin D is being the biggest contributor of TSS loading in the 2%-event case. The relative small size and high TSS loading of sub-basin D is striking, but can be readily explained from the fact that sub-basin D has 28 acres or 95 percent of its total area designated as “eroded”. Sub-basin B, while being the largest sub-basin in the watershed, does not have any TSS loading in the 2%-event, since its sedimentation pond are expected to retain all TSS loading. Furthermore, the relative size and TSS loading under the 2%-event deviates significantly for sub-basin F. The existing conditions of the proposed site suggest that the relative baseline and 2%-event TSS loading is larger than its relative size, suggesting that current conditions of the proposed site could be improved to lower the impact of peak run-off and associated pollutant loading.

The contribution of the proposed site under the existing conditions in regard to water quality (represented by TSS load) and flow rate in the Kapa’a Stream can be evaluated by considering the runoff scheme in the watershed, e.g. where along the Kapa’a Stream are sub-basins contributing to the flow rate and TSS load of the stream. Figure 3-16 illustrates the Kapa’a watershed runoff schematic. Portions within the sub-basins E, G and K represent the areas of the proposed site which contribute to the runoff flow rate and TSS loading in accordance with their specific hydrological characteristics. Figure 3-16 indicates the area percent values of the sub-basins E, G and K which represent the proposed site; as an example 48 percent of the sub-basin G is identified as “industrial;” in the DoH model and thus 48 percent of the proposed site contributes to the runoff.

Figures 3-17 illustrates the quantitative contributions for flow rates and TSS loading originating from the proposed site in relationship to the entire Kapa’a watershed, for the wet season baseline and peak (2%) flow events. The x-axis represents the Kapa’a Stream sections as defined in Figure 3-16.

The results in Figure 3-17 suggest that the existing TSS loading under base flow condition from the portions in sub-basin G and K that are within the proposed site are 75 and 25 percent, respectively. For the peak flow event (2%-event), however, the TSS runoff contributions of the area potions in sub-basins G and K are 15 and 85 percent, respectively. These results suggest that the runoff from the landfill area in sub-basin K produces high TSS loading in strong rain events, which can be attributed to the fact that the landfill surface in sub-basin K is largely composed of unstabilized and unprotected soil, which facilitates erosion.

Figure 3-15 Comparison of size and TSS loading for baseline and 2%-Event contributions



3.2.4 Existing drainage system at proposed site

Figure 3-18 shows the existing drainage system within and in the vicinity of the proposed project site. Most of the onsite storm runoff flows to the Kapa’a Stream corridor by means of surface flow and is discharged from the site either through an existing detention pond or through a series of drain outlets. This site drainage also includes runoff from off-site sources that are directed into the site, namely through an existing 30-inch drainage pipe under the quarry access road, which conveys runoff from an drainage ditch along the southern side of the quarry access road to a percolation field within the lower portion of the project site.

Figure 3-16 Kapa’a watershed runoff schematic (from DoH 2007, modified)

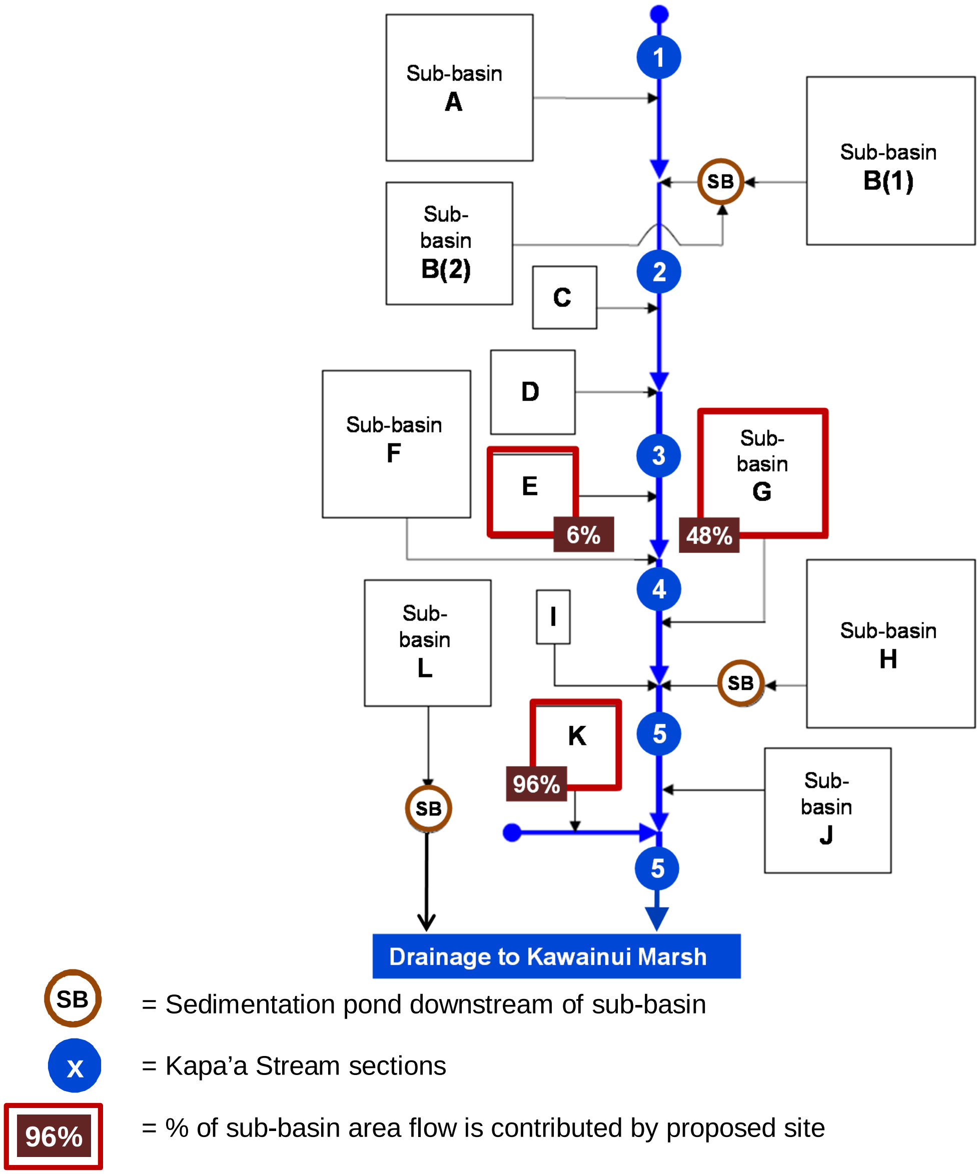
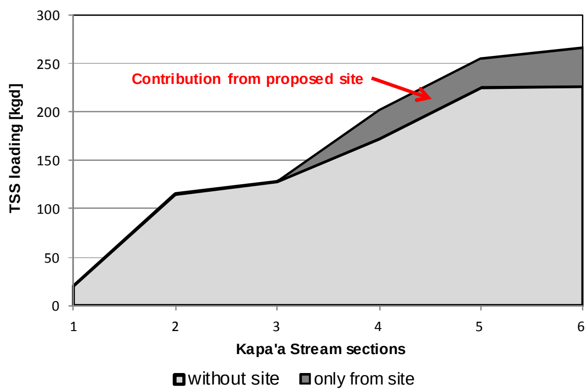
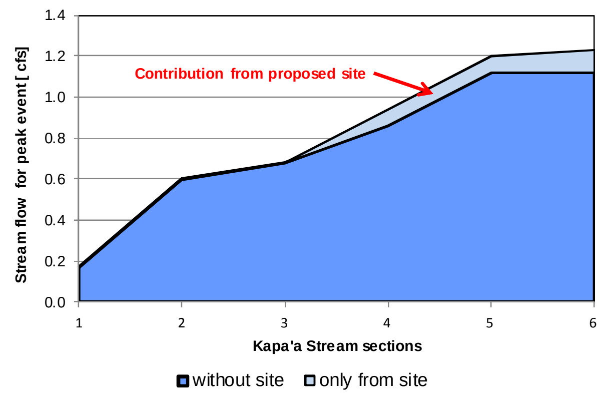


Figure 3-17 Existing flow and TSS contribution of proposed site to runoff on Kapa'a watershed

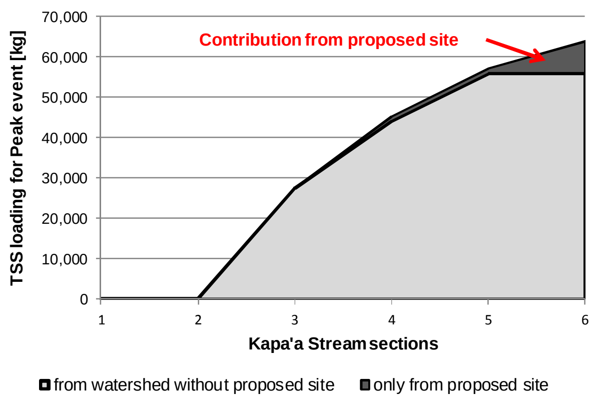
Existing contribution of proposed site to overall runoff in Kapa'a watershed



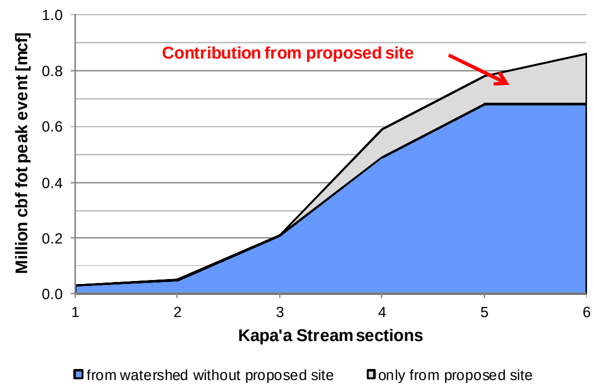
Watershed Baseload runoff; TSS loading



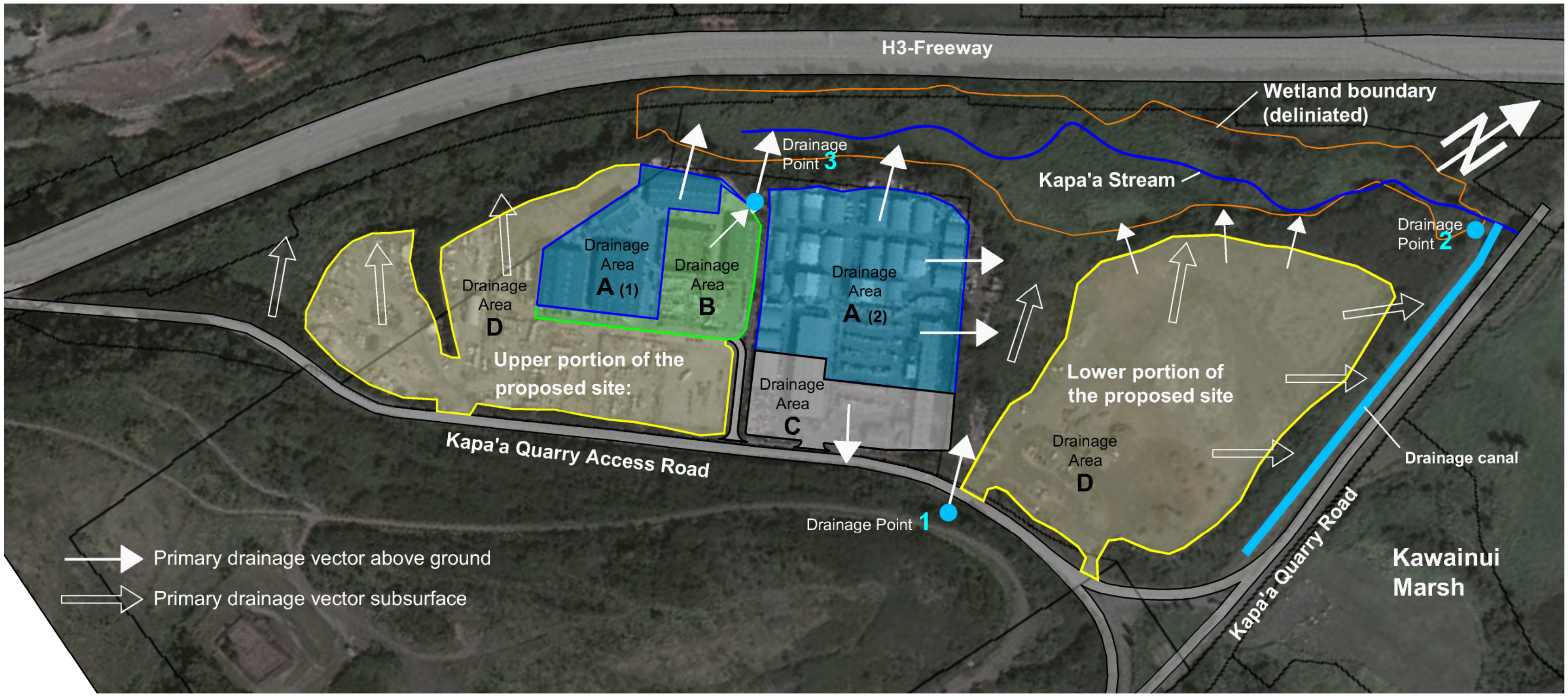
Watershed Baseload runoff; Flow rate



Watershed Peak (2%) runoff; TSS loading [kg]



Watershed Peak (2%) runoff; Flow rate [mcf]



Drainage Area	Description of drainage area
A	Drainage to stream corridor (directly)
B	Drainage to existing detention pond
C	Drainage to roadway with exist. drainage
D	Drainage by percolation into graded surface

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Figure 3-18
Existing drainage system of proposed site.

Figure 3-18 differentiates between four types of existing drainage areas within the proposed site. Table 3-5 defines these four types of existing drainage areas:

Table 3-5 Components of the existing site drainage system

Drainage area (note**)	Primary type of drainage in area	Description of drainage area; land use and surface conditions	in UPPER portion of the site (acres)	in LOWEWR portion of the site (acres)
A	Drainage to stream corridor (directly)	Industrial warehouses; concrete pavement between buildings covers the entire area	**9.4**	**N/A**
B	Drainage to existing detention pond	Industrial warehouses; concrete pavement between buildings covers the entire area	**2.5**	**N/A**
C	Drainage to roadway with exist. drainage	Industrial warehouses; concrete pavement between buildings covers the entire area	**2.8**	**N/A**
D	Drainage by percolation into graded surface	Industrial use, no permanent structures; pervious gravel pavement covers the entire area	**10.0**	**17.5**

Figure 3-18 shows the existing drainage system within and in the vicinity of the proposed project site.

Drainage Area A represents the part of the upper portion of the project site that drains to the Kapa’a Stream corridor either through drain inlet structures or by simple site runoff over the edge of the pavement into the pervious and vegetated site perimeter. The total size of Drain area A, composed of two separate areas, is 9.4 acres. The entire area has an impervious surface, either roof area of the warehouses or concrete pavement between the warehouses. Therefore the entire area contributes to the runoff volume, including the runoff from the warehouse roof surfaces. The stormwater collects by sheet flow towards shallow swales which are formed within the concrete surfaces and which convey the stormwater to the drainage outlets at the site perimeter.

Drainage Area B is that part of the site that drains through an existing detention pond. The detention pond’s main function is flood control and primary treatment before discharge to the stream corridor. The outfall of the detention pond is an armored spillway to curb erosion of the downward slope to the stream corridor. The outfall of the detention pond is defined as drainage point 3 in Figure 3-18. The size of Drainage Area B is 2.5 acres. Drainage Area B also includes the main internal concrete paved roadway of 600 feet length and 40 feet width that runs from south west to north-east. The entire area has an impervious surface, either roof area of the warehouses or concrete pavement between the warehouses. Therefore the entire area contributes to the runoff volume, including the runoff from the warehouse roof surfaces. The stormwater collects by sheet flow towards shallow swales formed within the concrete pavement and is conveyed to an existing drainage swale, from where the stormwater flows to the detention pond. The existing drainage swale is about 400 feet long and is formed divided into a concrete and grass of equal lengths.

Drainage Area C represents a 2.8 acre part of the upper portion of the project site, which drains into the existing drainage system of the quarry access road. The entire area has an impervious surface, either roof area of the warehouses or concrete pavement between the warehouses. Therefore the entire area contributes to the runoff volume, including the runoff from the warehouse roof surfaces. The stormwater collects by sheet flow towards shallow swales which are formed within the concrete pavement surfaces and which convey the stormwater to the drainage of the quarry access road. The main drainage of the quarry access road is a drainage ditch at the southern side of the road. The runoff within the drainage ditch flows towards the east towards a drain intake structure of an existing 30”-culvert under the quarry access road. The culvert conveys the entire runoff from the drainage ditch to a percolation field within the lower portion of the project site.

Drainage Area D represents graded and pervious areas within the proposed project site that have no existing drainage. The several drainage areas that contribute the Drainage Area D are located both in the upper and lower portions of the site.

The drainage area D in the upper portion of the site has a total area of 10.0 acres, all of which is pervious and not vegetated. This area is used for equipment storage and inert material processing, but no permanent structures. The area is near flat or has a gentle downward slope averaging 1% towards the northern side of the upper portion of the site. The rainwater within this area readily infiltrates into the ground and typically no surface runoff can be encountered. At stronger storm events, rainwater may pond at places but typically infiltrates rather than runs off at ponding. The subsurface flow of the infiltrated water is towards the Kapa’a Stream corridor.

The drainage area D in the lower portion of the site measures a total area of 17.5 acres, all of which is pervious and not vegetated. All of the graded and pervious area is on landfill area that was created several decades ago, by deposits of quarry overburden and tailings and some quantity of domestic waste. The area has a gentle downward slope averaging 2% to 4% towards the northwest. The rainwater within this area readily infiltrates into the ground and typically no larger surface runoff features can be encountered. At stronger storm events rainwater may pond at places but typically infiltrates rather than runs off at ponding. The perimeter of the area is formed as earth dikes having different heights, about 6 – 8 feet high berms at the southern and western sides and 2 – 3 feet high berms at the northern perimeter. There are some visual indications that some volume of surface runoff may occur over the northern perimeter towards the wet land. The drainage of the entire area is mostly through infiltration, and subsurface flow is assumed to flow toward the wetland and a drainage canal along the quarry road. The drainage in the canal flows towards the Kapa'a Stream and from there into the Kawainui Marsh. The Drainage Point 2 designates the confluence of the drainage canal and the Kapa'a Stream.

The lower portion of the site receives runoff from the drainage ditch along the southern side of the drainage canal. The runoff in the ditch flows into an intake structure which feeds an existing 30-inch culvert underneath the quarry access road. The culvert discharges to a percolation field that is located within the lower portion of the site at the foot of the sloped area between the upper and lower portion of the site. Downstream of the discharge point of the culvert, the runoff readily infiltrates within the percolation field and no surface stream features or ponding could be detected at a distance of about 100 feet from the culvert discharge point. After infiltrating, the subsurface flow is assumed to flow toward the Kapa'a Stream corridor.

Figure 3-19 shows the existing drainage system of the upper portion of the site in more detail.

3.2.5 Wetlands

Wetlands are defined by the United States Army Corps of Engineers (USCoE) and the United States Environmental Protection Agency (EPA) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas." While in the past wetlands were frequently filled or drained to make room for agriculture or other land uses, the significant ecological value of wetland is now recognized. This has resulted in comprehensive efforts to secure and restore wetlands.

The Kawainui Marsh is adjacent to the proposed site and represents one of the most important wetlands in the State of Hawaii. Some additional wetland areas are present within the lower reaches of the Kapa'a Stream corridor in the vicinity of the confluence of the Kapa'a Stream and the drainage canal adjacent to the Kapa'a Quarry Road. Since the Kapa'a Stream drains into the Kawainui Marsh, the stream's flow conditions and water quality directly affect the marsh. Figure 3-20 shows the vicinity map to the proposed site the adjacent wetland areas. Figure 3-20 indicates that the proposed project site will be located entirely outside of wetland areas.

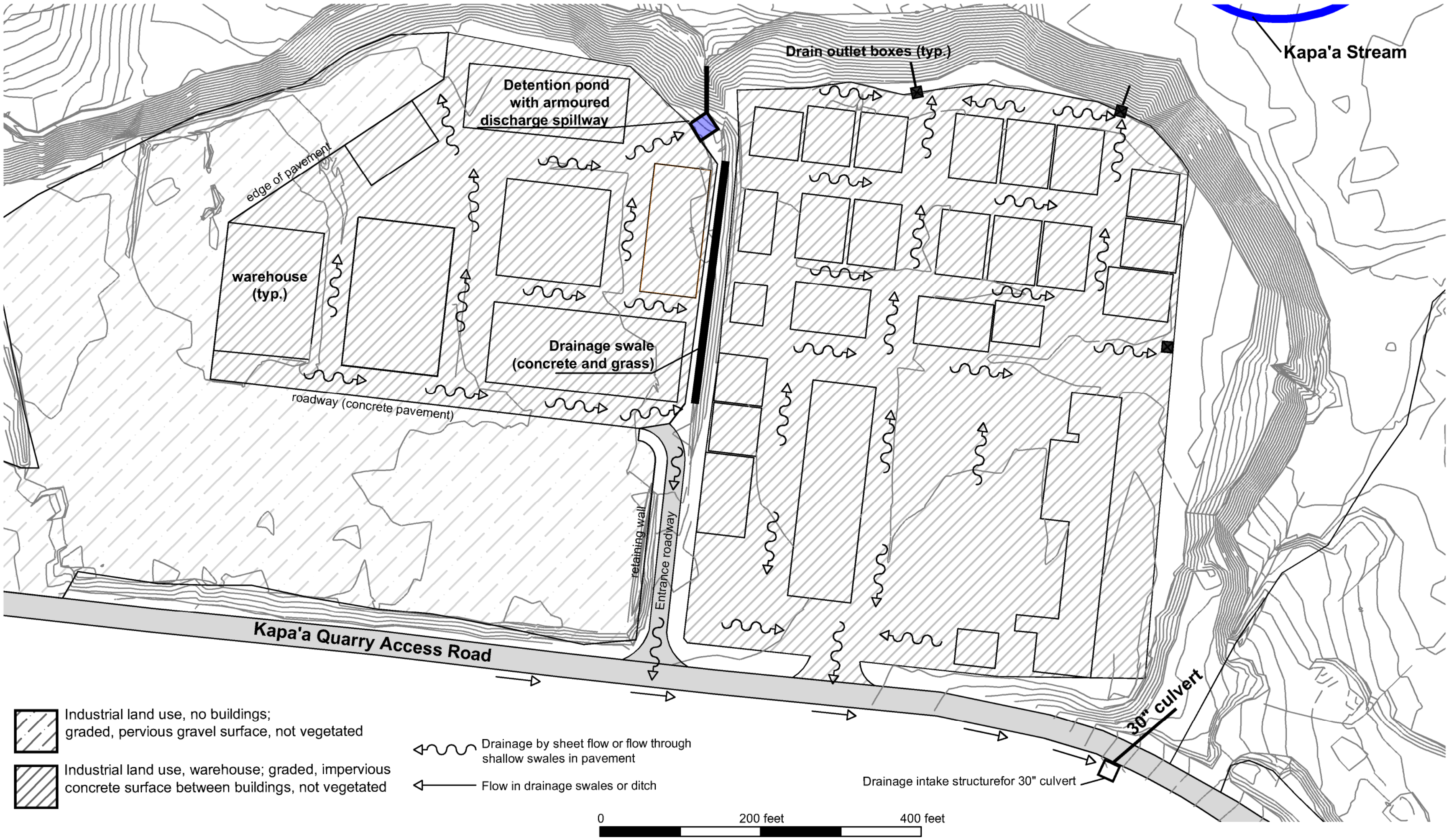

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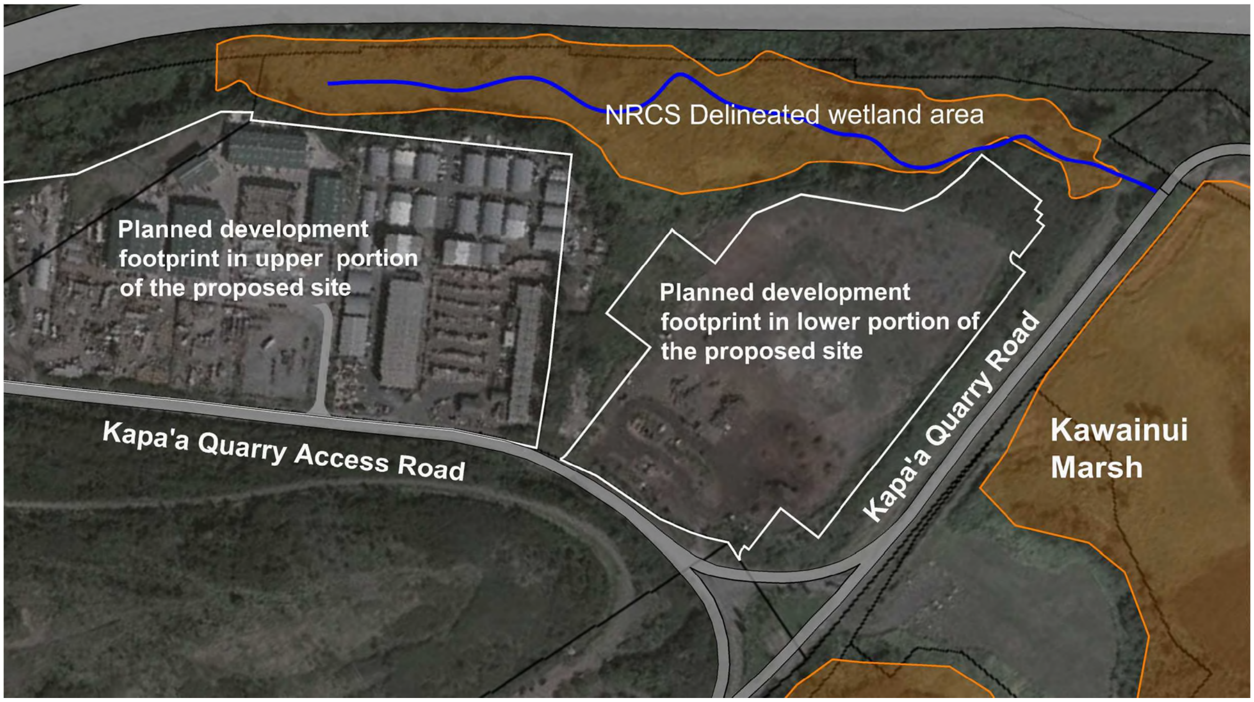
Figure 3-19
Existing drainage of the upper portion of the site.

Figure 3-20 Wetland areas in vicinity to the proposed site



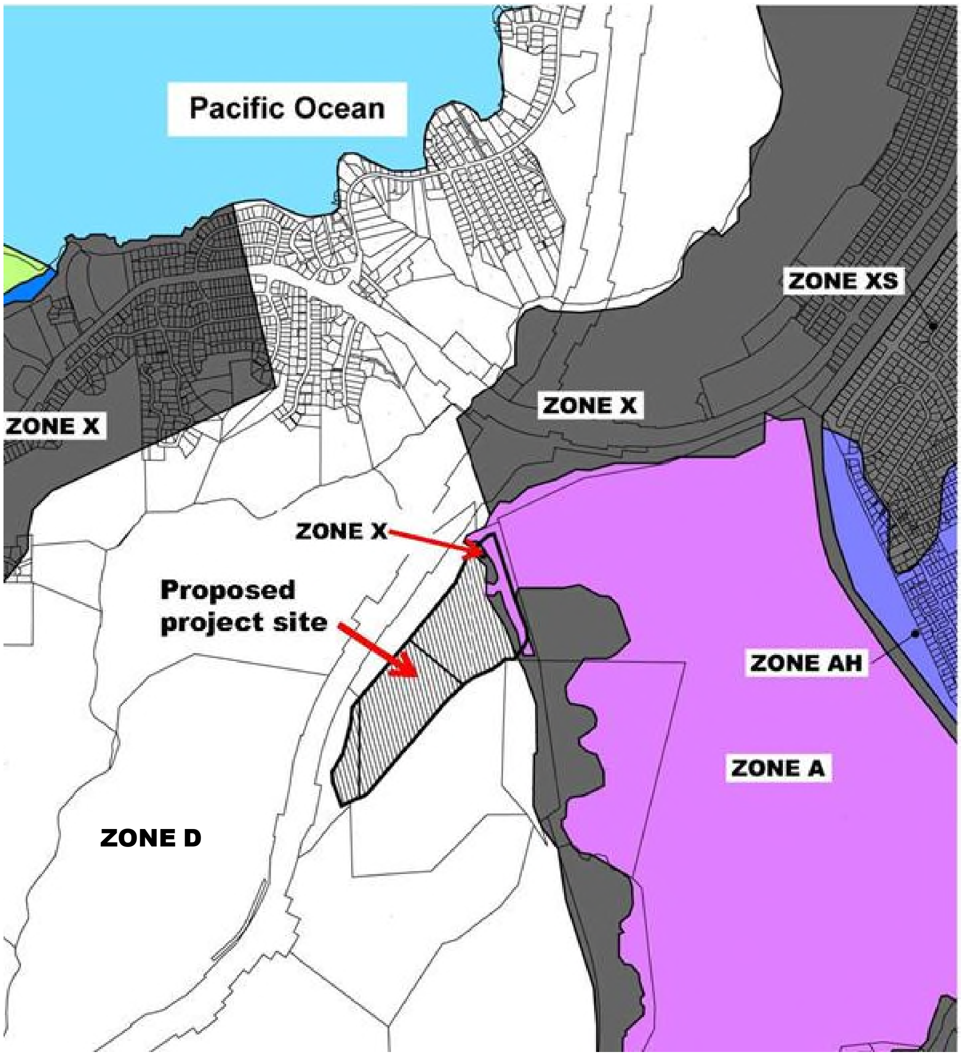
3.2.6 Flood and Tsunami Hazards

The project site is located outside of any potential tsunami inundation area. Figure 3-21 shows a portion of the Flood Insurance Rate Maps (FIRM) for the vicinity of the proposed project site. FIRM maps are used to determine the vulnerability of land to flooding. It has been observed that sections of the Kapa'a Quarry Road adjacent to the mouth of the Kapa'a Stream and the existing culvert under the Quarry Road are intermittently inundated at times of heavy rainfall. During such periods of flooding the Kapa'a Quarry road has to be closed for traffic.

Most of the land within the proposed site is in Flood Zone D, which indicates areas with possible but undetermined flood hazards. Figure 3-21 suggests that some low-lying areas of parcel TMK 4-2-015:006 adjacent to the Kapa'a Quarry Road are located within the flood zones X and A. The Flood Zone A refers to land, which is likely to be inundated by the flood event having a one-percent chance of being equaled or exceeded in any given year. The one-percent annual chance flood, is also referred to as the base flood or 100-year" flood. Land that is within the Flood Zone X represents moderate to minimal flood hazards. Land designated as Flood Zone X has flood vulnerability of equal or less than the 0.2-percent-annual-chance or 500-year flood.

Land inside the property and inside flood zones A and X is limited to the existing drainage channel adjacent to the Kapa'a Quarry Road and to the mouth and lower sections of the Kapa'a Stream. No portion of the proposed development footprint is within flood zones A and X.

Figure 3-21 Map of flood zones in the vicinity of the proposed site



Description of Flood zones:

- A- 100 Year flood zone; no base flood elevation determined
- X- Beyond 500 years flood plain
- D- Possible but undetermined flood hazards
- AH- 100 Year flood zone; with 1 to 3 feet of ponding
- XS- 500 years flood plain

3.3 Biological Resources Existing Environment

The core of the proposed project site consists of developed land, which comprises approximately 55 percent or 43 acres of the total 79-acre property.

Presently, only the upper portion of the proposed site is developed with warehouse structures and base yards. There is less than an acre or 5% of landscaped area within this developed, graded and mostly paved and section of the site. The lower portion of the site is unpaved land covered with a pervious gravel surface and the land is used for a variety of low impact activities, such as green waste processing. The graded part of the lower portion of the site does not have any permanent or landscaped vegetation, but portions of the graded area have a temporary grass cover during periods of time when that area is not used by green waste processing or storage of inert material.

Of the total 79 acres of the property, 21 acres or 27% are impervious due to buildings, paved areas between the buildings, parking lots, or other development. Sections of the quarry access road and the quarry road are within the property and contribute 0.5 acres of impervious area that is outside the development footprint of the present and planned development.

Most of the vegetation of the property is within the undeveloped land surrounding the site and within the adjacent Kapa’a Stream corridor. These lands include natural areas and bodies of water, such as forested areas, stream beds and wetland area. The forested areas can be further divided into forested buffers and some mature, contiguous sections of forest in the Kapa’a Stream corridor. Forested buffers occur along the site perimeter and adjacent roads and account for about 13 acres. Aquatic resources on the property consist of the Kapa’a Stream, approximately 15 acres of delineated wetland and a drainage canal along the quarry road. The vegetated and undeveloped land provides some habitat for a population of urbanized birds and small mammals.

3.3.1 Vegetation

Landscaped areas

The landscaped area is less than one acre or less than 5% of the developed area. The landscaped area is along the site perimeter along the quarry access road and within some smaller areas inside the development foot print. The landscaped areas include turf lawns, flower beds, individual shrubs, hedges, groundcover areas and landscaped trees. Presently, maintenance crews mow and trim the lawn throughout the growing season, apply a pre and post-emergent herbicide, and fertilize. Leaves are raked and or blown. Flowers are sprayed, fertilized, and pruned. Beds are weeded, planted, and mulched. Where needed the landscaped areas are irrigated with a permanent sprinkler system. The landscaped vegetated areas provide aesthetic beauty to existing development as well as habitat to wildlife occurring in the area.

Natural Vegetation Areas

Areas of natural vegetation areas are situated around the proposed project site and in the Kapa'a Stream corridor, which is located on the property and directly adjacent to the north of the proposed site.

The existing vegetation in these areas includes overgrown vegetation and shrubberies and sometimes dense growth of:

- Haole koa (Leucaena leucocephala)
- Guava (Psidium guajava)
- Chinese banyan (Ficus microcarpa)
- Monkeypod (Samanea).
- Hau (Hibiscus tiliaceus)
- Overgrown umbrella sedge (Cyperus alternifolius)
- Elephant grass (Pennisetum purpureum)
- California grass (Brachiaria multica)

Figure 3-22 shows the natural vegetated areas around the proposed site. The natural vegetated area is grouped in different land categories according to the vegetation found within these areas. Table 3-6 lists the size of the different designated areas.

Figure 3-22 Natural vegetated areas found adjacent to the proposed site

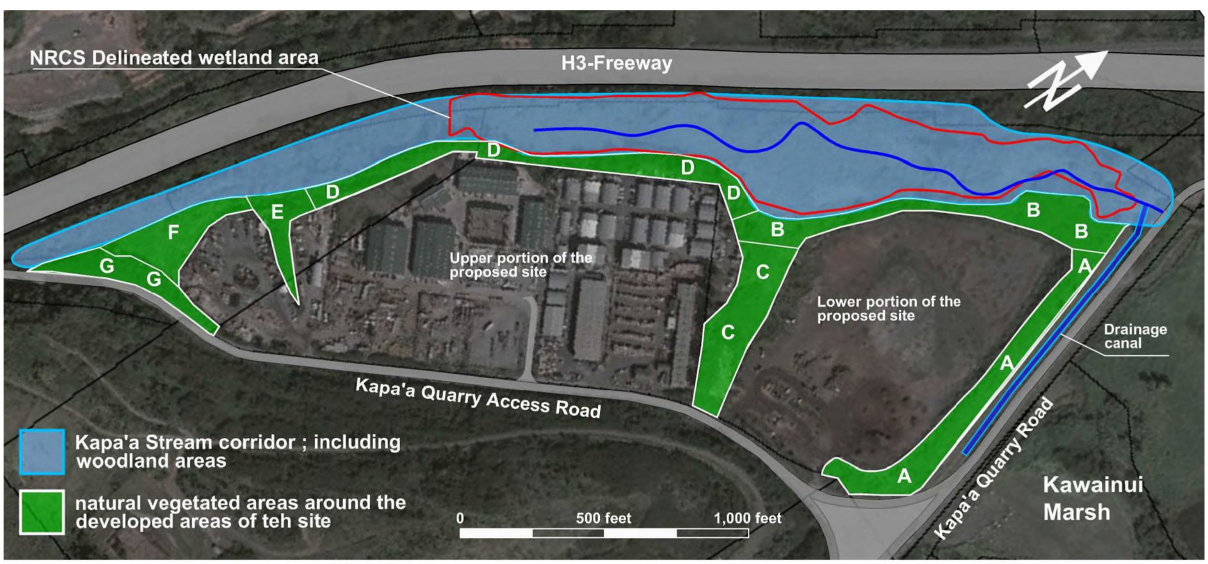


Table 3-6 Natural vegetated areas found adjacent to the proposed site

Type of vegetated area: Subzones		Total size acres	Subtotal acres
Kapa'a Stream corridor		19.5	
Delineated wetland (approximate)			15.0
rest of stream corridor			4.5
Vegetated area with mixed vegetation:		12.7	
A	On earth berm along the quarry road and drainage canal		2.5
B	Woodland along upland boundary of wetland area		2.5
C	Sloped area between upper and lower portion of the site		2.1
D	Woodland on sloped areas between upper portion of site and stream corridor		2.4
E	Vegetated earth dike within and at perimeter of upper portion of the site		0.8
F	Former siltation pond vegetated with grass and shrubs		1.3
G	Mature woodland along the quarry access road		1.1
Drainage canal		0.5	

The natural vegetated areas as depicted in Figure 3-22 are briefly described in the following:

1. Kapa'a Stream corridor: The stream corridor is located within the property, between the H3-Freeway and the developed areas, and has a total area of 19.5 acres. The flow path of the Kapa'a Stream through the property has a length of approximately 3,800 feet, entering the property at the culvert under the H3-Freeway in the and leaving the property through the culvert under the quarry road, where the stream flows into the Kawainui Marsh. The stream meanders through the stream corridor and is at length an intermittent stream and becomes a perennial stream in the last approximately 2,000 feet before the stream ends at the culvert under the quarry road. The width of the stream corridor increases towards the end of the stream and ranges from 150 to 350 feet, being the widest in the wetland areas in the lower stretches of the stream. The stream corridor has a mixed vegetation, including mature trees, which are more frequently located on the northern side of the stream corridor, e.g. away from the development footprint, shrubs and dense stretches of wetland vegetation. The size of the delineated wetland area within the stream corridor is approximately 15 acres.
2. Natural vegetated area – Section A: Section A is situated at the eastern perimeter of the lower portion of the site along the quarry road. The section has an approximate length of 1,200 feet, an average width of 100 feet and an area of about 2.5 acres. Within Section

A an earth dike with a width of approximately 60 feet and a height ranging between six and eight feet accommodates smaller trees, a variety of shrubs and a range of invasive grasses. The foot of the earth dike starts at a distance of about 20 feet from the mauka bank of the drainage canal.

3. <u>Natural vegetated area – Section B:</u> Section B is located between the graded plateau, which is the proposed lower portion of the site, and the wetland in the stream corridor. Section B is the 2.5 acres upland of the adjacent wetland. Section B stretches from the drainage canal to the foot of the sloped area of the upper portion of the site. The section has a length of approximately 1,200 feet and ranges in width between 200 feet in the north east to 60 feet in the west of the section. The section has a variety of smaller trees, shrubs and invasive grasses.
4. <u>Natural vegetated area – Section C</u>: Section C is located on a sloped area between the lower and upper portion of the site. The 2.1 acre section has an approximate length and width of 600 and 150 feet, respectively. In the steepest areas in the section slopes range between 50% and 90%. The vegetation consists of a number of free standing trees, shrubs of different sizes and a variety of grasses. Mature trees are located in the upper part of Section C at the border between parcels TMK 4-2-15:006 and 008.
5. <u>Natural vegetated area – Section D:</u> Section D is the steeply sloped area that separates the developed upper portion of the site from the stream corridor. Section D has a size of 2.4 acres. The natural vegetation area starts immediately past the paved and stabilized developed area and merges with the vegetation of the stream buffer. The slopes in this section average about 50 percent. The elevation difference between the developed area on the graded plateau and the stream corridor of 40 to 45 feet within about 90 feet. The section has a thick vegetation of trees, shrubs and bushes and is devoid of stabilizing ground cover over a part of the sloped area within the section.
6. <u>Natural vegetated area – Section E:</u> Section E is a smaller, less than an acre, natural vegetation area that starts at the site perimeter and stretches approximately 300 feet towards the interior of the developed land within the upper portion of the site. At the core of this small section is an earth berm with a height of 3 to 5 feet and a width of 10 to 30 feet which holds smaller trees and some shrubs.
7. <u>Natural vegetated area – Section F:</u> Section F is a near triangular plateau with a base length of 250 feet and a height of 350 feet. The area measures approximately 1.1 acres. The section is a former siltation pond for quarry runoff. The section contains mostly smaller plants, grasses and small shrubs and no trees.
8. <u>Natural vegetated area – Section G:</u> Section G is a stretch of mature trees along the quarry access road in the western most part of the property. The section has an area of 1.1 acres and a length and average width of 650 and 80 feet, respectively.
9. <u>The existing drainage canal along the quarry road</u>: The function of the canal is to convey runoff, mostly seepage from the lower portion of the site, towards the Kapa’a Stream and

the Kawainui Marsh. The canal has an average width of 20 feet and a length of approximately 1,150 feet, from the beginning at the intersection of quarry and access road to the confluence with the Kapa'a Stream. The canal is often entirely covered with invasive algae (e.g. Salvinia Molesta). At times no free surface can be detected underneath the algae cover and during these durations taller grasses can be observed growing inside the canal (see Figure 3-23). The banks of the canal have vegetation of different grasses, and no larger trees or shrubs line the canal over its length.

Figure 3-23 Water surface in existing drainage canal alongside Kapa'a Quarry Road covered with algae

Generally, both action alternatives evaluated for this DEIS will not use previously undeveloped land to build the proposed industrial development. Under both alternatives the development footprint will be outside existing natural vegetated area and, specifically, outside the stream corridor and wetland areas. The two alternatives evaluated in this DEIS will impact the natural vegetated areas as follows:

The Preferred Alternative will alter the size, topography and type of vegetation within the sections A, B, C and E. These modifications will not destroy the existing natural vegetation areas to make room for the development footprint; rather, the Preferred Alternative will restore sections A, B and C with native and adaptive plants under the “restore habitat and open space” credit of the sustainable development approach. In Section A, the width and height of the earth berm will be increased to plant a significant number of trees and shrubs, to establish a vegetative buffer zone, mainly for visual mitigation. In Section B, the mature trees will be retained and the slopes of the upland area will be stabilized and trees will be added. In Section C, numerous trees and shrubs will be added on the sloped area and at the perimeter of the upper portion of the site. A continuous ground cover will be established for added soil stabilization. The earth berm in Section E will be removed, graded and will become part of the development. Sections D, F and G will not be affected by the Preferred Alternative. In the same way, no parts of the stream corridor and wetland area will be modified under the Preferred Alternative. The drainage canal will likewise not be altered under the Preferred Alternative although the planned extended detention pond will discharge into the canal, therefore requiring minor changes of the mauka bank over a length of about 20 feet to allow installation of an armored spillway for the discharge of the detention pond.

Alternative B will only alter Section E, in the same way as under the Preferred Alternative. Sections A, B and C will not be altered under Alternative but left in their present state, with the exception of some minor improvements to selectively add some trees and shrubs. The drainage canal will not be altered under Alternative B although the planned extended detention pond will discharge into the canal, therefore requiring minor changes of the mauka bank over a length of about 20 feet to allow installation of an armored spillway for the discharge of the detention pond.

3.3.2 Wildlife

Due to historic use of the property for various industrial activities in the past 50 years, the upper tier of the site is devoid of any avifaunal (bird) habitat mostly because of removal of natural vegetation cover and ongoing human activities. The open space within the lower tier and at the mouth of Kapa’a stream, however, provides habitat for a range of birds, mammals and aquatic species. Observations suggest that the feral cat population in the area has been a main predator for the bird population. Birds and mammals sighted or observed around and within the proposed project site include:

Birds:

Common name	**Scientific name**
Cardinal	Cardinalis cardinalis
Cattle egret	Bubulcus ibis
Barred dove	Geopedia striata
Mynah	Acridothera tristis
Lace-necked dove	Streptopedia chinensis
Sparrow	Passer domesticus
Japanese white-eye	Zosterops jaonica
Shama thrush	Copsychus malalaricus

Mammals:

Common name	**Scientific name**
Mongoose	Herpestes auropunctatus
Mice	Mus musculus
Rat	Rattus rattis, norvegicus
Feral Cat	

The adjacent Kawainui Marsh is an important habitat for birds and other wildlife. The number and variety of birds observed in the Kawainui Marsh has varied over time. When the Kawainui Marsh was an open lake, before vegetation overgrowth and sedimentation had reduced the habitat area, a large number of endemic birds made their habitat there. Over time the number and variety of birds have decreased. The following birds have been sighted by different investigators in and around the Kawainui Marsh:

Common name	**Scientific name**
Cardinal	Cardinalis cardinalis
Pintail	Anas acuta
Mynah	Acridothera tristis
Pacific Golden Plover	Pluvialis dominica fulva
Japanese White-eye	Zosterops jaonica
Black-crowned Night Heron	Nycticorax nycticorax hoactli

Hawaiian Duck (*)	Ana wyvillienu
Hawaiian Coot (*)	Fulica americana alai
Hawaiian Stilt (*)	Himantopus himantopus knudseni
Hawaiian Gallinule (*)	Gallinula chloropus sandvicensis
Shoveler	Anas clypeata
Frigate Bird	Fregata minor

(*) = endangered birds

The following aquatic fauna has been sighted by different investigators in waters in and around the Kawainui Marsh:

Common name	**Scientific name**
Pelagic milkfish or awa	Chanos chanos
Aholehole	Kuhlia sandvicensis
Mullet	Mugil cephalus
Papio	Caranx sp.
Barracuda	Sphyraena
Nehu	Encrasicholina purpurea
O’opu	Eleotris sandwicensis
Rice eels	Monopterus sp.
Hawaiian river shrimp	Macrobrachium grandimanus
Crenate swimming crab	Thalamita crenata
Worm	Tendipes

In order to enhance and restore the natural habitat and encourage remigration and nesting indigenous fauna to the area, there have been recent initiatives to reintroduce some of the species of birds and restore appropriate habitats within the Kawainui Marsh or on adjacent land.

3.3.3 Threatened & Endangered Species and Species of Special Concern

Communication with the U.S. Fish and Wildlife Service (USFWS) has determined that the proposed project site is in the vicinity of the Kawainui Marsh and the Kapa'a Stream, which is habitat for the federally endangered Hawaiian stilt (Himantopus mexicanus knudseni), Hawaiian moorhen (Gallinula chloropus sandvicensis), Hawaiian coot (Fulica alani) and Hawaiian duck (Anas wyvilliana) as well as populations of migratory waterfowl and shorebirds protected under the Migratory Bird Treaty Act as amended (MBTA). While endangered species find habitat in the vicinity of the proposed site, the site is currently not a habitat for federally listed water birds or for listed migratory waterfowl and shorebirds. There is no designated critical habitat within the proposed project site.

The USFWS indicated concerns about the previously planned wildlife habitat, including taking measures to ensure that water birds attracted to the restored wetland are not exposed to predators. With the plans of restoring 13 acres wetland area within the Kapa'a Stream corridor and building an enclosed wildlife habitat <u>no longer pursued</u> by the developer the concerns of the USFWS which addressed the wildlife habitat project therefore no longer apply.

The remaining concern of the USFWS is about the possibility that the planned detention ponds might attract breeding water birds, although the design calls for "dry" detention ponds. The applicant will work with the USFWS to ensure that appropriate measures are developed to ensure that the detention ponds will be less desirable habitat for water. Furthermore, the sustainability design approach plans to utilize covered rainwater catchment for use in irrigation of the project site. With the planned large volume underground cisterns that will retain stormwater during frequent normal rain events, the chances of establishing a permanent body inside the detention ponds become even less likely.

3.4 Cultural Resources Existing Environment

As has been mentioned in the preceding section, the proposed site for the project has been heavily impacted by industrial activities in the past fifty years. The proposed site is devoid of any archaeological or cultural resources and the proposed site is exclusively located on land that was covered by layers of landfill from quarry operations or municipal waste several decades ago. A comprehensive archaeological survey conducted by Cultural Surveys Hawaii, Inc. (CSH) (Cultural Survey Hawaii, 2000) indicates that most of the historical or culturally significant sites in the vicinity of the proposed development are found around the southern perimeter of Kawainui Marsh. Figure 3-24 shows the locations of significant historical finds close to the Kawainui Marsh, as presented in the CSH study. The Pahukini Heiau is the closest major historical site to the proposed site for the Kapa'a Light Industrial Park. The Pahukini Heiau is a 120 by 180 feet stone structure and is on the site of a landfill within TMK 4-2-15:003, adjacent to the proposed site. According to the website of the Office of Hawaiian Affairs the Heiau was built by the Chief Olopana and was used in important state functions. The Heiau is completely surrounded by Kapa'a landfill and was badly neglected for many years, until it was restored and rededicated in the late 1980s. Other historical sites close to the Kawainui Marsh are shown on Figure 3-24 and are briefly described in Table 3-7. The column indicated as "State Site #" in Table 3-7 refer to the Hawaii State Register for Historic Places.

Figure 3-24 Cultural resources existing environment

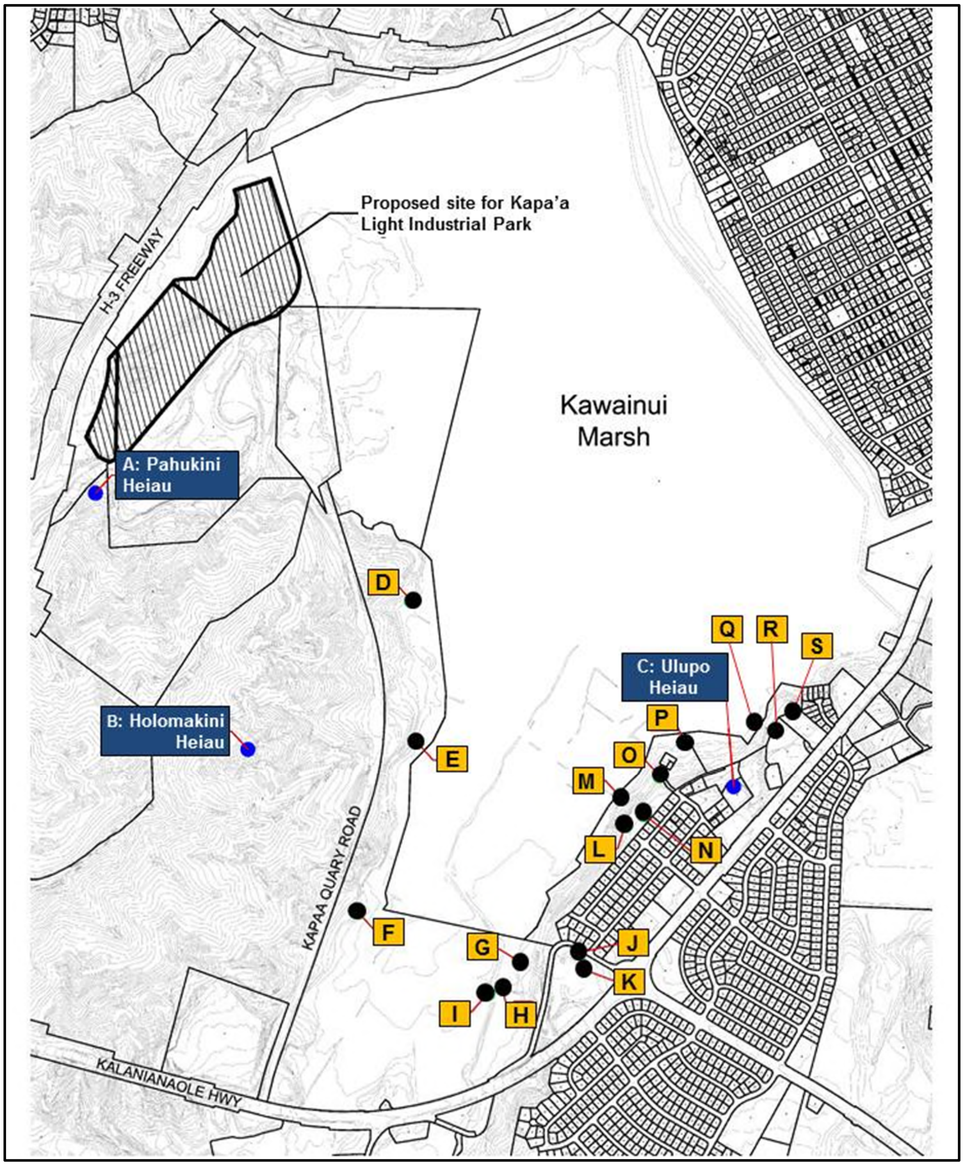


Table 3-7 Historical state sites around the Kawainui Marsh

ID of State site in Figure 3-24	State Site #	Site Description
A	50-80-11-359	Pahukini Heiau; in the middle of landfill in Kapa'a Quarry. Heiau also called Mo'okini Heiau; said to be built by High Chief Olopana in the 12th century; heiau is a Luakini or state-class heiau , where important state matters, including preparation for war were conducted.
B	50-80-11-360	Holomakini Heiau; supposedly built by high chief Olopana in the 12th century; the heiau was long thought to be destroyed when the land it occupied was cleared for agriculture; the indicated location is the presumed location of the Holomakini Heiau.
C	50-80-11-371	Ulupo Heiau; heiau was thought to be built mystically in one night by the Menehune; heiau had significance in preparing animal sacrifice; the site is a State park.
D	50-80-11-2023	Remnants with retaining walls, alignments of rocks, terraces and platforms
E	50-80-11-3865	Low stone wall and terrace
F	50-80-11-2026	A large agricultural terrace
G	50-80-11-2024	Mounds, wall remnants, a terrace
H	50-80-11-3962	Three historical building
I	50-80-11-3962	Earthen mounds
J	50-80-11-3960	A large lo'i, stone and earthen platform, stone lined channel, mound
K	50-80-11-2028	Wall remnants
L	50-80-11-2029	Large agricultural complex with rectangular fields

M	50-80-11-3959	Large number of mounds, agricultural terraces, walls, historical house foundation, etc.
N	50-80-11-2031	Several surface artifacts, evidence of prehistoric occupation
O	50-80-11-3961	Stone mounds, stone-edged canal, terraces, retaining walls
P	50-80-11-3957	Agricultural terraces, mounds, walls, remains of historical structure
Q	50-80-11-2022	Series of terraces, long retaining wall, remnants of historical house, a spring
R	50-80-11-3958	Terrace, walls
S	50-80-11-2027	Stone-walled enclosure, piles of rock, terrace

3.5 Air Quality

Air pollution in the vicinity of the proposed site can be attributed to anthropogenic and natural sources. Air quality impacts due to human activities mainly result from various commercial and industrial activities and from traffic. Relevant sources of air pollution are:

- Motor vehicles, cars and trucks, around the proposed site. There are a considerable number of heavy vehicles that serve the quarry and landfill operations, the refuse transfer station, the existing warehouse development and other industrial activities in the area. Commuters from Kailua and Kaneohe use the Kapa’a Quarry Road to travel to and from the central part of Oahu. The H3-Freeway directly passes the proposed site on its northern boundary and represents a significant contributor for release of air pollutants from motor vehicles.
- Dust from quarry, landfill and Green Waste operations, which represent earth moving activities.
- Dust set free by the outdoor equipment storage and building material processing activities which are presently ongoing on parcels TMK 4-2-15:001 (portion of)
- Waste decomposition in landfills, which generate methane.
- Fumes from paint, varnish, aerosol sprays and other solvents used in industrial and commercial activities in the Kapa'a Valley.

A relevant natural source for air pollution in the area is dust emitted from areas of land with little or no vegetation cover. Past land use in the area has resulted in extensively denuding of the site from natural vegetative cover facilitating erosion and soil loss.

In addition to release of airborne pollutants directly to the atmosphere, indoor air pollution is an increasingly important aspect to characterize the impact of air pollutants to occupants of buildings. Low Indoor Air Quality (IAQ) is generally attributed to poor ventilation and the elevated internal release of pollutants such as building materials emitting gaseous ingredients, paints and solvents emitting volatile organic compounds (VOCs), particulates and carbon monoxide. In addition, biological agents, either produced in the buildings or introduced by the ventilation system of imported materials, can accumulate in buildings and can cause significant health risks for the occupants.

Possible problems with indoor air quality in existing warehouses at the proposed site of the Kapa'a Light Industrial Park could result from older warehouse construction technology and inappropriate handling of materials. Indoor air pollution is an important consideration for the new warehouses development with environmentally friendly construction and operation.

3.6 Noise Characteristics

Noise pollution by definition is displeasing human or machine-created sound that has negative effects on human beings or animal life. The main current sources of noise at/near the proposed site are vehicular traffic, industrial and commercial activities and noise generated by recreational activities, mainly from model airplanes operated from the Kawainui Model Airplane Field.

The sources of noise in the vicinity of the proposed sites are augmented by distant noises, such as traffic noises from the H3-Freeway, noise from aircraft passing the site and noise from the urban developments in the north, west and south of the Kawainui Marsh.

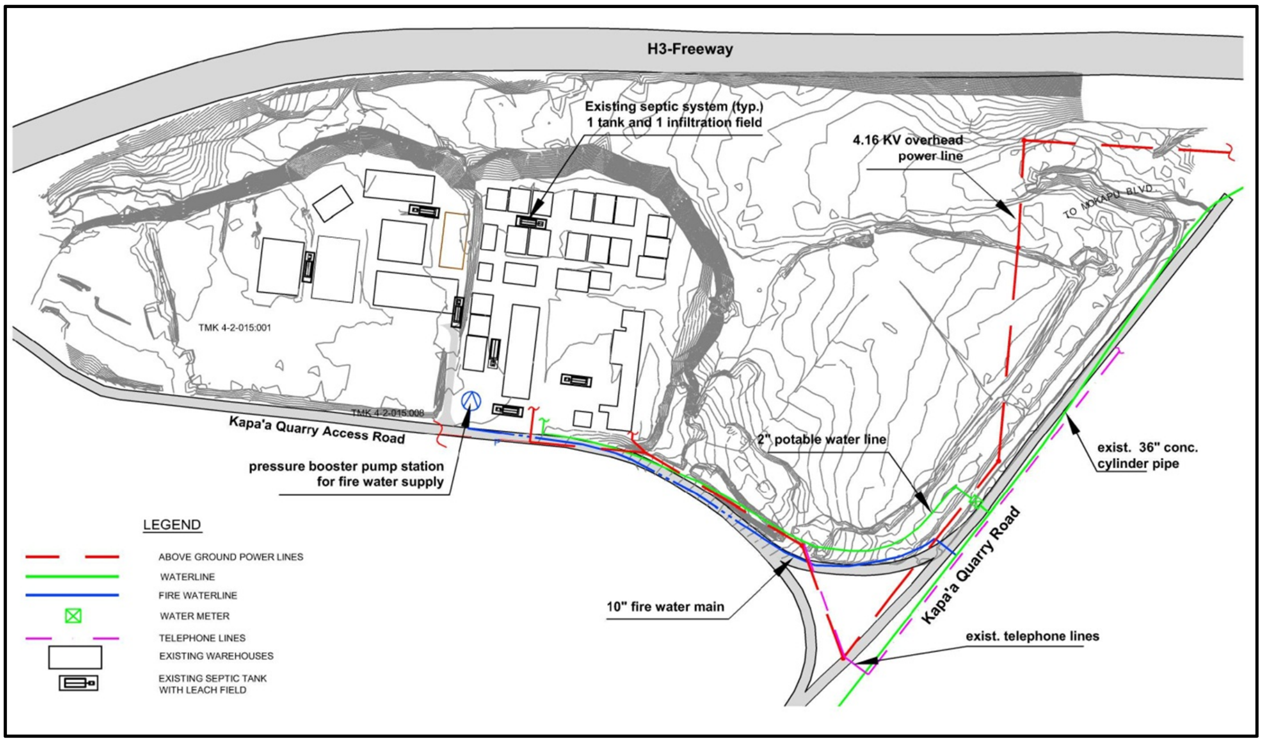
Current noise levels at the site are mainly caused by traffic passing the site on the Kapa'a Quarry Road. Minor sources of noises might be caused by light industrial activities. Based on peak traffic volume for cars and heavy trucks evaluated for this environmental review by a traffic impact assessment report (see Appendix 5) and considering an average speed of 30 and 25 miles per hour for cars and trucks on the Kapa'a Quarry Road, respectively, the traffic noise at the Kapa'a Quarry Road adjacent to the proposed site is estimated at 60 L_{dn} dB. The noise level of about 60 L_{dn} dB represents an average noise for urban residential area. As a general rule, traffic volumes must double or halve to produce a 3 dBA increase or decrease, respectively. A one or two dBA increase or decrease in noise level is not readily perceptible to the human ear.

The main recreational activities in the vicinity of the proposed project site are associated with operating model airplanes, an activity that inherently produces a certain level of noise since small, high-pitched engines are used in the model planes. Wildlife can be affected by elevated noise levels through interference with their use of sounds in communication and by causing stress. The main result of elevated noise on the animal world might be a reduction of usable habitat. Elevated noise levels could cause migration of animals away from the source of noise. Habituation, a behavioral pattern that causes animals to become familiar with noise levels and activities, might mitigate the migration of animals away from the source, especially if the noise levels are at background levels and not sharp noise peaks.

3.7 Utility Infrastructure Existing Environment

The existing utility infrastructure at the proposed site is depicted in Figure 3-25.

Figure 3-25 Utility infrastructure existing environment



3.7.1 Water System

The existing potable water infrastructure supplying potable water and firefighting water is depicted in Figure 3-25. An existing 36-inch water main runs along Kapa’a Quarry Road and supplies water to the site. A 2-inch water line connects the existing users at the site with the 36-inch water main in Kapa’a Quarry Road. There is a 2-inch water meter on the property next to the Kapa’a Quarry Road. A 10-inch firewater main also the 36-inch water main to an existing fire pumping station on parcel TMK 4-2-015:008. The fire pump station boosts the water pressure if firefighting water is needed. The current water demand at the existing warehouse development is estimated at about 20,000 gallons per day. The firefighting water demand is 4,000 gallons per minute for a three hour fire.

3.7.2 Wastewater System

The proposed site is currently not connected to the municipal sewer system since there is no gravity sewer or forced wastewater main serving the property or along the Kapa’a Quarry Road. Wastewater is presently treated on-site in seven septic systems, with each having one 1,250 gallons septic tank and one infiltration field (leach field) with average dimensions of 60 feet in length, 20 feet in width and 4 feet in depth. The sludge collected in the seven septic tanks is removed by private service companies every four to six weeks. Figure 3-25 shows the locations of the seven septic tanks within the parcel TMK 4-2-015:008. Presently there are no septic systems within the parcels TMK 4-2-15:01 (portion of) and 006.

3.7.3 Electricity and Telephone

The existing users of electricity on the proposed site are supplied via a HECO 4.16 kV line that connects to one 4.16 kV circuit on Mokapu Blvd. Figure 3-25 shows the alignment of the 4.16 kV line. From Mokapu Boulevard, the power line first runs southwest parallel to the H3-Freeway and then changes direction to the southeast. The line crosses the parcel TMK 4-2-015:006 and then runs parallel to the Kapa’a Quarry Road to the intersection of Kapa’a Quarry Access Road and Kapa’a Quarry Road. From there the power line again changes direction and runs westward along the Kapa’a Quarry Access Road to serve consumers of electric power in the Kapa’a Valley.

The existing 4.16 kV is currently the only electricity supply line that connects the Kapa’a Valley to the island electric grid. According to HECO there is limited spare capacity on the circuit from Mokapu Blvd. from where the Kapa’a valley is supplied at present. ~~Therefore, assuming the same electricity demand for the new development as is currently experienced by the existing warehouse development and the currently limited availability of capacity at the Mokapu circuit,~~ HECO has to assess if new significant loads in the Kapa’a valley might require the installation of a new power line along Kapa'a Quarry Road in addition to the existing 12.47 kV circuit at Kalanianaole Highway.

Telephone service to the Kapa'a Valley is provided by an aboveground telephone line that runs along Kapa'a Quarry Road towards Mokapu Blvd., as illustrated in Figure 3-25.

3.8 Transportation Existing Environment

Section 3.8 describes the existing transportation system serving the proposed project site, including the local roadway network, traffic conditions, public transportation, parking and pedestrian and bicycle circulation.

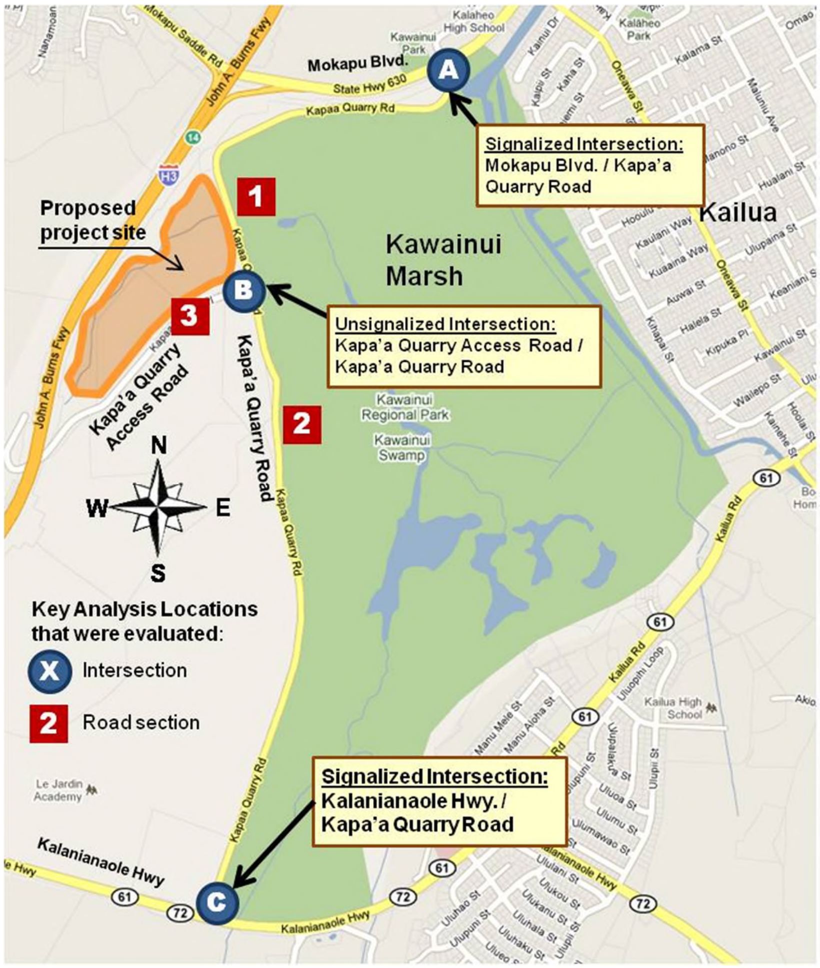
3.8.1 Roadway Network

The proposed project site is situated just south of John A. Burns Freeway (H3 Freeway) within Koolaupoko district of the Island of Oahu. Figure 3-26 shows the Kapa'a Quarry Road, a County road, which connects the Kapa'a Valley with the State highways Mokapu Blvd. and Kalanianaole Highway. The Kapa'a Quarry Access Road is a dead-end road which connects the industrial land uses in the upper Kapa'a Valley with the quarry road.

The Kapa'a Quarry Road is a Class II roadway. The length of the two-lane road is 2.5 miles and the lane-width is 11 feet. The road connects the proposed site and other facilities in the Kapa'a Valley to the regional roadway network south and north of the Kawainui Marsh. The Kapa'a Quarry Road runs along the western boundary of the Kawainui Marsh. Besides providing access to the Kapa'a Valley the road is also a popular shortcut road, connecting the two major roads, the Kalanianaole Highway, in the south and the Mokapu Boulevard, in the north. Vehicles traveling on the Kapa'a Quarry Road between Kalanianaole Highway and Mokapu Boulevard can bypass roads in Kailua and Kaneohe.

The Kapa'a Quarry Access Road is a Class II roadway. The length of the two-lane road is 0.7 miles, from the intersection with Kapa'a Quarry Road to the terminus of the road, which is the gate to the Ameron quarry. The lane-width is 11 feet. The road intersects with the Kapa'a Quarry Road and connects the installations in the Kapa'a Valley with the Kapa'a Quarry Road.

Figure 3-26 Region roadway network serving the proposed project site



The main commercial, industrial and recreational activities that generate current traffic volumes on the Kapa'a Quarry Access Road are as follows:

- Ongoing quarry and landfill operations (heavy truck traffic)
- Kapa'a Refuse Transfer Station (heavy truck traffic)
- Existing warehouses on parcel TMK 4-2-015:001
- Equipment storage and processing of construction material on parcel TMK 4-2-015:008
- Existing green wastes operations on parcel TMK 4-2-015:006 (heavy truck traffic)
- Model Plane Recreational Park (opposite the intersection of Kapa'a Quarry Road and Kapa'a Quarry Access Road

3.8.2 Key Analysis Locations

Figure 3-26 indicates the key analysis locations used in a traffic impact analysis report (TIAR; see Appendix 5) , which was conducted for this environmental review. The TIAR evaluates the existing traffic conditions at the site and predicts the future increase in traffic resulting from the proposed project.

The study area for transportation consists of three intersections located in the vicinity of proposed site (Table 3-8). Of the intersections to analyzed, two are signalized and one is unsignalized. These locations were selected for traffic analysis based upon their importance to connect the quarry and quarry access road to the regional roadway network, roadway traffic volumes and potential effect of the development scenarios and as a requirement by the reviewing agencies. The scope of the TIAR furthermore includes the evaluation of three roadway segments, two on the Kapa’a Quarry Road and one on the Kapa’a Quarry Access Road.

Table 3-8 Intersections evaluated

ID	Intersection location	signalized	unsignalized	jurisdiction
A	Mokapu Blvd. & Kapa'a Quarry Road	X		State
B	Kapa'a Quarry Road & Kapa'a Quarry Access Road		x	County
C	Kalanianaole Hwy & Kapa'a Quarry Road	X		State

Table 3-9 Roadway sections evaluated

Nr.	Roadway sections locations	length [miles]	jurisdiction
1	Northern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Mokaupu Blvd.	1.0	County
2	Southern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Kalanianaole Hwy.	1.5	County
3	Kapa'a Quarry Access Road between intersection with Kapa'a Quarry Road and roadway entrance to the existing warehouse development.	0.3	County

3.8.3 Traffic Volume Assessment

In order to assess traffic conditions at the intersections and on the roadways within the study area, the TIAR included a comprehensive traffic data collection program that was performed during the weekday morning and evening peak periods. The traffic data collected consisted of manual turning movement counts and identification of vehicles type. The traffic data was used as the basis for analyzing the existing operating conditions.

The traffic data collection considered the following:

- Vehicles counted included cars, trucks, buses, trucks, motorcycles, mopeds and heavy vehicles. Heavy vehicles are defined as vehicles with more than four tires. Bicycles and pedestrians were not counted. Pedestrian activity was negligible during traffic count.
- The intersections and roadways were counted from 6:30 am to 8:30 am (AM peak) and from 3:30 pm to 5:30 pm (PM peak) on both Tuesday and Thursday.
- Traffic count was conducted manually and included vehicle type identification.

3.8.4 Level-of-Service Concept

Level of service (LOS) is a common way of defining intersection and roadway capacity. In this approach, LOS ratings range from A to F, where A represents minimal delays and F represents roadways and intersections that operate over capacity, resulting in excessive delays with longer queues due to over-saturated conditions. Generally LOS ratings of A – D are acceptable while E, which is approaching capacity, is either acceptable or not depending on the jurisdiction. Level F, which represents severe congestion and is thus over capacity, is always unacceptable. Level D is typically considered acceptable for peak hour conditions in urban areas; the proposed site is located within the urban distinct.

For this DEIS, the level-of-service was assessed for three categories - signalized intersection, unsignalized intersection and roadway segments. These three roadway categories have specific methods to determine the level-of-service, as is delineated in more detail in the TIAR.

3.8.5 Existing Level-of-Service

The results of existing level-of-service analysis for the two signalized intersections and one unsignalized intersection are presented in Table 3-10. The results of existing level-of-service analysis are presented in Table 3-11.

Table 3-10 Existing level-of-service for intersections

ID	Intersection location	type of signal	Level-of-service LOS	
			AM Peak	PM Peak
A	Mokapu Blvd. & Kapa'a Quarry Road	signalized	B	C
B	Kapa'a Quarry Road & Kapa'a Quarry Access Road	unsignalized	B**	B**
C	Kalanianaole Hwy & Kapa'a Quarry Road	signalized	B	B

Note B**: The LOS for the unsignalized intersection reflects the minimum of LOS for the movements of the intersection

Table 3-11 Existing level-of-service for roadway sections

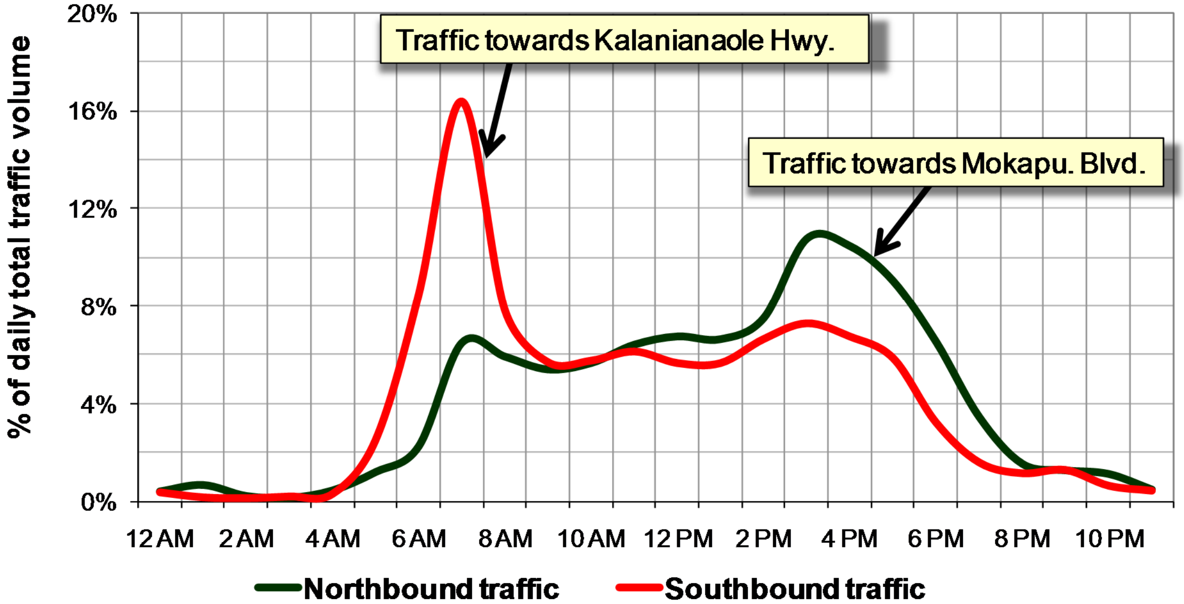
Nr.	Roadway sections locations	Level-of-service LOS	
		AM Peak	PM Peak
1	Northern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Mokaupu Blvd.	C	B
2	Southern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Kalanianaole Hwy.	B	B
3	Kapa'a Quarry Access Road between intersection with Kapa'a Quarry Road and roadway entrance to the existing warehouse development.	B	B

As the existing level-of-service analysis indicates, the three intersections and roadway segments that were investigated have satisfactory LOS.

3.8.6 Characteristics of Directional Traffic on the Roadways Investigated

The directional traffic on Kapa’a Quarry Road has a pronounced difference between the morning and afternoon traffic. Figure 3-27 shows the data analysis of an automatic traffic count (which was unrelated to the traffic assessment for this DEIS), on the northern section of the quarry road. The traffic volume on the y-axis indicates the percentage of the directional traffic in relationship with the time of the day. The traffic volume distribution for the south and northbound traffic in Figure 3-27 suggest pronounced morning and the afternoon peak for the southbound and northbound traffic on the quarry road, respectively. This can be interpreted as commuters using the quarry road driving from Mokapu Boulevard to Kalanianaole Highway in the morning and returning via the quarry road in the afternoon.

Figure 3-27 Diurnal distribution of traffic volumes on northern roadway section of quarry road



3.8.7 Existing roadway access to the proposed site

At present the three parcels that would constitute proposed site are accessed from Kapa'a Quarry Access Road by five road entrances, as shown in Figure 2-73.

Entrance No. 1 provides access from the Kapa'a Quarry Access Road to parcel TMK 4-2-015:001. This is an unpaved entrance.

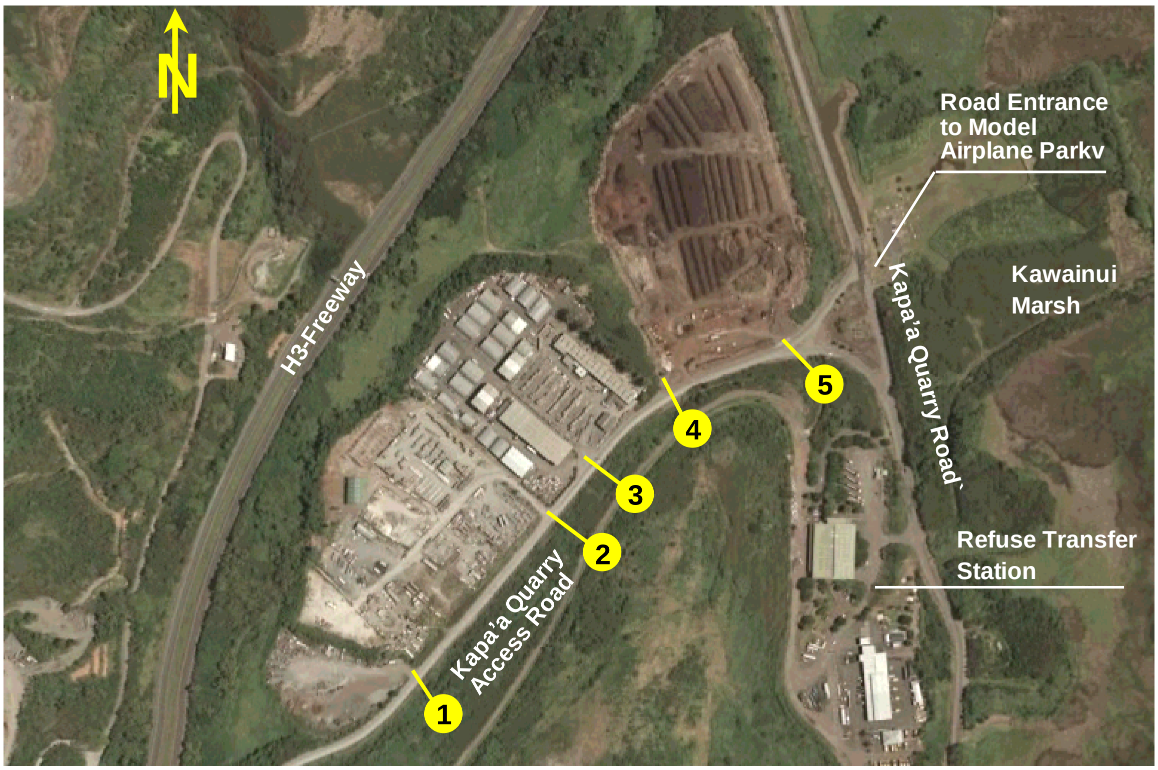
Entrance No. 2 provides access from the Kapa'a Quarry Access Road to parcel TMK 4-2-015:008. This is a paved entrance.

Entrance No. 3 provides access from the Kapa'a Quarry Access Road to parcel TMK 4-2-015:008. This paved entrance provides access to existing warehouses and outdoor equipment storage areas in the south-western part of parcel TMK 4-2-015:008.

Entrance No. 4 provides access from the Kapa'a Quarry Access Road to parcel TMK 4-2-015:006. This is an unpaved entrance.

Entrance No. 5 provides access from to the Kapa'a Quarry Access Road to parcel TMK 4-2-015:006. This is an unpaved entrance.

Figure 3-28 Existing road entrances to the proposed site



X = No. of Present Road Entrance to Proposed Site

3.8.8 Public Transportation

At present there is no public transportation service to the proposed site. The two nearest bus stops are on Kalanianaole Highway and Mokapu Boulevard.

The bus stop on Kalanianaole is at the intersection with Auloa Street, for both westbound and eastbound buses. This bus stop is at a distance of 1.3 miles from the proposed site. This bus stop is served by six bus lines (TheBus routes 56, 57, 70, 77, 85, and 89).

The bus stop on Mokapu Blvd. is at the intersection with Oneawa St., for both west and east bound buses. This bus stop is at a distance of 1.9 miles from the proposed site. This bus stop is served by three bus lines (TheBus routes 56, 85, and 86).

3.8.9 Parking

Parking at the proposed site is entirely off-road on parking spaces provided by the operator of the warehouse development. The number of parking spaces is concurrent with the applicable city ordinances of one parking space per 1,500 square feet of warehouse space.

3.8.10 Pedestrian and Bicycle Facilities and Circulation

There is negligible pedestrian activity around the proposed site. The roadways do not feature dedicated sidewalks or even shoulders.

From informal interviews it was learned that a few employees who work in the existing warehouse development use bicycles to commute to work. The Kapa’a Quarry Road cannot be deemed as a safe road for bicycles since the road has no shoulders. The road is, in sections, covered with thick foliage of trees which produce shade and sometimes dim lighting conditions. Furthermore the road has several turns and dips, which affect visibility.

The proposed marsh perimeter pathway (refer to Section 3.10.6) would provide a safe and pleasant venue for both bikers and pedestrians to reach the proposed site from Mokapu Blvd. and Kalanianaole Hwy.

3.9 Existing Views of Proposed Site

Industrial and commercial activities have significantly affected the appearance of the Kapa’a valley where agriculture and cattle ranching once thrived until the late 1940s. The topography of the valley has been significantly affected by quarry and landfill operation, which started about 60 years ago. The deep changes in the appearance of the valley include large quantities of earth moving, exposed rock formations, large quarry or landfill equipment, warehouse structures and the refuse transfer station in the lower and southern. Construction of the H3-Freeway has further resulted in major changes in the appearance of the valley. Seven views of the site and adjacent land are presented hereafter to exemplify the appearance of the proposed site in the current state. Figure 3-29 defines the views 1 through 7 in terms of location and direction of the camera. Figures 3-30 through 3-36 show the views defined in Figure 3-29 in annotated pictures.

Figure 3-29 Definition of existing views of the site

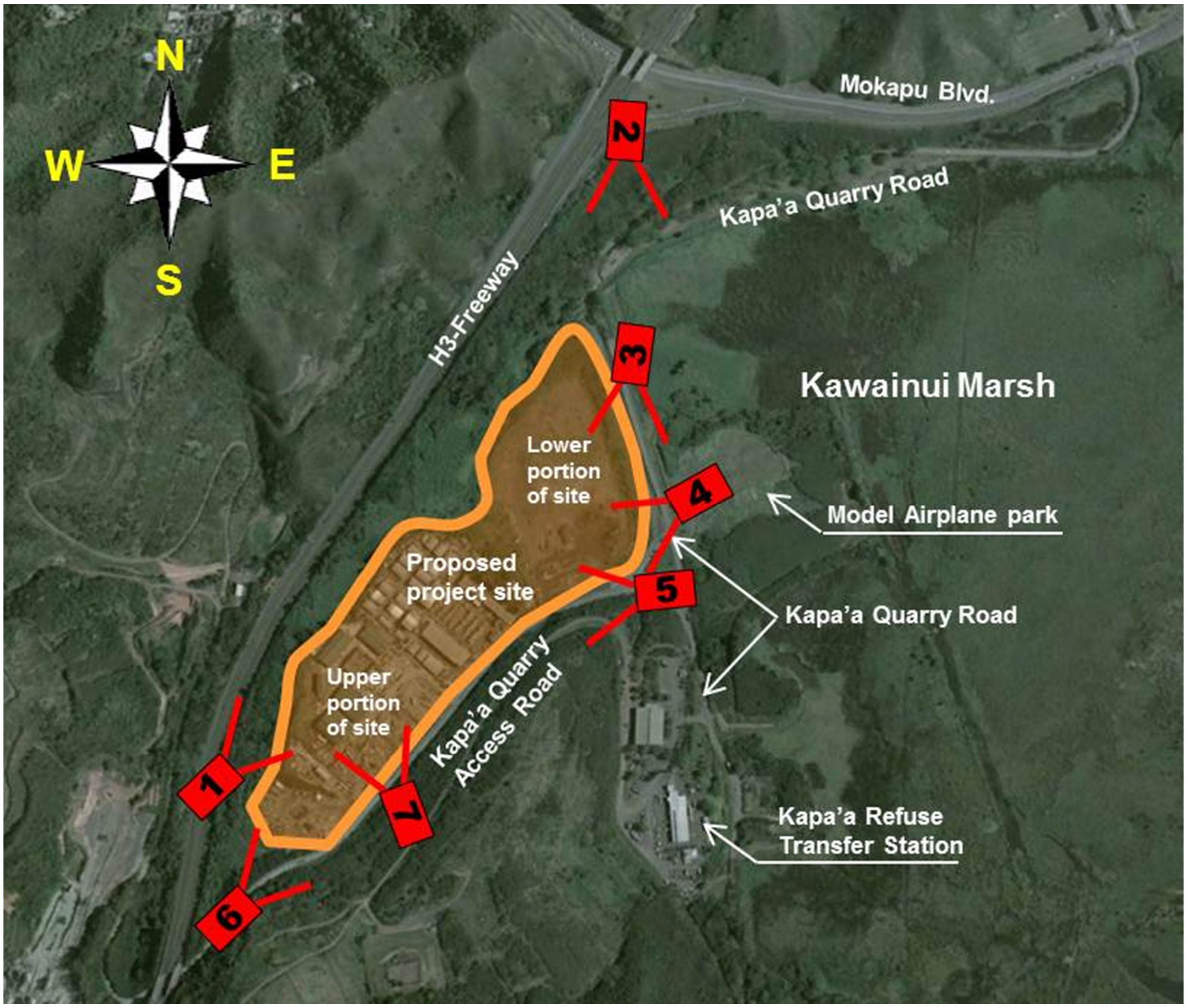


Figure 3-30: Existing view 1
View from H3-Freeway traveling northbound. The proposed site is on the right, obstructed by thick vegetation; as indicated by the yellow arrow.

Figure 3-31: Existing view 2
View from the H3-Freeway traveling northbound; at the exit to Mokapu Blvd. The lower portion of the proposed site is visible in the center and the upper portion is on the right of the picture; as indicated by the yellow arrows.

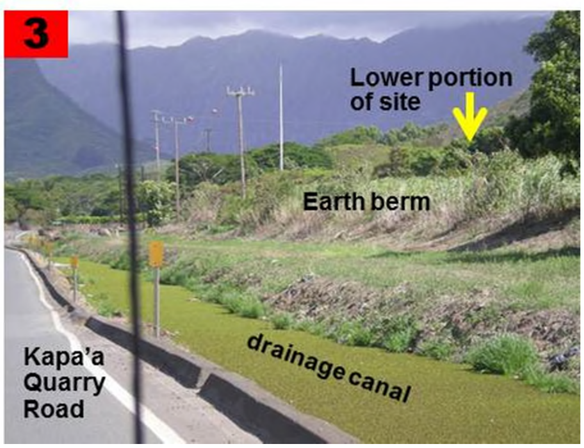


Figure 3-32: Existing view 3
View from the Kapa’a Quarry Road southbound, passing the lower portion of the site; the earth berm is shown beyond the existing drainage canal along the quarry road.

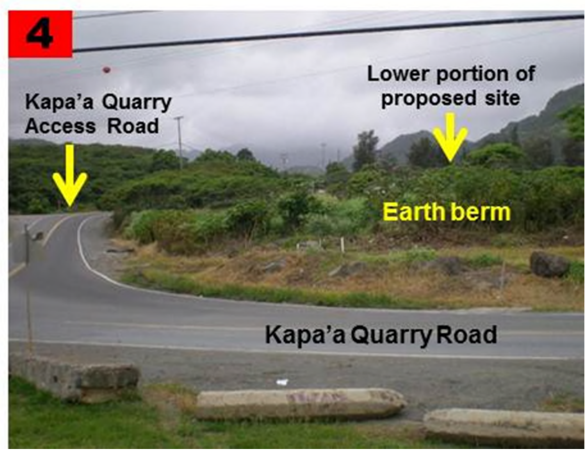


Figure 3-33: Existing view 4
View from the Kawainui Model Airplane Park towards the lower portion of the proposed site, the intersection of the Kapa’a Quarry Road and Kapa’a Quarry Access Road in seen in the left foreground. The lower portion of the proposed site is located behind the earth berm.

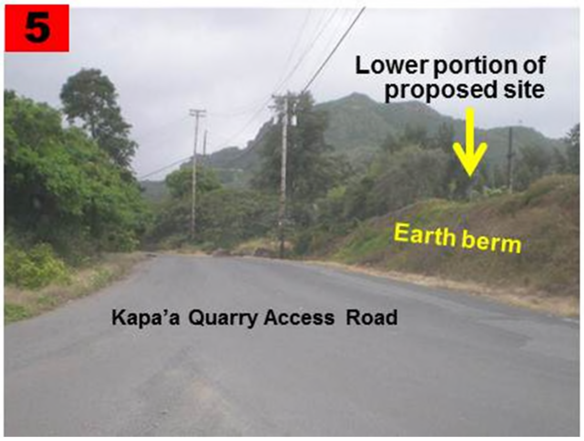


Figure 3-34: Existing view 5
View from Kapa'a Quarry Access Road traveling westbound. The lower portion of the proposed site is obstructed by the berm on the right.

Figure 3-35: Existing view 6
View from Kapa'a Quarry Access Road traveling eastbound. The upper portion of the proposed site, is beyond the trees on the left.

Figure 3-36: Existing view 7
View from Kapa'a Quarry Access Road traveling eastbound, existing warehouses are seen in the photo.

3.10 Land Use and Zoning Existing Environment

This section discusses the historical and existing land uses and the existing land use zoning of the proposed site and surrounding land.

3.10.1 Land Use ~~and Ownership~~

The Kapa'a Valley within which the proposed project site of the Kapa'a Light Industrial Park is located has been subject to significant commercial and industrial developments during the past fifty years. Historically, agriculture was the prime land use in the Kapa'a Valley from the time of early settlement of the Hawaiian Islands through the mid 1900's. For example, cattle ranching operations were important in Kapa'a Valley until the 1940's.

Quarry operations started in the valley in the early 1950's. This significantly changed the primary land use and the general appearance of the valley. The lower plateaus of the valley changed appearance as the quarry operations expanded. While the lower stretches of the valley were agricultural landscapes, this land was converted to serve industrial uses. Significant deposits of quarry tailings and overburden altered the topography of the valley. One of the overall changes of the valley was a raised roadway that subsequently became the Kapa'a Quarry Road. The roadway ran across the valley mouth and segregated the Kapa'a watershed from the Kawainui Marsh. While the Kapa'a watershed previously drained into the marsh through numerous water conveyances, the drainage of the watershed became concentrated to a limited number of openings through the raised roadway. The Kapa'a Stream subsequently acquired the present streambed, which is located between the landfill plateau created by landfill deposits and the H3-Freeway raised roadway.

The 1960's and 1970's brought about an increase in quarry related activities to the area. As quarry operations ceased in different locations, due to the end of cost effective processing, municipal solid waste landfill operations followed in its place. A large municipal landfill was operated in the valley through 1990. Today, there are still municipal waste related activities going on in the valley, though not in the form of landfills but in form of the Kapa'a Refuse Transfer Station, where waste collected in windward communities is transferred to larger transfer vehicles and is then transported to the leeward site of Oahu. Construction of the H3-Freeway and the associated earth moving and mass grading introduced another significant change to the Kapa'a Valley starting in the 1970's.

In the mid-1970's the development of an industrial park in the lower portion of the valley started with the construction of several warehouses on land that was created by landfill deposits. These warehouses are located on a near-level plateau. The number of warehouses has continuously increased over the years in response to a strong demand for industrial warehouse space in the Kailua and Kaneohe regions.

In summary, the Kapa'a Valley has been subject to intensive industrial activities over the past decades, which have caused significant impact on the environment. Earth moving and deposition activities have changed the original natural topography and visual vistas. Noise and air pollution have been introduced to the area due to land filling and other commercial and industrial activities. And finally, surface run off and erosion have contributed to degradation of water quality in Kapa'a stream. Although the proposed Kapa'a Light Industrial Park would expand the existing warehouse development by about twice the present size, the proposed warehouse park would not significantly increase the general industrial characteristics of the entire Kapa'a Valley.

3.10.2 City and County of Honolulu Land Use Zone Designation

All land within the City and County of Honolulu is classified into specific zoning districts. The site of the proposed Kapa'a Light Industrial Park encompasses portions of three land parcels. Two of which, TMK 4-2-015:001 (portion of) and 4-2-015:006 are presently classified as General Preservation District (P-2). The third parcel, TMK 4-2-015:008 is classified as Intensive Industrial District (I-2). Figure 3-37 shows the General Location Map of the proposed site.

Most of the land parcels in the vicinity of proposed project site are classified as either Restricted Preservation District (P-1) or General Preservation District (P-2). Figure 3-38 illustrates the land use zoning districts in the vicinity of the proposed site.

3.10.3 State Land Use Classification of Proposed Site

All lands in the State of Hawaii are classified into one of four land use districts; Conservation, Agricultural, Rural and Urban Districts. Urban districts include lands that are now in urban land use or represent a sufficient reserve area for foreseeable urban growth. Urban districts allow certain land use activities which are regulated by ordinances of the counties. The proposed Kapa'a Light Industrial Park would be within the State Urban District. Figure 3-39 shows the State Land Use Districts in the vicinity of the proposed site. A small, less than one acre portion in the southwest of parcel TMK 4-2-015:001 (portion of) is within the State "Conservation" District. This small portion of parcel TMK 4-2-015:001 would not be part of the development footprint and would remain open space. The requested zone change for the parcel TMK 4-2-015:001 would not include this small land portion and therefore the requested zone change would not require a State land use zone change from Conservation to Urban district.

Figure 3-37 General location map

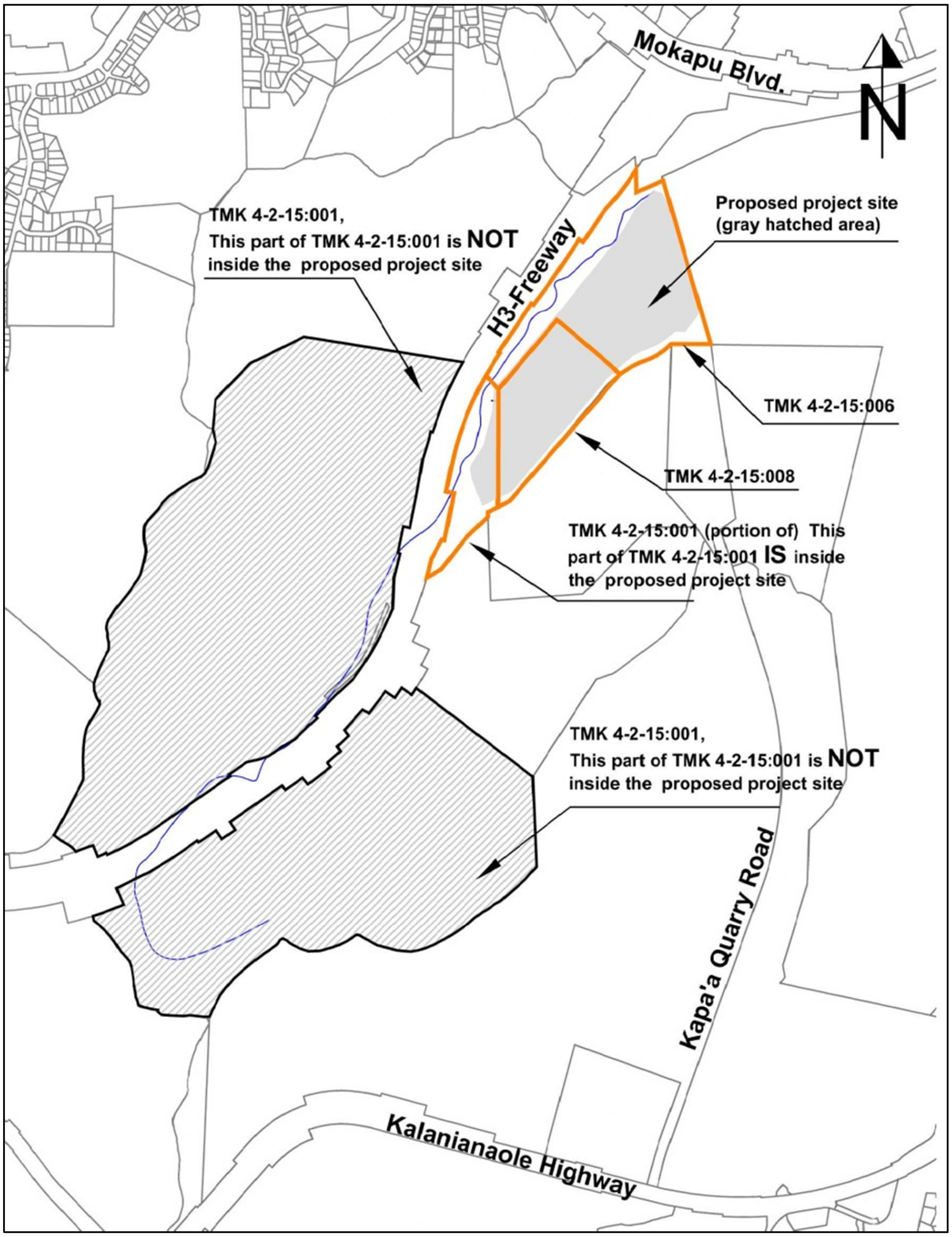


Figure 3-38 City & County land use zone designation in vicinity of project site

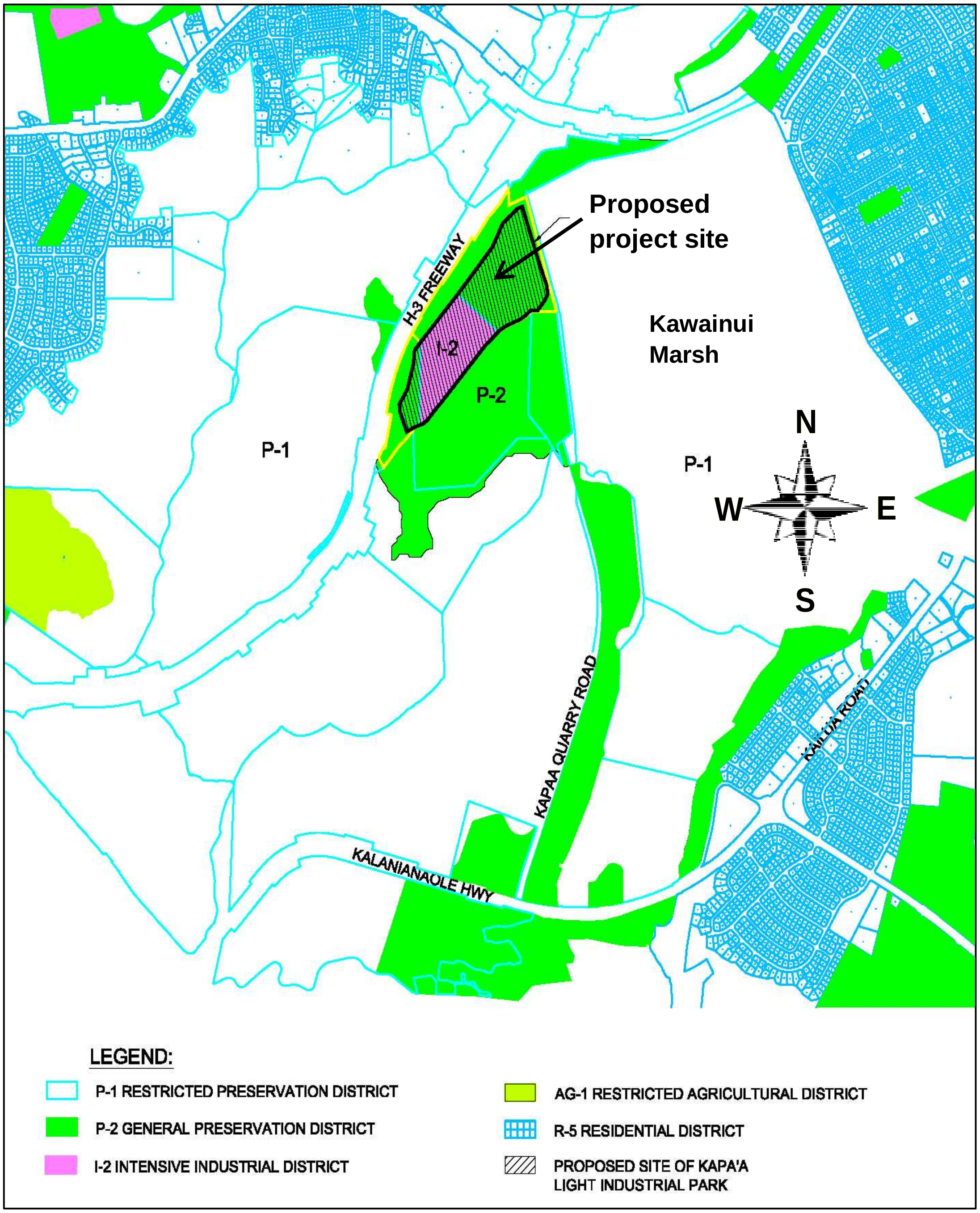
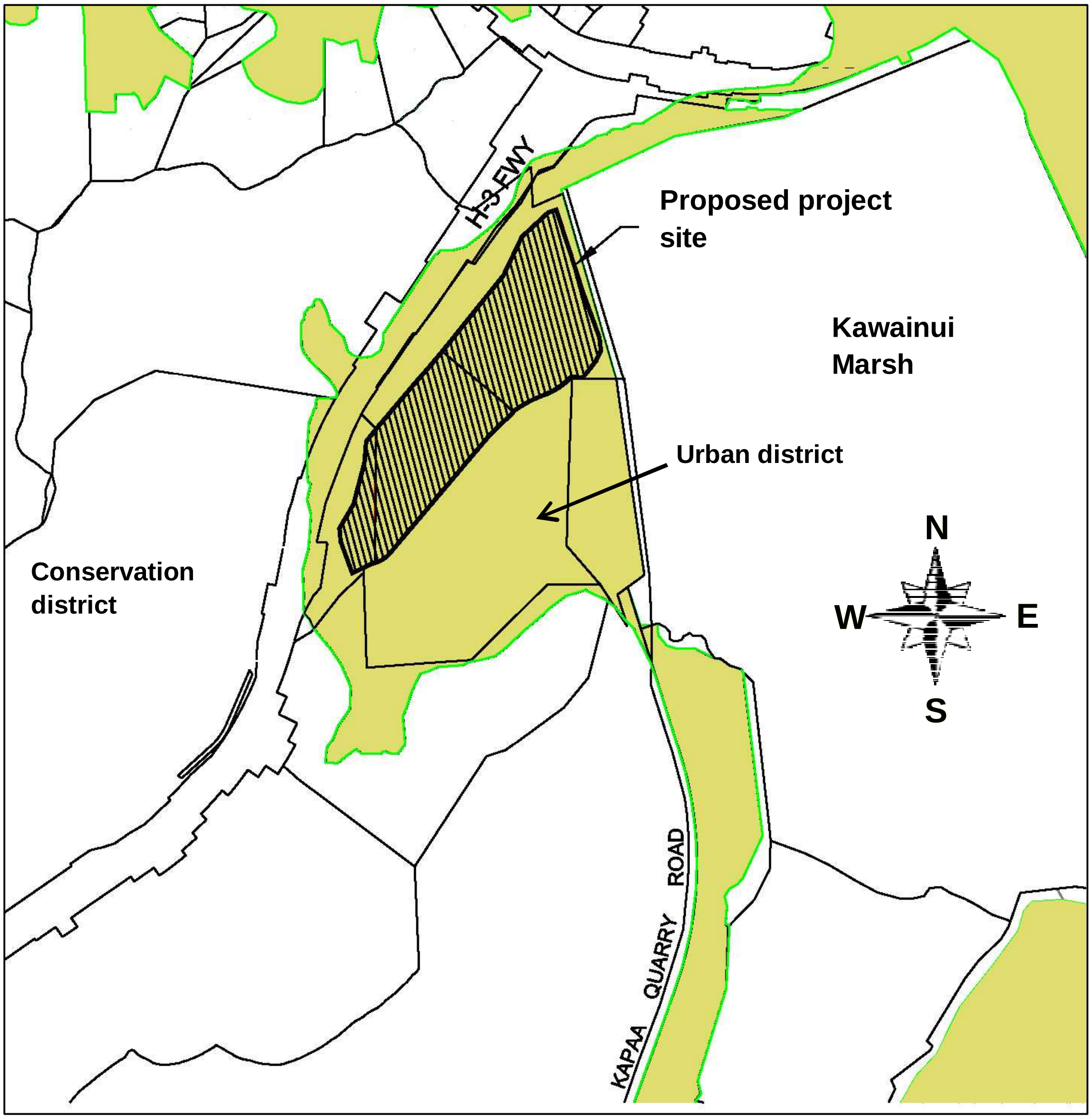


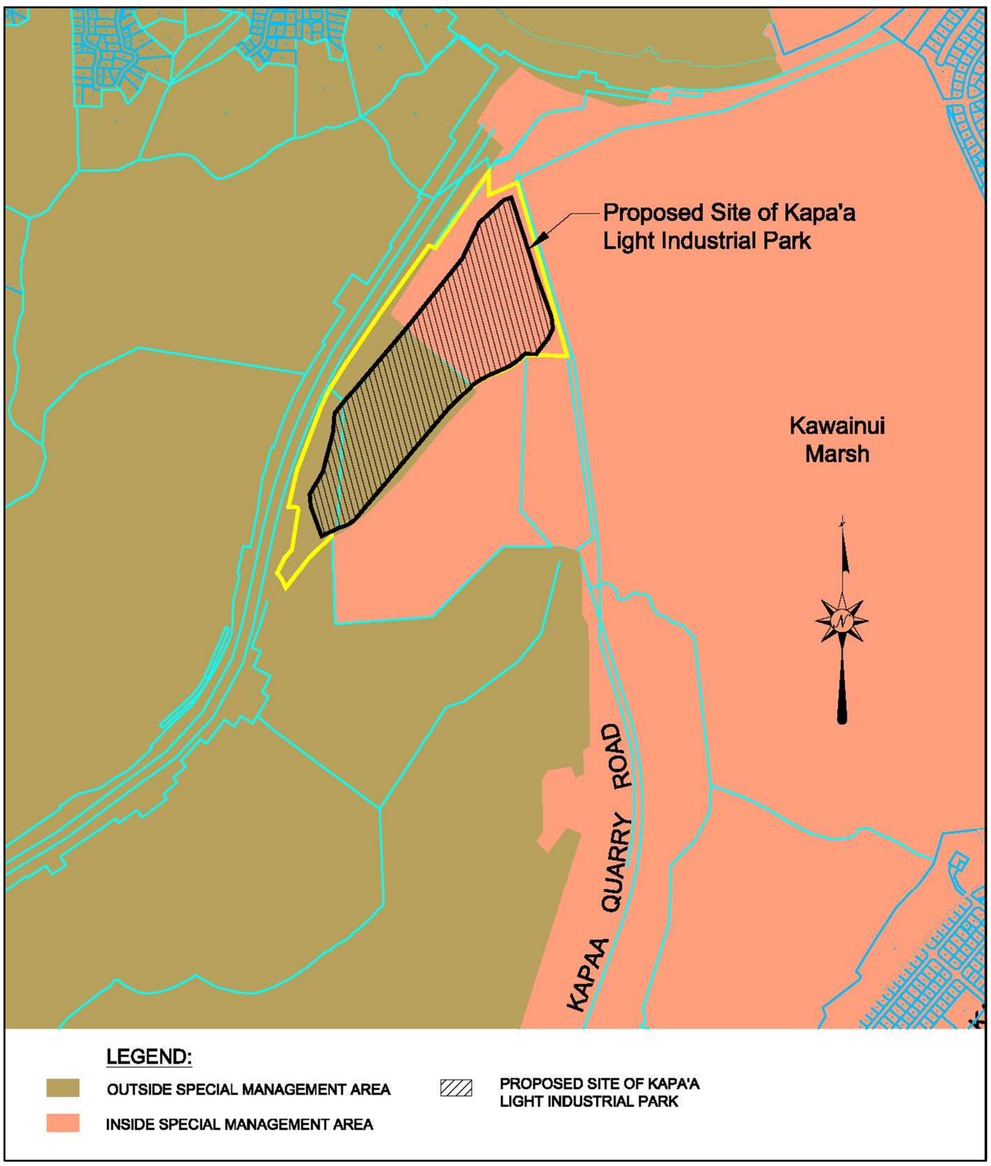
Figure 3-39 State land use districts in vicinity of project site



3.10.4 Special Management Area

According to Hawaii Revised Statutes (HRS) Chapter 205-A the City and County of Honolulu has the authority to regulate land use in Special Management Areas (SMA). As depicted in Figure 3-40, parts of the proposed site of the Kapa'a Light Industrial Park are within the SMA District. Therefore the proposed development will be subject to regulatory procedures, permit requirements, and review under the City's SMA regulations.

Figure 3-40 Special Management Area (SMA) district in vicinity of project site



3.10.5 Land Uses Surrounding the Proposed Site - Kawainui Marsh

Kawainui Marsh is the largest wetland in the Hawaiian Islands. The total area of the marsh with all associated wetland areas is approximately 850 acres. In 2005 the Kawainui Marsh together with the Hamakua Marsh Complex was introduced into the international Ramsar List, a list of Wetlands of International Importance. According to the Ramsar guidelines, " wetlands included in the list acquire a new status at the national level and are recognized by the international community as being of significant value not only for the country, or the countries, in which they are located, but for humanity as a whole…".

Approximately 4,000 years ago the marsh was an inland sea, which was divided from the ocean by a sediment barrier. The marsh accommodated a large fishpond and an agricultural field system that sustained the Hawaiian population in the area. The marsh is part of the ahu pua'a of Kailua, a section of land that stretched from the mountains to the ocean and encompassed a diversity of natural resources, which supplied the life essentials of the Hawaiian population.

The marsh played an important role in the Hawaiian culture. The marsh supported a 400-acre fishpond and an agricultural field system that provided to the people. Several heiaus and other gathering place were constructed in the area. Several of them are preserved to date and provide a rich educational and cultural experience to the people living and visiting the area. Most of the cultural assets are located in the southern part of the marsh, approximately 2 miles away from the site, on average.

A rich wildlife of birds, fish and aquatic animals use the Kawainui Marsh as their home. The marsh is also habitat for the federally endangered Hawaiian stilt, Hawaiian moorhen, Hawaiian coot and Hawaiian duck as well as populations of protected migratory waterfowl and shorebirds protected. The extent of the natural habitat for wildlife has been shrinking in the marsh due in part to a decrease of open water area caused by sedimentation and encroachment of non-wetland vegetation. Measures to restore important wetland throughout the marsh have been ongoing, though at times with different scope and intensity. The goal of such efforts is restore the capacity of the marsh to serve as quality wildlife habitat and effective flood control.

The marsh plays an important hydrological function for the Kailua watershed. During heavy stormwater events runoff, associated suspended solids and nutrients are held back in the marsh resulting in lower runoff impacts on Kailua Bay. Four decades of increased urbanization of the Kailua watershed increased soil erosion and sedimentation that have resulted in a decreased usable volume of the marsh and its ability to hold back water. Increased influx of nutrients into the marsh has caused an increase of free-flowing vegetation that has resulted in a decreased amount of free water surface.

The Kawainui Marsh has been an important area for recreation and repose for the population of Kailua, the Windward community and Oahu as a whole. Several recreational parks are rimming the marsh. A Model Airplane Field at the north-eastern edge of the marsh provides recreational opportunities for fans of model flying aircraft. The marsh furthermore offers scenic views of wetlands and mountains.

3.10.6 Land Uses Surrounding the Proposed Site - Proposed Kawainui Marsh Perimeter Trail System

The construction of a multifunctional pathway, e.g. a combined pedestrian walkway and bikeway around the perimeter of the Kawainui Marsh, has been promoted by State and County agencies and residents of the Kailua region for more than a decade. A combined pedestrian and bicycle pathway around the marsh is recommended as a part of the efforts to preserve, protect and enhance the ecological and historic/cultural resources of the marsh.

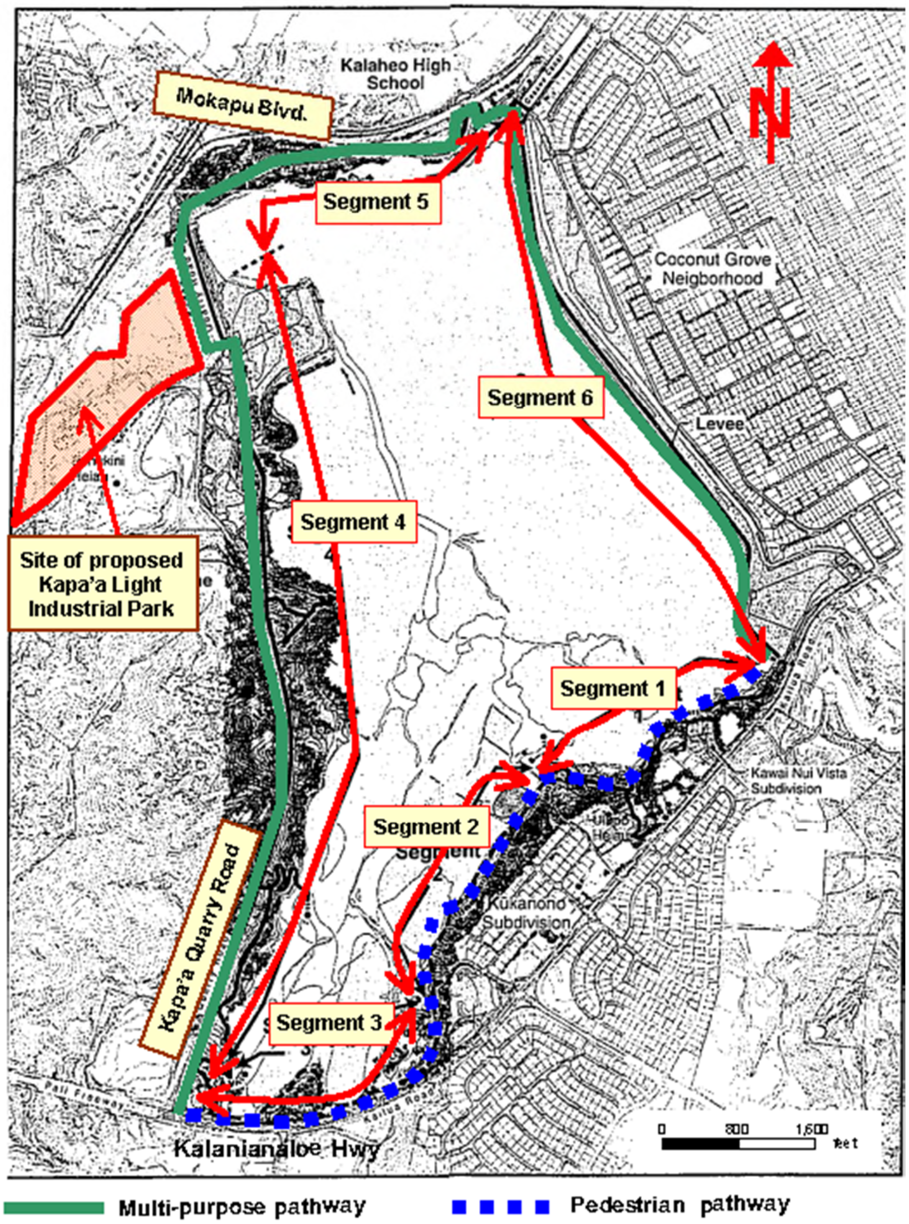
Plans of the Kawainui Marsh Pathway that have evolved over the years envision several segments of paths stretching around the entire perimeter of the Kawainui Marsh. Figure 3-41 shows the proposed six segments of the pathway.

<u>Segment 1, 2 and 3 would be located at the southern boundaries of the Kawainui Marsh:</u>
Segment 1 would be a pedestrian-only pathway along the slopes of the marsh. The path would be within an area that features several archeological and historic sites. Segment 2 would be basically a continuation of Segment 1 and would be a pedestrian-only pathway. The alignment would be finalized after the completion of a proposed water bird habitat restoration project. This segment of the pathway would offer some archeological and natural features and would have excellent marsh viewing. Segment 3 would connect the pathway Segment 2 with the trail system that commences at the intersection of Kalanianaole Hwy and Kapa’a Quarry Road. Construction of Segment 3 might be contingent on the construction of ponds for wildlife habitats and the relocation of cattle grazing in this area.

<u>Segment 4 would be located along the western boundary of the Kawainui Marsh:</u> Segment 4 would stretch from the intersection of Kalanianaole Hwy to the Model Airplane Park. Segment 4 would be the longest part of the proposed pathway system. It would feature a multi-purpose pathway for pedestrians and bicyclists. The proposed alignment of Segment 4 is on the marsh side of the Kapa’a Quarry Road. The proposed design of the pathway would place a small median between the multi-purpose pathway and the Kapa’a Quarry Road in order to separate vehicles from pedestrians and bicyclists, increasing safety along the pathway.

Figure 3-41 Segments of proposed Kawainui Marsh Pathway

(source: Helber, Hasters and Fee, Planners (2003), enhanced graphics by the author)



<u>Segment 5 would be located at the northern boundary of the Kawainui Marsh:</u> Segment 5 would extend from the Model Airplane Park to a location on Mokapu Blvd. across Kalaheo High School. This segment of the perimeter pathway would feature a multi-purpose pathway

for pedestrians and bicyclists. The pathway would cross from the marsh side to the mauka (mountain) side of the Kapa’a Quarry Road at the intersection of the quarry road and the quarry access road (close to the entrance to the Model Airplane Park). The pathway would cross the Kapa’a Stream with its own bridge alongside the existing overpass of the Kapa’a Quarry Road over the Kapa’a Stream.

<u>Segment 6 would be located along the eastern side of the Kawainui Marsh:</u> Segment 6 would be an existing multi-purpose pathway for pedestrians and bicyclists along the levee.

Relevance of Perimeter pathway to the proposed Kapa’a Light Industrial Park:

- Segments 4 and 5 of the planned Kawainui Marsh Pathway could benefit from the proposed Kapa’a Light Industrial Park. The applicant plans to offer alternative means of transportation that would promote the use of bicycles to commute to the industrial park and visit the park. In its existing configuration the Kapa’a Quarry Road presents traffic conditions for pedestrians and bicyclists that are far from safe. A multi-purpose pathway that is separated from the quarry road by a median would significantly improve the safety for bicyclists and pedestrians along the Kapa’a Quarry Road as they travel between Mokapu Blvd, Kalanianaole Hwy. and the proposed Kapa’a Light Industrial Park.

- The proposed alignment of Segment 5 would locate a 1,300 foot portion of the pathway on the mauka side of a section of the Kapa’a Quarry Road that borders the proposed site of the Kapa’a Light Industrial Park. For the construction of the multi-purpose pathway in this location, the existing drainage canal along the Kapa’a Quarry Road would have to be modified to make room for the pathway. The proposed site layout for Kapa’a Light Industrial Park envisions a vegetative buffer to be constructed along the existing drainage canal, which would leave little room for the proposed multi-purpose pathway, since at the present the space between canal and site perimeter accommodates a dirt road for the maintenance of the canal. One option to provide space for the marsh perimeter pathway would be to fill the drainage canal with pervious rock and install an underground pipe to convey drainage to the Kapa’a Stream. Since the amount of water that needs to be drained by the drainage canal along the quarry road would significantly be reduced under the new drainage infrastructure, the drainage canal could be reduced in size. Either a reduced or filled drainage canal would create enough room for the construction of the multi-purpose pathway. As was discussed earlier in the DEIS, filling or altering the drainage canal is not a part of the proposed project; any activities that affect the drainage canal would be part of a subsequent development project.

3.10.7 Land Uses Surrounding the Proposed Site - Kapa’a Valley

The Kapa’a Valley has gone through many significant changes over the past centuries; from agricultural cultivation starting several centuries ago, when the valley was home to the first settlements, to cattle ranching and last to industrial uses.

In the middle of the last century industrial uses started in the valley with quarry operations on the slopes of the Ulumawao ridge in the south of the valley. The quarry operations later expanded also to the upper parts of the valley. A dike supporting a raised roadway was installed in the lower part of the valley, which effective segregated approximately 40 acres of wetland from the Kawainui Marsh. This raised roadway became the Kapa’a Quarry Road. While quarry operations expanded in the valley, there still were farming activities ongoing in the valley.

The start of the quarry operations also resulted in the deposits of overburden and tailings on wetland areas on both sides of the raised roadway. The deposits on the makai (ocean side) side of the Kapa’a Quarry Road and located on the fringes of the marsh resulted in the creations of landfill area that today is used, among others, for the Model Airplane Park and a City & County of Honolulu base yard.

In the mid-1960s the 40-acre wetland area was filled to become a landfill area, displacing the remaining farming operations from the Kapa’a Valley. The upper half of the 40 acres became a refuse dump, which was eventually covered with quarry overburden, and the lower half of the area was filled with quarry overburden to create an approximately level plateau. Due to the obstruction of the landfill, the Kapa’a Stream streambed changed, moved further to the north and assumed its present location.

In addition to the quarry and landfill operations in the Kapa’a Valley, the construction of the Interstate H-3 Freeway created another impact.

With ongoing and expanding quarry operations, larger portions of the valley were used for landfills. Landfill operations in the lower stretches were completed in the mid 1970. The landfills were then used to start other industrial uses in the lower stretches of the Kapa’a valley. About 23 acres of the area generated by landfill was converted to industrial land use and industrial warehouses have been built on this land over the past three decades. The remaining landfill area directly adjacent to the Kapa’a Quarry Road is presently used for green waste processing. Other industrial uses at the southern fringes of the valley include a refuse transfer station.

The proposed Kapa’a Light Industrial Park would be built exclusively on land that was created from deposits of refuse and quarry tailings overburden and would not be built on land that was previously undisturbed.

The Kapa’a Valley has gone through extensive changes over the past century changing from farming to industrial uses and significant changes in the valley’s landscape. The changes reflect the scope of urbanization in the Kailua region and growth on Oahu. These changes have placed a burden on the natural resources in the valley. Recent efforts of the public and business community try to reverse the impacts that were started decades ago and mitigation measures, such as restoration of wetland area and more environmentally responsible construction and operation will bring about more balanced land uses in the Kapa’a Valley in the years to come.

3.10.8 Land Uses Surrounding the Proposed Site - Federal H3-Freeway

The H3-Freeway connects central Oahu with the windward side and is an important part of the freeway system on Oahu. The freeway is about 15 miles long and features a tunnel system of about one mile length and numerous viaducts that elevate the roadways and support the freeway structure over significant lengths.

The idea of the linking central Oahu and the windward part of Oahu by the H3-Freeway was conceived as part of the Statehood Act and initial federal planning started in 1963 to select a route of the freeway. On the Honolulu side of the Koolau Mountain range, the initial design considered the Moanalua valley route. On the windward side the route of the H3-Freway passes through the Kapa’a Valley. By the year 1972 the construction of the freeway through the Kapa’a Valley was in full process.

In the face of mounting public opposition to the construction the U.S. District court issued an injunction halting most design and construction work in 1972. By 1976 the route through Moanalua Valley was blocked and the State proposed a new route through Halawa Valley, which, in 1981, was confirmed by the Federal Highway Administration. Court injunctions were lifted and construction work resumed, but work was then stopped again and further delayed by more public and court interventions.

Further into the construction schedule of the H3-Freeway the route was again slightly relocated in order to avoid some cultural and historic sites. In 1997, almost four decades after being proposed, the H3 opened. The H3-Freeway now has become an important part of Oahu’s freeway system. Due to numerous delays, re-designs, relocation of the route and the need to build a roadway over viaducts over long distances, the H-3 has ended up as one of the most expensive (on a cost per unit distance basis) of any Interstate constructed. Its final cost amounted to 1.3 billion dollars or more than 80 million dollars per mile of freeway.

The construction of the H3-Freeway though the Kapa’a Valley has had considerable impact on the valley and its watershed. The roadway crosses the valley in East-West direction and its embankment basically segregates the valley into a northern and southern part. Since the road embankment affects the drainage of the valley watershed, drainage openings had to be installed for the Kapa'a Steam and other smaller drainage ditches.

In addition to affecting the watershed, the H3-Freeway has also altered the visual appearance in the valley and has caused other impacts, such as increased noise and light. The H3-Freeway is located directly adjacent to the land parcels that will constitute the site of the proposed industrial warehouse development.

3.10.9 Land Uses Surrounding the Proposed Site - Le Jardin Academy

The Le Jardin School is a private school that has served the Kailua and Kaneohe region since its founding almost 50 years ago. The school has seen significant growth since and in 1999 the school campus moved to a new location at the intersection of Kalanianaole Highway and Kapa'a Quarry Road, at the site of the former Kailua Drive-in. The Le Jardin Campus is located 1.6 miles away from the site of the proposed industrial warehouse park.

3.10.10 Land Uses Surrounding the Proposed Site - Kapa'a Refuse Transfer Station

The Kapa'a Transfer Station is located at the Kapa'a Quarry Road south of the site of the proposed Kapa'a Light Industrial Park.

The Kapa'a transfer station serves two functions:

1. It serves as one of three refuse transfer stations on Oahu, where the volume of refuse is consolidated and transferred from locally operating refuse collection trucks to larger hauling trucks, for cost effective transport of combustible and non-combustible refuse to the waste incinerators or landfills on the leeward side of the island, respectively.
2. It operates as one of 10 locations on Oahu that serve as drop-off convenience centers for Refuse and Recycling. At these locations residents can dispose of their household rubbish. Containers are provided onsite for the separate collection of different types of materials: combustibles are processed at H-POWER, non-combustibles are taken to landfill; organic waste is hauled to mulching and composting sites; and large appliances, tires and auto batteries are taken to recycling facilities.

The Kapa'a Transfer Station is open every day, including Saturday and Sunday. The transfer Station is located about 0.4 miles away from the proposed site.

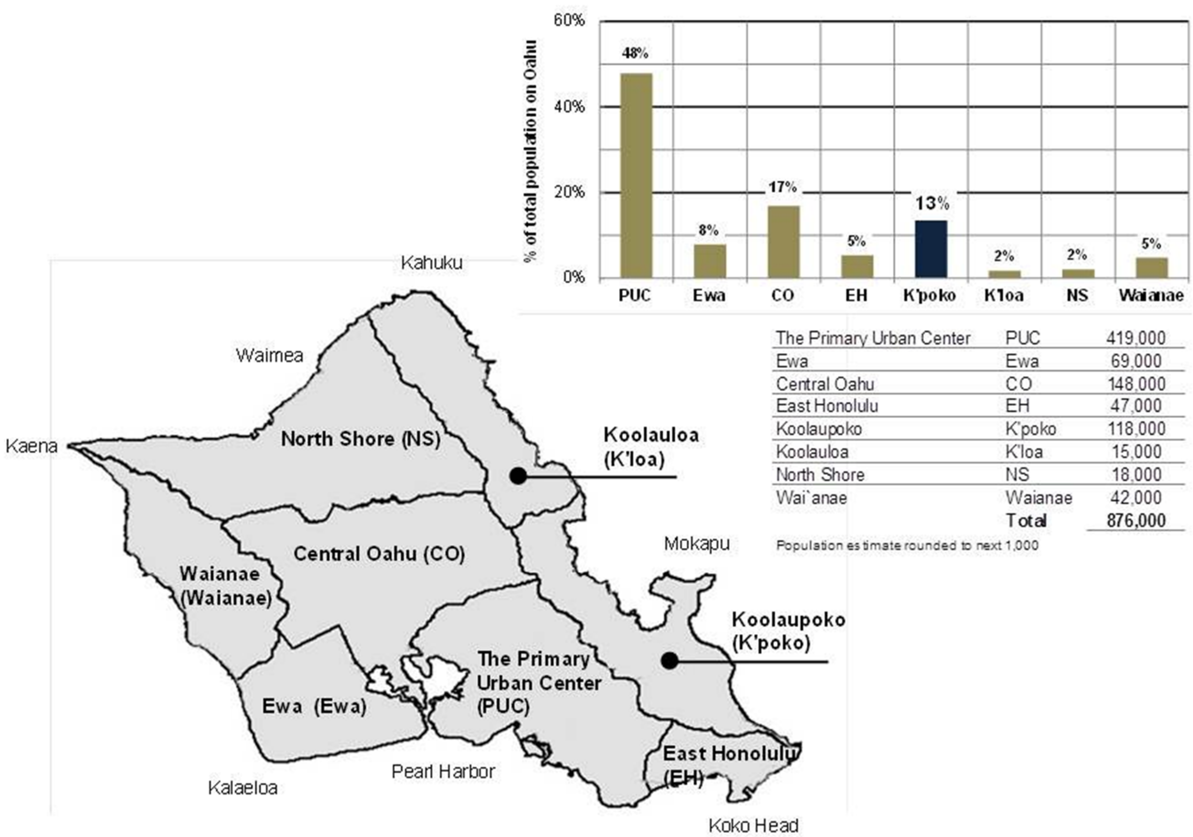
3.11 Population and Community Services and Facilities Existing Environment

This section discusses socioeconomic characteristics of the existing environment within the Koolaupoko region.

3.11.1 Population Characteristics

The Koolaupoko region has the third largest population among the seven main districts of the City & County of Honolulu. Figure 3-42 indicates the distribution of population on Oahu. As indicated about 13.5 percent of the Oahu population lives in the Koolaupoko region. Figure 3-43 indicates that the main population centers in the Koolaupoko region are the Kailua and Kaneohe subareas, which together account for approximately 70% of the population of the Koolaupoko region.

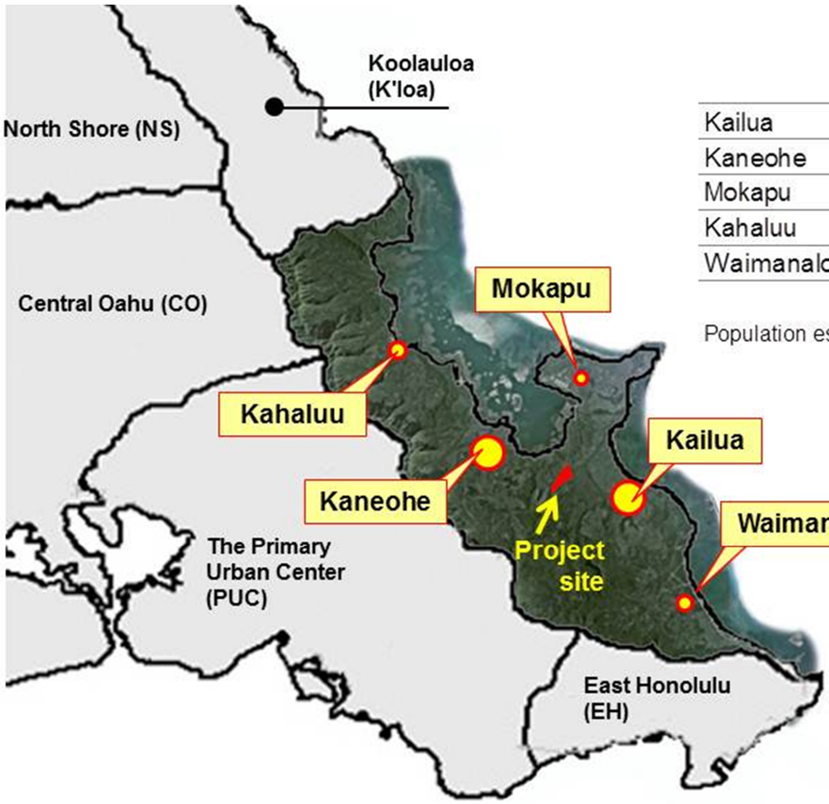
Figure 3-42 Population distribution in City & County of Honolulu (2000 estimate, source DPP) **<u>Figure 3-42 changed from DEIS</u>**



The Primary Urban Center	PUC	419,000
Ewa	Ewa	69,000
Central Oahu	CO	148,000
East Honolulu	EH	47,000
Koolaupoko	K'poko	118,000
Koolauloa	K'loa	15,000
North Shore	NS	18,000
Wai`anae	Waianae	42,000
	Total	876,000

Population estimate rounded to next 1,000

Figure 3-43 Population estimates for subareas of Koolaupoko region (2000 estimate, source DPP) *Figure 3-43 changed from DEIS*



	estimated population	
Kailua	42,000	36%
Kaneohe	40,000	34%
Mokapu	12,000	10%
Kahaluu	14,000	12%
Waimanalo	10,000	8%
	118,000	**100%**

Population estimate rounded to next 1,000

Existing policies and future visions of the region call for measures that retain a constant population density in the Koolaupoko region and discourage significant population growth in the region. For the period from 1980 through 2000, Figure 3-44 indicates that the Koolaupoko region has experienced little growth. While the total population within the City & County of Honolulu has been growing from 1990 to 2000, the population in the Koolaupoko regions has remained essentially constant. For the year 2030 it is predicted (DBEDT and DPP projections, 2009) that the population in the Koolaupoko region will decrease by about 0.8 percent (or 966 residents) relative to ~~its current number~~ the year 2010, while Oahu's total population is expected to increase by 11.5 percent (or 105,735 residents). The expected population decline in the Koolaupoko region is expected to result from fewer births and increasing death rates resulting from an older population, as well as from an out-migration of residents from the region. The Koolaupoko region is the only region on Oahu which is predicted to have a negative population growth ~~in the years to come~~ within the time period 2010 to 2030. Table 3-12 indicates the projected population growth of the eight subareas of the City and County of Honolulu. As illustrated in Table 3-12, positive growth rates are between 60% for Ewa and 1 % for East Honolulu.

Table 3-12 Population growth in subareas of City & County of Honolulu between 2010 and 2030 (data DPP and DBEDT projections) **Table 3-12 is a new table added to the FEIS**

		population increase from 2010 to 2030	
		[number]	[in %]
Primary Urban Center	PUC	24,330	5.8%
Ewa	Ewa	56,828	60.1%
Central Oahu	CO	18,064	11.4%
East Honolulu	EH	471	1.0%
Koolaupoko	**K'poko**	**-966**	**-0.8%**
Koolauloa	K'loa	1,180	8.3%
North Shore	NS	1,651	9.3%
Wai`anae	Waianae	4,177	9.4%
Total C&C of Honolulu	Oahu	105,735	11.6%

The urban areas of Kailua and Kaneohe are generally categorized as "bedroom" communities. The bulk of the population in these two regions commutes everyday to employment centers in the central part of Oahu. The development of the labor force on Oahu shows that it has been growing at a faster rate than the population, suggesting that Oahu provides a favorable employment environment. Figure 3-45 indicates the development of the labor force and population relative to the year 2002. According to State Department of Business and Economic Development, 2007 Data Book, the median income per household in the area which is primarily affected by the proposed development, is $66,000 to $72,800. The median income per household for the County of Honolulu, in comparison, is $51,900.

3.11.2 Police and Fire Department

Fire stations: There are three fire stations that serve the Kailua area and would also serve the proposed Kapa'a Light Industrial Park. These fire stations and the approximate distances to the proposed site are as follows:

(1) Main Kailua fire station on Kuulei Road, at a three mile distance from the proposed site,
(2) Fire station on Kaneohe Bay Drive at the Aikahi Park Shopping Center, at a two mile distance,
(3) Olomana fire station on Kalanianaole Hwy., at a two mile distance.

Police Stations: The police station that would serve the proposed Kapa'a Light Industrial Park is located next to the Kailua main fire station on Kuulei Road, about three miles from the proposed site.

Figure 3-44 Comparison of population in City & County of Honolulu and Koolaupoko Region **Figure 3-44 changed from DEIS**

(data source U.S. Census and DPP)

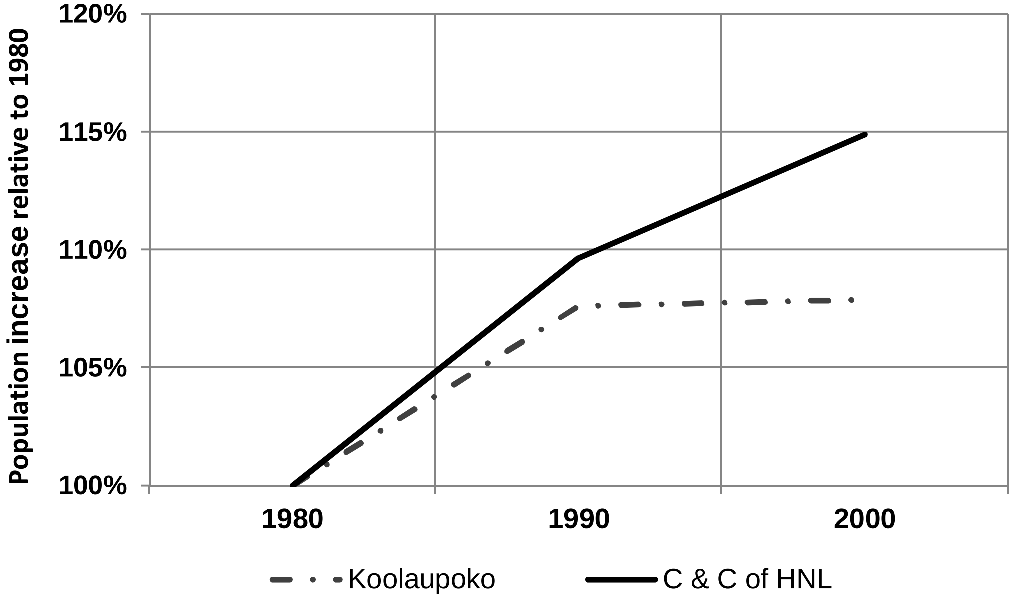
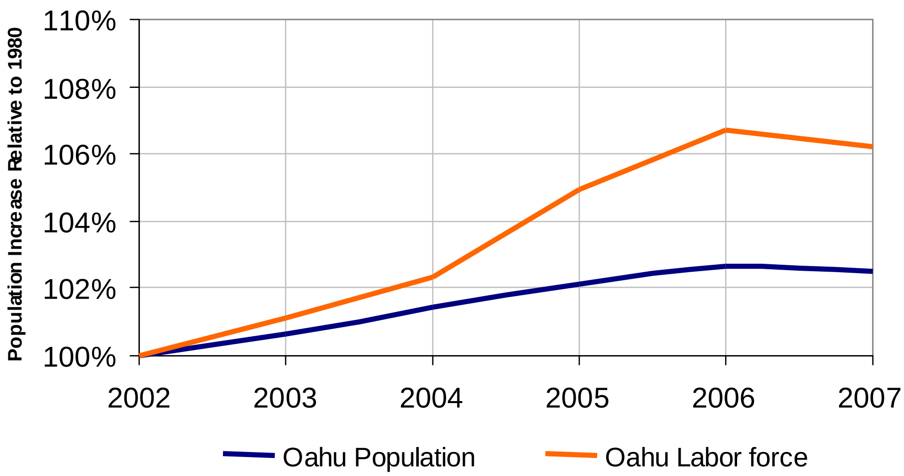


Figure 3-45 Development of Labor Force and Population on Oahu

(Data from DBEDT 2007 State Data Book)



3.11.3 Medical Facilities

There are two major medical facilities within five miles of the proposed site:

- Castle Medical Center - 2.5 mile distance from proposed site
  640 Ulukahiki Street, Kailua, HI
  Castle Medical Center is a non-profit medical facility owned by the Seventh-day Adventist Church and operated by Adventist Health. This 157-bed primary health care facility is located next to Kawainui Marsh on the Windward side of Oahu. The clinic serves the entire island of Oahu. The medical facility provides a wide range of inpatient and outpatient services. The clinic has a 24-hour emergency department.

- Hawaii State Hospital - 5.0 mile distance from proposed site
  45-710 Keaahala Rd., Kaneohe, HI
  Hawaii State Hospital is a 194-bed hospital located in Kaneohe on the windward side of Oahu. The hospital provides integrated and evidence-based psychiatric treatment and rehabilitation to individuals suffering from mental illness and co-occurring disorders. It is the only hospital in Hawaii which is dedicated to serving adults with serious mental illnesses.

3.11.4 Recreational Facilities

Currently, there is one community park within a one-mile distance from the proposed site. Plans call for potentially two future recreations venues, one park and one trail system:

The Kawainui Model Airplane Park is located on the western edge of the Kawainui Marsh and directly adjacent to the proposed site. The Kapa’a Quarry Road separates the “airplane” park from the proposed site of the Kapa’a Light Industrial Park.

The future Kawainui Gateway Park will be located east of the intersection of Mokapu Boulevard and Kapa'a Quarry Road and will be located within one mile of the proposed site.

In addition, the future Kawainui Marsh Trail will provide a perimeter trail around the marsh. The trail would pass the proposed site of the Kapa’a Light Industrial Park and would run in south-north direction along the eastern side of the Kapa’a Quarry Road.

3.11.5 Schools

There are several public and private schools within a two mile distance from the proposed site.

The closest school campus is the Kalaheo High School & Windward Community School, which is about one mile from the proposed site. This school is the only educational institution within walking distance to the proposed site. The Kapa'a Quarry Road does not serve any residential areas between the proposed site and the school and students would not normally walk past the proposed site.

Other schools that are within a two mile distance from the proposed site are Le Jardin (a private School), Kailua High School, Maunawili Elementary School, Kailua Elementary School, Aikahi Elementary School and Kainalu Elementary School.

3.11.6 Refuse Collection and Disposal

There is presently no municipal refuse collection at the proposed site. Refuse is collected and disposed of by private waste management companies. City and County solid waste transfer station is less than a quarter of a mile from the proposed development site.

3.12 Existing Supply and Demand for Industrial Space in the Region

A market study was conducted to evaluate the existing supply of industrial space in the Koolaupoko region and the ability of the region to absorb the planned expansion of approximately 600,000 square feet of industrial warehouse space, which would be created by the proposed Kapa'a Light Industrial Park. The market study is presented in full in Appendix 2. The market study suggests the following conclusions about the existing supply and demand of industrial space in the Koolaupoko region:

- A comparison of the four counties of the State of Hawaii indicates that the supply of industrial space in the state differs significantly between the islands. The City & County of Honolulu has a per capita allowance of industrial space, e.g. the available industrial space in each county divided by the county population, of 39.3 square feet per capita, which is slightly below the statewide average of 44.9 square feet per capita. Maui and Kauai counties have both per capita allowances that are well above the state average (see Figure 3-46).

- The comparison of per capita allowances for industrial space in the major trade areas on Oahu, urban Honolulu, Ewa/Waianae and Central Oahu with the Koolaupoko region is illustrated in Figure 3-47. The comparison suggests that the Koolaupoko region contains only approximately 21 percent of the industrial space demand created by the resident population. Therefore the region is significantly undersupplied with industrial space. In another comparison, while urban Honolulu has 54 percent of the population, it has 59 percent of the industrial space of Oahu. In contrast, the Koolaupoko region has 13 percent of Oahu's population but only 3 percent of the industrial space.

- Historically, the majority of demand created by windward (including Koolaupoko region) areas has been oriented to other areas of the island, notable Honolulu, for most industrial uses. While the lack of industrial space, notably those of intensive industrial uses and those that serve island wide market, is in accordance with development plans for Koolaupoko, the region is also significantly undersupplied with industrial space that accommodates neighborhood/ local and sub-regional industrial types of services, such as neighborhood-oriented contractors, suppliers, repair shops, craftsmen/woodworking businesses.

- This lack of suitable space for local businesses in the Koolaupoko region results in increasing time and costs for serving the windward side of Oahu from locations elsewhere in the island. Furthermore, providing the needed services from locations outside the region results in escalating traffic.

- Due to the significant problems with commuting into Honolulu, for example, small business owners are looking to relocate their business operations closer to their residences and / or employees.

- The Koolaupoko region presently contains about 992,000 square feet of finished floor space, which represents 3 percent of Oahu's total industrial space. The market study suggests that the region can readily absorb approximately 832,000 square feet of industrial space in the planned duration of project full build-out. This addition of 832,000 to the existing 992,000 square feet of finished floor space would still only represent only about 40 percent of the average allowance for the region. In other words, even with the addition of 140 percent of the planned maximum capacity of the proposed Kapa'a Light Industrial Park, the Koolaupoko region would still remain significantly undersupplied with industrial space when compared with the island-wide Oahu supply of industrial space. It should be noted that the prediction of the region's ability to absorb the planned amount of space is based on providing industrial space and land businesses to businesses that would serve the local and sub-regional market and not the Oahu island-wide market. Thus, the character of the businesses using future space in the region would not be intensive, but limited industrial land uses. This is consistent with the long-term development plans for the region and with the sought land use change to I-1.

Figure 3-46 Comparison of per capital allowance of industrial space between islands

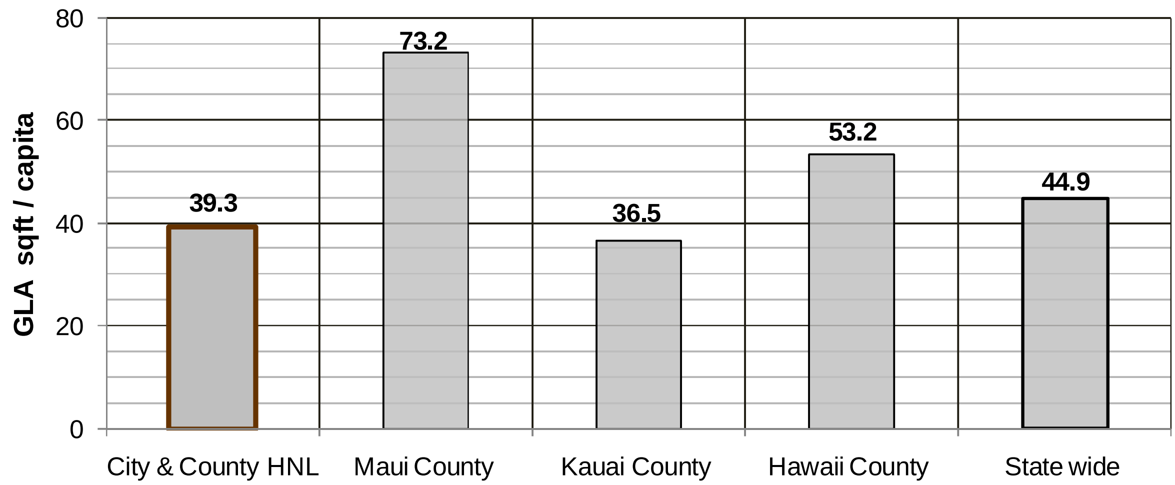
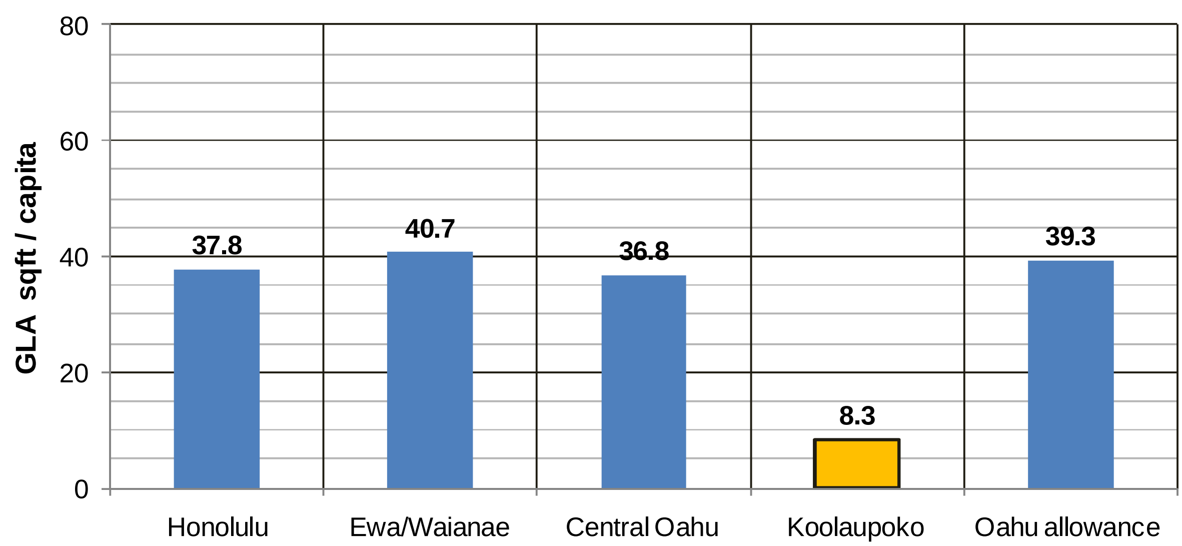


Figure 3-47 Comparison of per capital allowance of industrial space between major trade areas on Oahu



- In addition, a significant amount of industrial space is lost in the region due to conversion of industrial zoned land to commercial and other uses, i.e. the rezoning of industrial lands in Kailua Town to more profitable mixed-uses. The adds to the long-term undersupply of industrial space in the Koolaupoko region.

- Excluding the proposed project site, the amount of available industrial space/land is extremely limited in Koolaupoko. There is very little suitable land within Koolaupoko that offers the same favorable site conditions, including being centrally located within the Kailua and Kaneohe trade area, good access to the regional roadway, being located within the State “urban” land use district and therefore designated for urban development and the existing industrial uses within the Kapa’a Valley. Therefore the proposed site is uniquely suited to the proposed use.

CHAPTER FOUR - ENVIRONMENTAL IMPACTS AND MITIGATIONS

The implementation of either the Preferred Alternative or Alternative B has the potential to affect various environmental resources at the proposed site of the Kapa'a Light Industrial Park, as well as the potential to affect certain resources beyond the boundaries of the project site. Chapter Four identifies and evaluates the anticipated environmental impacts associated with each alternative. Besides the Preferred Alternative and Alternative B, Chapter Four also evaluates the No Action Alternative. After evaluating the possible and/or anticipated impacts, this section presents mitigation measures that are selected to mitigate the impacts to the extent possible.

4.1 Impact Mitigation though Low Impact Development for Lower Portion of the Site

The differentiating factor between the Preferred Alternative and Alternative B is the development approach used for the lower portion of the project site. Alternative B utilizes conventional building designs and technologies while the Preferred Alternative uses a low impact development approach; the sustainable design approach for the proposed project is presented in Appendix 4 of this DEIS.

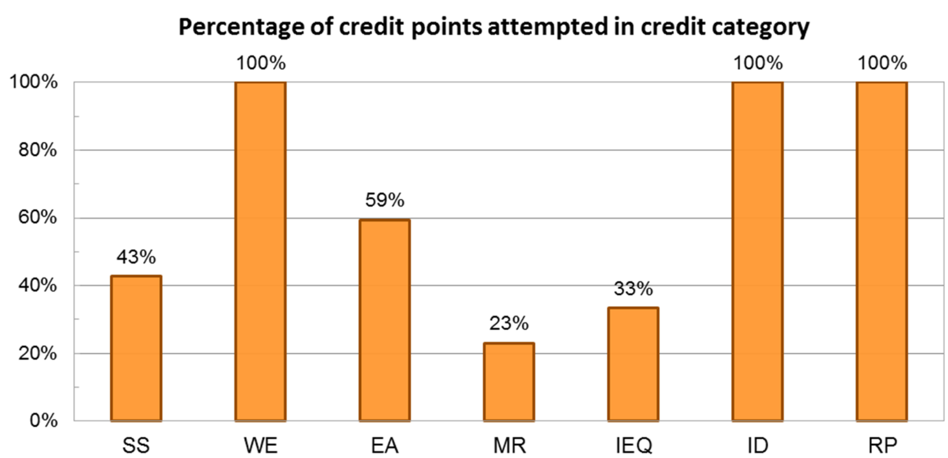
The proposed development will be designed and constructed to conform to requirements under the Leadership in Energy and Environmental Design (LEED) green building certification system of the U.S. Green Building Council. The LEED green building certification program recognizes sustainable green building and development practices and awards levels of compliance to projects that implement strategies for better environmental and health performance. The lower portion of the proposed project site will be designed and constructed to achieve the required number of credits to qualify for LEED Silver certification upon completion of the project. Under the LEED Silver certification level the project must qualify, confirmed by third party audit, that more than 50 percent of the 100 possible credit points (plus 10 possible bonus points) have been achieved by the design and completed construction.

The rationale to concentrate on developing the lower portion of the site to LEED standards rather than seeking LEED certification for the entire project, including the new developments in the upper portion of the site, is that environmental consequences resulting from the lower portion of the site can impact the surrounding environment more directly and to a larger extent, due to the proximity to important wetland areas.

The sustainable development plan for the lower portion of the site uses a strategy to emphasize on those LEED credit categories which can effectively mitigate such impacts that matter most for the proposed site. Figure 4-1 shows the proposed distribution of LEED credits among seven LEED credit categories for the project. As can be seen, the mitigation of water related impacts is emphasized by attempting all, actually surpassing the maximum LEED credit points for water efficiency. In addition the credit category Sustainable Sites reflects the applicants plan to attempt most of those credits which apply to the proposed project, considering the fact that some credits are not readily achievable due to the location of the proposed site (not close to existing residential areas, high density developments and connected to public transportation). Under the credit area Sustainable Sites, however, important mitigation of stormwater runoff and light pollution is implemented.

Table 4-1 shows important LEED credit points that have been strategically selected to mitigate significant impact categories on the environment, and particularly the wetland areas directly adjacent to the lower portion of the site. In Table 4-1, the use of the term “LEED project site” or “development footprint” refers to the development in the lower portion of the project site and does not include the new development area in the upper portion of the site.

Figure 4-1 Percentage of attempted to available credit points for credit category



SS	-	Sustainable Sites
WE	-	Water Efficiency
EA	-	Energy & Atmosphere
MR	-	Materials & Resources
IEQ	-	Indoor Environmental Quality
ID	-	Innovation in Design
RP	-	Regional priority

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	Types of environmental impact that are mitigated
Credit category - Sustainable sites	
Alternative Transportation - Bicycle	Lowering the amount of traffic on the roadways to the project and directly adjacent to the marsh by promoting the use of bicycles to commute. The present traffic situation on the quarry road is not conducive to bikers; the proposed marsh perimeter pathway would provide an excellent approach to combine bicycle friendly traffic condition with making the marsh more accessible in regard to recreation and enjoyment of nature.
Restore habitat	The areas around the development footprint are restored with native or adapted plants and the present invasive vegetation will be removed. These areas will serve as vegetative buffer zones around the development site, thereby mitigating visual impact, noise impact and air pollution. Furthermore the buffer zones will provide some habitat for wildlife and will serve as infiltration areas for stormwater and treated wastewater, thereby mitigating runoff and providing for better onsite wastewater treatment.
Maximize open space	The areas within and at the perimeter of the development footprint will contain the maximum amount of open space which is achievable for the planned layout of the warehouse development. The open space will be vegetated and pervious; open space also includes open grid pavement, which contains some vegetation and has a perviousness of at least 50 percent.
Stormwater design - quantity	The installation of detention ponds will act as flood control and will mitigate high runoff volume that could cause erosion impacts on the stream beds and associated sedimentation in the receiving waters. The design of detention ponds will consider measures to avoid attracting endangered water birds to the open water within the detention ponds, which could expose the birds to enhance predator threats. The use of stormwater recycling and rainwater harvesting will furthermore mitigate the frequency of runoff event that will fill the detention ponds.
Stormwater design – quality	The stormwater runoff will be treated to an enhanced

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	Types of environmental impact that are mitigated
	standard by using a comprehensive treatment approach that will contain stormwater filter units and one extended detention pond. The filter units are located upstream of the detention pond and serve as settlement tanks that remove all floatable debris, sediments and oil and grease from the runoff. The extended detention ponds have a design residence time of 24 to 48 hours and provide treatment capacities to further remove sediments, nutrients and suspended solids. The combined pollutant removal rate of the filter units and detention ponds is estimated of well over 80 percent, which is the required threshold for this LEED credit. With implementing this comprehensive stormwater treatment system impacts from stormwater runoff to the receiving waters, e.g. the Kapa'a Stream, the adjacent wetland area, the Kawainui marsh and the drainage canal along the quarry road can be effectively mitigated.
Heat island effect – non roof	The use of pavement with high Solar Reflectance Index (SRI) material, the planting of trees and the use of open grid pavement decreases the heat island effect within the development, therefore improving the thermal performance of the buildings. The use of trees inside the development will also mitigate visual impacts from.
Light pollution reduction	Light pollution is excessive lighting that can impact wildlife in the adjacent wetlands, diminish night sky enjoyment and produce glare, which could be detrimental to motorists passing the development. Implementing effective reduction of exterior and interior lighting are effective measures to mitigate this impact.
Credit category WE - Water Efficiency	
Water Use Reduction	The reduction of water use by at least 40 percent directly reduces the impact on the municipal infrastructure and reduces the amount of wastewater that needs to be treated onsite. The mitigation of all water related impacts resulting from the proposed development are a high priority for the proposed project.
Water Efficient Landscaping	Avoiding potable water for irrigation reduces the impact on

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	**Types of environmental impact that are mitigated**
	the resources of the municipal water supply and also reduces impacts of runoff, since stormwater can evaporate from plants and infiltrate into the ground rather than be discharged directly into the receiving waters. The use of native and adaptive plants within the development and in the buffer zones surrounding the developments reduces the demand for irrigation water, but also reduces the requirements for fertilizers and pesticides.
Innovative Wastewater Technologies	The use of advanced onsite wastewater treatment effectively reduces the emissions of biological oxygen demand (BOD), total suspended solids, nutrients, metals and harmful bacteria in the effluent of the development. The advanced treatment furthermore makes it possible to use the treated wastewater for below ground irrigation, furthering the treatment of the wastewater and producing a sewage effluent that will surpass the typically achievable pollution removal rates in domestic and commercial sewages effluent. The removal of high amounts of pollutants from the effluent of the development is effectively reducing impacts on the receiving waters and is protecting the adjacent wetlands.
Credit category - Energy & Atmosphere	
Optimize Energy Performance	The planned significant reduction of energy consumption, at least 30 percent, and power demand in the proposed development will mitigate impacts on the energy supply of the state. By providing modern, environmentally friendly and energy efficient warehouses to replace older inefficient industrial buildings has an important benefit for the environment and for Hawaii’s residents. At the present Hawaii obtains about 80 percent of its electricity from imported oil, making it one of the most oil dependent locations in the developed world. Saving electricity equates to saving importing oil which mitigates impact on the environment and the economy.
On-Site Renewable Energy	Implementing renewable energies to power the proposed development reduces the energy consumption and also reduces the peak power demand. By reducing the power demand the public utilities are less burdened by the new

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	Types of environmental impact that are mitigated
	development and thus less new infrastructure has to be built and maintained, thereby directly reducing impacts on the environment and the community.
Measurement & Verification	Verification that the ambitious energy and power reduction plans are met by the tenants is important to continuously assure that the environmentally friendly and energy efficient design goals are met during operation of the proposed industrial park.
Credit category - Materials & Resources	
Storage and Collection of Recyclables	The handling of waste will be an important aspect of environmentally friendly operation of the proposed industrial park. Well planned and maintained waste management and recycling programs will increase the awareness of the occupants to engage in responsible handling of waste and avoid littering, thus mitigating the possibility that waste can pollute the adjacent wetland and other environmentally important areas.
Construction Waste Management	Construction waste management will reduce the amount of waste that has to be transported to landfills. Thus traffic impacts are reduced, by lowering the amount of construction related heavy-truck traffic, and impact on the community are reduced be avoiding dumping into municipal landfills.
Recycled Content	Recycled, and reused, content reduces the impacts on the community and the transportation energy demand on the islands.
Regional Materials	The use of regional material reduces the need to import materials to the state and supports the community by supporting local businesses.
Credit category - Indoor Environmental Quality	
Construction IAQ Management Plan - During	By using strict rules about construction material handling and the use of low emitting materials impacts on the

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	Types of environmental impact that are mitigated
Construction	indoor and outdoor environment can be lowered.
Low-Emitting Materials	By using only adhesives & sealants as well as paints & coatings with low concentration of harmful components a good indoor and outdoor environment is maintained. Furthermore, beside the direct avoidance of harmful agents in construction or maintenance, the active encouragement to the occupants to use only environmentally friendly adhesives, sealants, paints or cleaning agents helps to mitigate further impacts to the environment during operation of the proposed industrial park.
Daylight & Views	The use of daylighting will reduce the electricity demand and related impacts on public infrastructure. By implementing the extensive use of daylighting, the building design needs to address mitigating measures for light pollution from internal lighting that might arise when building openings (e.g. those used for daylighting) can transmit light at night and thus contribute to light pollution.
Credit category - Bonus credits from Innovation & Design, Exemplary Performance and Regional Priorities	
Educational program	The applicant will develop and implement an educational program about the environmentally and culturally important Kawainui Marsh. The program will endeavor cooperation with schools and environmental groups to develop, produce and maintained the educational program. This effort will increase community involvement and will assist to identify and mitigate concerns of the community.
Electric vehicles for maintenance vehicles	The use of electric vehicles for maintenance of the proposed park helps to lower noise and air pollution. The use of renewable energy for the maintenance vehicles (either through onsite renewable energy generation or through tradable renewable energy certificates) will reduce impacts on the environment and the community.
Legally binding performance criteria for tenants	Making provisions of the sustainable development approach contractually binding, rather than voluntary, will help to achieve the goals for an environmentally friendly

Table 4-1 Using LEED credits to mitigate significant impacts to the environment and community

Type of LEED credit / prerequisite	Types of environmental impact that are mitigated
	and energy efficient industrial park.
Exemplary Performance for stormwater system	The project will implement a comprehensive stormwater treatment system that goes far beyond conventional stormwater treatment technologies. In doing so the project will qualify for exemplary performance credits. By using advanced stormwater treatment to treat 100 percent of the stormwater runoff in regard to quantity and quality environmental impacts associated with runoff will be effectively and greatly mitigated, thus significantly reducing impacts on important water resources adjacent to the project, including the Kawainui Marsh.
Exemplary Performance in innovative wastewater technologies	Adding advanced sewage treatment process steps to the conventional septic systems (such as aerobic biological treatment, denitrification by conversion of nitrates to atmospheric nitrogen, phosphate removal through absorption in the filter bed, sand filters and below ground irrigation fields), results in high removal rates of harmful pollutants in the wastewater effluent. The effective removal of a high portion of harmful pollutants significantly reduces environmental impacts.
Regional priorities	By implementing design and construction measures and technologies that are deemed important for the region, the project contributes to lowering impacts to the environment and the community.

4.2 Geology, Topography, and Soils Existing Environment

4.2.1 Impacts on Geology and Mitigation

In both the Preferred Alternative and Alternative B, the proposed project would be developed within previously disturbed soil areas and thus the project would not impact local geology. Implementation of the No-action Alternative would not alter the current characteristics of geologic resources at the project site and therefore, there would be no adverse effect.

No mitigation measures would be required under both action, e.g. the Preferred Alternative and Alternative B and the No-action Alterative.

4.2.2 Impacts on Topography and Mitigation

Topography within the proposed project areas is generally flat, as a result of past landfill operations which created two distinct topographic features, e.g. the lower portion of the site with elevations between about 15 and 45 feet and an upper portion of the site, which is practically flat, with an average elevation of 85 feet and a maximum height difference of 10 feet between the western and eastern boundaries of the upper portion of the site. The upper and lower portions of the site are separated by a steep sloped area with slopes between 40 and 100 percent.

Implementation of the Preferred Alternative would result in negligible alterations of existing topography in the upper portion of the site. All of the land in the upper portion of the site has been previously graded and has topography that is suitable for the planned development. Implementation of the Preferred Alternative would result in minor alterations of existing topography in the lower portion of the site. Alteration of existing topography in the lower portion of the site would be expected as a result of grading and associated cut and fill necessary to accommodate the buildings, roadwork and landscaped areas. The existing earth berms around the lower portion of the site in the south, east and north would be modified by widening the berms and increasing their height in order to accommodate the vegetative buffers at the site boundaries at the south, east and north. The topography of the sloped areas between the upper and lower portions of the site would not be altered, except for some grading to accommodate the landscaped areas and some minor structures, such as retaining walls for new buildings close to the sloped areas or infiltration fields for the treated wastewater.

Implementation of Alternative B would result in the same impact as under the Preferred Alternative, except that under Alternative B¸ the existing earth berms at the site boundaries in the south, east and north would not be altered but would remain as is.

Because no ground disturbing activity would occur under the no-action Alternative the topography within the proposed project site would not be impacted.

No mitigation measures would be required under the two action and the no-action alternatives.

4.2.3 Impacts on Soils and Mitigation

This section evaluates potential effects of the alternatives on soil resources at the proposed site and the potential for soil characteristics to affect proposed uses.

The Preferred Alternative would directly affect soils as a result of construction/demolition activities (i.e., grading, excavation, placement of fill, compaction, mixing, and augmentation) on approximately 10.6 and 16.7 acres in the upper and lower portion of the site, respectively. Of these combined 27.3 acres all construction would occur on currently graded and pervious land. All land that is used for the development of the proposed industrial park is presently graded and no open space, outside the land created by former landfills, will be used for the development.

The presently graded surfaces used for the development are not vegetated and are either practically flat or have small slopes, therefore impacts from erosion and associated sedimentation would be limited. The total amount of open space, e.g. vegetated and pervious areas, within the three land parcels of the proposed project site, would actually increase by approximately two acres due to the fact that land which presently has no vegetation cover or have sparse, primarily invasive plant cover would be converted to landscaped areas within and at the perimeter of the development footprint as well as restored habitat. The total area that would be converted from pervious and graded land to developed and impervious land (including impervious roadway pavement, roofs, concrete pavement between buildings) is 11.1 and 10.6 acres in the lower and the upper portion of the site, respectively, thus the total area converted from presently pervious area to impervious area equals 21.7 acres. Soil productivity, (i.e., the capacity of the soil to produce vegetative biomass), would be eliminated in disturbed areas that are converted to impervious surfaces.

As part of the sustainable development approach, rainwater and stormwater runoff will be collected from a portion of rooftops and impervious roadway sections and be used for irrigation, thus converting these impervious surfaces to quasi pervious areas. It is assumed that about 50 percent of the roof tops and roadways within the lower portion of the site will be used for rainwater harvesting, thus about 5.5 acres would be converted to quasi pervious area. In effect this means that the total amount of land converted from pervious to impervious surfaces is lowered from 21.7 to 16.1 acres.

Heavy machinery would be used to prepare the site for construction of the proposed buildings and facilities and for digging trenches for utility lines. As a result, soils would be compacted, soil layer structure would be disturbed and modified, and soils would be exposed, increasing the overall potential for erosion.

Potential building limitations for soils at the proposed project site might include limitations to the load-supporting capacity of soil within the lower portion of the site and the ease and amount of excavation required for the proposed construction. The soil layers found within the landfill area of the lower portion of the site might contain municipal waste from previous landfill operations. Appropriate soil engineering studies prior to construction would be conducted at the project site to assure proper design and building location.

Prior to construction, a sediment and erosion control plan would be developed for the proposed development, in accordance to the governing local ordinances and the requirements of the sustainable development approach (which goes beyond the measures required by local code). The sediment and erosion control plan would, among other things, define appropriate site-specific Best Management Practices (BMPs) for controlling runoff, erosion, and sedimentation during construction activities. Sites specific BMPs would be developed based on proper run-off calculations, slope factors, soil type, topography, construction activities involved, and proximity to water bodies. BMPs could include, but are not limited to protective devices preventing surface drainage flows, erosion control matting, rip-rap, and sediment traps. The application of any or all of these BMPs, or other appropriate BMPs, would depend upon precise, specific ground conditions in the areas disturbed by construction.

Areas disturbed outside of the footprint of the new construction would be aerated and reseeded or replanted with native or adaptive vegetation following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity. With soil erosion and sediment control measures, the actions proposed under this alternative would likely result in minor adverse impacts to soils from construction occurring in open areas.

<u>Alternative B</u> would directly affect soils as a result of construction/demolition activities (i.e., grading, excavation, placement of fill, compaction, mixing, and augmentation) on approximately 10.6 and 18.0 acres in the upper and lower portion of the site, respectively. Of these combined 28.6 acres all construction would occur on currently graded and pervious land. All land that is used for the development of the proposed industrial park is presently graded and no open space, outside the land created by former landfills, will be used for the development.

The presently graded surfaces used for the development are not vegetated and are either practically flat or have little slopes, therefore effect from erosion and associated sedimentation would be limited. The total area that would be converted from pervious and graded land to developed and impervious land (including impervious roadway pavement, roofs, concrete pavement between buildings) is 11.1 and 18.0 acres in the lower and the upper portion of the site, respectively. Therefore the total area that will converted from presently pervious area to impervious area measures 28.6 acres. Soil productivity, (i.e., the capacity of the soil to produce vegetative biomass), would be eliminated in disturbed areas that are converted to impervious surfaces.

Heavy machinery would be used to prepare the site for construction of the proposed buildings and facilities and for digging trenches for utility lines. As a result, soils would be compacted, soil layer structure would be disturbed and modified, and soils would be exposed, increasing the overall potential for erosion.

Potential building limitations for soils at the proposed project site might include limitations to the load-supporting capacity of soil within the lower portion of the site and the ease and amount of excavation required for the proposed construction. The soil layers found within the landfill area of the lower portion of the site might contain municipal waste from previous landfill operations. Appropriate soil engineering studies prior to construction would be conducted at the project site to assure proper design and building location.

Alternative B would implement a sediment and erosion control plan that would abide by but not exceed the requirements of local codes. Areas disturbed outside of the footprints of the new construction would be aerated and reseeded or replanted with native or adaptive vegetation following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity. With soil erosion and sediment control measures, the actions proposed under this alternative would likely result in minor adverse impacts to soils from construction occurring in open areas.

No-action Alternative: Implementation of the No-action Alternative would not alter the soil resources at the proposed site and thus no adverse impacts would occur.

4.2.4 Special Considerations of Developing on a Former Landfill

The proposed site is a former landfill area, which contains a combination of inert waste (i.e. tailings and overburden of the now discontinued quarry operations) and municipal solid waste (MSW). References viewed for this EIS suggests that the landfill should be composed of mostly inert waste and some quantity of municipal waste.

Redevelopment of landfill areas that consists mostly of inert material is perhaps the easiest type of landfill to redevelop, as environmental problems are usually minimal and conventional geotechnical ground improvement techniques can be used. Landfills that consist mainly of MSW are the most common forms of landfill and redevelopment of this type of landfill needs to consider more engineering and environmental aspects, including special requirements for foundations due to differential settlement, and decomposition of organics which result in gaseous and liquid agents that leave the landfill and therefore need to be mitigated with appropriate measures.

Redevelopment of landfills, both for inert and MSW, can utilize a wide range of established building and development technologies, depending on the type of land uses, such as soft (i.e. landscaping, parks, etc.) and hard uses (i.e. buildings, infrastructure), or the amount of gas and leachate generated in the landfill, among other design considerations.

The right foundation technology is dependent on the vertical and lateral load bearing capacity of the land fill material and whether or not landfill gas might migrate out of the landfill body. As a rule of thumb, redevelopment of closed landfills for hard use, such as that intended for the proposed project, should not start within 10 years of the closure of the land fill operations. For the proposed project, landfill operation was discontinued more than 40 years ago, and therefore the landfill should have reached a degree of stability that is necessary to substantially mitigate the engineering and health and safety concerns associated with waste degradation.

In general, there are two types of foundations used in landfill redevelopment: deep and shallow foundations. The proposed warehouses are relatively light structures that could use shallow foundations, such as raft foundations. If found to be necessary, some form of deep foundation might be considered for selected buildings, though deep foundations using piles are not anticipated to be extensively used for the proposed site, if at all.

The soil bearing capacity in the upper portion of the site has been investigated, and the experience with the existing buildings at the site indicates that normal foundations can be used on the structurally stable land.

In contrast to the upper portion of the site, where substantial structures have been built and show adequate foundation support, there are no existing large structures within the lower portion of the site. The soil bearing capacity within the lower portion of the proposed site and the most suitable type of foundation will be determined before construction of the structures begins. The most appropriate foundation approach will be determined for the planned traffic areas and warehouse buildings. In addition to selecting an appropriate foundation approach for building structures, an appropriate load bearing approach must also be applied for the paved traffic areas to avoid possible problems arising from differential settling. Even if differential settling might occur, tested and state-of-the-art construction and building methods are available to manage unfavorable site conditions. These conditions are not expected given the experiences with the existing use and structures within the upper portion of the site.

It should be noted that the intended use of the proposed site will be warehouse structures and possibly smaller baseyard operations. The business plan of the applicant does not include any high rise buildings or process facilities, which would require advanced load bearing capability. The intended structures for the proposed site will use conventional foundations, such as slab-on-grade foundation. The present use of the site has indicated that the sub-grade represents a stabilized body that is deemed suitable for the intended type of structures.

It should be noted that construction on landfills typically requires more effort in design, construction and operation, and that redevelopment of landfills is more costly that developing regular construction sites. The benefit to the community is that redeveloped landfill area can free more valuable land for other developments in the community, and potentially reduce urban sprawl and related ecological stress to the environment.

4.3 Impacts on Water Resources

This section assesses the potential effects of the alternatives on water resources at and surrounding the proposed site. Such water resources include surface and ground waters and consider impacts of the proposed project on the Kapa'a watershed, floodplains and wetlands. Possible impacts by the drainage system, construction activities and leaching of the landfill are also considered.

4.3.1 Impacts on Surface Water and Mitigation

This section discusses potential effects of the alternatives on surface water resources both on and downstream of the proposed site. Effects of construction and operation of the alternatives on surface water characteristics are considered, including effects of increased impervious surfaces and stormwater flows and their potential effects on surface water quality.

<u>The Preferred Alternative</u> would affect 29.5 acres of presently graded and pervious land. The resulting development footprint , which includes landscaped and other pervious areas, would be 27.3 acres, thereby converting 2.2 acres of presently graded but nor vegetated land to open space, e.g. as part of the habitat restoration measures outlined in the sustainable design approach, presented in Appendix 4.

During construction, soils would be exposed, which could create increased potential for erosion and/or transport of surface pollutants into adjacent water bodies. A sediment and erosion control plan would be developed, as part of the permit requirements, to reduce surface erosion and control runoff of pollutants, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. Site conditions will determine site specific BMPs to reduce potential impacts to adjacent land and waters. These BMPs could include the following measures:

- Erosion containment such as silt fencing and sediment traps to avoid runoff of sediment from the site.
- Utilize sedimentation basins, to allow for settling of sediments from stormwater volumes,
- Covering disturbed soil or soil stockpiles with suitable cover material, i.e. , plastic sheet, place hay, grass, woodchips, straw or gravel on the soil surface to cover and hold soils Scheduling the construction progress and applying the BMPs so that soil exposure remains minimal.
- Regular inspection of the erosion and sediment control BMPs and especially after each rainfall.
- Preventive measures to avoid exposure of hazardous materials, i.e. fuel or chemicals used in the construction and contain all rainwater that has been in contact with such material.

- Under the Preferred Alternative runoff from the site will further be mitigated by the construction of the earth berms (e.g. the berms will be developed as the vegetative buffers zones) before the grading of the lower portion of the site commences. The berms will serve as effective containment in addition to the other containment measures.
- For entry/exist to the site use stabilization gravel to avoid soil and dirt to be carried onto public roadways.

Under the Preferred Alternative, the planned BMPs and other measures of the sediment and erosion control plan, which will be implemented during construction, would effectively mitigate impacts to the water quality of the receiving waters surrounding the site. If impacts would occur from construction activities, these are expected to be minor and of short duration, occurring primarily during storm events.

In addition to mitigating impacts on surface waters during construction the Preferred Alternative will reduce stormwater runoff through structural and non-structural management practices during operation of the industrial park. Non structural BMPs would include natural area conservation, disconnection of rooftop and non-rooftop runoff, grass channels, and conserving or augmenting infiltration areas.

As part of the low impact development approach used in the lower portion of the site rainwater would be collected from a significant portion of the roof of warehouses and from portions of the roadways and would be stored in underground cisterns . The harvested rainwater would then be used for irrigation of the restored habitat areas at the perimeter of the site. Using the harvested rainwater for irrigation results in the infiltration of water into the ground and reduces the loss of rainwater through evapotranspiration from the plants. The storage capacity of the cisterns will be determined in accordance with the irrigation needs. It is estimated that under normal precipitation conditions, e.g. excluding more severe storm events, most of the rainwater would be captured by the cisterns and would not be discharged through the drainage system. Non-structural BMPs that are part of the environmentally sensitive development used for the proposed industrial park and are described in more detail in Appendix 4.

The Preferred Alternative would also employ structural stormwater management practices such as new stormwater detention pond, stormwater infiltration areas and filtration systems. The stormwater management practices used would exceed conventional practices and those required under local code. In the lower portion on the site the stormwater management practices would include the use of a two tired treatment process for the runoff from impervious surfaces thereby effectively lowering the pollutants in the runoff by at least 80 percent.

The Preferred Alternative would implement measures to mitigate impacts on all surface water resources surrounding the proposed development footprint. No untreated runoff from the development would be released into the surface water bodies. The development would not alter the streambeds of the Kapa’a Stream, the wetland areas in the Kapa’a stream corridor and the existing drainage canal along the quarry road. There would be minor construction at the banks of the drainage canal to build the discharge structure for the detention pond of the lower portion of the site. Any impacts from the construction would be mitigated by appropriate measures.

The existing infiltration field for the stormwater discharge on the lower portion of the site through the existing 30-inch culvert under the quarry access would be modified as part of the habitat restoration of the natural vegetation areas between at the sloped land between the upper and the lower portions of the site. This measure would result in the improved ability to infiltrate the runoff within the restored natural vegetation areas.

Alternative B would affect 29.5 acres of presently graded and pervious land. The resulting development footprint , which includes landscaped and other pervious areas, would be 28.6 acres, thereby converting 0.9 acres of presently graded but nor vegetated land to open space, e.g. landscaped area at the perimeter of the development footprint.

The proposed stormwater management practices under Alternative B would abide by the applicable code requirements and would mitigate impacts on the surface water resources during construction.

A sediment and erosion control plan would be developed, as part of the permit requirements, to reduce surface erosion and control runoff of pollutants, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. Site conditions will determine site specific BMPs to reduce potential impacts to adjacent land and waters. These BMPs could include the following measures:

- Erosion containment such as silt fencing and sediment traps to avoid runoff of sediment from the site,
- Utilize sedimentation basins, to allow for settling of sediments from stormwater volumes,
- Covering disturbed soil or soil stockpiles with suitable cover material, i.e. , plastic sheet, place hay, grass, woodchips, straw or gravel on the soil surface to cover and hold soils Scheduling the construction progress and applying the BMPs so that soil exposure remains minimal,
- Regular inspection of the erosion and sediment control BMPs and especially after each rainfall.
- Preventive measures to avoid exposure of hazardous materials, i.e. fuel or chemicals used in the construction, to stormwater and contain all rainwater that has been in contact with such material of its containment.
- For entry/exist use stabilization gravel to avoid soil and dirt to be carried onto public roadways.

Under Alternative B the planned BMPs and other measures of the sediment and erosion control plan, which will be implemented during construction, would effectively mitigate impacts to the water quality of the receiving waters surrounding. If impacts would occur from construction activities these are expected to be minor and of short duration, occurring primarily during storm events.

In addition to mitigating impacts on surface waters during construction, Alternative B will reduce stormwater runoff through natural area conservation and conserve or augment infiltration areas, wherever possible . Alternative B would employ stormwater detention pond and preserve stormwater infiltration areas, which presently exist at the site.

Alternative B would implement measures to mitigate impacts on all surface water resources surrounding the proposed development footprint. No runoff from the site would be directed to the surrounding surface water bodies without at least basic treatment, such as drainage inlets and conventional detention ponds for flood control. Under Alternative B the streambeds of the Kapa'a Stream, the wetland areas in the Kapa'a stream corridor and the existing drainage canal along the quarry road would not be altered. There would be minor construction at the banks of the drainage canal to build the discharge structure for the drainage of the detention pond of the lower portion of the site. Any impacts from the construction would be mitigated by appropriate measures.

Under Alternative B the existing infiltration field for the stormwater discharge on the lower portion of the site through the existing 30-inch culvert under the quarry access would be modified as required under the plans for site grading.

No-action Alternative: Implementation of the No-action Alternative would not alter the current condition of surface water resources on NNMC, and no additional effects to the resource would occur.

4.3.2 Impacts on Ground Water and Leachates from the Landfill Body

Groundwater is an accumulation of water within underground soil structures. Groundwater recharge results from infiltration of surface water through surface layers and into underlying aquifers. The capacity of aquifer recharge is typically affected by a variety of factors such as rainfall, topography, soil types, geologic structure, and ground surface cover. In the absence of significant disturbances to soil and topography resulting from construction, the capacity to recharge is usually affected by changes of ground surface cover, specifically resulting from the conversion of previous to impervious surface cover.

While, in general, groundwater recharge is desirable there are instances when groundwater quality can be negatively affected from leaching of material that is either deposited or is exposed due to excavation. The landfill area which will serve as development area for the proposed industrial park was created several decades ago by deposits of quarry overburden and tailings and some quantity of municipal waste. The landfill area thus predates more recent standards of landfill development that protects the groundwater from landfill leachate by means of a sealing agent, either soil with low permeability, plastic filter membranes or other installed impervious barrier between the land fill body and the underlying groundwater.

As can be observed at the existing site, water percolates readily from the non-paved areas into the ground and practically no runoff is created during normal rain events. The water therefore is readily absorbed into the landfill body and it is assumed that groundwater movement is controlled by the indigenous soil composition, below the landfill material. The groundwater movement in the upper portion of the site is assumed to be towards the Kapa'a Stream corridor. The groundwater movement within the lower portion of the proposed site is assumed to occur towards the east, following the natural slope, where the groundwater eventually flows underground towards the Kawainui Marsh or seeps into the existing drainage canal and flows as surface flow to the Kapa'a Stream and further into the Kawainui Marsh.

The impacts of leaching of the landfill material to the groundwater depends on the type and age of deposits, the residence time of the water in the landfill body and the amount of water that infiltrates into the landfill body. Absorption of pollutants from buried material occurs when the surface of the material is not in equilibrium with the surrounding water, e.g. when there are physical or chemical processes that promote the release of material into the water. With time, equilibrium conditions are attained under which driving forces are not effective enough to promote the release of pollutants from the material particles to the water that seeps through the landfill. In the case of organic material, an equilibrium condition occurs when enough organic material is decomposed. In the case of organically inert materials, the equilibrium condition is attained when the capacity of the water to dissolve and entrain organic material has diminished under a certain threshold level.

With regard to allowing water to enter the landfill body, there are two opposing design strategies to protect groundwater around landfills. The first strategy is the so-called "sealed tomb" approach, where measures are implemented that limit the amount of water to enter the landfill body. With less water entering the landfill body, less water can be polluted by the landfill material and less polluted water is seeping out of the landfill. An alternative approach is to facilitate the infiltration of water into the landfill. Often this approach augments the amount of water entering the landfill though precipitation by collecting the leachate and distributing the leachate on the landfill surface, e.g. recirculating the leachate. One benefit of the second approach, e.g. allowing water into the landfill body, is the accelerated process of decomposition of organic material inside the landfill in the presence of ample water. Since decomposition of organic waste requires water, it follows that keeping water out of the landfill, such as in the "sealed tomb" approach, actually decreases the effectiveness of the decomposition process and lengthens the time that is required to convert most of the organic waste in the landfill.

In the case of the proposed site, most of the landfill material is from organically inert material and thus is not subject to considerations of supplying enough water for decomposition of organic material. Furthermore, the deposits of municipal waste are several decades old and decomposition of organic material should have already occurred over a long time period while enough water was available through infiltration into the landfill body. Therefore it is assumed that sealing of the landfill areas might be beneficial to reduce potential groundwater contamination from landfill material. In the proposed project, this would mean that the benefits of sealing the landfill surface area and avoiding water percolation into the ground might outweigh the benefits of groundwater recharge with potentially contaminated water and the subsequent flow of the groundwater towards the Kawainui Marsh, the receiving water for the Kapa'a watershed.

Under the Preferred Alternative, 21.7 areas would be converted from pervious to impervious surface. This would include 10.6 acres in the upper portion of the site and 11.1 acres in the lower portion of the site. Precipitation and runoff from impervious surfaces in the upper portion of the site would be directed to the Kapa'a stream corridor where the water would infiltrate and recharge the groundwater table in the wetland area. An alternative to releasing the water to the Kapa'a stream corridor would be to convey the runoff from the newly developed area to the drainage field that is located to the west of the landfill area, at the western perimeter of the graded area in parcel 4-2-15:001 (portion of). This area is a former siltation pond for runoff from the landfill areas in the upper Kapa'a valley and releasing runoff from the developed site in this area would result in infiltration and subsequent underground flow towards the Kapa'a Stream

Under the Preferred Alternative, 11.1 acres of the 16.7 acres development footprint would be impervious, with the remaining 5.6 acres of the development footprint being pervious pavement or landscaped area. A significant portion of the roof tops and roadways within the lower portion of the site would serve as collection areas for rainwater which would be collected and stored for irrigation. The irrigation water would be distributed on the landscaped and natural vegetation areas within the restored habitat, either within the development footprint, at the perimeter of the development footprint of in the vegetative buffers zone that would surround the lower portion of the site.

By applying the harvested rainwater on plants for irrigation, most of the applied irrigation water would remain in the top soil or would be lost to the atmosphere through evapotranspiration from the irrigated plants. Therefore less water would infiltrate into the landfill body and less chances would exist that the infiltrated water would entrain and discharge pollutants from the landfill to the surrounding groundwater and surface water resources.

Under Alternative B, 28.6 areas would be converted from currently pervious land to impervious area. All precipitation and runoff from the 10.6 acres that would be converted from pervious to impervious land in the upper portion would be conveyed for discharge into adjoining land for infiltration. All precipitation and runoff from impervious surfaces from the 18.0 acres in the lower portion of the site would be collected and conveyed to detention ponds, from which the runoff would be discharged into the existing drainage canal. Under Alternative B no runoff or precipitation would be used for irrigation and therefore all of the runoff would be excluded from infiltrating and would be discharged to the receiving waters.

Implementation of the No Action Alternative would not change the current situation at the proposed site regarding groundwater resources and would not change impact on groundwater resources. It should be noted that under the No-action Alternative possible leaching of water percolating through the landfill would occur with the stated possible impacts. It is assumed that the No-action Alternative might therefore result in a less desirable situation than the Preferred Alternative that would collect rainwater and distribute it on newly formed top soil and plants and thereby lower the amount of water percolating through the landfill body. In this sense the NO-action Alternative would result in more possible impacts that the recommended development approach under the Preferred Alternative.

4.3.3 Floodplain Impacts

Potential impacts to the floodplains were evaluated using floodplain information and criteria established by the Federal Emergency Management Agency (FEMA).

Under the Preferred Alternative no parts of the proposed development footprint would be located within the designated 100-year floodplain zone. As a result, no adverse impacts to floodplains would occur from the actions proposed under this alternative.

Under Alternative B no parts of the proposed development footprint would be located within the designated 100-year floodplain zone. As a result, no adverse impacts to floodplains would occur from the actions proposed under this alternative.

Implementation of the No-Action Alternative would not alter the current condition or alter the current flood plain delineation.

4.3.4 Impacts of Proposed Site Drainage System and Mitigation Measures

Drainage systems collect stormwater from impervious surfaces and convey the stormwater to discharge location to the receiving water. Drainage systems safeguard the avoidance of flooding on developments and are designed to handle the design rain event, typically an assumed storm event of certain length and recurrence interval, i.e. a “10 year” storm event.

At the present time, the drainage infrastructure on the property consists of grass and concrete swales, drain inlets and one conventional detention pond. This infrastructure is limited to portions of parcel TMK 4-2-015:008 where all existing warehouses are located. The rest of the property has primarily pervious gravel cover and lacks structural drainage components. Stormwater runoff from these areas is readily infiltrating into the ground and flows underground following the groundwater movement.

The drainage system of the proposed development would differ from the present system by adding drainage system components which would minimize the impact of runoff to receiving surface waters. The drainage system of the proposed project would incorporate structural and non-structural stormwater management strategies and would collect and treat all stormwater from impervious surfaces before discharge to the receiving waters. The design approach of the proposed drainage system would also include some pervious surfaces, preferably vegetated pervious areas, to stimulate loss of stormwater through evapotranspiration.

Under the <u>Preferred Alternative,</u> the drainage system approaches in the upper and lower portions of the site differ. The drainage system in the <u>upper portion</u> of the site would collect all stormwater from impervious surfaces and convey the stormwater to detention ponds which serve as flood control, before the water is discharged to the Kapa’a Stream corridor through armored spillways in order to avoid scouring and erosion. An alternative drainage strategy in the upper portion of the site would incorporate discharge into the former siltation basin which is located at the western boundary of the development footprint in parcel TMK 4-2-15:001 (portion of) and directly adjacent to the planned development. The benefit of discharging the drainage collected from the new development in the upper portion of the site into the vegetated area at the western development boundary would be that the discharged stromwater would be treated in a quasi wetland environment and suspended solids would be eliminated before the stormwater eventually flows underground to the Kapa’a Stream. A detailed drainage study would determine what approach results in the better drainage systems for the upper portion of the proposed site.

Under the Preferred Alternative (upper portion), 10.6 acres would be converted from pervious gravel surface to impervious paved surface. The sum of 10.6 areas of impervious areas is composed of 6.2 acres of warehouse roofs and 4.4 acres of impervious paved surface between the warehouses. Drainage from these 10.6 acres would be conveyed in a combination of shallow swales in the paved areas or concrete channels which would collect the drainage of shallower swales and provide more drainage capacity and decrease the amount of drainage conveyed by the shallow swales.

The stormwater would then either enter one or more detention ponds before being discharged to the Kapa’a Stream corridor or would be discharged to the drainage basin at the western boundary of the proposed development, as described before. In the final design the selected drainage system might include the installation of stormwater filtration units, which would be located upstream of the detention ponds or the drainage basin. The type of filtration units envisioned would be able to remove from the stormwater all floatables, a percentage of suspended solids, sediments and oil and grease.

Under the Preferred Alternative, the drainage system in the <u>lower portion</u> of the site would result in a more thorough reduction of possible impacts, as part of the low impact development approach used for the lower portion of the site (See Appendix 4 for more details on the proposed stormwater system). As proposed, the 18.9 acres of presently graded and pervious gravel surface would be converted to a development footprint of 16.7 acres, while 2.2 acres which is presently graded, pervious but not vegetated would be included in the planned habitat restoration. Of the 16.7 acres of development footprint about 5.6 acres would have pervious surface, either landscaped area or pervious pavement, including open grid pavement. The rest of the development footprint of 11.1 acres would be impervious surface, such as roadways, truck loading areas and rooftops.

Drainage from the impervious areas would be collected in swales and concrete channels and be conveyed to one extended detention pond from which the drainage eventually would flow into the existing drainage canal at a location that would be near the confluence of the canal with the Kapa’a Stream. As part of the LEED development strategy, stormwater would be collected from a portion of the rooftops and roadway sections and stored for subsequent use in irrigation of the restored habitat areas and the landscaped areas within the development. The exact size of the surfaces that would be used for rainwater harvesting would be determined in the detailed design phase of the project, and would depend on the irrigation needs for landscaping and on the extent of other non-potable water application which would also make use of the harvested rainwater. It is assumed that about 50 percent of all impermeable surfaces, including rooftops and roadway sections, would be used for rainwater harvesting. Several underground cisterns would be constructed at the perimeter of the development footprint to take advantage of gravity flow of the stormwater to the storage and to decrease the length of the irrigation lines and required pumping energy for the irrigation pumps.

If more stormwater runoff occurs than can be accommodated in the underground storage taverns, the overflow would be conveyed to the detention ponds and be discharged along with the portion of the stormwater that runs off areas that are not connected to the rainwater harvesting system.

Stormwater runoff would be collected and conveyed to detention ponds before discharging into the existing drainage canal. Even though the overall runoff volume generated in the proposed development would be higher than the current runoff rates, the nature of stormwater collection, conveyance to detention ponds detention and timed release of the flood waters would result in effective flood control and better effluent quality, and would directly and positively impact the water quality in the receiving water. The detention and timed release of collected stormwater would allow settlement and removal of suspended solids in the extended detention ponds and ensures that the release of treated stormwater would occur after the storm event. In addition, installation of pre-treatment units upstream of the detention ponds oil water separators would increase the overall removal rate of the stormwater treatment.

The proposed type of "detention" system is a "dry extended detention pond", which would provide two basic functions, stormwater flood control and removal of pollutants in the stormwater. The proposed detention pond system has the following components:

- Pre-treatment: Pre-treatment units would be installed upstream of the detention pond, e.g. stormwater would run through the pre-treatment units before entering the detention pond. The pre-treatment units would remove a significant portion of sediments, nutrients and oil-grease contained in the stormwater. (note the short discussion of the anticipated removal rate at the end of this section)

- Treatment inside the detention pond: Treatment features in the extended detention ponds can remove a portion of pollutants and settleable agents from the stormwater

- Conveyance of the stormwater in detention pond: The proposed type of detention pond is "dry" during dry weather periods. Since the detention volume is designed to accommodate and store a "design storm event", according to County rules, smaller flows of runoff stormwater from lesser storm events would need a preferred flow path through the detention pond. Therefore a "pilot channel" inside the detention pond would be provided that ensures adequate conveyance into, through and out of the detention pond when flow rates are produced by small rain events rather than the "design" stormwater event

- Landscaping around and in detention ponds: Landscaping would use a vegetated buffer around the pond and would select plants that could withstand both wet and dry periods

- Discharge outlet system: The discharge outlet from the detention pond to the Kapa'a Stream would be through a discharge structure that allows a certain "safe discharge" from the detention pond into the Kapa'a Stream. The outlet structure could be a pipe or a weir structure. The goal of the detention pond is that the water in the pond should be held long enough to ensure a certain amount of treatment and to "flatten" out discharge rates to the Kapa'a Stream, e.g. to avoid high peak flow discharge rates, during strong storm events.

It is assumed that the overall removal rate of stormwater pollutants by the combined system of pre-treatment units and extended detention ponds would exceed 80 percent. The overall pollutant removal for stormwater drainage from the proposed site is a combination of two successive structural BMPs: (1) extended detention ponds and (2) so-called nutrient separating baffle boxes, which are the proposed pre-treatment units and which would be installed upstream of the detention ponds.

(1) The removal rate in the extended detention ponds is assumed to be at least 50% of the loads contained in stormwater. (according to the Stormwater Management Resource center, (www.stormwatercenter.net) average pollutant removal rates of dry detention ponds for selected agents are as follows; TSS 61%, TP 20%, TN 31%, Metals 29%-54%, Bacteria 78%).

(2) The stormwater would run through in-line pre-treatment units before flowing into the detention ponds. The inline treatment units would be designed to catch most, if not all, of the floatable debris and remove a significant amount of suspended solids and oil / grease contamination. The reported effectiveness of these types of treatment units are as follows (referencing the manufacturer): Pollutant removal efficiency: Trash & Debris 99%, TSS 76% to 93%, Fine TSS (d50 63 µm) 67%, Metals Up to 57%, Total Nitrogen 38% to 63%5, Total Phosphorus 18% to 70%.

Anticipated overall removal rate was evaluated using TSS as an indicator pollutant:

- Pre-treatment: Removal rate for TSS: 67% to 93%, depending on particle size, est. 70%
- Remaining after pre-treatment 30% from original TSS load
- Detention ponds: Removal rate for TSS: 60%
- Remaining after pre-treatment 12% from original TSS load
- Therefore the calculated overall removal rate for TSS would be approximately 88%.

For the stormwater treatment analysis a conservative estimate of 80 percent overall removal rate of pollutants for the stormwater is considered. The proposed development would improve run-off water quality and reduce storm discharge peak runoff rates into the receiving waters due to retaining and releasing stormwater in a controlled manner.

As pointed out, the pervious areas within and at the perimeter of the development footprint would be vegetated. Therefore a significant portion of the stormwater would be retained in the topsoil and lost through evaporation rather than infiltrated into the soil. A part of the pervious areas would be used for parking and temporary traffic areas; these pervious traffic areas would either have a gravel surface or open grid pavement (e.g. pavement with at least 50 percent pervious and vegetated surface).

Drainage during construction would occur in such a way to avoid entrainment and erosion of significant amounts of exposed soils on the site. Structural and non-structural stormwater management practices during construction would include the following:

- Pre-construction planning to determine scope of erosion control: development of an erosion and sediment control plan (would be required for permit).

- Preserving existing vegetation wherever possible: Established populations of trees, bushes, and grass could help keep erosion to a minimum.
- Limiting disturbed areas through phasing. No disturbed surfaces should be left without erosion control measures in place.
- Providing primary and secondary containment for fuel and other hazardous materials, would be placed around any storage tanks.
- Installing clean water diversions, sediment traps/ basins and stabilizing drainage channels with grass, liners, and silt check dams before excavation, fill, or grading work begins. Diversion berms or ditches could avoid upland runoff from flowing through the construction site.
- Installing construction entrances and controlling dust to avoid mud tracked on paved roads. Mud on roadways that originates from construction is annoying and also unsafe.
- Dewatering operations and discharges: sediments should be removed from water before they discharge into storm sewers, streams, lakes, or wetlands. Silt fence enclosures or use of bag filters or other devices should be applied to remove sediments. If possible, water generated as part of construction dewatering should be discharged onsite and should not be discharged to surface waters.
- Installing vegetated buffers above and below the construction site to avoid volume sheet flows from moving across cut or fill areas, and helping to filter and trap sediment before it can move into ditches, channels, and streams, respectively.
- Protecting soils with seed, mulch, or other products (e.g. erosion control blankets, turf reinforcement mats, temporary plastic covers).
- Using silt fences and other sediment barriers below (downhill from) areas of bare soil to avoid sediments from escaping the construction sites and flowing into downhill areas of receiving waters.
- Temporary downdrains using plastic pipe or rock lined downdrain channel should be used to stabilize sloped faces of temporary channels that carry water down slopes.
- Using steep slope protections: rock-filled, stacked gabion baskets or retaining walls should be used to protect steep slopes that cannot be effectively protected with other measures.
- Protecting Culvert and Ditch Inlets and Outlets; Sandbags, stone aprons or other measures should be placed around inlets and outlets to allow ponding for energy.

Under Alternative B, the upper and lower portions of the site would have similar drainage system; this means in direct comparison to the Preferred Alternative, Alternative B would have a less comprehensive stormwater management system. Under Alternative B the proposed drainage system for the upper portion of the site would be the same as in the case of the Preferred Alternative. This means that 10.6 acres would be converted from pervious gravel surface to impervious paved surface. The sum of 10.6 areas of impervious areas is composed of 6.2 acres of warehouse roofs and 4.4 acres of impervious paved surface between the warehouses. The stormwater would then either enter one or more detention ponds before being discharged to the Kapa'a stream corridor, or would be discharged to the drainage basin at the western boundary of the proposed development, as described earlier. In the final design the selected drainage system might include the installation of stormwater filtration units, which would be located upstream of the discharge to the detention pond or the drainage basin. The type of filtration units envisioned would be able to remove from the stormwater all floatables, a percentage of suspended solids, sediments and oil and grease.

Under Alternative B the drainage system of the lower portion of the site would be similar to the drainage system in the upper portion of the site. A total of 18.9 acres of existing graded but not vegetated area would be used to construct the 18.0 acres of development, including warehouses, roadways, truck loading areas and parking areas. All of the 18.0 acres of the development would be impervious surfaces, which would be drained by conveying the runoff to one detention pond that provides of flood control. The stormwater in the detention pond would then be released to the drainage canal in a time lagged manner to shave off high peak discharge flow rates. In the final design the selected drainage system might include the installation of stormwater filtration units, which would be located upstream of the discharge to the detention pond or the drainage basin. The type of filtration units envisioned would be able to remove from the stormwater all floatables and a percentage of suspended solids, sediments and oil and grease.

Under the No-action Alternative the existing drainage system on the site would not be altered.

4.3.5 Wetland Impacts

It is anticipated that the proposed project will not result in loss of wetlands, since the development footprint I entirely outside delineated wetlands. If wetlands were impacted, according to the Department of the Army, Section 404 Clean Water Act, an Individual Permit or Nationwide Permit issued by the Corp of Engineers would be required for unavoidable impacts. Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support vegetation that is typically adapted to life in saturated and/or partially anaerobic soil conditions. The determination if an area is delineated as jurisdictional wetlands is based on three criteria: the presence hydric soils, the frequency of inundation or other wetland hydrology features, and the presence of typical hydrophytic vegetation. Section Three of this DEIS describes the delineation of wetland within the land parcel TMK 4-2-15:006, which is part of the property containing the proposed project site.

Under the Preferred Alternative, wetland habitats would not be affected as a result of developing the proposed industrial site. The proposed development footprint of the Preferred Alternative does not contain wetlands. All permanent structures, including buildings, roadways, parking areas and truck loading are outside the delineated wetland. The development within the lower portion of the site would encroach on the wetland boundaries, but would not use any part of the wetland itself. Construction of the vegetative buffer zones and restored habitat areas which surround the lower portion of the site and which border the wetland in the Kapa'a stream corridors would occur exclusively within upland areas.

During construction at this site vegetation would be removed and soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent water bodies affecting aquatic habitat quality. Prior to construction at the proposed site, the permit procedure would include the completion and implementation of an approved sediment and erosion control plan. The implementation of site-specific stormwater management practices which would be part of the erosion and sediment control plans would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and associated pollutants before they enter the downstream water flow, thereby reducing reduce potential impacts to adjacent wetlands.

Under the Alternative B, wetland habitats would also not be affected as a result of developing the proposed industrial site. The proposed development footprint of Alternative B does not contain wetlands. All permanent structures, including buildings, roadways, parking areas and truck loading are outside the delineated wetland. The development within the lower portion of the site would encroach on the wetland boundaries, but would not use any part of the wetland itself. As in the case of the Preferred Alternative possible impacts from erosion and runoff from the site would be effectively mitigated with appropriate measures.

Under the No-action Alternative there would be no encroachment on wetlands and therefore no impacts to wetlands would occur.

Recommended Standard Best Management Practices: The U.S. Fish and Wildlife recommends measures to be incorporated into projects to minimize the degradation of water quality and minimize the impacts to fish and wildlife resources..

1. Turbidity and siltation from project-related work shall be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.
2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.
3. Dredging/filling in the marine/aquatic environment shall be designed to avoid or minimize the loss of special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat shall be replaced.
4. All project-related materials and equipment (dredges, barges, backhoes, etc.) to be placed in the water shall be cleaned of pollutants prior to use.
5. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channel, wetlands, etc.) or on beach habitats.

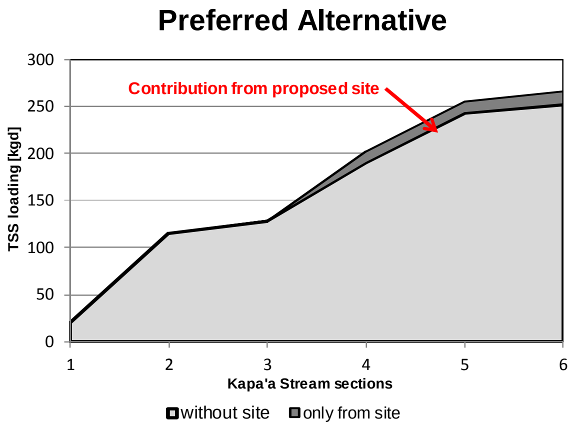
6. All debris removed from the marine / aquatic environment shall be disposed of at an approved upland or ocean dumping site.
7. No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities. This shall be accomplished by implementing a litter control and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/wizard/default.asp) to prevent attraction and introduction of non-native species.
8. Fueling of project related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.
9. Any under-layer fills used in the project shall be protected from erosion with stones and/or core-loc units as soon after placement as practicable.
10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

4.3.6 Impacts on Kapa’a Watershed

The impacts of the alternatives on the Kapa’a Watershed are evaluated through the contribution of the alternatives to the total watershed TSS load. As described in Section Three, which describes the existing environment, the Kapa’a watershed water quality has been investigated by a recent State of Hawaii Department of Health report (DoH, 2007). The anticipated impacts of the proposed project for the alternatives have been evaluated based on the results of the hydrological model contained in the DoH study.

Under the Preferred Alternative, measures would be implemented that significantly lower the amount of TSS in the stormwater runoff. Under this alternative a 60 percent and 80 percent reduction of TSS in the runoff are assumed for the upper and lower portions of the site, respectively, as a result of implementing a two-tiered stormwater treatment process, which includes stormwater pre-treatment units upstream of extended detention ponds for the lower portion of the site. The 80 percent reduction in TSS loading for the lower portion of the site is a conservative assumption, since the actual TSS of the two-tiered treatment system of pre-treatment units and extended detention ponds should be higher than 80 percent. The 60 percent reduction in TSS discharge assumed for the upper portion considers regular detention ponds for flood control working in concert with pre-treatment stormwater units. Furthermore, the 60 percent TSS reduction in the upper portion of the site assumes that stormwater would be released into the Kapa’a stream corridor. If the discharge would occur from the upper portion of the site to the drainage field at the western boundary of the development, the attainable removal rate could easily be higher than 60 percent. The resulting contributions of the entire project site to the TSS load of the Kapa’a watershed for the base load and peak flow conditions are indicated in Figures 4-2 and 4-4, respectively.

Under Alternative B, measures are implemented that lower the amount of TSS in the stormwater runoff. Under Alternative B a 45 percent reduction of TSS in the runoff is assumed for both the upper and lower portions of the site, respectively, due to the stormwater treatment system that is less effective than used in the Preferred Alternative. The resulting contributions of the entire project site to the TSS load of the Kapa’a watershed for the base load and peak flow conditions are indicated in Figures 4-3 and 4-5, respectively.



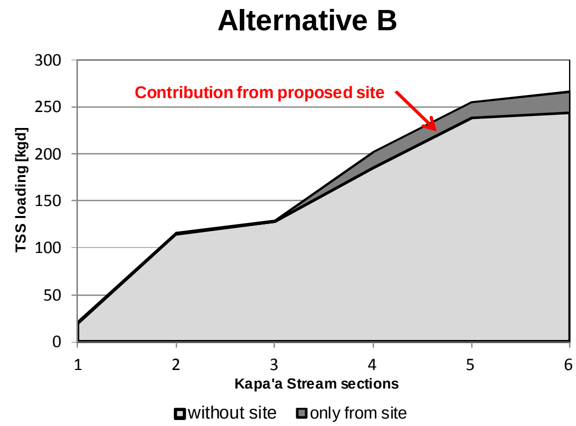
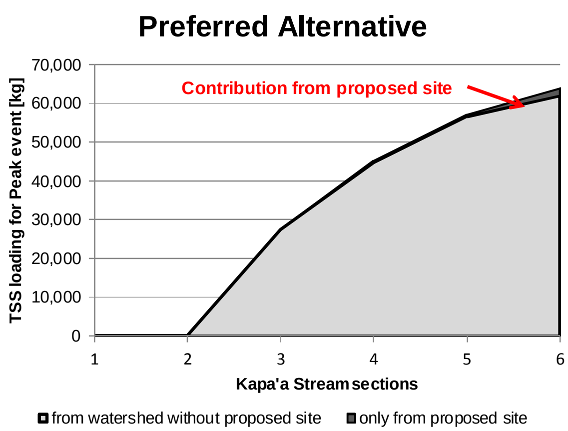


Figure 4-2 TSS contribution of site to watershed in base flow condition under the Preferred Alternative

Figure 4-3 TSS contribution of site to watershed in base flow condition under Alternative B



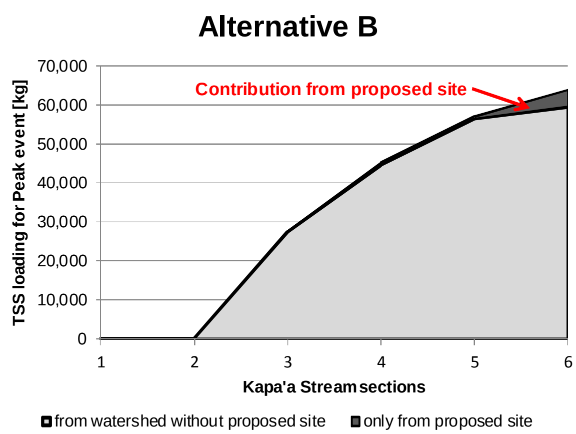


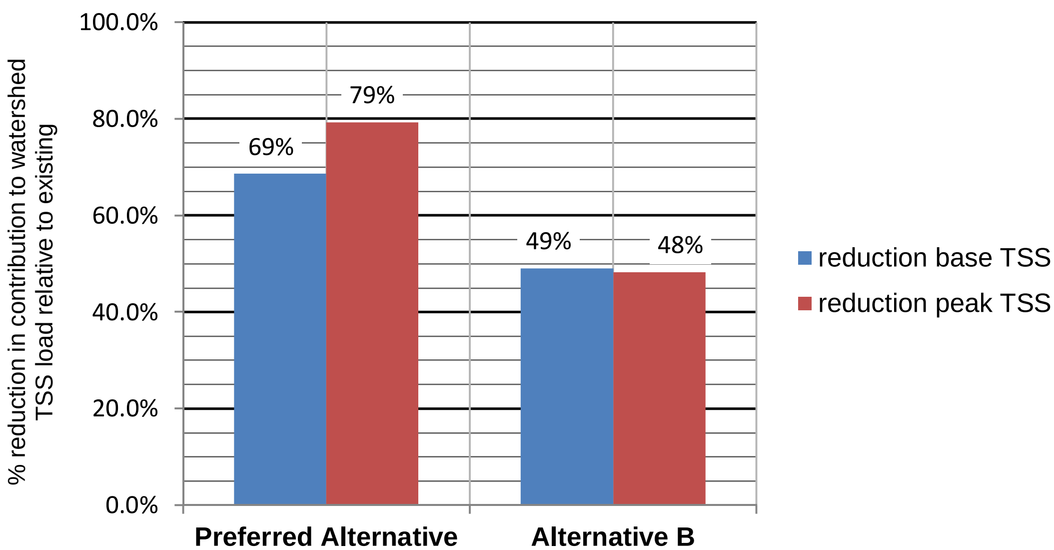
Figure 4-4 TSS contribution of site to watershed for peak flow (2%) condition under the Preferred Alternative

Figure 4-5 TSS contribution of site to watershed for peak flow (2%) condition under Alternative B

Under the No-action Alternative the contribution of the proposed site to the TSS loading of the watershed would remain unchanged.

Figure 4-6 shows a direct comparison between the two action alternatives. Figure 4-6 shows the reduction in TSS discharge by the Preferred Alternative and Alternative B relative to the existing conditions, which is the No-action Alternative. Figure 4-6 suggests that the existing TSS load from the proposed site can be effectively lowered by implementing effective stormwater treatment systems, such as proposed for the two action alternatives. Figure 4-6 furthermore suggests that the magnitude of the TSS loads reduction of in the runoff from the proposed site is significantly higher for the Preferred Alternative than for Alternative B. Therefore, TSS related impacts from the proposed site would be lower under the proposed two action alternatives than under the present condition.

Figure 4-6 Comparison of alternatives for magnitude of reductions in TSS discharge from the proposed site



4.4 Impacts on Biological Resources and Proposed Mitigation Measures

This section discusses possible impacts of the proposed project on vegetation, wildlife and threatened and endangered species. Under both action alternatives the development footprint for the proposed project would only use land that was created by landfill and which presently has no vegetation. With the exception of a small, less than one acre area within the upper portion of the site, no land that is presently vegetated would be used for the development, including buildings, roadways, parking areas and truck loading areas. Only land that is graded and is covered with a pervious gravel surface would be used for the development footprint.

4.4.1 Impact on Vegetation

The current landscaped areas would not be affected by the proposed development. Only impacts on natural vegetation are evaluated. Figure 4-7 shows the existing natural vegetation areas that surround the proposed site. The two action alternatives would impact the existing natural vegetation areas as described below.

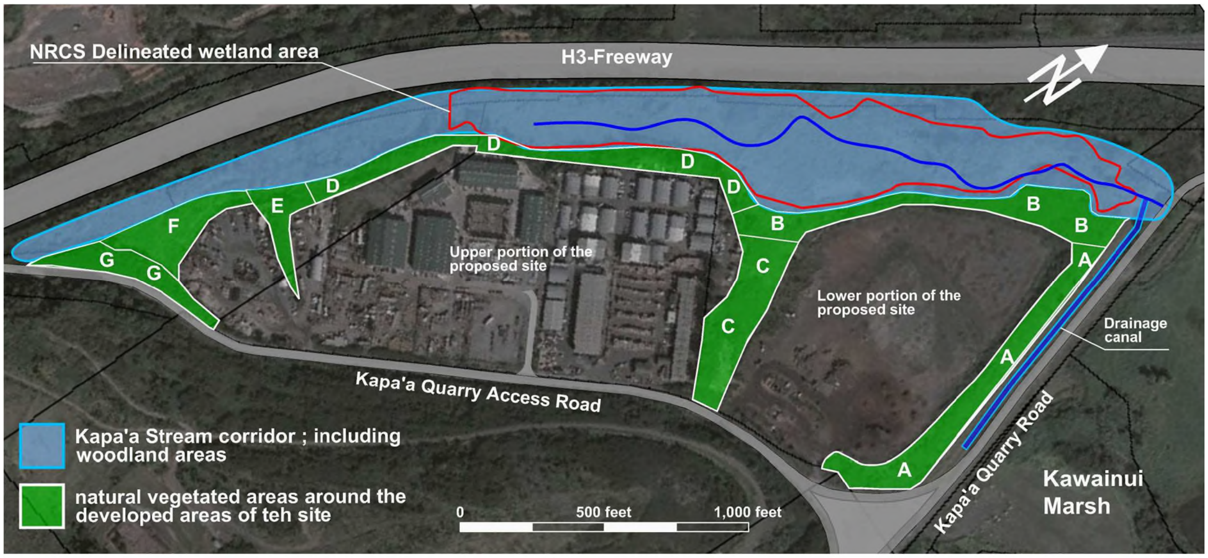
Under the Preferred Alternative, natural vegetation areas sections A, B C and D, depicted in Figure 4-7, would be affected, which represent a total vegetated area of 7.9 acres. Of these 7.9 acres only 0.8 acres of subsection E, located in the upper portion of the site, would be converted to impervious developed land. The sections A, B and C, all located at the perimeter of development footprint in the lower portion of the site, would be restored with native or adaptive plants, and about 2.2 acres of presently graded but not vegetated land would be included in the habitats restoration that surrounds the lower portion of the site, where open space is planted with native and adaptive plants. With the removal of the 0.8 acres vegetated area in the upper portion a net addition of 1.4 acres of vegetated area would occur under the Preferred Alternative in regard to the entire. Using native and adaptive plants in lieu of introduced plants has the significant advantage that typically less irrigation is used as well as less fertilizer and pesticides.

Under the Preferred Alternative the earth berm within section A would be increased in size and height to function as an effective vegetative buffer zone separating the lower portion of the site from the quarry road and the western parts of the Kawainui Marsh. Under this alternative the improved earth berm in Section A would be replanted with native or adaptive plants, including larger trees to provide a wind break on the new earth berms, which would also mitigate visual impacts. Under the Preferred Alternative, Section B would be augmented with native and adaptive plants to form an effective buffer between the adjacent wetland area in the stream corridor and the development footprint. Section C would likewise be improved by restoring the area with native and adaptive plants. There are a few larger trees within section C, which would be preserved in the habitat restoration effort. Under this alternative, the existing earth berm with some vegetation cover (i.e. some smaller trees and shrubs) within section E (0.8 acres) in the upper portion of the proposed site, would be removed and converted to developed and impervious land. In addition to converting the existing vegetation to a restored habitat, there would be about 3.7 acres of landscaped land within and at the perimeter of the development footprint.

Existing natural plant communities in sections A, B and C have rather low vegetative diversity.

The only exiting mature forested areas are in section G (see Figure 4-6) and the stream corridor. Under the proposed low impact development of this alternative, no impacts to forests would occur from new construction. Therefore no significant adverse effects to vegetation would be expected from new construction under the Preferred Alternative. Rather, planting native shrub and tree species in the areas of habitat restoration efforts would provide a positive impact on the vegetation around the proposed site.

Figure 4-7 Natural vegetated areas found adjacent to the proposed site



Under <u>Alternative B,</u> the 0.8 acre large section E within the upper portion of the site would be removed and converted to developed and impervious land. In the lower portion of the site 18 acres of the presently 18.9 areas of graded, pervious and not vegetated land would be converted to developed and impervious land. The remaining 0.9 acres at the perimeter of the development footprint would be converted to landscaped area. The sections A,B and C would not be altered under this alternative. Therefore, Alternative B would result in a net increase of 0.1 acres of vegetated area, relative to the entire project site. Under this alternative no landscaped area would be created within the development footprint nor would open space be improved at the site perimeter. The only exiting mature forested areas are in section G (see Figure 4-6) and the stream corridor. Therefore no significant adverse effects to vegetation would be expected from new construction under the Preferred Alternative.

Under the No-action Alternative no adverse effects would be expected to vegetation since no new facilities would be constructed on the proposed site.

4.4.2 Impacts on Wildlife

The proposed project site is not considered to have important wildlife habitat value, since these areas have been previously developed, graded and are practically void of existing vegetation.

Under the Preferred Alternative, it is assumed that a small population of urbanized small mammals and birds can be found within or, with more probability, at the perimeter of the proposed development, inside vegetated areas. It can be expected that these birds or small mammals would be temporarily displaced during the construction but would return after construction is completed and the open space would again be available as habitat. Under this alternative, the area around the lower portion of the site would be restored with native and adapted shrubs and tree species and the vegetation density would be increased. The vegetative buffer zones which would be developed from the sections A, B and C (see Figure4-6) would particularly serve as improved habitat for wildlife that is presently found on the site, and it is expected that new wildlife would be attracted to these newly created natural vegetation areas. No forested or natural vegetation area would be converted to developed land and therefore impacts to migratory birds are not expected.

The fact that waterfowl might be attracted to wet ponds needs to be considered in the design of the planned stormwater detention ponds. Communication with the U.S. Fish and Wildlife Service has indicated the possibility of an impact on the water bird community, especially attracting endangered water bird species to water ponds, even to those ponds which have only intermittent free water surfaces. The final design of the detention ponds would consider mitigation and avoidance measures to counter attraction to the detention ponds.

Impacts on wildlife at the proposed site under Alternative B would be similar to the Preferred Alternative, however, since the open space at the perimeter of the development footprint in the lower portion of the site would not be improved with the same scope and quality as restored habitat efforts under the Preferred Alternative, the positive impacts on wildlife habitat would be limited under Alternative B.

Under the No-action Alternative no adverse impact would be expected to wildlife. Under the existing conditions, however, there seems to be an overpopulation of feral cats. Such non-native predators are a serious threat to endangered bird species which nest in outer sections of the Kawainui Marsh and in the wetland area adjacent to the proposed site. Under both action alternatives, a program to control small non-native predators would be advantageous in order to improve the habitat for birds.

4.4.3. Impacts on Aquatic and Wetland Habitat

Under the Preferred Alternative by implementing the proposed stormwater management practices, no significant adverse impacts to aquatic and wetland habitat would be expected. The proposed project sites would not develop any portion of wetland areas, the Kapa'a Stream or the drainage canal along the quarry road, all surface water features that provide habitat for aquatic species. The proposed low impact development approach in the lower portion of the site would generally provide ample buffer zones between the development footprint and the aquatic habitat. Since a significant area is converted from presently pervious to future impervious area, the runoff peak rates and the amount of sediments and pollutants transported to the receiving waters could affect aquatic habitat conditions in the receiving waters adjacent to the proposed site. These potential adverse impacts must be mitigated by appropriate stormwater management practices, which are considered for this alternative. The construction of the vegetative buffer zones around the lower portion of the site would occur before grading of the site. The buffers, which include earth berms and dense vegetation, would serve as organic filter which would effectively diminish the amount of sediment that is transported to the receiving waters during construction but also during operation of the proposed industrial development.

During construction soil would be exposed and there would be an increased potential for erosion and transport of sediments into the adjacent receiving water, which could negatively affect aquatic habitat conditions. Under the Preferred Alternative comprehensive erosion and sediment control plans would be implemented to significantly reduce erosion of exposed soils, slow the stormwater discharge rate, and capture and contain eroded soils and concentrated nutrients before they enter the receiving waters. The possible attraction of water birds to ponds with free surface area would be considered in the design of the detention pond of the lower portion of the site, and suitable mitigation and avoidance measures would be implemented where it would be advisable or required by agencies.

Under Alternative B by implementing the proposed stormwater management practices, no significant adverse impacts to aquatic and wetland habitat would be expected. The proposed project sites would not develop any portion of wetland areas, the Kapa'a Stream or the drainage canal along the quarry road, all surface water features that provide habitat for aquatic species. Mitigation of possible runoff of stormwater and transport of sediment to the receiving waters would be similar to the Preferred Alternative. The scope and effectiveness of the stormwater management plan under Alternative B would be somewhat smaller than under the Preferred Alternative, due to the absence of the newly constructed vegetative buffer zones around the lower portion of the site.

Under the No-action Alternative no adverse effects would be expected to the aquatic and wetland habitat since there would be no new construction activities.

4.4.4 Impacts on Endangered Species

Any possible impact to federally listed or endangered species requires communication with the U.S. Fish and Wildlife Service (USFWS), as well as mitigation measures. The proposed project site is not considered habitat for endangered species, but the USFWS has determined that four federally listed water birds have a habitat in the adjacent Kawainui marsh and the wetland area in the Kapa'a Stream corridor. The four endangered water birds are the Hawaiian stilt, Hawaiian moorhen, Hawaiian coot and Hawaiian duck. The USFWS has communicated that recommended mitigation measures should be considered in the DEIS in order to minimize negative impacts to water birds. Out of the four recommended USFWS measures to avoid adverse impacts to water birds for the proposed development project, three measures were concerned with the previously planned 15-acre wildlife habitat project that was planned in conjunction with the wetland restoration. The wildlife habitat project is now no longer pursued by the applicant and therefore these three mitigation measures no longer apply. The remaining measure required by USFWS addresses possible adverse impacts to water birds from detention ponds which might feature permanent or intermittent water ponds. Water birds might be attracted to these water features, which would make them more prone to predators at the proposed site. Following the recommendation the final design of the detention ponds will incorporate suitable avoidance measures.

Under the Preferred Alternative one larger extended detention pond would be constructed at the eastern boundary of the lower portion of the site. Extended detention ponds have a longer residence time for stormwater runoff than regular detention ponds and therefore could have intermittent water pools more frequently than the regular detention ponds which would be considered for the upper portion of the site. Under the Preferred Alternative a significant volume of the storm water runoff in the lower portion of the site would be collected and stored in an underground cisterns to provide irrigation water for the open spaces and restored habitat areas surrounding the development footprint. By storing a part of the stormwater in underground tavern, the probability of creating water ponds in the detention pond in the lower portion of the site is significantly reduced.

Under Alternative B, several regular detention ponds will be constructed to serve as flood control and for lowering the rate speed at which the stormwater leaves the project. The regular detention ponds have a shorter residence time than in extended detention ponds, which also provide some treatment processes for the detained stormwater runoff. The probability of creating water pools and attracting water birds is therefore lower in regular detention ponds than in extended detention ponds.

Under the No-action Alternative, no added adverse impact to water birds would occur since at present there is no permanent of intermittent water pond which could attract water birds and make them subject to an elevated risk to predators.

4.5 Impacts to Cultural Resources

Prior communication with the State Historic Office has established the fact that no places of cultural or archeological significance are within the development footprint of the proposed project. The proposed site is a landfill area that was established several decades ago and the construction of buildings and the development of the industrial park on these man-made areas will therefore not have directly adverse effects on historical places.

As delineated in Section 3.4 of this DEIS, most of the sites of historical and cultural significance in the vicinity of the proposed site are located in the southern part of the Kawainui Marsh, with most of these identified sites being more than one mile away from the proposed site. Therefore the proposed project would have no adverse effect on these sites.

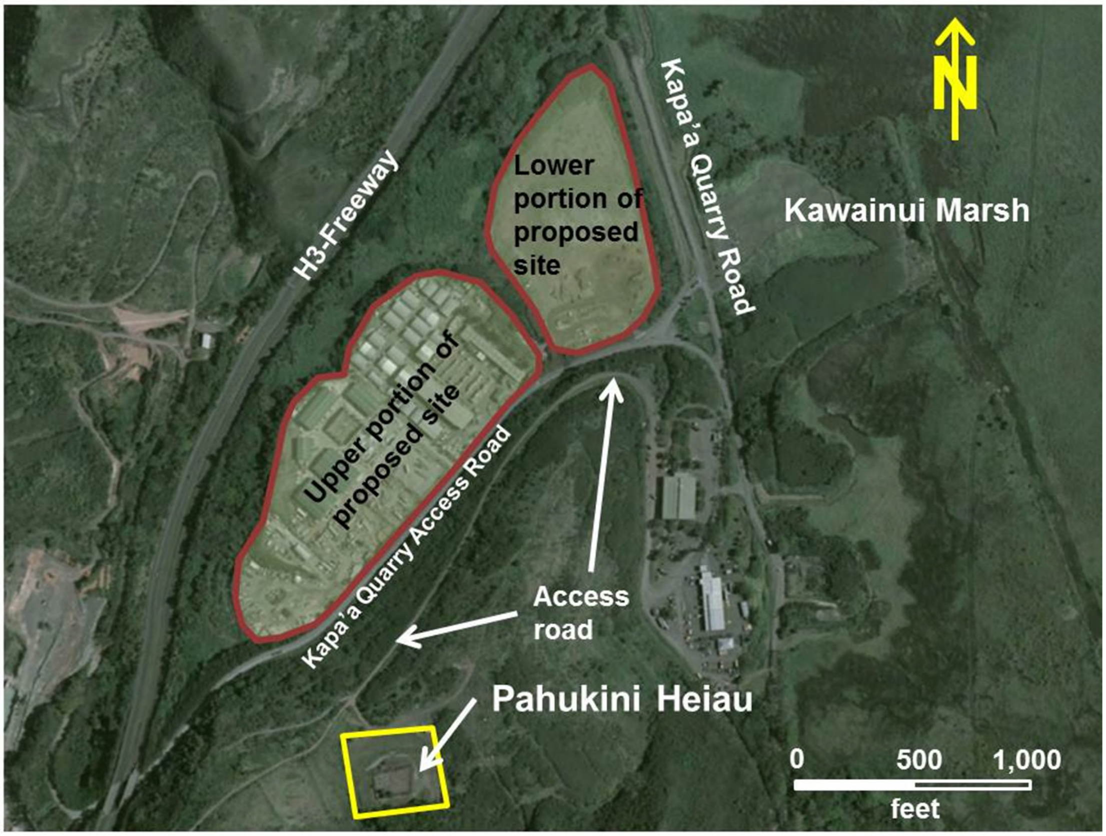
The only site of historical and cultural significance that is in close proximity to the proposed site is the Pahukini Heiau. Figure 4-8 shows the vicinity map of the Heiau to the proposed project site. The Pahukini Heiau is said to be built by High Chief Olopana in the 12th century. The Heiau is a Luakini or state-class Heiau , where important state matters, including preparation for war were conducted. The Heiau is now located on the site of the landfill in Kapa’a Quarry. The access to the Heiau is restricted but a visit can be arranged through the office of the Kapa’a Refuse Transfer Station where the access gate is located. The closest distance from the Heiau to the property is approximately 700 feet. The representative distances to the centers of the upper and lower portions of the proposed project sites are 1,400 feet and 2,600 feet , respectively. The proposed project would not limit access to the Heiau nor would in any way affect the physical site of the Heiau.

A site visit to the Heiau has determined that the existing warehouses within parcel TMK 4-2-15:008 are out of the direct line of sight. The existing warehouse development is hidden behind a screen of mature trees and a dense vegetation of shrubs. A more detailed analysis of the visual impact, or better the absence of any visual impact by the proposed project site, is delineated in the visual impact assessment presented in Appendix 8 of the DEIS. It can be expected that the proposed project will have no adverse effect on the Heiau.

The appearance of the planned warehouse structures would not have to conform to any historical buildings at or near the site. The appearance of the valley is determined by the ongoing industrial activities and the planned warehouse development or industrial park would fit in the established surrounding.

Under the Preferred Alternative, the proposed development would be shielded from direct view by means of the planned vegetative buffer zone which would include taller trees and dense vegetation or shrubs for visual impact mitigation around the lower portion of the site, the part of the development which would be more visible to passing motorists on the quarry road. Since the Preferred Alternative would be constructed in the previously developed area, there would be a low probability of finding unexpected archeological deposits. In the unlikely event that archeological effects would be discovered during construction all work would be stopped and all reasonable efforts would be made to avoid and mitigate any adverse effects while contacting a cultural resources manager. Upon consultation between the project team and the resource manager, design decisions would be made if and how changes to the construction progress would be necessary.

Figure 4-8 Vicinity map of Pahukini Heiau



Under Alternative B, the buffer zones around the lower portion of the site are not as extensive as under the Preferred Alternative; therefore the lower portion of the proposed site would be more visible than under the Preferred Alternative. The appearance of the planned structures in Alternative B would, however, still conform to the surrounding industrial appearance of the Kapa’a valley.

Under the No Action Alternative, there would be new construction and no adverse effects on historical sites would occur.

4.6 Impacts to Air Quality

Impacts to air quality can be categorized as follows:

- Air quality impacts during construction
- Air quality impacts during operation
- Indoor air impacts

Air quality impacts during construction vary with the scope and length of construction activities. Typical air quality impacts during construction would primarily be from exhaust of heavy machinery used in excavation, grading and other activities, from exhaust by construction related heavy truck traffic on adjacent roadways, and from added dust during earth moving and periods when lighter soil fractions are exposed to wind born entrainment and transport.

The construction schedule for the development features activities that stretch over several years, with periods of more intensive construction efforts during site development. The periods of more intensive construction efforts for grading, roadway construction and installation of all infrastructures would be followed by the construction of the individual warehouse structures. The most adverse impact would occur during a short duration of site development. Impacts on air quality associated with construction of the individual warehouse structures would include the time that is needed to build the outer shell of the warehouses, followed by finishing of the interior work inside the buildings. The following are air impact mitigation measures, which would be implemented:

- Control dust (e.g. fine water sprays), avoid entrainment of dust by wind through appropriate means such as fine water sprays or placing of fine mesh screening close to the dust source, or cover piles of building materials like cement, sand and other powder.
- Continuously inspection of sources of dust from exposed earth and building materials and implement targeted mitigation.
- Cover trucks loaded with construction materials.
- Prevent spills and exposed surfaces of agents which could generate air impacts, especially from hazardous agents such as VOCs.
- Proactive measures to prevent site contamination by and atmospheric exposure of fuel, solvents and other agents.
- Vegetative buffer zones with berms around the proposed site can mitigate air quality impacts since they act as wind breaks that reduces the probability of stronger winds entraining and transporting dust and hazardous particles from the site.
- Use low-emission diesel fuel and construction vehicles that incorporate particulate filters and catalytic converters; ensuring that engines are well tuned and other maintenance is carried out to limit unnecessary burning of fuel.

- No burning of any materials on site.
- Implement waste management control to limit the heavy truck traffic required to transport waste off the site and deliver material that could also be reused at the site.
- Recycle organic waste in form of green waste to produce top soil for the restored habitat or landscaped areas, thus avoiding the removal of organic waste or marginal top soil from the site and transport of top soil to the site.
- Contractors to offer shuttles of employees during construction rather solely relying on individual transport of all construction personnel.

With implementing the proposed construction plan and schedule, it is expected that adverse impacts on the air quality from the site during construction is limited.

The two action alternatives differ very little in the planned amount of new warehouse space and therefore air quality impacts during construction might differ only slightly. The Preferred Alternative, however, features some development approaches that will be more effective to mitigate air quality impacts, such as waste management plans, reuse of material on site, and more extensive buffer zones around the lower portion of the site during parts of site development and construction of individual warehouse structures. Under the No-Action Alternative, no additional air quality impacts would occur, since no new construction would be carried out.

<u>Air impacts during operations</u> of the proposed industrial park would be limited and the primary contributor of adverse air quality impacts would be through increased traffic on the adjacent roadways, where heavy truck traffic is expected to add most of the new air quality impact. Other air quality impacts would be through release of harmful agents such as solvents, paints and other agents, especially those containing VOCs. The proposed industrial development will not burn any fuel on the site to power machines or generate electricity or process heat, except the diesel operated fire pump in the fire water booster pump house.

Measures to mitigate air impacts during operation would include advising businesses leasing space in the new industrial development about maintaining and tuning the engines of their vehicles (e.g. heavy trucks, forklifts. The amount of discharge of exhaust in heavy trucks is a function of the power applied and the duration of operation. The amount of exhaust from internal combustion engines can be reduced if engines are not idling unnecessarily and if trucks avoid strong acceleration and high speeds. Air impacts from cars and light trucks can equally be reduced by advising the occupants of the park and customers not to idle the engine unnecessarily and keep their engines well-tuned.

Under the <u>Preferred Alternative</u> the following measures would be implemented:

- Attune and educate occupants of the proposed industrial development to follow low impact development and operation in an effort endeavor the lowest air quality.
- Prevent open burning of any material on the site.
- Prevent the exposure of harmful agents that could be released to the atmosphere.
- Prevent the inappropriate and unsafe handling of any fuels, solvents and any other harmful agents.
- Advise businesses that lease space to operate their commercial cars vehicles with well-tuned engines in and encourage employees to do the same with private vehicles.
- Promote car-pooling and the use of low emitting cars by providing incentives such as preferred parking.
- Promote the use of bicycles transportation and provide shuttles to lower the amount of individual automobile use.
- Use electric operated maintenance vehicles.

Under Alternative B, businesses would be asked to encourage employees to maintain their vehicles with well-tuned engines, and refrain for from unnecessarily idling the vehicle's engine. Furthermore, the operating guidelines of handling hazardous agents would be distributed to remind business and occupants to adhere to local codes and responsible use of such agents.

Under the No-action Alternative there would be no new adverse impacts on air quality and no new measures would be implements.

Indoor air quality impacts are an often neglected or insufficiently considered feature in the construction and operation of commercial and industrial developments. The importance of indoor air quality has been gaining more attention within the past few years, and indoor air mitigation is becoming a more important issue.

The Preferred Alternative in fulfillment of the LEED certification requirements, implements effective mitigation to adverse impacts on the indoor air quality. The goal of providing good indoor air quality is the avoidance of exposure of harmful agents to occupants, either through elimination of harmful agents inside the buildings or through sufficing ventilating the indoor spaces. The sustainable design approach in Appendix 4 describes the measure that would be implemented under the Preferred Alternative.

4.7 Impacts from Noise and Noise Mitigation

Noise sources considered are construction noise and noise during operation. Noise sources are very similar between the two action alternatives, since both alternatives require site development work using heavy equipment and delivery of construction materials to the proposed site. In a comment to the EISPN the Department of Health, Indoor and Radiological

Health Branch states that "Project activities shall comply with the Administrative rules of the Department of Health; Chapter 11-46 Community Noise Control".

Noise impact during construction: The planned construction work would see two primary phases of noise impact. First, the site development activities would be carried out as the initial work that would include the use of heavy machinery such as backhoes and trucks for clearing, grading and excavation. Once the entire site, or parts of the site, is/are prepared, individual warehouse structures would be erected. It is expected that between one and two standard warehouses (e.g. about 24,000 square feet each) would be constructed on the prepared site per year, on average. The construction of the warehouse structure would also include the use of heavy equipment, such as cranes and trucks, but the noise level created by these activities would be significantly less than during the first phase of construction.

It is expected that the first phase of the construction, the site preparation, would be completed within approximately a three to four month window. The follow-on phases of construction of the individual warehouses and the traffic areas and utilities in the immediate vicinity of the warehouses would be carried out over a long duration of several years. Warehouse space will be added to the development in accordance with the absorption of the available warehouse space by the local market. This does not imply that construction noise would occur continuously over a span of several years. Rather it is expected that construction noise from individual warehouses would only be noticeable during about 20 weeks of the year.

It should be noted that the noise receptors – occupied buildings – are located in an industrial park where the occupants are used to noise levels, which are higher than in residential areas.

The type of noise sources that would be used during construction at the proposed site would involve heavy equipment such as backhoe, trucks, grader and other equipment. These types of equipment are typically generating maximum equipment noise level and noise levels 50 feet from the source of between 80 and 70dBA, depending on the equipment used . With increasing distance from the noise source the noise level declines. As a general rule, the noise level decreases approximately 6 dBA with the doubling of the distance; this means that as an example a truck that generates 72 dBA at a distance of 50 feet generates 66 dBA at a distance of 100 feet. Table 4-1 lists expected noise levels for heavy equipment that would likely be used in construction at the proposed site

Since the construction site is not located near a residential area or other locations with sensitive noise receptors, the anticipated noise levels are expected to be within allowable levels. If it is deemed that the construction related noise is high enough to warrant noise reduction measures the following measure could be considered:

- Limit the type of noise to certain times during the day

- Temporary noise barriers to shield sensible receptors or noises sources that are operating close to occupied buildings
- Schedule operations that are especially noisy operations to occur at the same time during the day
- Use low noise emission equipment, such as encapsulated compressors.

Table 4-2 Expected noise levels of heavy construction equipment

Type of construction equipment	**Noise Levels at 50 feet, dBA** hourly equivalent	**Noise Levels at 100 feet, dBA** hourly equivalent
Backhoe	78	72
Front loader	76	70
Bulldozer	79	73
Heavy dump truck	73	67
compressor	75	69
Vibrator roller	77	71
Concrete pump	78	72
Flatbed truck	72	66

Since the construction will occur adjacent to environmentally sensible area wildlife might be affected by elevated noise levels. It is expected that urbanized wildlife that is presently finding habitat at the proposed site would temporarily leave the area where the construction takes place and would return once the construction noise stops.

<u>Traffic related noise:</u> The impact due to traffic related noise would occur in an area that is already experiencing traffic related noise. The representative location to compare adverse impacts between existing traffic noise levels and future increase noise levels is at the Kapa'a Quarry Road north of the intersection with the quarry access road and close to the entrance to the model airplane park.

Table 4-3 compares the predicted increase of traffic volume at the reference location for the 2016 and 2026 project development milestones. The 2016 project development milestone indicates the completion of the development in the upper portion of the site, and the 2026 project development milestone indicates the completion of the lower portion of the site, which would also represent the development at full build out. Table 4-3 indicates the increase of traffic volume as an average over the south and northbound traffic for the AM and PM peak hours. In

Table 4-3 the term “background” suggest the increase in traffic due to natural growth expected for the region; e.g. this growth in traffic could be expected under the No-Action Alternative.

The data in Table 4-3 suggests that at the completion of development of the upper portion of the site, the traffic at the reference location on the quarry road would increase by about 39 percent compared with the existing traffic volume. Without the proposed development, e.g. under the No-Action Alternative, the traffic volume would have risen by 8 percent. In comparison the increase of traffic volume compared with the existing traffic volume would be expected to rise by 107 percent at full build out in 2026, and 23 percent in the No-Action Alternative, or without the proposed development.

Table 4-3 Expected increase in traffic volume on quarry road next to propose project site

project development milestone >>> year >>> Traffic volume increase scenario	**Upper portion of project site fully developed** **2016** increase over existing [%]	**Lower portion of project site fully developed; project at full build out** **2026** increase over existing [%]
Only background traffic, without project (or under the No-action Alternative)	**8%**	**23%**
Project plus background traffic (both Preferred Alternative and Alternative B	**39%**	**107%**

The increase of traffic volume can be used to assess the anticipated increase in traffic noise impact. As a general rule, traffic volume must double to produce a three dBA increase in traffic related noise. The level of 3 dBA is the level that is discernable to the human ear.

As suggested in Table 4-3, the net increase in traffic volume by the proposed project would be about 30 percent (39% - 8%) after completion of the development in the upper portion of the site and about 84 percent (107% - 23%) after completion of the entire project. Applying the general rule of an increase in traffic noise with doubling of the traffic volume and an increase of about 3 dBA being within the threshold for perception of increase in noise, it can be expected that slight adverse noise level changes might be noticeable after the completion of the entire project. Since the present traffic induced noise at the reference location is estimated at about 60 dBA, the noise level at project full build out after 2026 would be equal or less than 63 dBA. This level of noise is about average for urban traffic conditions. At the time of completion of the development in the upper portion of the site, no adverse traffic noise would be discernable to the human ear. It should be noted that the traffic impact assessment study used a trip generation rate that does not consider possible reduction of traffic due to efforts to promote alternative transportation. The

Preferred Alternative, however, would implement several measures to lower the amount of individual traffic as part of the LEED design approach. Such measures would include incentivizing carpooling, shuttle service and the use of bicycles to visit the proposed industrial park. The actual traffic volume at project full build out could therefore be somewhat less than expected under the traffic impact assessment report for this DEIS.

It is expected that the traffic related noise level of about 63 dBA would not require mitigation measures since the proposed location is not close to residential areas and sensitive noise receptors. If noise mitigation measures would, however, seem necessary as the project approaches completion, the following measures might be appropriate to lower any traffic related adverse noise impacts:

- Lowering the speed limit on the quarry road since traffic noise increases rapidly with speed.
- Implementing sound adsorbing surfaces along the road (e.g. a line of trees along the makai side of the quarry road to mitigate propagation of sound towards the marsh).
- Resurfacing the road.
- Implementing dedicated left turn lanes on the quarry road to the quarry access road to avoid deceleration and subsequent acceleration for northbound traffic on the quarry road.

In addition to the primary noise sources, the traffic noise generated on the quarry road and quarry access road, noise sources during industrial park operation might affect people and animals. The proximity of the lower portion of the proposed site to the Kawainui Marsh could exacerbate the impact of additional noise generated by the proposed development on the environment. Therefore, responsible noise reducing construction and operations would be especially important for the lower portion of the site.

The following noise abatement measures could lower or eliminate impacts of noise sources for activities in the lower portion of the site and reduce the propagation of noise:

- Install buffer zones made of vegetated berms to reduce the noise that is a normal byproduct of industrial and commercial activities.
- Use of aerated concrete or similar material in lieu of corrugated metal walls as construction material for the warehouse structures. The aerated concrete wall segments have a large mass that impedes the transmission of noise energy through the walls.
- Orient warehouse structures in such a way that direct emission of indoor noise (e.g. through large rolled gates) is directed away from the areas that are sensitive to noise.
- Promote the use of low noise emitting machinery (e.g. shielding noise sources).
- Promote that all vehicles operating in the park are in good operating condition (e.g. mufflers should work efficiently).

- Install insulation for machinery noise, such as acoustic barriers, noise dissipation walls and vegetative buffer zones in the proposed development. The planned detached loading dock for trucks in the vicinity of the wetland area could be surrounded by sound absorbing vegetation and/or a sound absorbing wall. In addition to noise abatement these measure would also aid in mitigating visual impacts and lower impacts of avoidance.
- Mandate enforcement of guidelines and procedures to reduce noise levels such as guidelines against unnecessary idling engines.
- Locate noise generating commercial and light industrial activities to the interior of the development and away from sensitive areas.
- Prohibit noise generating activities at night or over the weekend.
- Educate tenants in the importance of acting proactively to lower noise generation and abatement.

4.8 Impacts on Utility Infrastructure

This section evaluates the anticipated impacts of the proposed project on the utility infrastructure that is presently serving the existing warehouse development. While the planned increase in industrial space would be practically the same under the Preferred Alternative and Alternative B, the two action alternatives differ greatly in their demand characteristics for water and electricity as well in their discharge characteristics for wastewater and solid waste.

For the comparison between the two action alternatives, conventional per square foot or per function demand and discharge volumes are assumed for Alternative B, which represent baseline assumptions for conventional warehouses. The demand and discharge volume under the Preferred Alternative, which is based on a low impact development approach described in the sustainable design approach for the desired LEED Silver certification, is represented with the targeted percent reduction over the conventional baseline demand and discharge rates.

4.8.1 Impact on Water Supply

The proposed development would increase the amount of water needed for the operation of warehouses, supporting office functions (only in a business support function and not as a dedicated office function) and possibly retail functions. The estimated increase in water use at the site would not necessarily be the same increase in water use on an island-wide level. Some businesses would relocate to the proposed site from industrial warehouse space that is slated for conversion or otherwise no longer serves such industrial operations. Therefore the demand would be shifted to new locations on the island and not all of the increase in water use for the new development would be new net demand.

Table 4-4 shows the expected increase in water demand at the site in comparison to the existing water use. In order to compare the different alternatives unit water use rates expressed in gallons per day per one thousand square feet are used. For the No-Action Alternative, an average unit rate of 29.5 gallons per day and per one thousand square feet is assumed. This daily rate is a mixed use rate established from daily rates for warehouses, offices and retail operations, which are assumed to contribute 85, 10 and 5 percent to the area, respectively. It is also assumed that 20 percent of the water use rate is used for irrigation. The 20 percent is at the lower range of what is typically used for irrigation since the landscaped area in the existing warehouse development and the planned new development in the upper portion of the site would have only limited landscaped area. Most of the landscaped area in the upper portion of the site is at the perimeter along the quarry access road and the existing entrances to the upper portion of the site.

Table 4-4 Expected increase in water use for the alternatives

Description	unit	Existing warehouse development; No-action Alternative	Preferred Alternative	Alternative B
Existing leasable space	sqft	283,000		
Added leasable space	sqft		606,000	606,000
Total leasable space	sqft	283,000	889,000	889,000
Water use in buildings	gpd	8,300	20,700	23,600
Water use for irrigation	gpd	1,700	2,900	4,700
Total water use	gpd	10,000	23,600	28,300
Increase ofer present	**gpd**	**N/A**	**13,600**	**18,300**

Under the Preferred Alternative, the water use is the sum of the upper and lower portion of the site. In the upper portion of the site a 10 percent reduction on the water use rate of the No-action Alternative is applied. A 20 percent allowance for irrigation of the total water use is assumed. For the lower portion of the site, a 40 percent reduction and no potable water use for irrigation are assumed. The 40 percent reduction below the current baseline, considered for the lower portion of the site would be achieved by comprehensive water conservation strategy delineated in the sustainable design approach in Appendix 4. The 10 percent reduction below the current baseline, considered for the upper portion of the site, would be achieved through the use of more effective water fixtures and faucets.

It should be noted that under the Preferred Alternative, irrigation needs would be significantly more substantial for the lower portion of the site than under Alternative B. Under the Preferred Alternative, significant areas at the perimeter and within the development footprint would be landscaped and would need irrigation, although the selection of native or adaptive plants rather than introduced plants species, such as turf grass, would somewhat reduce the irrigation needs. In addition, the low impact development approach for the lower portion of the site includes the "restoration of habitat" measures which will replace and/or augment the existing vegetation within about eight acres around the development footprint with native or adaptive plants. This habitat restoration measure would require irrigation, although most of the habitat would not need irrigation. The source of the irrigation water would be harvested rainwater, which would be collected from the roofs of warehouse structures and section of the roadways. The collected rainwater would then be stored in underground taverns for subsequent use in irrigation. There would be several underground taverns in order to take advantage of gravity flow of the collected rainwater and to shorten the supply lines for the irrigation system. More details about the efficient irrigation systems can be read in the sustainable design approach in Appendix 4 of this DEIS.

Harvested rainwater would also be used for sewage conveyance and selected custodial water needs in the warehouse structures in the lower portion of the site. The rainwater for these applications would be collected from the roofs of the warehouses and fed directly into smaller rainwater tanks which would be located next to the warehouses.

Under Alternative B, a 10 percent reduction of the water use rate of the No-Action Alternative and a 20 percent allowance for irrigation on the total water use is assumed for both the upper and the lower portion of the proposed site. Table 4-4 indicates the resulting daily water use for the alternatives.

Previous communications with the Honolulu Board of water Supply (BWS) have indicated that the BWS is able to provide the water supply to the proposed project. From an initial review of the existing water supply system, it appears that the BWS has a water main with significant supply capacity at the quarry road. The final determination of whether the water demand for the proposed project can be supplied through the existing system will be made during final design. Table 4-4 does not list the demand for firefighting, which will remain the same as the existing allowance for a 3-hour fire water supply at a rate of 4,000 gpm.

The distribution of water to the buildings in the new development would be accomplished by extending the distribution systems. Presently the existing warehouse development is supplied through a 2-inch water line, which connects the warehouses in the upper portion of the site with the 36-inch water main at the Kapa'a Quarry Road. An existing 10-inch line is a dedicated firewater line that connects the 36-inch water main with the firewater pumping station (e.g. the fire water booster pumps). It is expected that the existing 2-inch water line might not have enough capacity to provide the baseline and peak supply to the upper portion of the site. A detailed design study will determine if a new larger water line or keeping the existing water but adding a storage tank, which would serve peak demand, is the most cost effective design approach. The water supply to the lower portion of the site would be part of the new water supply system. A new firewater distribution line would connect the fire water pumping station with fire hydrants within the lower portion of the site. Alternatively, a new firewater pumping station would be installed if necessary or if this would be more cost effective than serving the firewater through the existing firewater pumping system. The installation of the new water lines would result in short-term minor adverse impacts caused by trenching and burial of lines.

4.8.2 Impacts on Wastewater System

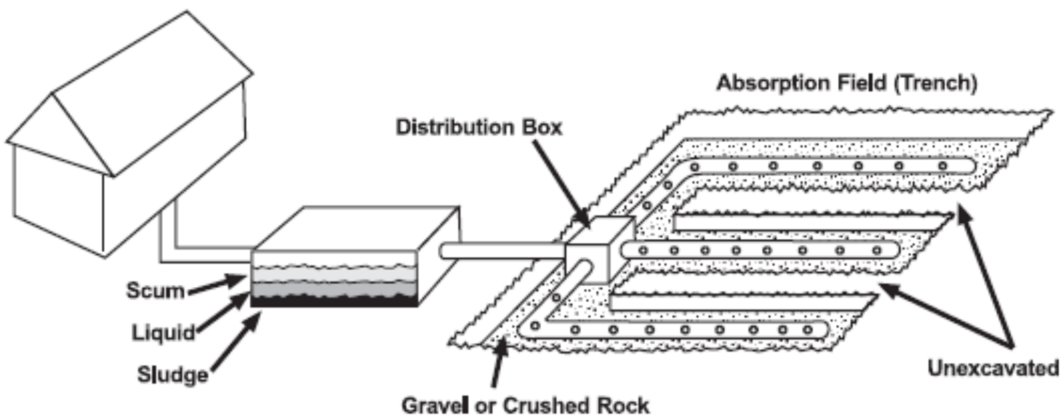
The proposed site, as well as all installations and buildings in the Kapa'a valley, are not connected to the municipal sewer system. Connecting the proposed site to the Kailua sewer system would require the installation of a forced sewer line of about 1.2 miles in length, measured between the upper portion of the site and the assumed take-over-point of the existing sewer system in Mokapu Boulevard. The expected comparatively low quantity of the wastewater, the long distance of the forced sewer and the required pumping power render a connection of the proposed site to the existing sewer system as not advantageous in economic and ecological terms.

The proposed project would therefore use onsite wastewater treatment units to treat the wastewater and dispose of it onsite. The selected wastewater treatment process would be conventional and alternative septic systems, depending on the location and the alternatives. According to the U.S. Environmental Protection Agency (EPA), about 25 percent of households in the U.S. dispose of their wastewater through septic systems. The EPA indicates that septic systems, when adequately installed and operated as decentralized wastewater systems, are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas.

The conventional septic system consists of a two-stage treatment process. The wastewater first flows into a septic tank where solids are separated from the water by settling or by floating in a foamy scum layer at the surface of the water inside the tank. Anaerobic decomposition of organic matter reduces the amount of sludge that accumulates in the tank. The tank has to be pumped, e.g. the sludge has to be removed from the tank periodically when the storage volume of the tank is removed. The liquid effluent, after initial treatment in the anaerobic septic tank overflows by usually passing through a filter, and flows to an underground infiltration field, the so-called leach field, where aerobic decomposition of the organic matter continues the treatment process, added by filtration and absorption processes, as the water percolates into the ground. Figure 4-9 shows a typical configuration of a septic system, comprised of a septic tank followed by a subsurface infiltration system (e.g. leach field).

In establishing a well performing septic system, the design of the septic tank system is as important as the design of the infiltration field. The septic tank has to be designed, manufactured and installed to avoid leakage of raw sewage due to corrosion, uneven settling or other failure modes of the tank. Leaking septic tanks can lead to a catastrophic failure of the entire septic system. Typically, good design, construction and installation practices exclude total failures of the tank; but it is always a prudent maintenance approach to have the tank periodically checked by a certified wastewater professional.

Figure 4-9 Conventional subsurface wastewater infiltration system (EPA, 2002)



The failure of the leach fields is typically more often the responsible mechanism that determines total or partial failures onsite treatment and disposal systems of wastewater. A leach field has to be designed and sized in conformance with the design flow and organic loads. While the sizing of the leach field based on hydraulic loading rates is typically used to assess the required size of the leach field, the sizing of the field size on the basis of organic load is a more conservative design assumption, since it results in larger leach field dimensions for wastewater with higher BOD concentrations. The leach field is an important part of the treatment process in a septic system since after distribution of the septic tank effluent, filtration, microstraining, and aerobic biological decomposition processes in the biomat and infiltration zone can remove up to 90 percent of the BOD and suspended solids and 99 percent of the bacteria

Leach fields can fail in their intended function if the distribution of the effluent is not uniform, the organic loads are too high to stimulate clogging by a proliferating biomat (e.g. bacteria overpopulations) or when the leach field has a tight surface cover, e.g. resulting in insufficient aeration to maintain aerobic treatment processes and to allow water loss through evaporation. If the pollutant concentration of the septic tank is too high for the configuration of the leach field, sewage infiltration and treatment in the field might be insufficient and sewage with too high concentration of pollutants can reach the ground water. Furthermore, if the distance between the bottom of the infiltration field (e.g. the point of injection) and groundwater table is too small, treatment in the wastewater infiltration field does not occur in unsaturated soil conditions and can lead to unwanted release of insufficiently treated wastewater into the groundwater or seeping of polluted water into surface waters.

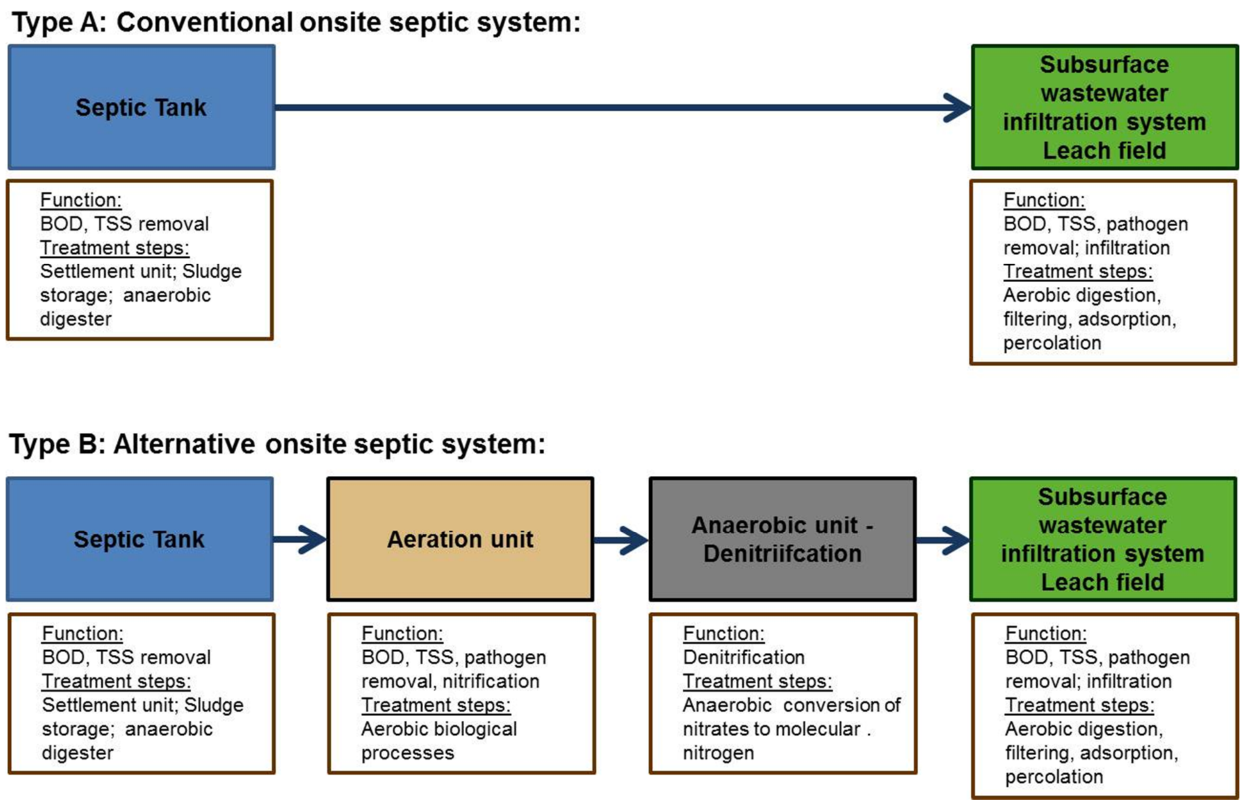
At locations close to important surface or groundwater resources, the effectiveness of conventional onsite sewage systems might not be sufficient to treat and dispose of wastewater enough to effectively mitigate all adverse impacts. The lower portion of the proposed site is deemed such a location where wastewater treatment is required that goes beyond conventional septic systems. Onsite wastewater treatment systems in the lower portion of the proposed site would be closer to surface and ground water than such systems in the upper portion of the site. The infiltration points of several leach fields in the lower portion of the site would have short vertical and horizontal distances to travel, and there would be a probability of insufficiently treated wastewater reaching the ground table and/or seeping into the Kapa’a stream corridor or drainage canal. The upper portion of the site, on the other hand, has a significant vertical distance between infiltration points and water resources, e.g. the underground path of the injected wastewater is longer, and renders more time for effective removal of pollutants until the effluent reaches the groundwater table to seep out into the stream corridor and enter the wetland or Kapa’a stream.

While septic systems as onsite wastewater systems can achieve reasonable removal rates of biological oxygen demand (BOD), total suspended solid (TSS) and pathogens, most conventional septic systems have a limited capacity to reduce the organic load to such low concentration as is required for larger treatment facilities and to cause a significant removal of nutrient. In cases where higher removal rates of nutrients are required, for example, alternative septic systems should be used which add aerobic and denitrification treatment steps to the conventional septic system process. There are a number of commercially available alternative septic systems which use different treatment methods and process vessel dimensions. The detailed design of the proposed project will select the most cost effective treatment technology. For the assessment of impact and possible mitigation in this section, an alternative septic system approach is considered that would be comprised of septic tank (with and without aerobic treatment steps), aerobic (recirculating) sand filter, anaerobic recirculation pump chamber and subsurface infiltration field.

Figure 4-10 compares the treatment process steps of the proposed alternative septic system with a conventional septic system.

As illustrated in Figure 4-10 the alternative onsite septic system would include an aerobic treatment step and an anaerobic denitrification process step upstream of the subsurface infiltration field. Table 4-5 compares expected removal effectiveness of BOD, TSS and Total TN for the proposed alternative septic systems (e.g. recirculating sand filter with recirculation into anaerobic tank) with that of conventional septic tanks. The numbers presented in Table 4-5 represent a range of effluent concentrations and removal rates for the conventional septic tank effluent and the alternative septic systems considered for the proposed project. Table 4-5 further provides an estimate on how high the typical removal rates are after the effluent of septic tanks percolates for about five feet through well aerated sand layers.

Figure 4-10 Comparison between candidate alternative septic systems and conventional septic systems



The EPA (EPA, 2002) suggests an approach to value and vulnerability assessment of sensitive surface and ground water resources by considering the following components:

- Value of ground and surface water as a public water supply or resource
- Vulnerability of the water supply or resource
- Control measures for addressing hazards

Applying this approach to the lower portion of the proposed site suggests the following wastewater treatment requirements:

Assumed water resource value:	Surface water resource which is nutrient sensitive, such as lakes, ponds, rivers, etc. where surface water are sensitive to eutrophication or loss of shellfish or finfish nursery area die to nutrient input (considering important wetland areas)
Vulnerability rating	High
Vertical separation distance between point of release and water table or impermeable soil layer	1 – 3 feet (it must be considered that the total depth of the infiltration field is in the order of 4 to 6 feet below surface). The considered range of 1-3 feet is a conservative estimate

Proposed onsite system treatment performance standards for lower portions of proposed site:

BOD (mg/L) : <= 10
TSS (mg/L) : <= 10
Total N (% removed) : >=50%

Table 4-5 Comparison of typical wastewater effluent from septic system and recirculating filters

Description of wastewater or effluent	BOD concentration mg/l	BOD removal %	TSS concentration mg/l	TSS removal %	Total N concentration mg-N/l	Total N removal %
Representative domestic wastewater						
representative influent	150 - 290		150-330		40-75	
typical concentration	250		200		60	
Conventional septic tank effluent:						
typical range	140 - 200	10%-30%	50-100	40%-60%	45-60	5% - 10%
typical concentration	180	25%	90	55%	52	13%
Alternative septic system RSF effluent						
typical range	5 - 10	96% - 98%	3 - 9	96% - 99%	15 - 30	50% to 75%
typical concentration	6	98%	6	98%	20	70%
Subsurface water injection systems after 5 feet percolation in well aerated sand layer	~25	>90%	~20	>90%		~40%

As can be concluded from the expected effluent concentrations of conventional septic systems, comprised of septic tanks and leach fields, in Table 4-5, the treatment performance of conventional septic systems might not be sufficient for the lower portions of the proposed site, even if the septic tank effluent is released in a well suited thick layer of sandy and well aerated soil. Since the vertical distance between point of release (e.g. bottom of leach field) and saturated soil layers (e.g. groundwater table or soil layer with low permeability, such as Pearl Harbor Clay) might be smaller than required for sufficient treatment in the lower portion of the site, a prudent approach to onsite wastewater treatment would be to select an alternative septic system rather than conventional septic systems.

For the upper portion of the site it is assumed that conventional septic systems would be sufficient, since the vertical distance between point of release and saturated soil layers is considered to be in the range of at least 10 to 15 feet and the point of release is further separated from the wetland areas in the Kapa'a stream corridor and the Kawainui Marsh. This substantial vertical and horizontal distance between point of release of effluent at the leach fields in the upper portion of the project site and sensitive water resources would provide a wide enough safety envelope for the use of conventional septic systems.

In considering the above discussion about the expected applicability of wastewater treatment technologies the following systems are considered for the alternatives:

Under the Preferred Alternative about four to five conventional septic systems would be installed to serve the new warehouses in the upper portion of the site . Each septic system would comprise a septic tank of 1,250 gallon volume and a leach field of about 1,500 square feet and would typically serve two warehouses. The septic systems would be installed as needed, e.g. at the pace at which warehouses would be constructed. The septic tanks would be pumped in intervals of several months, of as needed, by a licensed pumping company. The sludge removed from each septic tank would be disposed of offsite in safe way according to local codes.

Under the Preferred Alternative, onsite wastewater treatment would occur with an alternative septic system, most likely with the recirculating sand filter units which were considered for the discussion above. The proposed system is illustrated in Figure 4-11. The overall system would comprise about six septic tanks without leach fields and three systems that contain recirculating sand filters. The six septic tanks (e.g. standard size of about 1,250 gallons) without a leach field would be located directly adjacent to the new warehouses and each septic tank would serve up to two warehouses. The effluent of these septic tanks would flow to three alternative septic systems with recirculating sand filters and infiltration field. These three more comprehensive septic systems would be located at the perimeter of the development footprint. The effluent of these three systems at the site perimeter would be distributed in subsurface infiltration fields which would preferably be subsurface irrigation fields (e.g. with drip irrigation) serving landscaped areas at the perimeters. (Refer to Appendix 4 for more details on the spatial arrangement of the septic systems in the lower portion of the project site).

As mentioned earlier, Figure 4-11 shows a sample diagram of the advanced onsite wastewater treatment for the lower portion of the site. The effluent of the septic tanks within the inner portions of the site would either flow as gravity flow to the septic system at the perimeter or would be pumped. The septic systems at the site perimeter would distribute the effluent of their own septic tanks and the effluent received from the septic tanks without their own leach fields on sand filters. By percolating through the sand filter body, the wastewater would be treated by aerobic, filtration and adsorption processes. Enough oxygen would be available for BOD removal and nitrification of organic matter. The effluent of the sand filter would enter the recirculation tank, which is anaerobic, where denitrification would occur. From the recirculation pump chamber the treated water is pumped to the top of the sand filter and the surplus effluent is distributed on the infiltration field. The details of the alternative septic system would be determined in the final design phase.

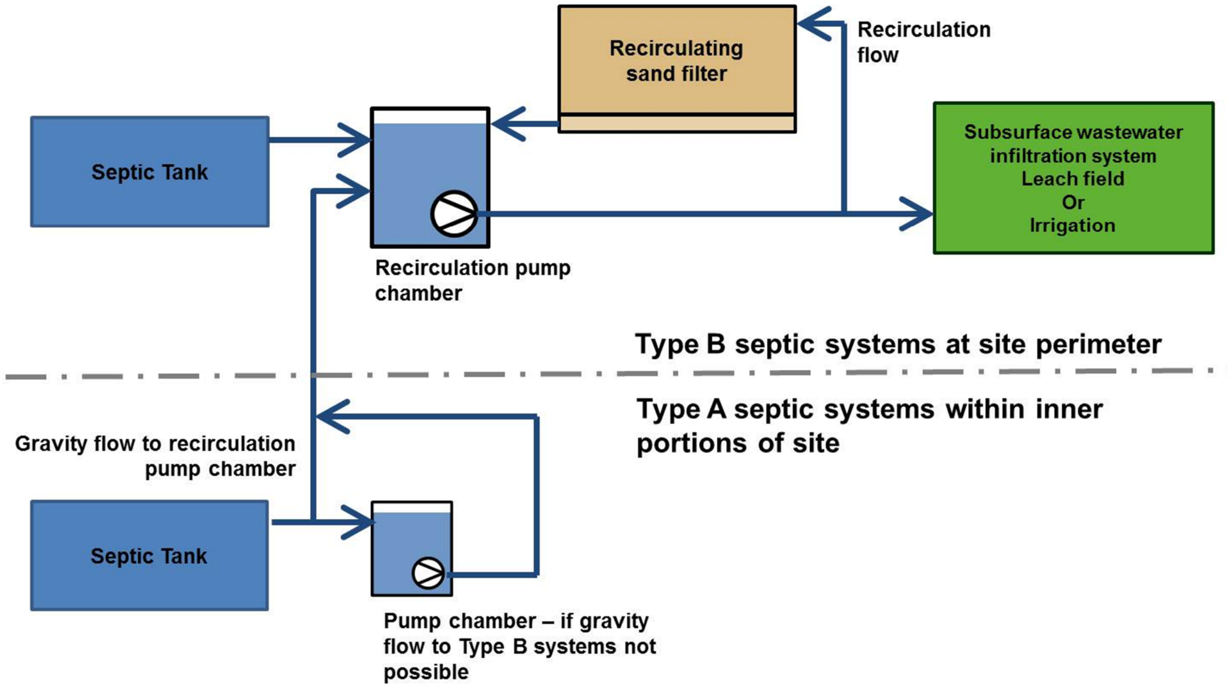
With adopting this system design, the Preferred Alternative would use a design approach that ensures that sensitive water resources adjacent to the proposed site would not be adversely affected. During installation of the septic systems, excavation for the tank, leach fields and interconnecting piping would cause temporary impacts from excavation.

Under Alternative B, a more conventional approach to the onsite wastewater treatment would be implemented. Alternative B would use about four to five conventional septic systems to serve the new warehouses in the upper portion of the site. Each septic system would comprise a septic tank of 1,250 gallon volume and a leach field of about 1,500 square feet and would typically serve two warehouses. The septic systems would be installed as needed, e.g. at the pace at which warehouses would be constructed. The septic tanks would be pumped in intervals of several months, of as needed, by a licensed pumping company. The sludge removed from the septic tanks would be disposed of offsite in safe way according to local codes.

Alternative B would use about nine conventional septic systems in the lower portion of the site to serve the new warehouses. Each septic system would comprise a septic tank of 1,250 gallon volume and a leach field of approximately 1,500 square feet and would typically serve two warehouses. The installation and maintenance of the septic systems would be identical to the septic systems in the upper portion of the site. If needed, fixed activated sludge treatment (FAST) systems would be added to every septic tank in order to increase the removal rates for BOD, TSS and especially for total nitrogen. If the vertical distance between surface and saturated soil layer would be too small for conventional infiltration fields, a mounded leach field (e.g. leach field is installed above the finished grade within a mound of sand) might be installed for the systems that are closest to the wetland areas in order to ensure good vertical separation from the point of release to the saturated soil layers. During installation of the septic systems excavation for the tank, leach fields and interconnecting piping would cause temporary impacts from excavation.

Figure 4-11 Proposed Advanced Onsite Wastewater Treatment System

(for the lower portion of the site under the Preferred Alternative)



Under the No-Action Alternative no new septic systems would be installed and there would be no added impacts associated with onsite wastewater treatment.

For both action alternatives, septic tanks would be installed underground at suitable locations close to the warehouses they would serve. On average, one septic tank would serve about 38,000 square feet of warehouse space each, which means that on average one septic system would serve two warehouses. The specific progress of the construction of warehouses in accordance with the expected absorption of industrial space might require deviations from the number of septic tanks that would need to be installed. The location of the septic tanks and leach fields systems would be well marked above ground and would also be documented. The septic systems would not be located under structures, and the leach fields would have measures to assure appropriate ventilation and exposure of the soils to the atmosphere. Since sludge has to be periodically extracted from the septic tanks, the manholes of septic tanks would have to be accessible and in reach of larger service trucks. In normal operation the leach fields do not need to be accessible for maintenance.

There are various design and operational measures that would safeguard against sewage overflow or spill from the septic systems. The soils in the vicinity of underground infiltration fields would have to have a suitable permeability to ensure percolation of the wastewater and avoid backing up of the sewage caused by clogging or insufficient distribution. The septic system would have to be large enough to accommodate the projected wastewater load of the warehouses that are served by the septic system. After construction of the septic system no construction would be permitted that would damage septic systems. With adequate maintenance septic systems function well. Indications that septic systems are overloaded or structurally damaged would require immediate attention. The septic tanks would require regular pumping by a licensed pumper. The area around the septic system would have to be regularly inspected for signs such as foul odor, slow or clogged drains, wet, spongy ground or lush plant growth, algae blooms and excessive weed growth in nearby streams.

No adverse environmental impacts are anticipated from the installation and operation of new septic tanks and leach fields in the proposed development. The septic systems proposed under the two action alternatives are expected to treat common wastewater discharge from the proposed warehouse development and ensure disposal of the wastewater that is environmentally safe and would not cause adverse impacts. The close proximity to adjacent sensitive wetland areas and Kapa’a Stream would require a more sensitive treatment process, as indicated in the above discussion.

4.8.3 Impact on Telecommunication

The proposed action alternatives would increase the demand for telecommunication services at the proposed site. New infrastructure would be required in the some parts of the upper portion of the site and within the entire lower portion of the site. Installing these improvements on the site would not likely result in a significant impact. Presently, the telephone service to the Kapa’a Valley is provided by an above-ground telephone line that runs along Kapa’a Quarry Road towards Mokapu Blvd. It is expected that the existing line would have sufficient capacity for the expansion of services. If required new conduits could be installed at the utility pole to increase capacity. This installation is not expected to pose significant problems or impacts.

4.8.4 Impacts on Electricity Supply

The proposed development of the industrial park is expected to increase the current electric demand and energy consumption as more industrial space is added. It is expected that the existing feeders would not be to handle the load increase in the upper portion of the site. For the lower portion of the site an entire new distribution system would be required. The electrical distribution system within the proposed project site would use cable runs contained within a network of underground ducts. Further analysis of the individual building loads would be required to determine the improvements to the installation distribution system.

Table 4-6 indicates the expected increase in demand of the two action alternatives compared to the existing demand profile, which represents the No-action Alternative. The receptacle loads, peak loads and energy consumptions are determined for all three alternatives using unit demand data based on the assumed baseline against which the LEED credit for energy efficiency for the Preferred Alternative is evaluated (USGBC, 2009). The unit demand numbers are a function of occupancy type. With the assumed mix of new businesses in the proposed industrial development as 85% warehouses, 10% office (e.g. only in a auxiliary support function of businesses) and 5% for retail, the expected electricity demand and consumption is determined by multiplying the unit demand numbers by the planned leasable warehouse space. The results are indicated in Table 4-6.

Table 4-6 Comparison of electricity demand between alternatives

Description	unit	Existing warehouse development; No-action Alternative	Preferred Alternative	Alternative B
Existing leasable space	sqft	283,000		
Added leasable space	sqft		606,000	606,000
Total leasable space	sqft	283,000	889,000	889,000
Receptacle loads	kW	218	564	685
Peak loads	kW	327	786	1,027
Electric energy consumption	MWh/a	1,900	4,800	6,000
Electric energy consumption relative to present	%	100%	250%	320%

note: numbers for MWh/a rounded to the next one thousand

Under the <u>Preferred Alternative</u> the electricity demand and annual electric energy consumption is expected to increase from 1,900 MWh to 4,800 MWh, an increase of about 150 percent. Under the Preferred Alternative the lower portion of the site would implement energy efficient warehouse structures and the use of renewable energy in accordance to the sustainable design approach. The expected savings in energy consumption under the LEED Silver certification goals are at least 30 percent relative to the baseline. The overall industrial park peak load is expected to be lowered to approximately 75 percent of the assumed peak level of Alternative B. The sustainable design approach also incorporates the installation of renewable energy (e.g. photovoltaic and solar thermal collectors) as energy saving devices. While stringent energy efficiency measures would be implemented in the lower portion of the project site (e.g. in fulfillment of the LEED Silver requirements), some energy efficiency measures would also apply to the upper portion of the site, but to a lesser extent. The full list of energy saving measures are presented in the sustainable design approach in Appendix 4 of this DEIS.

Under Alternative B energy consumption would be following the defined demand numbers of the baseline, as indicated in Table 4-6. Under this alternative, the electric energy consumption would increase by approximately 220 percent of the current demand, e.g. the demand under the No-Action Alternative.

Under the No-action Alternative no new warehouses would be installed and there would be no new electricity demand.

The existing project site is supplied with electricity through a transmission line from Mokapu Boulevard. Communication with Hawaii Electric Company (HECO) suggests that anticipated load demand for the proposed warehouse development may exceed the capacity of the existing 4.16 kV circuit at Mokapu Boulevard. In the event that the future demand could not be met by the existing circuit, a new power line would be necessary to connect the proposed development with the existing 12.47kV circuit along Kalanianaole Hwy. At the present time there are no existing HECO utilities along Kapa'a Quarry Road and therefore approximately 10,000 linear feet of power line and associated appurtenances would need to be installed along Kapa'a Quarry Road from Kalanianaole Highway to the proposed site in order to supply additional power. If it is determined that an additional power line has to be installed along the Quarry Road ,an environmental review will need to identify impacts of this installation, such as impacts of the installation on the marsh, during construction and normal operation. While a detailed review will identify qualitative and quantitative impacts, it can be assumed that the impact of such a new power line would include construction activities during installation of new poles, including excavation, erosion and traffic obstructions. ~~In addition to these temporary impacts, no adverse impacts are expected from installing additional transmission capacity along the existing transmission facilities.~~

The increase in electricity demand and energy consumption needs to be considered on the micro and macro level. At the micro level, e.g. for the proposed project development, an increase of demand would require the installation of additional electric distribution facilities within the development and a possible increase of capacity to transmit the increased load and energy to the proposed site from the regional substations.

On a macro level, e.g. the energy supply for the entire island, the increased demand at the proposed site would not necessarily result in the same absolute increase in the island wide grid. A part of the businesses would be relocating from industrial space that would be retired in the process of converting presently industrial space to higher value land use. Therefore older warehouse space ~~would~~ might be substituted by modern warehouses structures which are inherently more energy efficient that the older and abandoned warehouse structures. It is also expected that while relocating their place of operation, businesses might choose to upgrade energy consuming devices, such as lighting, machinery, and air conditioning, with more energy efficient devices, (e.g. Energy Star certified devices). Relocating to new locations would also increase the likelihood of implementing more energy responsible operations such as load management and commissioning. In summary, while the electricity demand and energy consumption are expected to increase at the project site, the long-term impact on the island wide energy supply is potentially positive, since space required for economic development would be developed in a more environmentally and energy responsible manner. In the short-term, the low impact development approach of the proposed project could be an effective method to use energy wisely by creating more industrial floor space in proximity to the region served by the proposed project.

4.8.5 Impacts on Solid Waste Disposal and Mitigation

A private company is presently contracted for the solid waste disposal at the proposed site. Waste receptacles are periodically (e.g. weekly) collected and the solid waste is disposed of at an offsite landfill. The contractual terms with the waste management company ensure that the waste is disposed of in an environmentally responsible way and in accordance with local codes and standards.

Under the Preferred Alternative a comprehensive recycling program would be implemented for the lower portion of the site, in accordance with the sustainable design approach and LEED certification requirements. There would be several easily accessible dedicated areas for the collection and storage of the recycled materials. Recyclable materials would include, at a minimum paper, corrugated cardboard, glass, plastic and metals. The separate collection of bottles and aluminum cans which carry a refundable deposit would be provided in each building. While the comprehensive recycling effort would be organized and verified only for the lower portion of the site, e.g. within the LEED project site boundary, collection and storage of recyclable material would also be offered in the upper portion of the site, in order to take advantage of synergy and increase the volume of recyclable material for the waste management company.

Under Alternative B there would be a basic recyclable program, comparable with that of the municipal solid waste collection service and the currently limited recycling at the project site

Under the No-action Alternative the present system of limited recycling at the project site would be continued.

Littering and non-conforming disposal of waste can result in a range of impacts, from simple annoyance to direct adverse impact. Waste that is improperly disposed of or abandoned can result in the release of hazardous agents that can directly impact the environment, human beings or wildlife, or could accumulate in terrestrial or aquatic soil and could pose a long-term threat when released, due to elevated concentration.

Littering and non-conforming disposal of waste would be mitigated during the construction and operation of the industrial park. The presence of ample waste receptacles and the education of tenants and their employees to refrain from any littering and assist in the avoidance would be effective mitigation measures. In addition the management of the industrial park would safeguard that no waste would be disposed of in a non-conforming and environmentally harmful way. The propagation of waste into the adjacent wetland areas and the Kapa’a Stream corridor would be mitigated by the fence at the perimeter fence of the property. Periodic survey and controls of the perimeter of the development footprint would also assist in maintaining the proper appearance of the proposed development, and reduce the chance that wildlife and plant life are adversely affect by inappropriate waste disposal.

4.9 Impacts on Traffic and Mitigation

This section evaluates expected impacts of increase traffic under the various alternatives on the traffic on the adjacent roadways and on three intersections, as listed in Tables 4-7 and 4-8, respectively. This section summarizes the findings and recommendation of the Traffic Impact Assessment report (TIAR), which was conducted for this environmental review and is attached to this DEIS in Appendix 5. The scope of the analysis considers scenarios as delineated in Table 4-9. In Table 4-9 the Preferred Alternative and Alternative B are considered to generate the same traffic volume, since the projected trip generation volumes under both action alternatives are the same when consider the same trip generation unit rates (e.g. trips per 1,000 square feet of warehouse space) and the same leasable space in the warehouses. While this approach is valid in regard to the selected trip generation rates for the occupancy type, the Preferred Alternative would result in somewhat lower traffic volumes, since the sustainable design approach for the LEED certification promotes alternative transportation through measures such as incentivizing car pools, implementing shuttle services from the proposed site to public transportation bus stops and promoting the use of bicycles to commute. Therefore the suggested traffic volumes under the Preferred Alternative would be a conservative assumption and actual traffic volumes might be somewhat less than assume din the TIAR.

Communication with county and state traffic authorities suggest considering a reassessment of the traffic projections after a couple of years, e.g. after the completion of the development of the upper portion of the site, in order to compare the actual traffic volumes at that point in time and reassess the projections for the remaining completing of the project in a new TIAR at that time. Therefore, while the projections for the year 2026, which means the expected completion of the proposed development at full build out, are covered in the TIAR it also has to be considered that the basis of the traffic projections might experience changes, such as modified trip generation, and increased acceptance of alternative modes of transportation, which would lower the individual traffic volumes.

In the course of the design of the proposed project, the planned amount of leasable space that would be developed under both action alternatives was reduced by about 10 percent from the 660,000 square feet, which was the basis of the TIAR, to about 606,000. This design adjustment of leasable space was due to the decision to demolish and or renovate part of the existing warehouse space under both action alternatives and a reduction of number of new warehouses. The net square footage for the added space reflects added space of new warehouses and demolition of older spaces. Furthermore, the configuration of the buildings was modified to result in a more effective layout and avoid encroachment of open space. The traffic assessment is thus based on a slightly higher leasable space than is actually planned at the moment, thus the projections made in the TIAR are conservative.

Notwithstanding the considerations discussed above, the TIAR lays out the expected traffic volume and associated impacts.

The State DoT review of the current TIAR, submitted with this FEIS, has indicated areas of analysis that should be reevaluated, since the LOS values reported in the current TIAR might be too optimistic. Specifically, the DoT review calls for the re-analysis of LOS at the two intersections under state jurisdiction (e.g. the intersections of the Quarry Road with Kalanianaole Hwy. and Mokapu Blvd.) using additional traffic analysis parameters and a reassessment of the anticipated traffic growth in the region. If the reevaluation determines LOS levels that are indeed significantly higher (e.g. less favorable) than in the current TIAR, the traffic improvement recommendations might have to be revised.

Since the design revisions in the updated project Masterplan, which will be submitted during the zone change permit application, will result in a tangible change of the trip generation rates relative to the current TIAR, the revised TIAR analysis in conjunction with the zone change request will provide a better understanding of the future LOS and what mitigation measures would be most effective. The DoT has agreed that the revised TIAR may be submitted during the upcoming zone change request, rather than as part of the FEIS.

Table 4-7 Roadway sections evaluated in traffic impact analysis

Nr.	Roadway sections locations	length [miles]	jurisdiction
1	Northern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Mokaupu Blvd.	1.0	County
2	Southern section of the Kapa'a Quarry Road; between the intersection with Kapa'a Quarry Access Road and Kalanianaole Hwy.	1.5	County
3	Kapa'a Quarry Access Road between intersection with Kapa'a Quarry Road and roadway entrance to the existing warehouse development.	0.3	County

Table 4-8 Intersection evaluated in traffic impact analysis

ID	Intersection location	signalized	unsignalized	jurisdiction
A	Mokapu Blvd. & Kapa'a Quarry Road	X		State
B	Kapa'a Quarry Road & Kapa'a Quarry Access Road		x	County
C	Kalanianaole Hwy & Kapa'a Quarry Road	X		State

.

Table 4-9 Scope of traffic impact analysis scenarios for alternatives

Description of alternatives	Traffic components considered	years of analysis	traffic indicators used	mitigation requirements identified
Existing conditions	traffic counts at three intersections	2009	AM, PM peaks volume; LOS at three intersections; LOS on quarry and quarry access roads	
No-action Alternative	considering projected growth of background; without proposed project\	2016 2026	AM, PM peaks volume; LOS at three intersections; LOS on quarry and quarry access roads	
Preferred Alternative and Alternative B	considering projected growth of background; and projected trip generation from the project (e.g. trips per 1k sqft of space)	2016 2026	AM, PM peaks volume; LOS at three intersections; LOS on quarry and quarry access roads	No mitigation required through the end of 2016; mitigation woud need to be in place before 2026

Notes:

2016 is the year in which the upper portion of the site would be fully developed

2026 ~~2016~~ is the year in which the lower portion of the site would be fully developed and the project would be at full build out

The Preferred Alternative and Alternative B are considered to generate the same trips based on the leasable areas added

4.9.1 Expected Impacts from Background Traffic

The growth of background traffic volume, that is the traffic volume that is expected to occur without the proposed project, represents the No-action Alternative. The expected background traffic volume was assessed by applying a compounded growth rate to the existing traffic. The selected growth rate that is compounded over the development schedule of the proposed project, e.g. from the present to the expected time of completion of the project development, represents a weighted average of historic growth rates on roads that would be affected by the project. In addition, projected increases in background traffic also have to consider possible projects that are planned for the area; there are none that were identified at the writing of this DEIS. The TIAR in Appendix 5 delineates the assumptions used in the projection of future

Table 4-10 shows the expected level of service (LOS) for the background traffic volume at the three intersections and three roadway segments that are considered for the analysis. While the LOS of intersections has been identified for all movements through the intersections, one LOS is given for the particular intersection.

The results of the projection of the background traffic in Table 4-10 suggest that by the year 2016 no mitigation would be required at the intersections as well as on the roadways since the intersections and roadways would operate at a LOS level of C or better. By the year 2026, or at the completion of the proposed project it is expected that mitigation would be required for the intersection of Kapa’a Quarry Road and Mokapu Blvd. Possible mitigation measures are discussed later on in this section.

Table 4-11 indicates the projected trip generation rates for the proposed project under both action alternatives for the years 2016 and 2026, which represent the completion of the development of the upper portion of the site and the completion of the development of the lower portion of the site, which would also be the project at full build out, respectively.

4.9.2 Projected Trip Generation and Project Generated Traffic Volume

The traffic count conducted under this TIAR for the existing warehouse development determined the movement in and out of the project for the AM and PM peak periods. The identified traffic movements were than normalized to a trip rate per 1,000 square feet of space in the existing warehouse development. The resulting existing trip generation rates per 1,000 sq. ft. for the AM and PM peaks were calculated as 0.87 and 0.84, respectively. A comparison with the standard trip generation rates for warehouses under the Institute for Transportation Engineers (ITE) Trip Generation Manual (ITE, 2003) suggests that the existing trip generation rates are lower than the ITE AM and PM peak standard trip generation rates of 0.92 and 0.98, respectively. Since it is assumed that the occupancy type of the proposed industrial development at full build out would be the same as at present, the existing trip generation rates at the project site were used for the subsequent analysis.

Table 4-10 Expected LOS for background traffic

Intersection / roadway segments	signalized / unsignalized	backgorund traffic w/o proposed project 2016		backgorund traffic w/o proposed project 2026	
		AM peak LOS	PM peak LOS	AM peak LOS	PM peak LOS
Intersections:					
Kapa'a Quarry Road & Mokapu Blvd.	signalized	**C**	**C**	**C**	**F**
Kapa'a Quarry Road & Kalanianole Hwy.	signalized	**C**	**B**	**C**	**D**
Kapa'a Quarry Road & Kapa'a Quarry Access Road	unsignalized	**B**	**B**	**B**	**B**
Roadway segments					
Kapa'a Quarry Road; **North** of quarry access road intersection	N/A	**C**	**C**	**C**	**C**
Kapa'a Quarry Road; **South** of quarry access road intersection	N/A	**B**	**B**	**C**	**C**
Kapa'a Quarry Access Road	N/A	**B**	**B**	**B**	**B**

LOS level requires mitigation as unsatisfactory taffic conditions occur

The directional distribution of the projected trip generation is assumed to follow the same distribution as identified for the existing traffic condition at the proposed site. Figures 4-11 and 4-12 show the expected trip generation distribution for the Am and PM peak hours, respectively. The distribution rates in Figure 4-12 and 4-13 suggest that the northern segment of Kapa'a Quarry Road, e.g. the portion of the quarry road between Mokapu Blvd. and the quarry access road intersection, would experience more traffic volume than the southern part, e.g. portion of the quarry road between Kalanianaole Hwy and the quarry access road intersection. The identified asymmetric distribution of the trips between northbound and southbound traffic on the quarry road would suggest that northern portion of the quarry road would cause the larger proportion of traffic impacts.

Table 4-11 Estimated project generated traffic volume

Time period	direction of traffic movement	expected trips in year **2016**	expected trips in year **2026**
AM peak	**total**	270	570
	into development	170	360
	out of development	100	210
PM peak	**total**	260	550
	into development	80	160
	out of development	180	390

Figure 4-12 AM peak distribution of generated trip for in and out bound project traffic

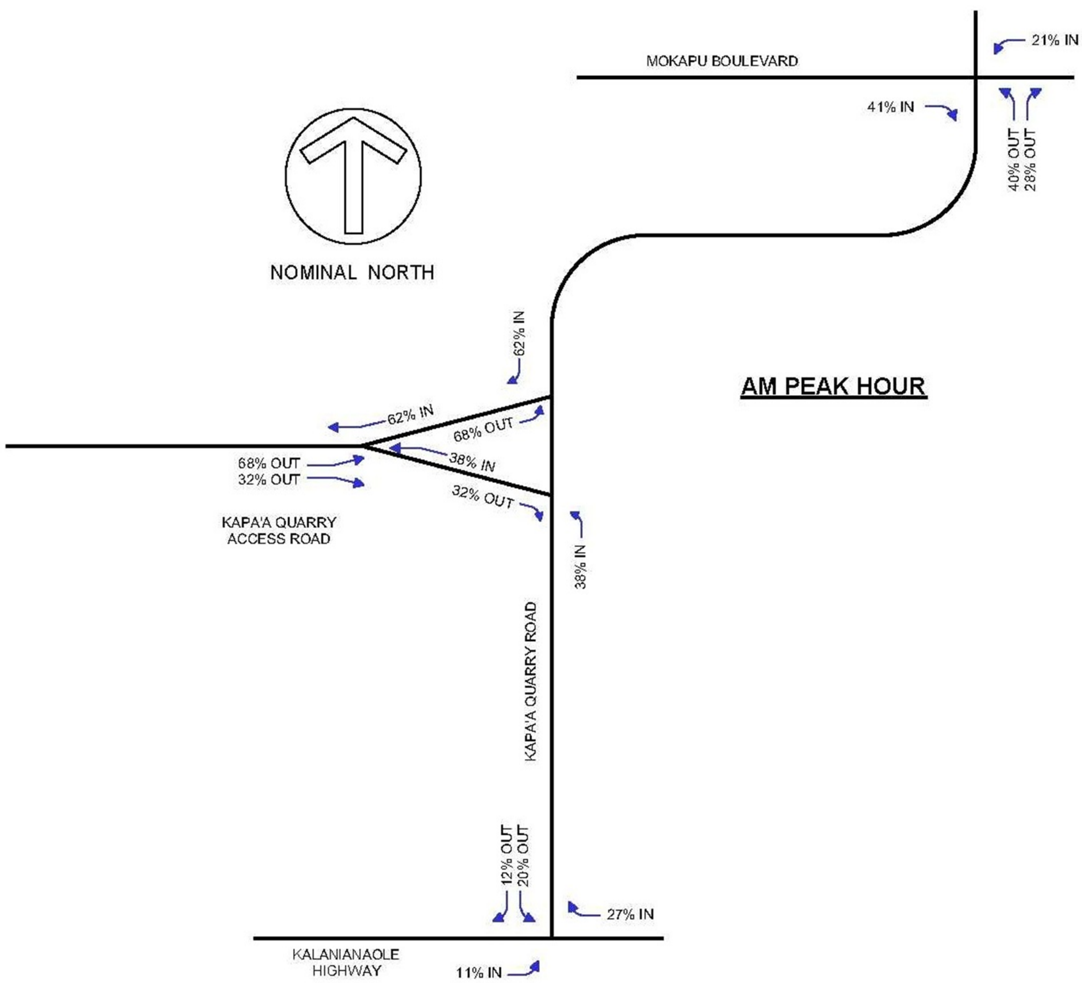
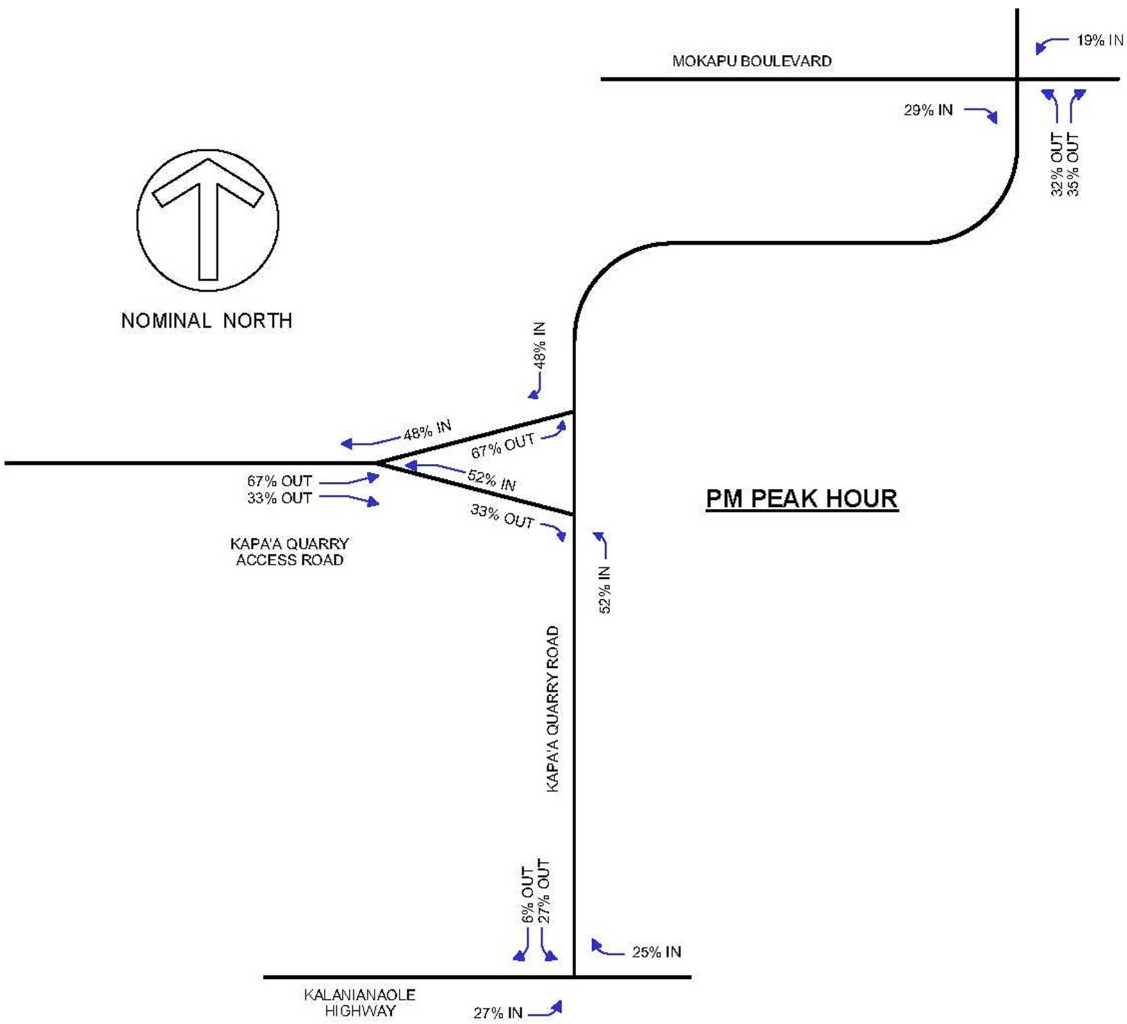


Figure 4-13 PM peak distribution of generated trip for in and out bound project traffic



4.9.3 Expected Future Traffic Volumes and Impacts

The expected future traffic volumes can be deduced from adding the project related traffic (e.g. from the trip generation analysis) to the projected background traffic volumes for the different phases of the proposed project. Table 4-12 shows the expected level of service (LOS) for the project's future traffic volume at the three intersections and three roadway segments that are considered for the analysis. While the LOS of intersections has been identified for all movements through the intersections, one representative LOS is given for each particular intersection.

Table 4-12 Expected LOS for background traffic plus project related traffic

Intersection / roadway segments	signalized / unsignalized	Future traffic volumes background + project 2016		Future traffic volumes background + project 2026	
		AM peak LOS	PM peak LOS	AM peak LOS	PM peak LOS
Intersections:					
Kapa'a Quarry Road & Mokapu Blvd.	signalized	C	D	C	F
Kapa'a Quarry Road & Kalanianole Hwy.	signalized	B	B	E	D
Kapa'a Quarry Road & Kapa'a Quarry Access Road	unsignalized	C	C	D	E
Roadway segments					
Kapa'a Quarry Road; **North** of quarry access road intersection	N/A	C	C	D	C
Kapa'a Quarry Road; **South** of quarry access road intersection	N/A	C	C	C	C
Kapa'a Quarry Access Road	N/A	C	C	C	C

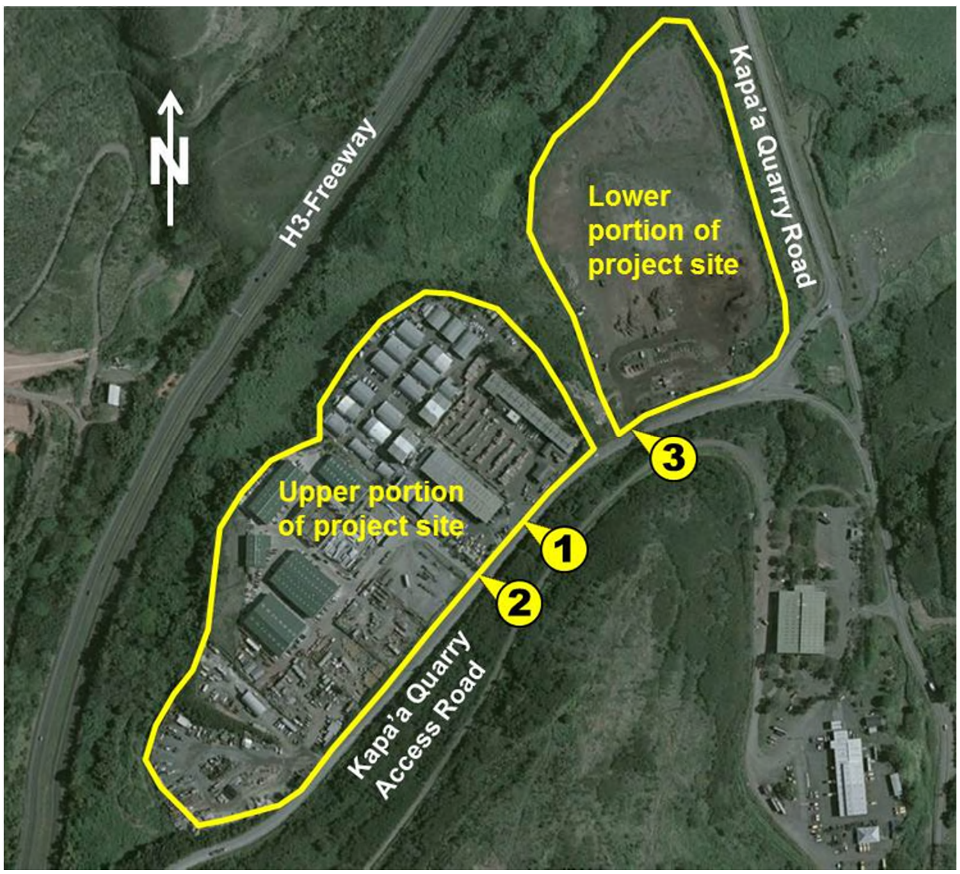
LOS level requires mitigation as unsatisfactory traffic conditions occur

The results of the projection of the future traffic in Table 4-12 suggest that by the year 2016 no mitigation would be required at the intersections as well as on the roadways since the intersections and roadways would operate at a LOS level of D or better. Under urban area traffic conditions, which apply for the proposed site, mitigation measures are required when intersections and roadways are operating at LOS levels lower than D, e.g. at LOS E or F. For the traffic conditions in 2026, which implies at the propose project full build out, unacceptable LOS levels are expected for all three intersections that would be affected by the proposed project. Possible mitigation measures are discussed later on in this section.

4.9.4 Expected Traffic Condition at Proposed Project Driveways

The proposed project will have three driveways. Figure 4-14 shows the locations of the proposed project driveways. Driveways No. 1 and No. 2 are serving the upper portion, and driveway No. 3 is serving the lower portion of the project site. There are two more driveways, one for the upper and one for the lower portion of the site, which are intended for use by emergency vehicles only and are not regular driveways. Table 4-13 indicates that all three traffic driveways would operate at LOS levels of C or better, therefore traffic conditions would be satisfactory.

Figure 4-14 Project driveways



A sight distance analysis was carried out for the three project driveways. The sight distance analysis is presented in Appendix 5 of this FEIS. All sight distances for right-turn and left-turn maneuvers at the three driveways, Driveways No. 1, No. 2 and No. 3, would be adequate, considering the layout of the driveway, roadways as well as buildings, structures and vegetation adjacent to the driveways presented in this sight distance analysis. Figure 4-15 shows an example of the sight distance assessment for project driveway No. 3 (serving the lower portion of the site). The sight distance analysis suggests that all project driveways would have adequate sight distance and there would be no adverse traffic impacts due to insufficient sight distances. (A comprehensive sight distance assessment study is presented in Appendix 6 of this DEIS).

Table 4-13 Expected LOS of proposed project driveways

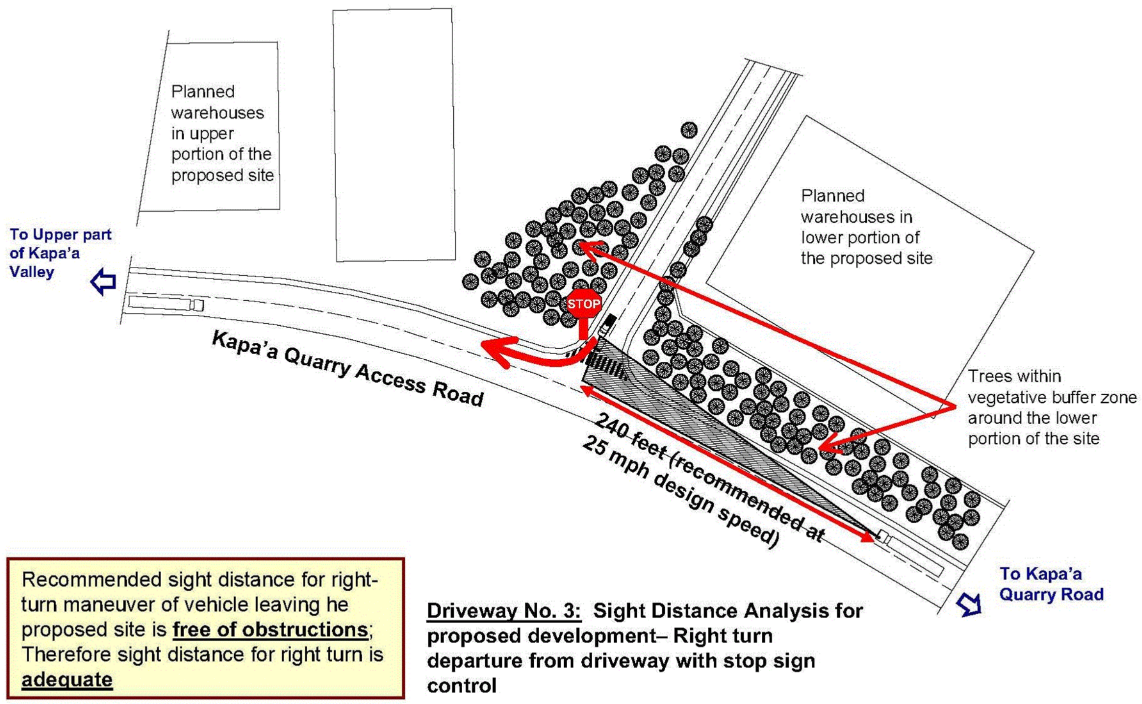
Driveway intersection & movement	Future traffic volumes background + project 2016		Future traffic volumes background + project 2026	
	AM peak LOS	PM peak LOS	AM peak LOS	PM peak LOS
Driveway No. 1: upper portion of the project site				
eastbound; left turn and through traffic	**A**	**A**	**A**	**A**
southbound; left turn and right turn	**B**	**B**	**B**	**B**
Driveway No. 2: upper portion of the project site				
eastbound; left turn and through traffic	**A**	**A**	**A**	**A**
southbound; left turn and right turn	**A**	**A**	**B**	**A**
Driveway No. 3: lower portion of the project site				
eastbound; left turn and through traffic	**N/A**	**N/A**	**A**	**A**
southbound; left turn and right turn	**N/A**	**N/A**	**C**	**C**

Note: Number of driveways are assigned in Figure 4-13

4.9.5 Traffic Impact Mitigation Measures

The traffic impact analysis suggests that the traffic conditions in the year 2016 would not warrant mitigation measures since all intersections and roadway segments that would be affected by the proposed project would be operating at LOS levels equal or better than D. LOS D is the lowest LOS level that does not automatically carry the requirements of mitigation. The expected traffic conditions in the year 2026, which represent the completion of the development in the lower portion of the site and the full build out of the proposed industrial park, would require mitigation measures, since the three intersections would operate at a LOS levels lower than D.

Figure 4-15 Sight distance analysis for project driveway No. 3



As stated, it is recognized that it might be not feasible to firmly consider specific mitigation measures since it seems advantageous to conduct a new traffic impact assessment study several years into the project. The completion of the development in the upper portion of the site, for example, could be an appropriate project milestone when a new traffic assessment could be carried out. At a later time in the development schedule of the project, a new traffic assessment would compare the projected traffic volumes with the actual occurring traffic levels at that time. This would make it possible to better define and design mitigation measures.

Considering that mitigation measures might be better defined at a later stage in the project after reassessing the traffic conditions several years into the project schedule, the following suggested mitigation measures indicate what scope of mitigation might be required as the worst case scenario by the end of the project development, expected in the year 2026:

1. During PM peak hour, the intersection of Kapa'a Quarry Road at Mokapu Boulevard would operate at LOS level F. This would require implementing mitigation measures. The proposed mitigation measure would be the addition of an eastbound to southbound right turn and deceleration lane.
2. The intersection of Kapa'a Quarry Road at Kalanianaole Highway would operate at an AM peak LOS level E. The proposed project, however, would not add traffic to the

movements within the intersection, which are responsible for the low LOS. The reduced level-of-service is the result of increased background traffic. An appropriate mitigation measure would be the addition of a second eastbound left turn lane which would mitigate the unacceptable level-of-service for the movement through the intersection.

3. During PM peaks, left turns at the intersection eastbound Kapa'a Quarry Access Road to northbound Kapa'a Quarry Road would operate at Level-of-Service E, which might cause long delays and long queues. Mitigation could be implemented in form of an added acceleration and merge lane for the northbound quarry road out of the quarry access road. This lane at the intersection of quarry and quarry access road would allow acceleration of the left turn traffic from the quarry access road without interfering in the movement of the northbound traffic on the quarry road.

Other recommendations of the TIAR are as follows:

- The project could provide shuttle bus service along Kapa'a Quarry Road between the project and Mokapu Boulevard and Kalanianaole Highway to provide transportation for employees to and from the public transportation bus stops. The Bus presently operates routes along Mokapu Boulevard and Kalanianaole Highway.
- Based on the LOS analysis, no improvements are required to accommodate project traffic volumes along Kapa'a Quarry Access Road and the projected traffic volumes of traffic between the various phases is minimal. However, the background traffic along Kapa'a Quarry Access Road would consist primarily of larger, heavy vehicles. The turning movements of larger and heavy vehicles into and out of the project driveways would have an adverse impact on the through traffic on the quarry access road. Therefore, the feasibility of a "frontage" road connection between the project drive ways might offer some mitigation. If frontage lanes are not feasible, left turn storage lanes should be provided. (Refer to the TIAR in Appendix 5 for a more detailed discussion)
- A sidewalk might be required along the property at the Kapa'a Quarry Access Road.
- The TIAR recommends that an update TIAR might be performed some years into the project, for example after the expected completion of the development in the upper portion of the proposed site and prior to the expected time of start of development in the lower portion of the site. As determined in the traffic impact assessment, some form of mitigation would be required before the full build out of the project, expected around 2026. The objective of an updated TIAR would be to confirm the background traffic growth estimates, confirm that trip generation rates are reflecting the actual situation and the quantify the reduction of peak hour traffic as a result of the traffic management plan, for example determine the scope of alternative transportation modes used by the park occupants.

4.9.6 Consideration of Impacts from Heavy Vehicle Traffic

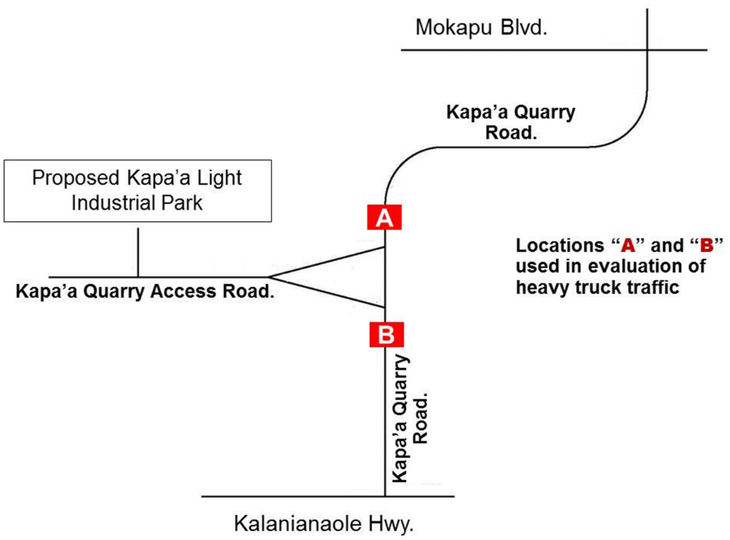
The data derived in the TIAR is used to evaluate the likely increase in heavy vehicle traffic on the quarry road. For this analysis the projected number of heavy vehicles is used. The percentage of heavy vehicle of the total traffic was assessed for the existing traffic conditions in the traffic count. The calculation of the expected background traffic , trip generation and derived total traffic for the year 2016 (e.g. the conclusion of the development of the upper portion of the site) follows the same assumptions and procedures as for the total traffic.

The assessment of the increase of heavy vehicle traffic on the quarry road was done at two locations, and for both the AM and the PM peak. The traffic levels on the southbound and northbound traffic were added to give the total, bidirectional traffic volume as the representative traffic volume. The locations “A” and “B” are defined in Figure 4-16, where “A” represents the northern segment of Kapa’a Quarry Road, between the intersections with the quarry access road and Mokapu Blvd and “B” represents the southern road segment between the quarry access and Kalanianaole Hwy. Figure 4-17 shows the increase of heavy vehicle traffic at locations “A” and “B” through 2016, which represents the expected time of completion of the development in the upper portion of the site, for the Am and PM peak traffic.

The results in Figure 4-17 suggest that the traffic volume, expressed in number of heavy vehicles, on the northern segment of the quarry road, represented by “A”, would cause the greatest related traffic volume. In terms of increase of heavy vehicle traffic by 2016, the AM peak at “A” suggests an approximately 70 percent increase in volume: a magnitude of increase that is about the average of increase in heavy vehicle traffic under the four scenarios illustrated in Figure 4-17. It is therefore expected that the northern segment of the quarry road would experience most of the possible impacts of heavy vehicle traffic. A comparison of the project related rates of increase between total traffic and heavy vehicle traffic suggests a 36 percent increase in total traffic volume versus 70 percent increase in heavy vehicle traffic. Therefore the traffic impact assessment suggests that the heavy vehicle traffic generated by the project would result in a twice as large increase in traffic volume than that of the total traffic. It might be beneficial to validate these projections in a new TIAR to be conducted several years into the project, for example at the time a major project milestone is completed, such as the completion of the development in the upper portion of the proposed site, in order to plan mitigation measures with a better understanding of the actually occurring increases in specific traffic volumes.

It is expected that the increase in heavy vehicle traffic may adversely affect the environment and the community, such as through traffic congestion, increase in noise and air pollution, increased highway maintenance costs, increase or wildlife collisions, and other safety issues. Some of the major potential impacts are discussed in the following.

Figure 4-16 Location of point A and B for heavy truck impact evaluation

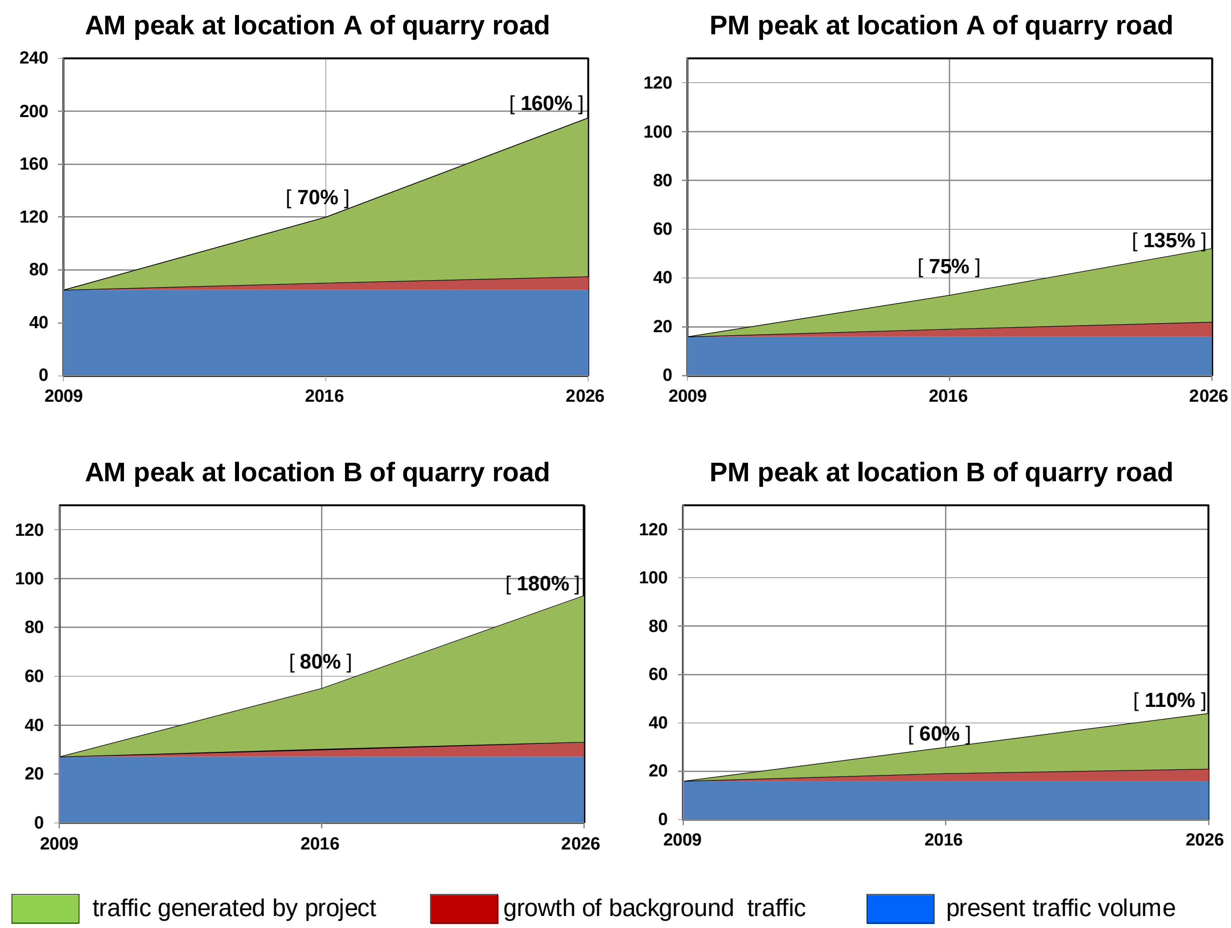


<u>Impacts due to weight:</u> Heavy vehicles contribute more to roadway damage than light vehicles. There is a correlation between weight of trucks and buses and the amount of anticipated damage to bridges and roadway pavement. Hawaii limits the maximum weight and length of heavy vehicles to 65 feet for truck-tractors and semi-trailers and 80,000 pounds for any vehicle that operates or moves on any public road, street, or highway within the state. But the weight of trucks on certain roads could be limited to significant lower allowable weights, especially on roads that were built decades ago and have bridges that cannot accommodate modern day heavy vehicles. While road damages generally increase with heavier vehicles the individual axial weight is also important to consider. Recent trends are towards larger and heavier trucks that would reduce the number of trips and also lower the axial loads since these larger vehicles usually distribute the weigh on more axles, thereby reducing the impacts to roadway pavements.

<u>Impacts due to noise:</u> Noise impacts from heavy vehicles result from two main parameters, the traffic stream and the individual noise from the heavy vehicle.

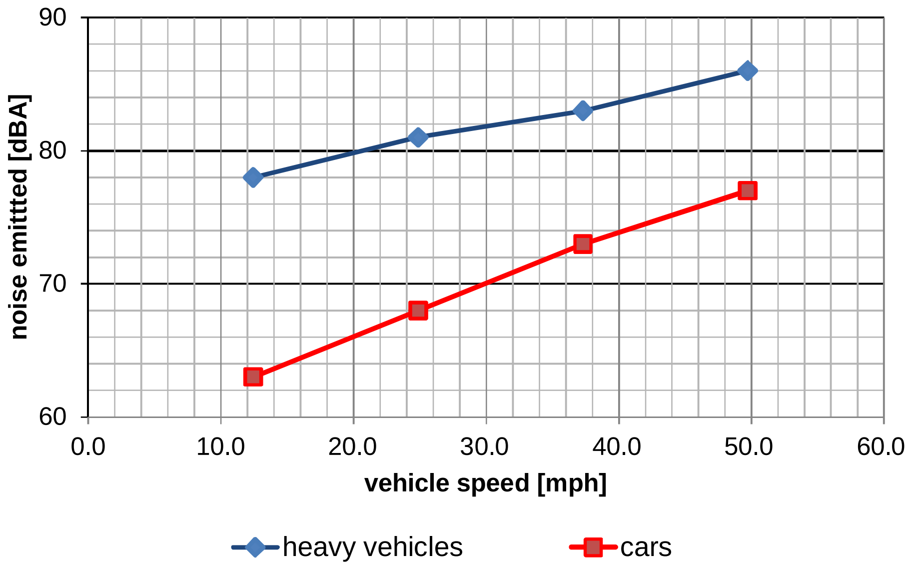
Noise levels resulting from the traffic stream increases with vehicle speed of individual vehicles on the road. The increase of noise with the vehicle speed follows a function that is specific for the type of vehicles. As an approximation, Figure 4-18 shows a comparison between the typical generated noise by a personal car and a heavy vehicle with three of more axles traveling at the same speed (Figure 4-18 represents an average of data given by different publications). As the figure suggests, the noise level emitted by heavy vehicles is significantly higher than for cars. Figure 4-18 suggests that a reduction in speed related noise is more readily accomplished with cars than with heavy vehicles. Reducing actual driving speed can result in significant noise reduction. Enforcing speed limits can be a challenge and typically requires the buy-in of drivers. Enforcing speed limits through simple static signs is most often not effective; but controls as well as dynamic variable signs and those informing drivers of their speed can result in significant speed reduction and noise mitigation. As a rule of thumb, doubling or halving traffic volume results in noise changes of about 3 dBA, which is the level of noise change discernible to the human ear.

Figure 4-17 Projected increase of heavy truck traffic on quarry road for 2016 and 2026



Vertical axis = peak traffic of heavy vehicle (HV) [total number of HV in both direction on quarry road]
[xxx %] % increase of traffic generated by project relative to background traffic in that year; rounded to nearest 5%

Figure 4-18 Comparison between typical speed dependent noise level generated by cars and heavy vehicles



Noise resulting from the operation of an individual heavy vehicle can be strongly attributed to the driving patterns of the operator. The noise emitted from the vehicle is a strong function of the rpm of the engine. Driving the vehicle in low gear can contribute to higher noises. Furthermore frequent deceleration and acceleration can result in higher noises than for vehicles traveling at a constant speed. Avoidable noise is generated from idling large engines unnecessarily and there are recent laws and ordinances forbidding unnecessary engine idling. Another source of noise in the operation of heavy vehicles is pneumatic brakes, which suggests that heavy vehicles driving at a constant speed can reduce noise levels.

Safety issues: Accidents involving heavy vehicles are always risky due to the large kinetic energy coming to an abrupt halt or deflecting on other vehicles. As rule of thumb, human error is the biggest contributor to accidents, not size or weight of the vehicle. For about two thirds of accidents involving heavy vehicles, the drivers of light vehicles are “at fault”. Operators of heavy vehicles are professionals who know the capacity and limits of their vehicles often better than operators of private cars. The most common contributors to driver impairment in heavy vehicle are fatigue, drug taking (including drinking) and medical conditions.

The most effective mitigation of accidents involving heavy vehicles is a more effective general road safety deterrence, which includes regulating traffic issues on the roads that are most responsible for unsafe mixing of significant traffic volume of heavy vehicles, cars, light trucks and motorcycles.

Beside human error, ineffective roadways can contribute to a less than desirable safety situation on the roads, such as reduced lane width, sharp curves, insufficient visibility, high speed limits and missing visual indicators, to name a few. Mitigation could include such measures as clearance of roadside hazards or use of barriers to reduce such hazards, improvement and widening of shoulders, audible edge lining, night-time delineation, passing lanes (where appropriate), and replacement of intersections by roundabouts.

Wildlife collisions: An impact of significance for the proposed project is possible wildlife collisions, due to the proximity to the marsh. Avoidance is easier and potentially safer for a car than for a heavy vehicle, given the mass of a truck or bus. Elevated speed is a major contributor to wildlife collisions, since reaction time and avoidance maneuvers are more difficult at higher speeds. The frequency of wildlife collisions is further dependent on the time of day, with night contributing most of the collisions since wildlife is more active at night and can be blinded by headlights of approaching vehicles. Since heavy vehicle traffic resulting from the proposed project would be almost exclusively during the daytime there would be a significant reduction in related impacts. Studies have shown that informative dynamic signs, such as “drive slowly to protect our wildlife” or “# of birds were killed last year on this road; drive with caution” are more effective in promoting better and slower driving than static signs. Considering such dynamic signs for the quarry road and in the vicinity of the marsh might have a positive effect on the reduction of animals killed on the road.

Impacts on air quality: Heavy-duty diesel engines of trucks and buses release unburned hydrocarbons, carbon monoxide (CO), sulfur oxides, nitrogen oxides (NOx), particulate matter, and other toxic compounds. While the emission of hydrocarbon emissions and carbon monoxide from heavy vehicles represent only a small fraction of the overall traffic related emission of these agents, heavy vehicles contribute significant amounts of NOx and particulates. NOx and particulate matter both contribute to public health problems in the United States. NOx emissions from diesel vehicles play a major role in ground-level ozone formation. Ground-level ozone, more commonly known as "smog," is a respiratory irritant that is most problematic in the summer months. It causes a range of health problems related to breathing, including chest pain, coughing, and shortness of breath. Diesel particulate matter (soot) is a fine particulate matter that is easily inhaled and deposited deep in the lungs and is a probable human carcinogen. Particulate matter can be linked to increased respiratory symptoms and disease. Children and the elderly are most at risk of ozone and particulates. In addition, ozone , NOx, and particulate matter can adversely affect the environment through damage to vegetation, impacts to the aquatic environment and visibility impairment.

Harmful emission levels from heavy vehicles are a function of the weight and size, and therefore of the engine power of the vehicles, and naturally more vehicles with more powerful engines emit more. What seems to be a more important determinant, however, are the ages and the state of operational readiness of the vehicles. Stricter standards for new trucks, originating back some 10 years and having become applicable standards recently, have resulted in significant reductions of emissions, and have lowered the emission of heavy diesel powered vehicles by more than 90% under those of vehicles built only 20 years ago. Therefore, approximately 8 of today's cleaner trucks and buses equal the NOx and particulate matter emissions from one heavy vehicle manufactured about 15 years ago. The reductions are achieved through the use of pollution control devices (e.g. catalytic converters) and low sulfur diesel content, which has reduced the sulfur content of road diesel from 500 ppm to 15 ppm. The overall clean air impacts of these rules have contributed to a significant reduction in emissions from diesel operated heavy vehicles.

The new standards are not applicable to retrofits of the existing fleet of heavy vehicles. Too many vehicles remain in a poor operational state and continue to emit high levels of particulates, visible as smoke. Excess smoke generation indicates diesel engines require maintenance and dark smoke is a sign of insufficient combustion, resulting in wasting fuel and producing excess emissions. From the public's perspective smoking trucks symbolize significant health concerns which need to be mitigated. Suitable mitigation efforts include promoting regular tune-ups and maintenance. Enforcement to reduce excess smoke can use tests to determine the opacity of smoke being emitted from the exhaust pipe. An engine that is not emitting any smoke or emits very little smoke is probably operating efficiently and will pass the opacity test.

Safety concerns that are not directly related to the project: As stated by several commenters, the Kapa'a Quarry Road in its existing condition has inherent safety concerns that should be mitigated even in the absence of future project related traffic volume increases. These safety concerns include one significant vertical dip combined with a horizontal curvature in the quarry road, several portions of the road with less than optimum pavement conditions, missing stabilized shoulders on sections of the road, and a virtually missing shoulder along a portion of the drainage canal (directly adjacent to the proposed project). The proposed project will have an impact on the pre-existing road problems, since future employees and customers of the proposed light industrial park will use the quarry road.

Improvement of the existing traffic problems will include two issues; first, the identification of the type and magnitude of the problems and possible measures to improve the current situation, and second, how the responsibility for the improvements will be distributed between the parties; e.g. the existing land uses, the owner of the street and affected intersections and the proposed project. Section 6.7 discusses this issue as an unresolved issue.

Mitigation measures to limit impacts from heavy vehicle traffic which would be considered under the action alternatives include the following:

- Increasing the safety on the quarry road by enforcing or promoting the speed limit, experience has shown that static signs are not as effective as dynamic signs and active enforcing the speed limit.
- Clearance of roadside hazards or installation barriers to reduce such hazards, as an example of a roadside hazard is the present state of the drainage canal directly adjacent to the quarry road and a missing shoulder separating the road from the canal, over sections of the road.
- Improvement and widening of shoulders, possibly also implementing a shared bicycle or sidewalk at sections of the quarry road.
- Audible edge lining and night-time delineation to increase traffic safety during night time. Streetlamps are not installed along the quarry road and therefore nighttime visibility remains difficult. However, streetlights would add to light pollution along the marsh and might not be advisable.
- Passing, acceleration or deceleration lanes (where appropriate) to allow a more effective merging of the heavy vehicles into the quarry road. As have been shown in the TIAR, the AM peak left turn from the quarry access road would require mitigation before planned completion of the proposed industrial park, die to unacceptable level of service (LOS).
- One possible measure to improve the level of service of the intersection of quarry road and quarry access road would be the replacement of the intersection with a roundabout traffic. The roundabout would avoid the potentially problematic merging of heavy vehicles into northbound traffic on the quarry road. A roundabout might also be preferable to other measure, such as signalizing the intersection.
- Noise impacts could be mitigated by avoiding an unsteady traffic flow with frequent decelerations and accelerations. Noise reductions can also be achieved by such measures as lowering the speed on the quarry road, improving the pavement quality and installing noise barriers, e.g. a tree line at the mauka side of the quarry road (this would also help in reducing the visual impact and the probability of wildlife collisions.
- Air impact mitigation is best achieved by promoting the use of newer heavy vehicles in the proposed development and by promoting avoidance of unnecessary idling, strong acceleration and decelerations. The operator of the proposed industrial park could identify inefficient vehicles driving in the development by the amount of excess dark smoke and require maintenance and engine tune-ups as a condition to operate in the industrial development.

~~With such mitigation measures implemented, the adverse impacts from project related heavy vehicle traffic on the adjacent roadway could be effectively mitigated to such an extent that no significant impacts are expected.~~

While the above mitigation measures will help to significantly lower traffic impact, heavy truck traffic is a special case that would require extensive and comprehensive mitigation measures in order to reduce impacts to below significant levels.

4.9.7. Parking

Under both action alternatives, parking would be exclusively on-site and public roads would not be used for parking by employees and visitors of the proposed industrial park. Therefore there would be no adverse impacts on roadway parking. Both alternatives would provide sufficient parking and loading space in accordance with county land use ordinances.

Under the Preferred Alternative, on-site parking spaces would be less available as under Alternative B, in accordance to the sustainable design approach that encourages alternative modes of transportation. Under the Preferred Alternative parking spaces would be preferably offered to drivers of low emitting vehicles and car- and van-pools. Under the No-action Alternative there would be no added demand for parking and therefore there would be no adverse effect on roadway parking.

4.9.8 Public Transportation

At present the proposed site is not served by public transportation and no plans have been identified by public transportation authorities to start serving the proposed site in the foreseeable future. The nearest bus stops are at Kalanianaole Highway and Mokapu Boulevard, and employees and visitors who wish to walk to the proposed site would find it hard to walk along the quarry road due to missing or insufficient shoulders and completely missing sidewalks.

Under the low impact development goals of the Preferred Alternative, the applicant envisions implementing a private shuttle that would connect the proposed development with parts of Kailua or Kaneohe or with the nearest public transportation service locations. The implementation of a private shuttle is not committed to in the sustainable design approach and no credit points under the LEED sustainable site credit categories are attempted at this point. The implementation of a shuttle service would be contingent on the identified need for employees and visitors of the propose development. Connecting the proposed site to the public transportation system would be a positive step in promoting the low impacts development goals of the proposed development.

Under Alternative B, no shuttle service is planned and no added demand for public transportation would be expected from the proposed project.

Under the No-action Alternative, there is no known demand for public transportation due to the non-existence of a connection to public transportation.

4.9.9 Alternative Modes of Transportation

As discussed in the previous section, the applicant envisions a private shuttle service if no public transportation service to the proposed site would be implemented before the expected full build-out of the development. With a private shuttle service between, at least, the closest public transportation service points (e.g. bus stops), the occupancy of the affected bus lines on Kalanianaole Highway and Mokapu Boulevard would increase. It is anticipated that the added demand for public transportation would be within the capacity of the existing public transportation system.

Under the Preferred Alternative's low impact development approach for the lower portion of the site, the use of bicycles would be incentivized by secured bicycle storage and shower facilities, in accordance with LEED requirements. While the proposed project promotes the use of bicycles as an alternative mode of transportation, the quarry road in its existing state does not offer a safe and convenient use of the road for bikers. The proposed marsh perimeter pathway would serve as an attractive and safe means of reaching the proposed site by bicycle from the Kailua and Kaneohe directions. The perimeter path would significantly support the low impact goals of proposed development and it is expected that employees and visitors of the entire industrial development, and not only those of the lower portion of the site, would use the perimeter path. While the perimeter path would be primarily used by pedestrians and bikers for recreation employees and visitor of the park would increase the use of the path. It is expected, however, that project-related additional pedestrians and bikers who would be using the perimeter path between Kalanianaole Highway and the site and between Mokapu Boulevard and the proposed site would not add a significant number of users to surpass the capacity of the perimeter pathway. Therefore it is not expected that the proposed project would have adverse impact on the planned marsh perimeter pathway.

The conceptual design of the proposed route of the marsh perimeter defines the path of the perimeter path to follow along the eastern boundary of the lower portion of the proposed sites. The proposed alignment of the perimeter path along the boundary of the property would coincide with the alignment of the existing drainage canal. The proposed path could only be installed in the area if the existing canal would be filled and the area above the existing canal be used for installing of the perimeter pathway. A separate environmental review might be necessary to ascertain that the adverse impacts of converting the existing canal to make room for the proposed perimeter pathway would not cause significant impacts to the environment.

Under Alternative B, no efforts are planned to promote alternative transportation modes and therefore there would be no adverse effects.

Under the No-action Alternative, no changes would occur in regard to alternative transportation modes.

4.10 Impacts on Existing Views

The proposed project site is located in the Kapa'a Valley, which is located next to the Kawainui Marsh, the largest contiguous wetland area in the state. The project site is located in the lower reaches of the Kapa'a Valley and represents approximately six percent of the land area of the Kapa'a valley. Over the past several decades the Kapa'a Valley has experienced significant changes in its appearance. Significant portions of the valley have been converted from agricultural land use to industrial land use. These industrial operations have contributed to changes in topography in the valley, with vegetation of larger parts of the valley being removed and converted to quarries and landfills. A series of aerial photos, Figures 4-19 through 4-22, portray changes in land use and character of the Kapa'a Valley over the past six decades.

Figure 4-19 shows Kapa'a valley in 1952. The main land use in the lower reaches of Kapa'a valley was agriculture. A raised roadway, being built in the 1940s, separated the Kapa'a Valley from the Kawainui Marsh. Figure 4-20 shows Kapa'a valley in 1965. Significant land area in the valley was converted to quarries and landfills. Agricultural land, stream channel and wetland areas were covered with refuse and/or quarry tailings and overburden. Figure 4-21 shows the valley in the year 1976. The landfill and quarry operations had expanded and occupied more land. Some of the landfill operations were completed. Figure 4-20 shows the work on the H3-Freeway underway. Figure 4-22 shows the valley in the year 1993, when parts of the former quarry and landfill areas in the lower parts of the valley were completed, and vegetation can again be seen covering parts of the former disturbed land areas. Figure 4-23 shows the lower portion of the Kapa'a valley in its present appearance, where the former quarries and landfills have been either vegetated or converted to other land uses. This figure shows the proposed project site, with the existing warehouse development and graded land areas in the upper and lower portions of the site.

As the previous figures show, the Kapa'a Valley has seen major changes in land use and appearance. Efforts during the past decade have improved the appearance of wide stretches in the valley and reintroduced vegetation on the areas where quarries and landfills had created stretches of exposed soil and rock.

Under the two action alternatives, the proposed project would affect existing views in the lower portion of the Kapa'a valley. Warehouse structures would be constructed on land that is presently developed and graded, but not vegetated. A comprehensive visual impact assessment was done to compare existing views with anticipated views of the completed project and is

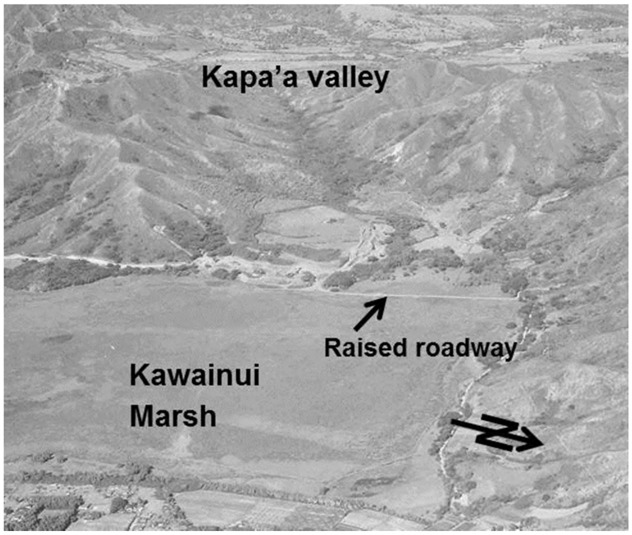


Figure 4-19 Kapa'a valley in 1952

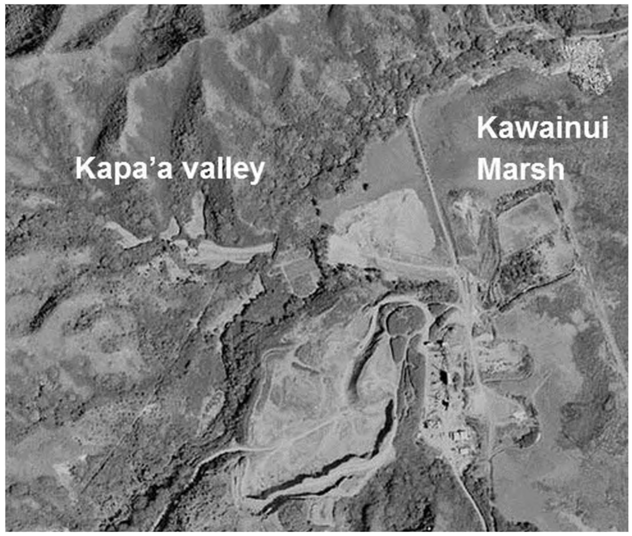


Figure 4-20 Kapa'a valley in 1965

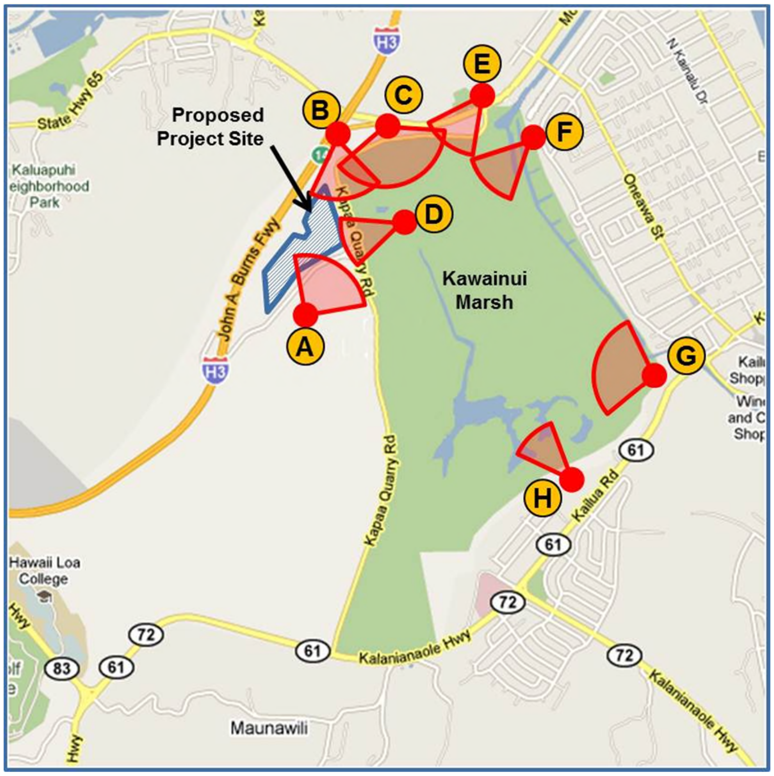
Figure 4-21 Kapa'a valley in 1976

Figure 4-22 Kapa'a valley in 1993

Figure 4-23 Proposed project site in Kapa’a valley at present

presented in Appendix 8 of this DEIS. The view analysis considered a total eight viewplanes at various locations in the vicinity of the proposed project site. To be considered as relevant viewplanes, the locations have to be publicly accessible and represent places of public interest. Figure 4-24 identifies the eight viewplanes used for the visual impact assessment in terms of location and directions of the camera.

Figure 4-24 Definition of eight viewplanes used in the visual impact assessment



The eight viewplanes A through H are defined as follows:

A. Panoramic view from Pahukini Heiau
B. View from the H3-Freeway; at the beginning of the off-ramp
C. Panoramic views from the H3-offramp, at the lane merge with Mokapu Boulevard
D. View from the grounds of the Model Airplane park
E. Views from the grounds of Kalaheo High School
F. View from the Kawainui Neighborhood Park <u>and the northern part of the path along the flood control levee</u>
G. Panoramic view from the southern end of the flood control levee
H. Views from the viewing area of the Ulupo Heiau

Figure 4-25 Existing Viewplane B

Figure 4-26 Existing Viewplane C

Figure 4-27 Existing Viewplane D

Figure 4-27.B Existing Viewplane F-2
(This figure has been added to the FEIS)

In an initial visit at the locations of the viewplanes, an assessment was made of whether the proposed project site was in direct line of sight. From several viewplanes the proposed project site was either not visible, or the large distance suggested a minor visual impact. Viewplanes B, C ~~and~~ D, and F were identified as having a noticeable visual impact. These ~~three~~ four viewplanes are shown in Figure 4-24, 4-25,~~and~~ 4-26 and 4-26B.

For the assessment of how the proposed project development would affect viewplanes under the Preferred Alternative, a virtual model was created and a series of virtual images were generated from the same location and camera settings as the original photos of the viewplanes analyzed. Since it was determined in the initial assessment that the upper portion of the site would not create significant visual impact, the virtual model was only created for the lower portion of the site. Figure 4-28 shows the extent of the virtual model in a superposition with an oblique aerial photo of the proposed site. The virtual model contained the concept layout of the proposed industrial development, with true dimensional representation of warehouses, roadways, site grading, landscaped areas as well as trees, which would serve as visual impact mitigation (as well as for other functions under the low impact development approach). In the virtual images generated for the assessment, objects were rendered with solid surface colors rather than texture maps in order to clearly distinguish the virtual objects from the actual background in the photographic images of existing viewplanes. Using texture maps would create more photorealistic images but mostly for close up views, while the visual impacts assessment typically used views from larger distances (viewplane D is an exception and shows anticipated views of the proposed project from a closer distance).

Figure 4-28 Scope of virtual model of the proposed development used in the visual impact assessment

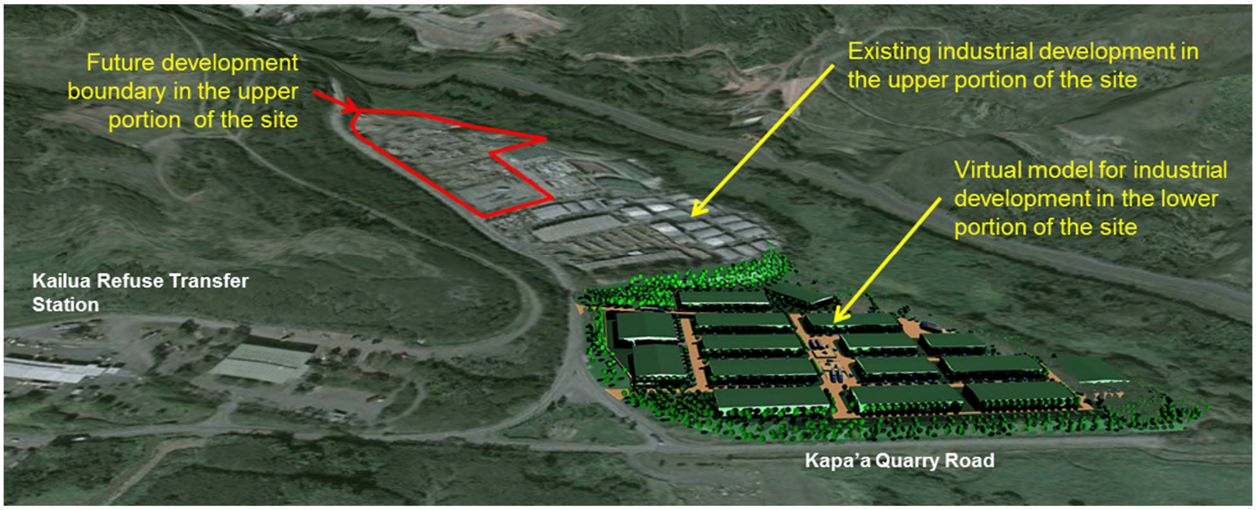


Figure 4-29 Expected view for viewplane B under the Preferred Alternative

Figure 4-30 Expected view for viewplane C under the Preferred Alternative

Figure 4-31 Expected view for viewplane D under the Preferred Alternative

Figure 4-31 B Expected view for viewplane F-2 under the Preferred Alternative (This figure has been added to the DEIS)

The anticipated views in Viewplanes B, C,~~and~~ D and F for the Preferred Alternative are presented in Figures 4-29 through 4-31B, respectively. For a more comprehensive discussion of all viewplanes, refer to Appendix 8 of this FEIS. Under the Preferred Alternative, the development footprint of the lower portion of the site would be surrounded on all four sides by vegetative buffer zones, which would contain larger trees, shrubs and lower vegetation cover to create a dense vegetative screen around the site. In addition to planting trees and shrubs within the buffers at the site perimeter trees would also be planted inside of the development around warehouses. Besides providing effective visual impact mitigation for distant views, the trees will also provide a better appearance inside the development, lower the heat island effect by providing shade for parking areas and building walls, provide sound attenuation, and improve the air quality.

As shown in Figure 4-29 ~~and~~ 4-30 and 4-31B , it is expected that with the planned visual impact mitigation measures used under the Preferred Alternative the proposed development would blend into the surrounding landscape and the industrial character of the development would be effectively softened. Figure 4-31 shows the expected visual impression of proposed development in the lower portion of the site from the grounds of the model airplane park. Figure 4-31 used photorealistic representation of trees which would be part of the vegetative buffer zones around the development. In this view, warehouses in the lower portion of the site would only be slightly distinguishable above the trees of the buffer zone.

It is expected that under the Preferred Alternative, visual impact mitigation measures for the proposed development in the lower portion of the site would add no significant adverse visual effects to the appearance of the lower part of the Kapa'a valley. The existing development within the upper portion of the site is already effectively shielded by an existing line of mature trees at the western boundary of the parcel 4-2-15:008. The applicant plans to add several trees to the existing line of large trees at the eastern site boundary of the upper portion of the project site. The added tress will further decrease the visual impact of the warehouses in the upper portion of the site from distant views.

The low impact development approach under the Preferred Alternative has identified other visual impact measures that might be implemented if the final design recommends its use. One of the technologies considered would be "green walls". A "green wall" is a green building technology that is increasingly used in urban setting to provide attractive cover of living vegetation on otherwise bare looking walls. Green walls use a variety of plants that grow on structurally independent lattice structures which are attached to walls. Green walls are a recent building technology (although many old houses in the US and in Europe have plants growing vertically up on the exterior walls). For industrial buildings, the final design of the proposed project will determine whether green walls would be feasible and recommended. The proposed visual impact mitigation measures under the Preferred Alternative could be augmented by using green walls on eastern and/or northern walls of warehouses at the eastern side of the development in the lower portion of the site that face the marsh.

Under Alternative B, the visual impact would not be mitigated to the same extent as under the Preferred Alternative. No virtual model was created for the planned Alternative B site layout of the lower portion of the site. Under Alternative B, the perimeter buffer zones around the lower portion of the site would not be improved to the same extent as under the Preferred Alternative. No trees would be planted under Alternative B within the site, and therefore visual impact mitigation would be significantly less than under the Preferred Alternative. The appearance of the development in the lower portion of the site would reflect a typical industrial warehouse development, featuring larger structures and paved traffic areas between them.

Under the No-action Alternative, the existing appearance of the project site as depicted in Figures 4-25 through 4-27B would not be altered and there would be no changes in the visual impact.

4.11 Impacts on Land Use and Zoning

This section discusses the expected impacts on land use and zoning for the proposed site and the vicinity. Both action alternatives would change the existing land use and zoning at the proposed site. While the land use under the action alternatives would be different from the existing land use, the proposed land use would not be incompatible. The proposed industrial development would be in an area that is already characterized by larger industrial land uses, and the proposed development, especially under the Preferred Alternative, would effectively mitigate environmental impacts with a low development approach that stresses a development that is responsible towards the environment and the community.

4.11.1 Impacts on Land Ownership

The proposed development would be built on land that is already under the ownership of the applicant and therefore no changes in ownership would be required

4.11.2 Impacts on County Land Use Designation

Both action alternatives would require the rezoning of two of the three land parcels of the property. Parcel TMK 4-2-15:001 (portion of) and 006 are presently within the P-2 (General Preservation) land use zone district and would require a zone change to I-1 (limited industrial). The third parcel TMK 4-2-15:008 is already zoned I-2 (Intensive Industrial) and would not need a zone change.

Under the No-action Alternative no change in land use zoning would be required.

4.11.3 Impacts on State Land Use Districts

The proposed project site is within the Urban state land use district and there would be no changes required under the two action alternative and the No-action Alternative.

4.11.4 Impact on Special Management Area

The lower portion of the site is within the Special Management Area (SMA) . Therefore both action alternatives, the Preferred Alternative and Alternative B, would require a SMA permit for the proposed project.

4.11.5 Impacts on Land Use for the Surrounding Environment

The following land uses would be affected by the action alternatives but would not be affected by the No-action Alternative:

The existing land use in the Kawainui Marsh might be affected; but it is expected that any adverse effect could be mitigated. Impact on the Kawainui Marsh are discussed in more detail in section 4.14

The proposed marsh perimeter trail system would be affected by the proposed project. It is expected that the positive effects of the proposed project would outweigh possible adverse impacts. Adverse impacts on the perimeter path would possibly include increased traffic on the quarry road, associated increases in noise and possibly slightly affected air quality. The expected increases in average traffic related noise from approximately 60 dBA to 63 dBA, at the time of full build out, would still be within a range that is typical for an urban environment. While the perimeter trail would most likely run at a distance from the quarry road for most of the length from the Kalanianaole Highway to Mokapu Boulevard, the planned trail alignment would use an area adjacent to the proposed site for a section of about 1,500 feet. Possible impact would also arise from employees using the trail to commute by bicycle of walking from the bus stops on Mokapu Blvd. or Kalanianaole Highway.

According to the Masterplan of the perimeter path, the area of the mauka drainage canal adjacent to site would be used to construct the perimeter path. This could only be realized when the drainage canal would be modified from its present state; a situation that is not considered under this DEIS but an initiative which the applicant would support.

The industrial operations in the upper part of the valley would be affected by the increased traffic on the quarry road and quarry access road. The traffic impact assessment for this DEIS suggests that the level of service (LOS) on the quarry access road would not be significantly affected by the increase traffic volume generated by the proposed project. The proposed project would increase the water and electricity consumption and thus would impact the associated supply situation of the valley. The capacity of electric supply of the Kapa’a valley would likely have to be increased during the development schedule of the proposed project. If an increase in electric load capacity has to be installed, ample capacity increments would be installed so that possible increases in electric load would not cause any capacity concerns to the established industrial uses in the valley. The water supply is expected to be adequate for the area, even with the added demand created under the two action alternatives. Wastewater systems are not affected since the Kapa’a valley is not connected to the municipal sewer system and onsite wastewater treatment and disposal occurs with septic systems.

The traffic on the federal H3-Freeway will be affected by the proposed project since it has been determined that most of the traffic generated by the proposed project would use the northern segment of the quarry road to go to and leave the proposed development by way of the connection of Mokapu Boulevard. It is expected that a part of the traffic generated by the proposed project would use the H3-Freeway to connect to the island wide and regional traffic network. It is expected that the number of additional trips resulting from the proposed project would not constitute a significant increase of traffic on the H3-Freeway.

The Le-Jardin Academy is located about 1.5 miles from the proposed site. It is expected that students of the Le Jardin Academy and their relatives would be affected by the increased traffic volume generated by the proposed project, but that the impacts would be minor. While it is expected that both action alternatives would affect the traffic volume on the entire length of the quarry road, it is anticipated that the northern segment of the quarry road will have higher increments in traffic volume than the southern segment. The school is located at the southern most segment of the quarry road, and therefore the school is likely less directly affected by traffic conditions. Besides traffic and associated impacts, no other impacts of the proposed project on the school are expected under both action alternatives.

Under the No-action Alternative, there would be no increase in traffic and therefore no adverse impact would be expected.

The Kapa'a Refuse Transfer Station is located in close proximity to the proposed project. It is expected that under both action alternatives, the transfer station would be affected by increases of electricity and water demand by the proposed project, as well as increases in traffic volume. Since the transfer station is located on the southern segment of the quarry road, the traffic impacts are lower than on the northern quarry road segment, where most of the additional traffic would occur as a result of the proposed project. Under the Preferred Alternative, the impacts on the electricity and water supply infrastructure are less than under Alternative B due to the low impact development approach of the Preferred Alternative. No electricity and water supply shortfalls, however, are expected for the transfer facility. The water supply to the transfer facility and other users in the affected area appears to be adequate for the anticipated increase in demand. Electricity supply would be adequate since there would be new power lines installed from the Kalanianaole substation along the quarry road if required.

Under the No-action Alternative, there would be no increase in traffic and also no increases in the water and electricity demand and therefore no adverse impact would be expected.

4.12 Impacts on Population and Community services

This section discusses the impact of the proposed project on the economic development in the Koolaupoko region and associated possible impacts on the community services. The market study, which was conducted for this environmental review, suggests that positive impacts of stimulating economic development in the region would most likely outweigh adverse socioeconomic impact.

The Preferred Alternative and Alternative B would create very similar socioeconomic impacts, and therefore only one assessment of socioeconomic impact is performed in this section. While treating the economic consequences of both action alternatives as equal it is understood, however, that the Preferred Alternative would create somewhat lesser consequences due to the low impact development approach of this alternative. For example, it is assumed that the capital investments of the LEED Silver certifiable development under the Preferred Alternative would involve slightly higher capital investments than developments which would be developed using conventional building technologies. Since the Preferred Alternative would incentivize carpooling, chances are higher under the Preferred Alternative that future employees from outside the greater Kailua and Kaneohe region would opt to commute to work rather than move closer to work, since the expenditures and strains associated with longer commutes would be much more manageable with carpools.

4.12.1 Economic Development Impacts

The main economic development consequence of the proposed project described in the market study for this environmental review are summarized in this section. Appendix 2 presents the market study and offers a more in-depth discussion of methodology, results and recommendation. It should be noted that with the advances in the concept design, some assumptions made in the market study have experienced some minor updates. For example, as a result of a 2010 survey of companies at the existing warehouse development (see Appendix 3 for a more detailed discussion of the company survey), it is anticipated that the minimum number of full time equivalent positions created by the proposed project would be about 80 percent of the number assumed in the market study, while the net increase of industrial space would be 90 percent of the added leasable space in the market study. While some of the input and output values of the models used in the market study might be lower following the updates in the concept design of the proposed project, the result and conclusions of the market study are still valid to describe the anticipated trends and general impacts of the project.

In the timeframe of 2030, it is estimated that the Koolaupoko region will readily support about 1,000,000 square feet of additional industrial-type floor area, which includes about 170,000 square feet of demand that will be created via dislocation and conversion of land use. Although an additional one million square feet would represent a doubling of the currently available industrial space in the region, the resulting leasable industrial space would still only supply about 40 percent of the average per capita allowance when compared to other major Oahu and State markets. It is expected that it will take about 15 to 17 years for the proposed the new industrial space to be reach absorption.

<u>The market study assumed that approximately 60 to 70 percent of current tenants at the existing warehouse development are relocations of newer and exiting small businesses; some upgrading from their home or non-conforming locations, seeking better value by leaving their</u>

more expensive locations to industrial developments in the Koolaupoko region, or being encouraged to locate the businesses closer to home in the Koolaupoko region. The remaining 30 to 40 percent are assumed to be new businesses, such as newly-formed companies or branch locations of already existing leeward companies. For the future it can be assumed that the newly developed industrial floor space will be about equally occupied by relocating companies and be new companies. The main reason for businesses to lease space in the proposed light industrial park will be to serve the expanding windward market without incurring extra cost associated with long distances service operations to the market.

~~The findings of the survey of businesses leasing space in the existing warehouse development, which was conducted for this DEIS, supports this assumption and has determined that 85 percent of the companies at the existing warehouse development are smaller companies with 1 to 9 employees, with the average number of employees per company at 6.3. Most of the other tenants are expanding businesses, which would like to serve the expanding windward market without incurring extra cost associated with long distances service operations to the market~~.

Besides the proposed project, there is very limited land within the Koolaupoko region that could be converted to industrial land use. This emphasizes the importance of creating industrial-type capacity by implementing the proposed project, since alternatives to the proposed site are almost non-existent compared with the size of the planned expansion of the existing warehouse development. The Koolaupoko sustainable communities plan discourages the development of any further industrial subdivisions in the district, but encourages the expansion of industrial uses in the Kapa’a valley “if sufficient demand can be demonstrated”. The market study has demonstrated that the region can readily absorb the planned expansion of the existing warehouse area and that the demand for industrial space is high.

The proposed project would generate about $50 million in new capital investment during the length of the proposed project, which is expected to last about 15 to 17 years, from start of site development to full build out. It is expected that total construction wages would be around $12 million.

Taxes that would be generated by the operating industrial park would be in the order of $1.8 and $8 million for the City & County of Honolulu and the State of Hawaii, respectively.

The survey of businesses leasing space at the existing warehouse development concluded that approximately 57 percent of their employees reside in Kailua and Kaneohe. It is expected that in the future under the proposed project, this proportion would remain similar. With an estimate of 600 full time equivalent workers to be employed at the proposed site at full build out, it is predicted that approximately 340 employees would come from areas in proximity to the proposed project, and the remaining 260 employees would come from other parts of Oahu, and either commute or relocate to the region.

4.12.2 Impact to Demographics and Public Services

As stated earlier, the Koolaupoko region is expected to have a somewhat stable population, with a slight decrease of about ~~three~~ 0.8 percent from its current ~~118,000~~ 114,000 residents or ~~3,500~~ approximately 1,000 residents anticipated through the year 2030 (note: new demographic data was furnished by DPP). The estimated new out-of-district 260 employees and their families would be the likely maximum number people moving into the district as a result of the proposed project. The commute from Honolulu or other leeward urban regions could increasingly be a reason to relocate to the windward area when taking a new position in the proposed industrial park; but it is not expected that many of the new employees would indeed relocate to the region.

While in-migration of a certain number of new employees and their families to the Koolaupoko region would be assumed, the expected number of people moving into the region would most likely be ~~significantly~~ smaller than or equal to the projected decline in population ~~people who are assumed to move out of~~ in the region through the time period of 2030. ~~Therefore it is expected that the net in-migration to the region in the next two decades would be essentially negative, e.g. the proposed project would not generate as many people moving into the region as people who are expected to move out of the region.~~

Therefore, considering regional-wide consequences of a negative net in-migration on public services, no significant additional burden is expected on schools, hospitals, fire and rescue services, and police services as a result of the proposed project.

Considering site-specific consequences on public services, the following could be expected:

Police department: It is anticipated that the proposed development would not result in significant added demand on the police department. The proposed development would maintain its own security service, and the development would be secured by structural (e.g. perimeter fence, security lighting, security locks) and operational measures (e.g. surveillance cameras, frequent patrols). The strict security maintained within the proposed site would also have beneficial effects on the surrounding area, since the security service would cooperate with the police department to report any unlawful acts and possible security risks in the vicinity of the park (which would also include the adjacent model airplane park and the wetland areas).

Fire department: The new development would be constructed following strict fire codes and using appropriate non-flammable building material. The proposed park would interface with the existing fire water system that features an independent firewater supply that has its own diesel powered fire pumps. The newly developed areas would be equipped with code conformant fire systems. The security and maintenance staff would be trained in basic fire-fighting procedures and potential fires would be reported directly to the fire department in the Kailua area. The response time of fire engines to arrive at the scene would be similar to the present, since the distance between the proposed site and the responding fire stations is unchanged from the existing conditions. Since under both action alternatives, the adjacent roadways would operate at a level of service of C or better, it is expected that fire and rescue vehicles would be able to proceed as swiftly and without delay as they can do so presently.

While the manner of response to potential fires would be the same as under the existing conditions, the probability of fires is always increasing with increasing size of developments. The key to lowering the probability of fires is in mitigation, which includes fire-resistant building materials, code conformant design and layouts, training in basic firefighting and avoidance techniques, and last but not least in the choice of businesses that would be allowed to lease space in the proposed development. The proposed project site seeks a land use zone change from General Preservation (P-2) to Limited Industrial (I-1) for two of the three contiguous land parcels of the property. An I-1 zone excludes businesses using or manufacturing hazardous or fire sensible material or products. This by itself would significantly reduce the risk of fire when comparing the intended land use at the proposed site with intensive industrial land use elsewhere.

In summary, it can be stated that adverse effects on the fire department in the Kailua and Kaneohe areas are not expected.

Medical facilities: Possible consequences of the proposed project on medical facilities could be increased work related accidents or traffic accidents on the adjacent roads as a result in increased project related traffic. The expected type of businesses which would lease space in the proposed project would exclude those involving hazardous materials, products and manufacturing processes. Adding of about 600 new workers in the proposed project would undoubtedly increase the potential of accidents and other incidences that would require medical intervention but it is expected that there would be no significant adverse consequence on medical services. As indicated for the police and fire department the response time to medical emergencies at the proposed site would not be increased.

4.13 Cumulative Impacts

Cumulative impacts are defined as impacts on the environment which results from the incremental impact of the proposed action when added to other past, present, or reasonably foreseeable future action regardless of what agency or person initiates such additional actions. Consequently, cumulative impacts might result from individually minor but collectively significant actions taking place over a period of time.

<u>Chapter Six of this EIS presents a discussion about cumulative impacts of all project alternatives. The scope of the cumulative impact analysis considers the geographic extent and the time frame under which the proposed project will affect the environment.</u>

~~While it might seem intuitive that the No-Action Alternative would not result in any cumulative environmental impacts, even the absence of an action can contribute in cumulative impacts.~~

~~For example, providing additional industrially zoned space to businesses in the Koolaupoko region will decrease traffic volume as a result of avoided traffic that would otherwise be generated by businesses that serve the Koolaupoko region from outside the region. The avoided traffic volume will include long commutes of employees, who live on the windward side, and long drives for customers visiting those businesses.~~

~~Also, as is discussed in Chapter Six, Hawaii's recent plans to increase sustainability call for measures and investments that would be supported by the proposed development. The No-action might increase impacts through the lack of infrastructure developments that would be desirable under future plans of bringing employment, commerce and recreation closer to the residents and thus lower the need for individual transportation.~~

Important types of cumulative impacts that have to be considered in conjunction with the proposed project are, (1 cumulative impacts on the water quality, the Kapa'a watershed and the project's drainage improvements, (2) cumulative impacts on the transportation infrastructure in the area and (3) cumulative impacts on the aesthetic conditions.

(1) The overall hydrological conditions of the Kapa'a watershed have an important effect on cumulative impacts on the water quality in the Kapa'a Stream and other water bodies. The Kapa'a watershed has experienced changes from mostly vegetated open space to land that has been significantly changed by quarry and landfill operations. These developments span over several decades and have resulted in a conditions where the Kapa'a stream bed has changed over the years due to physical changes of the stream bed and stormwater events that produce higher volumes of runoff, associated with higher transport of suspended material. The proposed project contributes only a small portion of the watershed's total runoff volume and entrainment of eroded soil. The improvements planned for the drainage of the project site will result in quantitative and qualitative improvements of the stormwater runoff. As a consequence, the overall conditions of the Kapa'a stream will mainly be a result of how and to what extent the remaining land uses in the Kapa'a valley will mitigate stormwater runoff. The overall development goal of the Kapa'a watershed is the improvement of the water quality in the Kapa'a Stream, avoidance of soil erosion and uncontrolled stormwater runoff, and restoring a healthy stream bed with indigenous aquatic flora and fauna. Planned mitigation in the entire Kapa'a watershed area in the form of soil stabilization and removal of pollutants prior to stormwater discharge, as well as increased infiltration on land that features vegetation, would reduce the overall cumulative impacts and support improvements to Kapa'a Stream and its receiving water, the Kawainui Marsh. The applicant had previously proposed to develop a 13-acre wildlife habitat and wetland restoration project within the Kapa'a Stream corridor and on his property. This initiative has been discontinued because of possible impacts due to the removal of significant wetland

vegetation to construct the water bird habitat. The applicant intends to support future initiatives, in cooperation with the community and/or agencies, to improve the water treatment capabilities of the Kapa'a Stream; one immediate initiative will be the installation of approximately eight acres of restored habitat at the perimeter of the proposed site. This added vegetation buffer zone around the development footprint will improve the water quality in the adjacent Kapa'a Stream.

(2) Under the cumulative impact analysis, the traffic on the quarry road and affected intersections would increase mainly due to the proposed project and due to the anticipated growth in background traffic. Considering reasonably foreseeable future actions, no significant increases in traffic from existing industrial uses or planned developments, other than the proposed project, are anticipated in the Kapa'a valley. Possible temporary traffic additions suggested by commenters , such as traffic resulting from the tunnel construction for the Kaneohe-Kailua wastewater conveyance project, are not that likely to become a reality.

(3) The Kapa'a valley has experienced significant changes in appearance over the past five decades. The former appearance of open valley with agricultural land use gave way to intense quarry and landfill operations, during which times large areas of land were stripped of their vegetation. After quarry and landfill operations were reduced plant cover has started to return to the many areas in the valley. The proposed project site is a former land fill area that does not have significant permanent vegetation. The planned addition of vegetation on the site of the proposed project, such building a restored habitat area at some sections of the site perimeter, will improve the aesthetic appearance of the valley.

~~By definition the No-action Alternative would not involve any actions and therefore would not result in any cumulative environmental impacts. Both action alternatives could potentially result in cumulative impacts if they were adding to impacts generated by other future projects. At the time of this DEIS, however, no additional project of the nature of the proposed project or other development project is known that might be implemented in the vicinity of the proposed project. Therefore cumulative impacts are not expected under both action alternatives. It should be noted that cumulative impacts would only be identified by source and would only be considered in the context of potential incremental impacts for the proposed project.~~

4.14 Impacts on the Kawainui Marsh and Planned Mitigation

Kawainui Marsh is a designated Wetland of International Importance (established 2005) which has a total area of approximately 830 acres of land. The Kawainui Marsh is the largest remaining wetland in the State of Hawaii and represents site of significant environmental and cultural importance.

The marsh is an important habitat for endangered and listed water birds and numerous species of migratory seabirds and waterfowl. The marsh features a number of historic sites site which mirrors its cultural significance dating back to the early days of Hawaiian settlements in the area. The marsh has a significant importance as flood control for the community of Kailua immediately adjacent to the marsh. A flood control levee was build several decades ago along the eastern side of the marsh to improve flood control after several floods in the past had caused significant damages. The marsh, furthermore serves as a natural filter to contain sediments and trap pollutants upstream of the Kaneohe Bay.

After decades of relative neglect, the community and governmental agencies are cooperating in efforts to improve the overall condition of the marsh and mitigate effects caused by invasion of alien species, overgrowth of vegetation and poor water quality. Efforts are underway to restore areas of the marsh, reverse various impacts on its natural environment, and improve habitat conditions for wildlife, so that the marsh can function as an educational and recreational asset for the residents of Oahu, especially the communities closest to the marsh and to visitors alike.

The proposed project is located at the north western perimeter of the marsh and could directly impact on the marsh due to its proximity. This section discusses possible impacts on the marsh which could be caused by the proposed project. This section also lists a range of mitigation measures that would be implemented to reduce unavoidable impacts so that they are no longer representing a significant impact potential. In the following discussion the most effective mitigation measures are introduced and briefly described. The Preferred Alternative features most of the effective and comprehensive impact mitigation measures, since this alternative is committed to a low impact development approach. Under the Preferred Alternative, the lower portion of the site will be developed with the goal of attaining LEED Silver certification under the Core and Shell rating system (Version 3.0) upon project completion.

While most of the considerations hereafter explicitly address impacts on the Kawainui Marsh, such analysis and mitigation measures would also apply to the wetland area in the Kapa’a Stream corridor. Furthermore, the marsh spans approximately 1.3 and 2.0 miles in the east-west and north-south direction, respectively. Due to the considerable dimensions of the marsh, most of the environmental consequences of the proposed project would only affect a small part of the marsh. The impacts and mitigation measures discussed hereafter are therefore only limited to an area of the marsh that is directly adjacent to the proposed site.

4.14.1 Impact on Water Resources

Impacts on water resources, both surface water and groundwater, have immediate consequences and potentially the most significant impacts on the marsh. The marsh is the receiving water for the Kapa’a watershed. The main surface drainage of the watershed is the Kapa’a Stream, which has a total length of about 1.9 miles, approximately 0.7 miles of which are on the property of the applicant. Additional minor surface drainage into the marsh occurs through some drain outlets in the vicinity of the proposed site, all of which have hydrological conditions that are separate from the proposed site. Some drainage of the watershed also flows underground following the original soil horizons. An existing drainage canal, which is located directly mauka of the quarry road, receives seepage and occasionally surface runoff. The drainage canal is connected to the Kapa’a Stream and the confluence of canal and stream is just upstream of a culvert under the quarry road, which represents the end of the Kapa’a Stream and the beginning of the marsh.

Impacts of the surface water runoff into the marsh include sediments, nutrients, suspended solids, organic loads and other water pollutants, such as metals.

Sediments that enter the marsh primarily originate from erosion of the stream bed during high flow events. While the normal flow rates in the Kapa’a Stream are in the range of one to two cubic feet per second, a strong storm event can result in significantly higher flow rates. High flow rates can result in entrainment and transport of sediments to lower elevation. When the hydraulic energy of turbulent flow in the stream are no longer present, e.g. when the flow becomes less turbulent, the entrained sediments settle and result in the accumulation of sediments and in the volume reduction of water basins and flood channels in the marsh. Erosion, which means entrainment and transport of sediments, and subsequent sediments are natural occurrences in stream and receiving water and are not necessarily adverse effects. Problems arise when a watershed stops releasing rainwater at a continuous rate and drainage occurs mainly through high peak flow rates. In case of high peak flows rainwater cannot be percolated into pervious surfaces and be consumed by vegetation covers, so drainage flows from increasingly impervious surfaces. The proposed project converts a significant area from pervious to impervious surface and therefore can add adverse effect from high peak runoff rates. Excess sedimentation in the marsh and associated growth of vegetation on areas that are created by sedimentation can turn wetland into upland, thereby destroying habitat for aquatic fauna and water birds. Sedimentation can furthermore result in death or debilitation of sedentary organisms. In addition to the effect of wildlife sedimentation creating upland in the marsh, sedimentation decreases the flood control function of the marsh, since a wetland area with free surface is no longer available to retain flood water in the marsh.

> Mitigating flood control measures would shave off high flow rates through extended detention of stormwater and controlled release. As a consequence, high runoff rate and associated erosion can be mitigated and the release of the detained water to the stream would occur when the high flow rates in the stream during and after a storm event have abated. Other measures to control high runoff rates from the proposed site would include collection of rainwater from road and roadway sections for subsequent use in irrigation of landscaped and restored habitat areas at the perimeter and within the development footprint. Irrigation promotes the percolation of stormwater and recharging of aquifers. Evapotranspiration from plants furthermore returns the stormwater to its natural environment without contributing to site runoff and associated erosion. The existing

wetland area in the lower reaches of the Kapa'a Stream functions as a natural filter that removes sediments from the stream flow and converts the organic components of sediment. The conservation of the wetland area in the stream corridor is therefore an important function that needs to be ensured to mitigate impacts to the marsh.

Nutrients in the surface drainage from the watershed can impair the water quality in several ways. The two primary impacts of excess nutrients in the water are as a potentially toxic substance, and indirectly through a process called eutrophication. Eutrophication is the accelerated growth of algae in the water stimulated by the presence of excess nutrients, nitrogen and phosphorus. The result of runaway eutrophication is the depletion of oxygen and the release of substances that toxic to the aquatic environment. Sources of nutrients can be from entrained natural deposits or organic matter, or from anthropogenic sources, such as from wastewater. Excess nutrients can have a significant adverse consequence on the marsh.

Mitigation of nutrient release for the proposed project would be to remove nutrient sources from the runoff through treatment units. Another important mitigation is the advanced onsite wastewater treatment, which includes the removal of a significant portion of the nutrient load through combined nitrification and denitrification and absorption to remove nitrogen phosphorus from the wastewater, respectively. Advanced septic system wastewater treatment would be implemented in the lower portion of the site. Advanced treatment is called for because of the proximity to wetland areas and the marsh, and because of the small vertical distance between the saturated soil layer and point of release of the effluent in the infiltration field. These conditions call for more effective wastewater treatment processes that can be achieved through conventional septic systems. The proposed project would result in effluent concentration in the treated wastewater in the lower portion of the site to such low concentration of organic load, nutrients and suspended solids that the wastewater can be used for irrigation. By implementing the proposed mitigation measures, the impacts of nutrients from the proposed site to the marsh would be effectively mitigated.

Suspended solids are created by dissolving material from solid surfaces and transporting the particles downstream. Suspended solids usually cannot be separated from water through sedimentation since the particles are too small and do not readily settle when the kinetic energy of the water diminishes. The removal of suspended solids relies more on filtering and absorption mechanisms than on settling. Suspended solids contribute to high turbidity and result in degradation of the water quality in the marsh. The concentration of suspended solids in the runoff can be reduced by filtering mechanisms in the soil, biomat or dense aquatic vegetation.

Mitigation measures of suspended solids in surface water include reducing the sources of suspended solids (e.g. reduction in erosion and leaching of particles from materials) and filtering functions in soil and vegetation. Stabilizing exposed soil with vegetation reduces erosion and improves removal of suspended solids through filtering.

Organic load in water can result in adverse effects if the decomposition of organic matter surpasses the ability of the receiving water to effectively break it down. In the presence of sufficient oxygen in the water, organic matter is decomposed by aerobic processes. If the replenishment of oxygen in the water cannot keep up with the rate at which oxygen is used for the aerobic processes, the oxygen concentration can get too low to sustain aquatic life. The decomposition processes would then shift to anaerobic processes which are not as productive as aerobic processes, and which can generate substances that are toxic to aquatic life. Anaerobic processes are a natural component of a wetland in which vegetation and soil naturally exist in partly anaerobic environments. Problems arise when aerobic and anaerobic processes are out of balance and anoxic environments prevail. The marsh is negatively affected by an oxygen concentration which is too low.

> Mitigation measures planned for the proposed project would include the advanced wastewater treatment to substantially lower the organic load in the effluent where the point of release of treated wastewater is close to surface water, e.g. in the lower portion of the project site.

Additional impacts on water resources of the marsh could originate from the release of harmful agents to the water, either directly or indirectly. For example, runoff could be polluted by leaking equipment if such equipment is operated or installed in a non-conformant fashion. Another example is the use of unsuitable herbicides or fertilizer products near or in water that could introduce toxic discharge in the water.

Mitigation under the proposed project would include the avoidance of leaking equipment or the runoff of contaminated stormwater from such equipment. Furthermore only certified and environmentally friendly herbicides and fertilizers would be used near or in water. The choice of vegetation used in landscaping, could have a significant indirect effect since native and adaptive plants have a significantly lower demand for fertilizer and herbicides than typical plants used in landscaping.

Impacts to water resources during construction and site development require comprehensive and thorough mitigation, since significant impacts typically occur during construction when larger areas of the project site are not soil stabilized and exposed to erosion and runoff. Mitigation measures have to be in accordance with local codes and state and federal laws, such as the requirements to conform to provisions of the Clean Water Act (such as the National Pollutant Discharge Elimination System (NPDES)). In accordance to the more strict mitigation requirements under the low impact development approach of the project, a comprehensive erosion and sedimentation control plan would be created and implemented for all phases of the project that would conform to the requirements of the 2003 EPA Construction General permit. Site specific best management practices (BMPs) would be implemented to significantly reduce impacts during construction. Applicable site specific structural and non-structural BMPs could include the following:

- Utilize silt fences to remove sediments with filter media as stormwater flows through the fence.
- Utilize sedimentation basins, to allow for settling of sediments from stormwater volumes.
- Build perimeter dikes to contain runoff on the site and promote infiltration.
- Plant fast growing grasses for temporary soil stabilization if there are breaks or delays in construction of the final stabilized grade.
- Place hay, grass, woodchips, straw or gravel on the soil surface to cover and hold soils.
- For entry/exist use stabilization gravel to avoid soil and dirt to be carried onto public roadways.
- Prevent spills of hazardous agents.
- Avoid building material being washed into the receiving stream or other drainage areas.

4.14.2 Impact on Vegetation

Wetland vegetation is specifically adapted to the living conditions within wetland areas, and can exist and thrive in saturated soil for extended periods of time. Wetlands are characterized by applying three criteria: type of soil, periods of inundation and specific vegetation. Changes in wetland can cause changes in vegetation. For example wetland vegetation could make way for woody or wood-forming plants, which then would promote the conversion of wetland to upland. The growth of undesirable plants in wetlands areas might require intervention, especially when undesirable plants encroach to the wetland.

> <u>Mitigation</u> to undesired changes of vegetation in the marsh would include controlling the encroachment of unsuitable plants to the marsh. Mitigation measures would further involve avoidance of the conversion of wetland to upland area and the restoration of wetland where needed. Avoidance of excess sedimentation would not only improve the hydrological condition of the marsh but would also help to conserve the unique wetland vegetation.

4.14.3 Impact on Wildlife

In the absence of suitable mitigation measures, the proposed project could contribute to adverse impacts on wildlife living in the Kawainui Marsh. Some important potential consequences are briefly discussed:

The marsh is a <u>habitat for a number of endangered and listed water birds</u> and a population of migratory seabirds and waterfowl. Since the proposed project would construct detention basins for flood control and treatment of runoff, water ponds with constant or intermittent water surfaces could develop inside these detention ponds, especially around the discharge wells. Endangered water birds could be attracted to these water ponds, subjecting them to increased predator threat.

Mitigation measures would be implemented in accordance with recommendations and requirements of the U.S. Fish and Wildlife Service (USFWS). The objective of such mitigation measures would include keeping endangered water birds away from the water ponds and related threats from non-native predators.

The proposed project might attract non-native predators such as feral cats, rats or mongooses. These predators could be attracted by human activities and by trash stored in open containers or carelessly spread. These non-predators are a threat to ground breeding birds and other wildlife.

Mitigation measures would involve continuous predator removal and control, e.g. through trapping methods. Other mitigation would further be to remove all sources of food for these predators from the development and instruct occupants and visitors of the warehouse development not to feed these animals.

The potential of wildlife collisions typically increases with higher traffic volume and with higher vehicle speed, when effective avoidance maneuvers could become dangerous for motorists and are therefore not executed by the motorists. The proposed project would increase the traffic volume on the quarry road, directly causing adverse effects on wildlife collisions.

Mitigation measures would include the development and implementation of site specific avoidance measures for federally listed endangered species and migratory birds in cooperation with the USFWS. The reduction of the average speed of vehicles on the quarry road would reduce wildlife collision potential. (Lowering the speed on the quarry road would also decrease impact from air pollution and noise, and increase traffic safety). Dynamic traffic signs that inform motorists about the frequency of wildlife collisions and solicit cooperation are more effective than static signs; active speed limit enforcement also is more effective than static signs.

Light pollution can have a significant impact on wildlife, since excess light can impair navigation and can reduce the food source by attracting insects and thus causing an undersupply of food for birds in areas close to bright night sky.

Mitigation of light pollution is part of the low impact development approach of the proposed project. The sustainable design approach (Refer to Appendix 4 of the DEIS) gives a detailed description of the proposed measures to mitigate light pollution, such as reducing exterior lights and avoiding interior lights to penetrate the building envelope. Excessive outdoor lighting would be avoided, to ensure that light does not directly shine into the Kawainui Marsh or contribute significantly to a strong glare that could be seen from the interior marsh. The lighting scheme of the industrial development within the lower portion of the proposed site would be developed in accordance to Lighting Zone LZ1 – “Dark” of the Illuminating Engineering Society of North America. The lighting requirements would call for low emitting lamps, full cut-off or shielded lamps to avoid light trespass into the adjacent areas, avoidance of light intensities that exceed the objective of lighting, timed and event controls of lighting, directing of lights on tasks to avoid glare, and controlling interior lighting power with a direct line of sight to any opening in the envelope by a significant degree during certain times of the night. External lighting would only be directed on areas where light is needed and all excessive lights will be avoided or effectively shaded.

4.14.4 Air and Noise Impact

The primary source of air and noise pollution would be from increased traffic on Kapa'a Quarry Road.

Air impacts, the most immediate and quantitatively largest impact potential on the marsh would come from increased vehicle exhaust, with exhaust originating from diesel powered vehicles possibly being the largest impact. Direction of the prevailing trade winds is from the east, which would primarily send the exhaust away from the marsh and would thus naturally mitigate related impacts. Other impacts on wildlife and vegetation would be the discharge of agents that could be directly harmful to living organisms, or those which could cause indirect adverse effect through the stimulation adverse environmental and habitat conditions as a result of accumulation and of changing chemical composition in water and soil.

Mitigation to air impacts from increased traffic would be through reduction of vehicle speed and driving habits of motorists on the quarry road. While speed is the main determinant for increased traffic related air pollution, the types of vehicles and their operational conditions are also important mitigation measures. Newer heavy vehicles emit considerably less volume of harmful agents than older trucks and buses; vehicles with well-maintained engines likewise emit significantly less than engines that are inefficiently operated. Active mitigation measures would be the implementation of lower speed limits and better driving habits through appropriate signaling, enforcement and information about the merits to protect our nature through good driving, respectively. Other mitigation measures could be improvements of the quarry road to make the traffic flow more effective, by lowering the instances of frequent accelerations and deceleration and making the traffic flow more smoothly, thereby lowering fuel consumption and reducing the exhaust of harmful agents.

Noise impacts, the most immediate and quantitatively largest noise potential on the marsh would likewise originate from increase traffic volume on the quarry road. Noise can affect the marsh primarily through affecting wildlife and the resulting reduction in habitat, as wildlife retreats from areas in the vicinity to the roads. While it is generally true that noise causes loss of habitat and avoidance, habituation occurs when wildlife gets used to the noise level of the environment and newer generations of animals grow up accustomed to the elevated noise level. With increased traffic, there is also an increased chance of wildlife collisions and deaths of animals from the traffic. Noise has the somewhat beneficial side effect of causing wildlife to leave the area next to the roads and thereby decrease the number of deaths or injuries of animals when they collide or are otherwise adversely affected by vehicles. Habituation bears the risk that wildlife re-approaches the roads and thereby gets endangered by increased risk of colliding with more vehicles in the road. With the direction of the dominant trade winds coming from the east, noise propagates more efficiently downwind, which means away from the marsh, thereby mitigating the noise impacts via natural conditions. In addition to adverse impact on wildlife, noise is an annoyance and sometimes harmful to human beings. The expected noise levels on the quarry road at the time of full build-out would be in the order of about 60 to 63 dBA, which are noise levels common to urban settings. The traffic noise level on weekends, when the marsh is more used for recreation, is expected to be lower than during weekdays.

> Mitigation measures of noise impacts from traffic address similar mechanisms as air impacts. Noise is a strong function of the speed of vehicles and decreases measurably with lower speed. Noise at lower speeds is generated primarily from accelerations and decelerations. Heavy vehicles produce significantly more noise than cars at lower speeds, as a result of less wind generated sound energy and more audible engine noise. Noise levels are higher on streets with rough and damaged pavement than on roads with smooth asphalt. Noise is attenuated in the presence of sound absorbing surfaces, such as vegetation close to the road, which reduces multiplying sounds caused by reflection on hard surfaces. Besides lowering the speed on the quarry road and allowing for a smooth traffic flow, effective noise mitigation measures could include repaving the road and planting vegetation along the makai (direction to the ocean) side of the road.

4.14.5 Impacts through Litter and Non-conforming Waste Disposal

There are ample examples around the perimeter of the marsh where litter and unsuitable and unlawful waste disposal adversely affect the appearance of the environment and cause harm to fauna and flora. For example, while disposed rusting refrigerators are an eyesore and can affect wildlife, leaking refrigerators that are dumped can cause spills of harmful agents that also affect water, soil and air. As a general rule increasing human activity in an area increases the potential of littering and unlawful waste disposal, especially when law enforcement is difficult and the area is remote.

> Mitigation of littering and unlawful waste disposal can be achieved through two types of measures; avoidance of littering and unlawful disposal, and swift removal. Avoidance of littering can be achieved through better education, combined with encouragement to report on cases of exceptional unlawful disposal activities. Much of the littering is due more to carelessness than malice, and educational signs and campaigns telling people that litter and disposed objects can kill animals and harm the environment can be an effective mitigation measure. Unlawful disposal of larger and possibly harmful objects is

almost always perpetrated with intent and could only be mitigated by strict enforcement and significant fines and penalties. Community organized removal of litter is a great way to rectify related impacts and many community groups are engaged to help keep the environment safe and beautiful. Removal of larger objects that were disposed of at the perimeter of the marsh requires more organized effort, including use of lifts and trucks to collect and transport the debris away from the marsh and to proper disposal. Over many years, the applicant has removed substantial amounts of debris and litter from the perimeter of the proposed site and from the banks of the drainage canal, and even from canal itself. The proposed project would continue the strict management of litter and debris from the area that surrounds the proposed site, which most likely would also include the marsh perimeter on the mauka side of the quarry road facing the proposed site.

4.14.6 Cultural Impacts

Within and around the Kawainui Marsh there are several archeological and cultural sites of importance which are listed in the Hawaii State Register for Historic Places. Almost all of the sites are located at the southern side of the marsh with a distance between the proposed project and these sites between one and two miles. Given the distances, there are no direct impacts of the proposed project to these sites. One site that is located adjacent to the proposed site is the Pahukini Heiau, which is located about 2,000 feet west of the closest wetland area.

Mitigation measures are not expected to be required due to the lack of adverse impacts of the proposed project on archeological and cultural sites in and around the Kawainui Marsh. The applicant, however, sees the importance of preserving the cultural heritage of the region and has cooperated in the past with local community groups to preserve important sites and improve their appearance, when those showed signs of deterioration. One mitigation measure is the responsible handling of cultural artifacts if found during construction. The construction would be stopped until a cultural resources manager has determined the required course of action. Communication with State agencies has indicated that no cultural and archeological sites and assets are expected at the proposed site.

4.14.7 Visual Impacts on the Marsh

Visual impacts can affect long-distance and near distance viewplanes in and around the marsh. A comprehensive visual impact assessment was created for this environmental review and can be found in Appendix 8 of this DEIS. The study concluded that the project would not significantly affect most long distance and panoramic views of the marsh. The proposed project is located within an area that has existing industrial uses and visible structures. The upper portion of the project site is effectively shielded from direct line of sight from almost all view planes within and around the marsh. The lower portion of the site is visible from view planes at a higher elevation in the north western area around the marsh, for example form the adjacent H3-Freeway, but is not visible from locations around and within the marsh that are at equal elevations as the project site.

Mitigation measures for visual impacts are the construction of vegetative buffer zones around the lower portion of the site. The upper portion of the site does not adversely affect the view planes around the marsh that were investigated in the visual impact assessment of this DEIS. In addition to planting trees and shrubs around the perimeter of the site, trees would also be planted around buildings within the development. Trees would therefore create a vegetative buffer next to the building, which, besides visual impact mitigation, would also improve the thermal performance of the building, lower the heat island effect and reduce air and noise pollution. The applicant contemplates the use of so-called “green walls” around the sides of buildings that face the marsh. Green walls can be very effective to shield buildings and help them blend into a green background. The visual impact assessment suggests that with the planned mitigation measures, the proposed development in the lower portion of the project site would not create a significant visual impact for the marsh. More details can be obtained from the visual impact assessment in Appendix 8.

4.14.8 Impacts on Recreational and Educational Uses of the Marsh

Conservation efforts of the Kawainui Marsh have recently gained increased support by community groups and governmental agencies to protect and enjoy the marsh as a valuable asset to the community and nature. There are recent initiatives which endeavor to make the marsh more accessible for recreation and education. One of these initiatives is the planned marsh perimeter pathway, which would create a path that stretches around the entire marsh and provides pedestrians and bikers with an opportunity to enjoy the marsh from close distance and on a secure pathway. The planned marsh perimeter route would use a stretch of about 1,500 feet, which is on the property of the applicant next to the quarry road. The existing model airplane park is next to the proposed project site on the makai side of the quarry road. This park could be affected by the proposed project primarily through increased traffic on the quarry road and possible visual impacts from newly constructed buildings only a couple of hundred feet away.

Mitigation measures would include actions already described for lowering traffic induced noise and air impacts on the marsh. The primary activity of the Airplane park is the operation of small planes with miniature high-pitched engines for recreational enjoyment. The related activities do inherently create sound and people engaged in model airplane activities as well as spectators are expected to be less susceptible to sound in their related recreational activities than people who engage in quite recreational activities.

However, the activities in the model airplane park are mostly going on over the weekend, when the traffic on the quarry road is lower than during weekday rush hours and those times when the increased traffic due to the proposed project is at its peak. For these reasons it is expected that traffic mitigation measures to be implemented for air and noise mitigation would be sufficient for the recreational activities adjacent to the proposed project site. Visual impact mitigation could be accomplished by installing the planned vegetative buffer zone around the eastern perimeter of the proposed site. In regard to the planned perimeter path, the planned route adjacent to the proposed site would coincide with the existing drainage canal along the mauka side of the quarry road. Proposed changes to the canal could open this area up for the construction of the perimeter pathway as a paved path located at a safe distance beside the quarry road.

4.14.9 Impact to Infrastructure

The perimeter of the marsh that borders the proposed project site features electric power lines and telecommunication cables installed at utility poles along the quarry road. Project related consequences to the marsh would mainly be through short term impacts to add cables to the existing utility poles and install new poles, if required, or through visual impact. Besides these impacts no other impacts are anticipated since no requirements are anticipated by the project to install new infrastructure close to or within the marsh.

Mitigation measures would address only short-term effects, such as possible replacement of utility poles along the quarry road.

4.14.10 Miscellaneous Impacts

One possible impact to the marsh would be the danger of fire in the marsh. Historically, the marsh has been subjected to a number of fires in the past decades, some more serious than others. A wide spread fire could significantly damage marsh vegetation. A project related risk related to increase the fire hazard could not been identified, since the proposed development itself would implement strict fire standards to prevent and to combat fires. In addition, the predominant wind direction is from the east, thus fires in the marsh could more likely endanger the proposed development than vice versa. An indirect elevated fire risk could arise through increased traffic on the quarry road. Since the proposed project would greatly increase the presence of security and protective surveillance in the area it is expected that fire risks from arsons and self ignition from unlawfully disposed waste would actually be reduced.

Mitigation measures to fire risks in the marsh in the area of the proposed project would be surveillance and the removal of unauthorized or abandoned objects that could pose a fire hazard.

~~4.15 Irreversible and Irretrievable Commitment of Resources~~

Note: Section 4.15 has been moved to the New Chapter Six

~~The development of the proposed Kapa'a Light Industrial Park would result in direct and indirect commitments of resources. Some resources committed could be recovered in a relatively short period of time, while in other cases, resources would be irreversibly or irretrievably committed by virtue of being consumed or by the long time period that resources would be committed to the proposed action.~~

~~Resources expended for the development of the proposed project would be offset by the creation of needed facilities and the resulting operational benefits. Construction of the proposed Kapa'a Light Industrial Park would augment the economic and social viability of the Koolaupoko region and would provide a centralized location with urgently needed industrial space for light industrial and commercial activities.~~

~~The conversion of approximately 22 acres of pervious to impervious land (under the Preferred Alternative) could be considered irretrievably committed. On the other hand about two acres would be converted from developed land to open land thereby offsetting part of the losses. Under the Preferred Alternative measures would be implemented to reverse some of the adverse impacts by implementing rainwater harvesting and use of collected rainwater to recharge of aquifers of irrigation.~~

~~Biological resources lost during the development are expected to be minimal, and the restoration of currently sparsely vegetated land at the perimeter of the site to quality habitat would augment biological resources and diversity at the site. The area converted from pervious to impervious land would not be previously undeveloped land or agricultural land but would be area that was created by landfill. The proposed industrial park would be developed in accordance to LEED standards for sustainable project development. The project team would implement building approaches that would be consistent with the intent and objectives of sustainable site development.~~

~~The development of the proposed project would require commitment of various construction materials, such as aggregate, concrete, steel, wood and other building materials. As part of the low impact development approach and LEED certification goals, a significant portion of construction material would be reused or recycled material. In addition, much of the material committed to the new construction may be recycled in the future or be used for upgrades at the proposed site sometime in the future.~~

~~The proposed industrial development would require the use of an amount of fossil fuel, electrical energy and water during construction. These should be considered irretrievably committed to the development effort.~~

CHAPTER FIVE RELATIONSHIP TO LAND USE PLANS POLICIES AND CONTROLS

The development of the proposed Kapa’a Light Industrial Park needs to be consistent with the main principles of existing land use visions, policies and guidelines for Oahu and the Koolaupoko region. This section discusses compliance of the proposed industrial development with the City and County of Honolulu General Plan and the Koolaupoko Sustainable Communities Plan.

5.1 State Land Use Districts

The proposed Land Use Zone Change would not require a change of State Land Use Districts. All land that would be used for the proposed industrial development is presently located within the state’s Urban district.

5.2 Compliance with General Plan

The five following sub-sections of the General Plan apply to commercial and industrial developments, such as the proposed Kapa’a Light Industrial Park. These sections discuss how the proposed Kapa’a Light Industrial Park would be consistent with such policies, visions and guidelines of the General Plan.

5.2.1 Consistency with Views and Policies of Economic Activity

Objective A *To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.*

Policy 1: *Encourage the growth and diversification of Oahu's economic base.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would provide important infrastructure prerequisites for the growth and diversification of Oahu's economic base. The Koolaupoko region is significantly under supplied with industrial space. Employees and customers of businesses, which serve the windward region from other location on the island, have to travel considerable distances to commute or visit these businesses. Increased time and costs to travel and commute costs businesses, employees and customers valuable resources that could be saved if more leasable industrial space were available in the Koolaupoko area. The proposed Kapa'a Light industrial Park would alleviate the shortage of industrial space and would help to encourage growth and diversification.

<u>Policy 2:</u> *Encourage the development of small businesses and larger industries, which will contribute to the economic and social well-being of Oahu residents.*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would provide ample opportunity specifically to small businesses and some larger businesses in the Koolaupoko area to develop and diversify. Industrial space in the Koolaupoko region is scarce and small and larger companies are hampered in their development by such shortages. Growing small companies from Koolaupoko region can lack the resources required to incur logistical costs caused by the need to find industrial space outside of the region that they want to serve. A survey conducted for the DEIS reveals that 85 percent of the businesses leasing space in the existing warehouse development are smaller companies with less than ten employees. Seventy percent of the employees of such companies reside in the greater Kailua and Kaneohe region. Large companies could save on costs if they could locate service centers and base yards close to the customers in the Koolaupoko region, instead of incurring costs and time to drive from service centers and base yards outside of the region.

<u>Policy 3:</u> *Encourage the development in appropriate locations on Oahu of trade, communications, and other industries of a nonpolluting nature:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would provide an appropriate location for businesses and light industries developed on the premises of sustainable site and socially responsible development. The requested zone change to Limited Industrial (I-1) land use would disqualify highly polluting industrial or industries that store or handle harmful material. The proposed Kapa'a Light Industrial Park would be built utilizing sustainable design, construction and operational methods, thereby decreasing emissions that typically accompany such industrial activities. While the sustainable core and shell development approach would be administered by the developer, tenants would be encouraged to streamline their businesses along the low impact development approach of the development. In certain cases tenants would be contractually obligated to adopt low impact development strategies where required to mitigate impact that extends past the leased area. For example tenants would need to abide by light pollution reduction and energy and water saving strategies as part of their lease agreements. The fact that the Kapa'a Light Industrial Park would be developed in accordance to LEED and would, upon completion, apply to be LEED certified, would help to attract businesses who are environmentally aware and would also help businesses offer more environmentally friendly products and services.

Policy 4: *Encourage the development of local, national, and world markets for the products of Oahu-based industries.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would provide sufficient infrastructure and warehouse space for innovative businesses that can compete with products on the local, national and world market. The innovative nature of the development, using sustainable technologies and alternative energies promises to attract innovative thinking organizations.

Objective G: *To bring about orderly economic growth on Oahu.*

Policy 2: *Permit the moderate growth of business centers in the urban-fringe areas:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would provide the means for existing and new businesses to grow or to provide a better long-term basis for their businesses. The capacity of the proposed Kapa’a Light Industrial Park would be able to accommodate moderate growth. More important yet, the Kapa’a Light Industrial Park would be geared to provide the framework for a sustainable infrastructure to engage in entrepreneurial activities.

Policy 3: *Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on Oahu:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would provide space for commercial and light industrial activities to help ensure a favorable business climate on Oahu. There is an urgent and significant need for quality industrial space in the Koolaupoko region. Industrial space, including industrial warehouse space, will be lost in the Koolaupoko region due to changing land uses and rezoning efforts. In addition, older industrial developments now in use in the region could be replaced by modern and environmentally friendly facilities. Relocation of businesses and establishing new businesses in the new Kapa’a Light Industrial Park would help to create opportunities for businesses and the local community.

5.2.2 Consistency with Views and Policies of Natural Environment

Objective A: To protect and preserve the natural environment.

Policy 1: Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would provide important light industrial infrastructure, which would be developed in a manner that is responsible to the environment and the community. The low impact development approach of the proposed warehouse development with sustainable technologies would minimize impacts on the environment and community of the proposed warehouse park.

Policy 2: Seek the restoration of environmentally damaged areas and natural resources:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would be built on land that has been significantly impacted by industrial activities over the past decades. Developing this area would improve land that was impaired by landfill many years ago. The proposed project would decrease harmful runoff and would actively engage in restoring natural resources. As part of the low impact development approach about eight acres of land that is presently either not vegetated or only sparsely vegetated would be restored to habitat condition using native and adaptive plants.

Policy 3: Retain the Island's streams as scenic, aquatic, and recreation resources:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would implement mitigation that would effectively protect the water resources from polluted runoff conditions and would actually improve existing water quality in the Kapa'a Stream.

Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would give due considerations to important natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation. The development of the Kapa'a Light Industrial park would follow low impact development standards of environmentally friendly and energy efficient buildings and the development would be designed and constructed in such a manner to qualify for LEED Silver certification upon completion of the project

The proposed project would give due consideration for the features mentioned above:

- Slope, flood and erosion hazards: All slopes in within the development area would be stabilized with appropriate means to avoid erosion. Flood exposure would be avoided since the development would be built outside areas with defined flood hazards.
- Water-recharge areas: The proposed development would endeavor to increase perviousness within the proposed site. All open space within the development would be pervious and vegetated. Rainwater would be collected from a significant portion of the warehouse roof and some segments of roadways. After storage in underground taverns, the collected rainwater would be used for irrigation (e.g. potable water would no longer be used for irrigation) and allow water recharging through infiltration.
- Distinctive landforms would be retained within the proposed site. The existing site is a landfill area that was formed about 30 – 40 years ago. The landfill area would be graded to create an attractive landscaped surface, where currently there is exposed soil with signs of surface erosion at the present time.
- Existing vegetation would not only be conserved but vegetation on the site would be significantly improved by using native and adaptive plants for landscaping and open space restoration and eradicating the existing thick vegetation of invasive plant species.

Policy 6: *Design surface drainage and flood-control systems in a manner, which will help, preserve their natural settings.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would use an array of Best Management Practices (BMP) to create an environmentally friendly drainage and flood-control systems. The stormwater management system would include the following components:

- Pervious areas would be maximized within the development footprint by use of open-grid pavement and landscaped areas around the warehouse structure that would be planted with trees.
- All land outside the development footprint would be pervious area, stabilized with native of adaptive plants or other suitable final soil stabilization measures.

- All parking spaces within the lower portion would be pervious to increase the amount of rainwater infiltration.
- All or a large portion of the impervious warehouse roofs and some roadway sections would collect rainwater. Harvested rainwater would then be stored in underground cisterns for subsequent use of irrigation; therefore converting impervious roof area to “semi-pervious area”.
- All stormwater would be collected and conveyed to detention basins. No stormwater would be released directly to the receiving water without first flowing through detention ponds.
- Upstream of the detention basins the stormwater would flow through pre-treatment units where all floatable debris and a high portion of sediments, nutrients, and oil-grease contained in the stormwater would be removed from the stormwater.
- The stormwater would remain in the detention basins for flood control. The detained stormwater would be released after the storm event to the receiving water in order to shave off high peak runoff flow rates which could result in streambed erosion and subsequent sedimentation in the marsh.
- The type of detention pond for the lower portion of the project site would be an “extended” extension pond. These types of detention ponds can remove a significant portion of suspended solids and nutrients.
- The banks of the normally dry detention ponds would be planted with plants that can either live in a dry or wet environment.
- The detention ponds would be equipped with suitable avoidance measures to discourage endangered water birds from accessing the pools since they would be subject to higher predator threats.

<u>*Policy 7:*</u> *Protect the natural environment from damaging levels of air, water, and noise pollution:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would incorporate active and passive measures to limit air, water, and noise pollution. In particular, some examples of effective measures would include:

- Landscaping with native or adaptive plants within and at the perimeter of the development footprint.

- Using vegetative buffer zones around the development to limit air and noise pollution.
- Using other means to lower air pollution such as avoid unnecessary idling of engines, promoting low-emitting vehicles, promoting alternative transportation, and other measures.
- Using other means to lower noise pollution, both mitigating noise at the source and attenuating noise propagation.
- Implementing an advanced and highly effective stormwater management and treatment system for flood control, and effective removal of pollutants in stormwater.
- Implementing effective onsite wastewater treatment in the form of up to 18 new septic systems for the entire new development; the onsite alternative septic systems in the lower portion of the site would be able to increase the treatment effectiveness and reduce a much higher percentage of organic loads, nutrient and suspended solids than can be removed with conventional septic systems.
- Implementing an effective waste management plan to avoid disposal of wastewater that is not compatible with the onsite wastewater treatment systems (septic systems).

<u>*Policy 8:*</u> *Protect plants, birds, and other animals that are unique to the State of Hawaii and the Island of Oahu:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy. The low impact development approach of the proposed project would create habitat and vegetative buffers zones between the development and surrounding wetland areas. The existing site is not considered a habitat for endangered species. The existing site rather features a population of urbanized birds and small mammals. This population would find an expanded habitat in the perimeter areas of the project.

<u>*Policy 9:*</u> *Protect mature trees on public and private lands and encourage their integration into new developments:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since efforts would be made to preserve all mature trees on the proposed site. Mature trees are mainly located in stream corridor and in the eastern side of the property, but not within the area of the proposed development footprint. The area containing mature trees would not be negatively impacted by the new development, thus most of the mature trees would be preserved. In addition to conserving existing trees the proposed project would plant a significant number of trees in vegetative buffer zones around the proposed development and within the development in landscaped areas around buildings. The vegetative buffer zones would feature native or adaptive plants and would have densely planted wind-breaks to provide effective mitigation against noise pollution, air pollution and visual impact (including light pollution).

Policy 10: Increase public awareness and appreciation of Oahu's land, air, and water resources.

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since the proposed development would be designed and built based on sustainability concepts. Part of the LEED Silver certification plan is to offer educational outreach to promote awareness about the Kawainui Marsh.

Objective B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

Policy 1: Protect the Island's well-known resources: its mountains and craters; forests and watershed areas; marshes, rivers, and streams; shoreline, fishponds, and bays; and reefs and offshore islands.

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would be developed using a wide range of mitigation measures to protect adjacent forests and watershed areas; marshes, rivers, and streams. The Kawainui Marsh, which is located adjacent to the proposed development would benefit from the new development through an improved upstream watershed and water quality of the Kapa'a Stream, achieved by the comprehensive stormwater management system, which would improve the present water quality impacts of the present site configuration. Erosion control measures used in the proposed project would decrease the amount of erosion. Detention ponds of the proposed development would regulate the storm-water discharge by retaining water in the soil and in the ponds. The wildlife habitat on restored land upstream of the marsh would add to the biodiversity of the area.

Policy 2: Protect Oahu's scenic views, especially those seen from highly developed and heavily traveled areas:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would utilize visual impact mitigation measures to protect scenic views. The new warehouses would be built in an attractive style that blends into the surrounding area. Trees would be planted around the buildings within development to provide “green cover” for large warehouse walls. Trees planted in the vegetative buffers around the perimeter of the lower portion of the site would provide effective visual impact mitigation. External lighting design would avoid light pollution. The proposed project would be planned in an area where previous industrial activities have changed the appearance of the Kapa’a Valley. In contrast to the existing industrial uses in or adjacent to the Kapa’a Valley, the proposed industrial development would implement visual impact mitigation.

Policy 3: Locate roads, highways, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the sea:

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would not impede important views of the mountains and the sea.

Policy 4: Provide opportunities for recreational and educational use and physical contact with Oahu's natural environmental.

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would provide educational opportunities about environmentally friendly commercial and industrial developments as part of the LEED Silver certification approach.

5.2.3 Consistency with Views and Policies of Transportation & Utilities

Objective A: To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

Policy 9: Promote programs to reduce dependence on the use of automobiles:

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since the sustainable development approach would promote the use of alternative transport modes. Alternative transport would include public transportation, private shuttles, bicycles, car pools, and other measures. Preferred parking would be offered for car pools and low-emitting vehicles. There would be secured bicycle racks and a locker-shower opportunity for bicycle users. At the present there are no plans to extend TheBus service to the proposed site. The use of bicycles on the Kapa’a Quarry Road is far from safe and secure and a dedicated combined pedestrian and bikeway would be beneficial to create good traffic conditions for bicyclists and pedestrians. The applicant would support plans to build a 1,500 feet section of the proposed perimeter pathway on his property. Portions of this proposed marsh perimeter pathway could be used to safely and comfortably reach the project site from Mokapu Boulevard and Kalanianaole Highway.

Objective B: *To meet the needs of the people of Oahu for an adequate supply of water and for environmentally sound systems of waste disposal.*

Policy 3: *Encourage the development of new technology, which will reduce the cost of providing water and the cost of waste disposal:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since the proposed development would actively engage in incorporating new technology that reduces costs of water usage, as well as lowering the cost of waste disposal through recycling measures. The proposed industrial development would make extensive use of harvested rainwater for irrigation and other applicable non-potable applications. Rainwater harvesting in concert with use of high efficiency toilets, urinals and fixtures offer a significant technology solution to reduce water consumption. Part of the LEED Silver certification program is a comprehensive construction waste management plan under which significant part of material from the site would be reused or recycled. Operational plans of the proposed industrial development will have a comprehensive recycling program.

Policy 4: *Encourage a lowering of the per-capita consumption of water and the per-capita production of waste.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would actively incorporate measures to lower the water consumption and would lower water consumption by recycling water and harvesting rainwater that can be used for irrigation or other grey water applications. A part of onsite treated wastewater would be reused for irrigation and infiltrated on the site. As part of the low impact development approach occupants of the park would be encouraged to recycle and to responsibly use resource, and facilities would be provided to make these efforts easy and convenient.

Policy 5: *Provide safe, efficient, and environmentally sensitive waste-collection and waste-disposal services:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would incorporate safe, efficient, and environmentally sensitive waste-collection and waste-disposal services. The proposed industrial park would implement a comprehensive waste management plans that would include construction waste management, material reuse, recycled content of both pre- and post-consumer content, preferred use of regional material, rapid renewable material and certified woods. These measures would be promoted under the LEED project approach of sustainable design, construction and operation.

Policy 6: *Support programs to recover resources from solid-waste and recycle wastewater.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would implement and maintain comprehensive waste management and recycling content programs. Wastewater would be treated and infiltrated on site. Wastewater disposal in areas that are close to sensitive areas would include advanced treatment capabilities to significantly lower the concentration of organic loading, nutrients and suspended solids in ten effluent. The effluent of the onsite wastewater treatment would be such a good quality to allow us to use it for irrigation.

Policy 7: *Require the safe disposal of hazardous waste.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would safely collect and dispose of any hazardous waste. The type of land use in the proposed industrial development would exclude industries using or manufacturing hazardous materials.

Objective C: To maintain a high level of service for all utilities.

Policy 1: *Maintain existing utility systems in order to avoid major breakdowns:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would implement and maintain, in good working order, all utilities in the proposed development. Implementation of energy savings and on-site photovoltaic electricity generation would reduce the baseline energy demand and in particular peak demand, thus mitigating system breakdown. Implementation of water saving products and management measures would significantly lower water consumption and preserve the existing infrastructure. Onsite wastewater treatment would provide effective treatment of sewage and avoid discharge of wastewater from the proposed development to municipally wastewater treatment plants in Kailua or Kaneohe.

Policy 4: *Increase the efficiency of public utilities by encouraging a mixture of uses with peak periods of demand occurring at different times of the day:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would incorporate load management technology to decrease peak electricity demand or to flatten out the peak demand curve over the day. In addition, the proposed development would incorporate renewable heat recovery or electricity generation by photovoltaic in order to lower peak demand.

Objective D: *To maintain transportation and utility systems, which will help Oahu, continue to be a desirable place to live and visit.*

Policy 5: *Require the installation of underground utility lines wherever feasible:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would place all improved utilities underground within the proposed site.

5.2.4 Consistency with Views and Policies of Energy

Objective A: *To maintain an adequate, dependable, and economical supply of energy for Oahu residents.*

Policy 1: *Develop and maintain a comprehensive plan to guide and coordinate energy conservation and alternative energy development and utilization programs on Oahu:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would support active and passive energy conservation. The proposed development would utilize state-of-the-art energy conservation technology and measures to lower baseline and peak demand in the proposed development. A portion of the electricity demand would be generated using on-site renewable energy systems. The project development of the lower portion of the site would apply for LEED Silver certification upon completion, which requires the implementation of a wide range of for sustainable technologies, including energy savings of at least 30 percent under the baseline of conventional developments.

Policy 2: *Establish economic incentives and regulatory measures, which will reduce Oahu's dependence on petroleum as its primary source of energy:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would promote the use of renewable energies and therefore help to reduce energy demand that is primarily based on petroleum fuel. The proposed development would promote energy efficiency that would consume electricity at levels that is far below design baseline performance prescribed in conventional building codes. At present about 80 percent of Hawaii’s electricity is made from petroleum. Effective energy savings therefore directly helps reducing Hawaii’s dependency on petroleum. The proposed development would install photovoltaic panels on rooftops to generate electricity that is either used by the warehouses on site or is net-metered.

<u>Policy 3:</u> *Support programs and projects, which contribute to the attainment of energy self-sufficiency on Oahu.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would incorporate energy generation technology to provide electrify, heat and cooling from renewable or indigenous resources. The low impact development approach of the proposed project uses a wide range of active and passive building technologies to reduce energy consumption and promote renewable energies. As part of the LEED Silver certification plan an amount of renewable energy certificates (REC) will be purchased to promote the use of indigenous energy.

<u>Policy 5:</u> *Give adequate consideration to environmental, public health, and safety concerns, to resource limitations, and to relative costs when making decisions concerning alternatives for conserving energy and developing natural energy resources.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it makes capital investments in energy efficiency and renewable energy sources. The integrated LEED project development approach stresses a triple bottom-line to promote the economy, social responsibility and environmental stewardship. .

<u>Objective B:</u> *To conserve energy through the more efficient management of its use.*

<u>Policy 1:</u> *Ensure that the efficient use of energy is a primary factor in the preparation and administration of land use plans and regulations.*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would follow the LEED project development approach and would make energy efficiency and renewable energy important design and development goals. Since LEED project certification involves a third party review process the public can be assured that energy efficiency and savings would be part of proposed industrial warehouse development. Energy efficient performance of buildings is a prerequisite to obtain LEED Silver certification.

<u>Policy 2:</u> *Provide incentives and, where appropriate, mandatory controls to achieve energy efficient siting and design of new developments:*

The proposed Kapa’a Light Industrial Park development would be consistent with this policy, since it would incorporate energy efficiency in the proposed development as per LEED project development approach. The sustainable building and site development standards of LEED entail the completion all or many of the following credits:

- Commissioning of building energy systems to increase energy efficiency

- Minimum energy performance
- Refrigeration management by avoiding or phasing out CFCs (Chlorofluorocarbons) and using environmentally friendly refrigerants
- Optimize energy performance
- Onsite renewable energy
- Measurement and verification of building and tenants
- Promoting green power applications

<u>Policy 3:</u> *Carry out public, and promote private, programs to more efficiently use energy in existing buildings and outdoor facilities:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would not only equip new warehouses with energy efficient technology, but would also convert existing buildings to be more energy efficient.

<u>Policy 4:</u> *Promote the development of an energy-efficient transportation system:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would encourage car-pooling and other means of alternative transportation for the users and employees of the proposed warehouse development. The proposed development would provide bicycle friendly infrastructure with bike racks and locker & shower facilities. Preferred parking would be offered for carpools, low-emitting cars and alternative fuels cars. The applicant promotes the extension of public transportation to the proposed site; although at the moment such extension is not planned by the City & County traffic authorities. In the event that no public transportation would be offered to serve the proposed site with public transportation, the applicant may possibly offer private shuttle service at a point in the development, when enough demand is being developed by businesses in the light industrial park.

<u>Objective C</u>: *To fully utilize proven alternative sources of energy.*

<u>Policy 1:</u> *Encourage the use of commercially available solar energy systems in public facilities, institutions, residences, and business developments.*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would actively promote and install commercially available solar energy systems. In addition to photovoltaic energy generation selected warehouses would be equipped with solar water heater for potable water needs.

<u>Policy 2</u>: *Support the increased use of operational solid waste energy recovery and other biomass energy conversion systems.*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would implement a comprehensive waste management plan, which would include recycling of glass, metal, paper, cardboard and plastic as well as composting of some organic waste. The recycled combustible content (e.g. plastic, paper, cardboard) could be converted to energy in waste incendiary facilities. The organic biomass could be composted onsite and reused, thereby reducing the energy footprint of the proposed development.

Objective D: To develop and apply new, locally available energy resources.

Policy 1: Support and participate in research, development, demonstration, and commercialization programs aimed at producing new, economical, and environmentally sound energy supplies from:

a. Solar insulation;
b. Biomass energy conversion;
c. Wind energy conversion;
d. Geothermal energy; and
e. Ocean thermal energy conversion.

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would seek to attract companies that develop, build and sell innovative energy technology. In addition, the proposed development would make efforts to attract pilot installation of innovative energy conversion technology. Onsite renewable energy is part of the LEED Silver certification plan.

Objective E: To establish a continuing energy information program.

Policy 1: Supply citizens with the information they need to fully understand the potential supply, cost, and other problems associated with Oahu's dependence on imported petroleum:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would make efforts to engage the users of the park to increase the portion of renewable energy resources and save energy (thus avoiding the use of petroleum derived energy)

Policy 2: Foster the development of an energy conservation ethic among Oahu residents:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would actively engage the users of the park to use energy efficiently. The proposed warehouse development would be a "living proof" that energy conservation and enhanced business activities are not exclusive propositions. The proposed industrial development could publicly promote responsible energy use and would therefore offer valuable "real life" application knowledge of energy efficiency, energy saving strategies and renewable energy applications. Sharing of energy and water consumption data is a prerequisite of the LEED Silver certification plan. The planned web site of the proposed project could promulgate energy and water consumption data.

Policy 3: Keep consumers informed about available alternative energy sources and their costs and benefits:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would engage users of the park about implementing energy conservation and using renewable energy.

Policy 4: Provide information concerning the impact of public and private decisions on future energy use:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would encourage participation in energy issues of users of the propose warehouse park, which are not only relevant to the warehouses but also of broader public interest.

5.2.5 Consistency with Views and Policies of Public Safety

Objective A: To prevent and control crime and maintain public order.

Policy 1: Provide a safe environment for residents and visitors on Oahu:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would provide a safe environment for the users and visitors of the proposed warehouse development. It is anticipated that the constant presence of security measures and private security patrols would decrease any possible criminal activities in the areas adjacent to the proposed site.

Policy 5: Establish and maintain programs to encourage public cooperation in the prevention and solution of crimes:

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since it would actively work with users of the park in the prevention of crime. It is anticipated that the development of the proposed warehouse park would lower the incidence of crime in the area since improved security on the proposed site would also positively impact adjacent areas.

Objective B: *To protect the people of Oahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.*

Policy 1: *Keep up-to-date and enforce all City and County safety regulations:*

The proposed Kapa'a Light Industrial Park development would consistent with this policy, since it would enforce all City and County safety regulations as well as additional safety regulations implemented by the users.

Policy 2: *Require all developments in areas subject to floods and tsunamis to be located and constructed in a manner that will not create any health or safety hazard:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since all buildings would be located outside high-risk flood zones and the buildings would be constructed in such a manner to not create any health or safety hazards.

Policy 6: *Reduce hazardous traffic conditions:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since all private roads and intersections with public would be constructed and maintained in such a manner to reduce hazardous traffic conditions.

Policy 7: *Provide adequate fire protection and effective fire prevention programs:*

The proposed Kapa'a Light Industrial Park development would be consistent with this policy, since effective fire prevention and protection would be implemented, such as adequate fire water supply, fire water booster pumps, preference to fire resistant construction materials, dedicated fire accesses to the buildings and comprehensive fire prevention instructions.

5.3 Consistency with Koolaupoko Sustainable Communities Plan

This section discusses how the proposed Kapa'a Light Industrial Park would support the visions, guidelines and planning principles set forth in the Koolaupoko Sustainable Communities Plan.

5.3.1 Consistency with the Role of Koolaupoko on Oahu

The Koolaupoko Sustainable Community Plan calls for sustaining quality of life in the region by balancing and integrating environmental, economic, social and cultural objectives. The proposed Kapa'a Light Industrial Park would positively affect economic and social aspects of the region, while providing an attractive place of operation for commercial and light industrial businesses that would be environmentally friendly and respectful to cultural concerns and the natural surroundings.

Goals for the future land use the Koolaupoko region are shaped by the region's role to provide only minor population growth, while future significant residential growth is directed instead to Oahu's Primary Urban Center and Ewa Development Plan Areas in accordance with the General Plan. The future role of the Kapa'a Light Industrial Park would be to attract beneficial new employment opportunities for residents of the Koolaupoko regions, while providing modern and environmentally friendly warehouse space for light industrial and commercial uses in the region, in order to mitigate a growing shortfall for warehouse space.

It would not be the goal of the proposed Kapa'a Light Industrial Park to attract significant growth of economic activity and employment from other part of the islands, or such businesses that would serve an island-wide market. Rather, the primary business goal of the proposed Kapa'a Light Industrial Park would be to contribute to the revitalization of the commercial base of the Koolaupoko region by providing much needed modern warehouse space that is built, equipped and operated in an environmentally friendly and energy efficient manner.

As was identified in the market study of this environmental review, the Koolaupoko region is presently significantly undersupplied with industrial space. Compared to the average per capita allowance of industrial space on Oahu, the Koolaupoko region only provides about 20 percent of the average per capita allowance at the present time. Adding the planned approximately 600,000 square feet of gross leasable space of the proposed development to the industrial space supply in the Koolaupoko region would result in approximately 40 percent of comparable per capita allowance of industrial space in other markets on Oahu. The Koolaupoko region could absorb the planned industrial space within a development time frame of 15 to 17 years.

The proposed Kapa'a Light Industrial Park would be the expansion of an already existing industrial warehouse complex. The proposed expansion of the development is not a brainchild of "foreign" developers, who have identified the land adjacent to the Kawainui Marsh for a significant industrial project. The proposed development is a "local" initiative, initiated by long-term "local" developers, who are rooted in the community and the proposed development is directed to benefit the local community rather than an island-wide market.

5.3.2 Consistency with the Visions of the Sustainable Community Plan

The vision of the Koolaupoko Sustainable Community Plan is the long-term protection of community resources and its residential character as well as the adoption of improvement and developments that reflect a stable population. The two cornerstones of the plan are protecting community resources and providing improved infrastructure to serve changing needs of the population.

The first cornerstone of the plan requires the preservation, conservation, and enhancement of the region’s resources, which are:

1. Natural and scenic resources
2. Cultural and historical resources
3. Agricultural resources
4. Residential environmental of neighborhoods

The proposed Kapa’a Light Industrial Park would affect the first two resource categories of the above list, namely natural and scenic resources and cultural and historical resources. The area in the Kapa’a Valley is not of agricultural use and is not adjacent to residential neighborhoods. Appropriate measures for the design, construction, outfitting and operation of the industrial development would be applied to effectively protect important community resources.

The second cornerstone of the plan calls for improved infrastructure to serve the changing needs of the population in the region. The proposed Kapa’a Light Industrial Park would provide urgently needed industrial space which is modern, environmentally friendly and energy efficient. Both environmental protection and an efficient and responsible use of energy are increasingly important and fundamental challenges for Hawaii.

Key elements of the vision, policies and guidelines for Koolaupoko futures, which are applicable to the proposed Kapa’a Light Industrial Plan, are as follows:

The concept of “ahupua‘a” in land use and natural resource management: Ahupua’a refers to the historic Hawaiian principle that the land provides abundantly only when revered as a unique entity stretching from the mountains to the ocean. All elements in the stream of natural abundance must contribute to the health of ahupua’a. Therefore any development in the ahupua’a will affect its viability. The proposed Kapa’a Light Industrial Park would therefore contribute by being developed in manner that is respectful to the land, limits its emissions to a minimum and consumes as little resources and in the most responsible manner as possible. Being located adjacent and upstream from the important Kawainui

Marsh, the proposed industrial warehouse development would contribute to the health of the Kapa’a Stream by discharging only stormwater that has passed through a comprehensive stormwater management system that removes a significant portion of pollutants and provides flood control.

Preserve and promote open space throughout the region: The proposed Kapa’a Light Industrial Park would be developed while leaving large areas within the property as open spaces. As part of the LEED Silver certification plan about eight acres of land would be converted from either graded and not vegetated and sparsely vegetated to restored habitat, featuring native and adaptive plants. The proposed site would be surrounded by vegetative buffer zones comprised of dense planted shrubs and trees, establishing dense wind-breaks that could effectively mitigate noise, air pollution and visual impacts. The vegetative buffer zones would be open spaces service as habitat for the native population of urbanizes birds and small mammals.

Enhance existing commercial and civic districts; The proposed Kapa’a Light Industrial Park would be an expansion of an already existing warehouse development. While the present warehouse development represents individually designed and erected buildings, the future industrial warehouse development would be a consistently planned development and would contain modern environmentally friendly and energy efficient warehouses.

5.3.3 Consistency with Land Use Policies, Principles and Guidelines

The relevant commercial and industrial activities that define the land use of the proposed warehouse park would include service companies, light industrial activities and storage facilities. According to the Sustainable Communities Plan, it is encouraged to satisfy evolving infrastructure needs for certain commercial and light industrial uses in the regions. The plan contends that the anticipated demand for industrial space in the region should be accommodated by existing industrial zones in the Kailua, Kaneohe and in the Kapa’a area, with the latter being a portion of the proposed Kapa’a Light Industrial Park that is already in operation at the present time.

The market study of this environmental review has determined that the demand for industrial space cannot be satisfied by existing industrial zoned land within the Koolaupoko region. At present the Koolaupoko region is significantly undersupplied with industrial space when compared to the average Oahu supply of industrial space. The per capita industrial space allowance in the Koolaupoko region is presently only about 20 percent of the average Oahu allowance. Another factor to be considered is that over the next years it can be anticipated that more and more industrial zoned land within the region is being lost due to re-zoning and new developments on this land that is not industrial in nature. The proposed Kapa’a Light Industrial

Park would therefore be consistent with land use policies and guidelines of the Koolaupoko Sustainable Communities Plan.

General Policies indicate that light and extractive industry activities in the Kapa'a Valley are accepted land uses. Therefore the proposed Kapa'a Light Industrial Park would be consistent with future land use plans in the region.

Applicable Planning Principles of the Sustainable Community Plan would be consistent with the proposed Kapa'a Light Industrial Park, such as:

- The proposed park would promote alternative modes of transportation, such as bicycles uses and car-pooling. Though at the moment the site is not served by public transportation, the developer of the proposed industrial park would promote public transportation or private shuttles to serve the expanded industrial development in the futures.
- The buildings in the proposed industrial development would be built in such a manner to respect the natural surroundings.
- Landscaping features would use open spaces between the buildings and would use native and adaptive plants, which offer many advantages over other plants, such as less irrigation requirements, less fertilizer, and less maintenance, to name a few.
- The development approach of the proposed industrial development would be consistent with the demand for energy efficiency and resource conservation by promoting the use of alternative energy as well as implementing comprehensive energy efficiency measures. Water conservation would be promoted by use of appropriate water efficient fixtures (e.g. fixtures certified under the EPA WaterSense program) use of harvested rainwater for irrigation and more water efficient landscaping (e.g. plants that need less irrigation water, water efficient irrigation technology). The proposed development would establish comprehensive waste management programs during construction and normal operation that would include recycling and other sustainable waste reduction, use and reuse measures.
- The site of the proposed Kapa'a Light Industrial Park is composed of presently large areas of fill material from former quarry operations. Plans for restoring these areas of the site are consistent with the planning principles of the Sustainable Communities Plan, which call for suitable depth of topsoil to establish plant material similar to that in the surrounding area.

The following planned measures of the proposed Kapa’a Light Industrial Park would be consistent with the Implementation Guidelines for light and extractive industry, set forth in the Koolaupoko Sustainable Community Plan, such as:

Visual Screening, Lighting and Signage:

- Noise and other adverse impacts from parking, loading and service areas would be buffered from adjacent wildlife preserves and public roads by an appropriate combination of vegetative buffer zones, landscaped setbacks other mitigation measures (e.g. sound barriers).
- Visual impact from large buildings and solid walls would be mitigated by landscaping to soften the appearance of buildings, by planting trees and by the possible installation of “green walls” around selected buildings.

Drainage and Waste Material:

- A comprehensive stormwater management plan would mitigate impacts from qualitative and quality impacts of runoff from the site. The stormwater management plan would contain a range of Best Management Practices (BMPs), such promoting infiltration of rainwater, collecting all stormwater in detention ponds for release into receiving waters after the storm event and removing at least 80 percent of main pollutants from the stormwater before discharge to the receiving waters. With the implementation of the proposed comprehensive stormwater management system the proposed development would result in no direct discharge of stormwater runoff into receiving water.
- Leachate from underground storage tanks, if any, would be avoided by appropriate measures. Leachate from fill material, as currently happens, would be avoided by collecting the stormwater runoff into suitable detention basins and treating it efficiently before discharging it into the receiving waters;
- Litter and other waste material would be prevented from encroaching into adjacent sites through the use of landscaping as well as proper maintenance of the site.

5.3.4 Consistency with Infrastructure Policies and Principles

The proposed Kapa’a Light Industrial Park would be consistent with the following policies and principles in regard to public infrastructure.

Water system development: The general policies on conserving precious water resources would be adopted through planned design and operational measures:

- The sustainable development plan of the proposed industrial park calls for significant water savings of 40 percent savings compared to conventional industrial developments excluding irrigation needs.
- The proposed development would install only water efficient fixtures such as certified under the EPA (including low-flush toilets, waterless urinals, flow constrictors and other water conserving devices).
- Native and adaptive plants would be used for landscaped areas; drip irrigation would be used, where applicable; no potable water would be used for irrigation, instead collected rainwater and recycled wastewater (after receiving advanced treatment) would be used for irrigation.

Wastewater treatment systems: The proposed Kapa'a Light Industrial Park would endeavor to minimize wastewater discharge in order to conserve natural resources and to alleviate current capacity problems of public wastewater systems.

The proposed development would be consistent with the following General Policies:

- Within the newly developed area, wastewater effluent would be treated and recycled, where feasible, as a water conservation measure. The extent of wastewater recycling would be contingent on technology and other regulatory aspects.
- The proposed on-site treatment of wastewater would be consistent with the requested delay of further sewer connections in Kailua.
- The reduced water use in toilets, urinals and other blackwater sources would result in less wastewater generated on the site and a reduced volume of wastewater to be treated.

The proposed development is consistent with the following Planning Principles and Guidelines:

- The proposed development would use recycled wastewater for the purpose of irrigation, provided these uses conform with State's rules and guidelines for the treatment and use of recycled water;
- Berms or other suitable landscape elements would be used, where applicable and necessary from the design, as a buffer between on-site wastewater treatment system and adjacent buildings on the property.

Electrical and communication systems: The proposed development of the Kapa'a Light Industrial Park would be consistent with the applicable guidelines:

- Electrical and communication cables in the proposed development would be placed underground within the proposed development footprint.
- The proposed development would encourage and implement significant energy conservation and saving measures as well as on-site electricity generation (by renewable means); therefore, additional electrical grid capacity required by the proposed industrial development would be reduced from a normal baseline amount.
- With innovations in the communication technology, no major additions of communication assets would be anticipated for the proposed development.

<u>Solid Waste handling and Disposal:</u> The anticipated waste management of the proposed Kapa'a Light Industrial Park would be consistent with the demanded general policies of the Koolaupoko Sustainable Communities Plan, regarding to waste reduction, re-use and recycling as well as the efficient disposal of waste.

- The design, construction and operational approach of the proposed development would follow the LEED Silver certification plan. Since the proposed industrial development will be developed in accordance with the LEED rating system for Core and Shell, implementation of energy efficient site development and technology is a requirement.
- The proposed industrial development would actively engage in significant efforts to reduce and reuse solid waste. All or some of the following waste mitigation measures would be implemented by the proposed development, construction waste management, materials reuse, recycled content, regional material, rapidly renewable materials, and certified wood.

<u>Drainage systems:</u> The sustainable development approach of the proposed Kapa'a Light Industrial Park would be consistent with drainage related policies of the Koolaupoko Sustainable Communities Plan. Due to the proximity and upstream location to important wetland area (e.g. Kawainui Marsh), the proposed development would implement and operate a comprehensive stormwater management system to mitigate all possible adverse drainage effects.

The planned stormwater management and drainage system for the proposed Kapa'a Light Industrial Park is consistent with the following general policies and planning principles:

- The planned drainage system design would promote control and minimization of non-point source pollution and the retention of storm water on-site and in wetlands; the proposed system would collect all stormwater runoff from impervious surfaces and convey it to detention ponds where they are temporarily retained and then released after the storm event..

- The entire development footprint would be outside the Kapa’a Stream set-back. This ensures that the natural drainage capacity of the Kapa’a Stream would not be negatively affected by the development.
- Stormwater is recognized as an important source of non-potable water that should be retained for recharge of the aquifer rather than quickly moved to coastal waters. The planned drainage strategy would collect stormwater in detention ponds and release it in a controlled way. Stormwater would also be harvested from roof areas of warehouses and selected roadway section, stored in underground cistern and subsequently used for irrigation and, if possible, other graywater applications in the buildings.
- The proposed development would promote infiltration of rainwater through natural and developed vegetated open space as the preferred solution to drainage problems wherever these measures can be applied. The proposed development would implement structural and operation measures to control non-point source pollutants.
- The proposed development would utilize several stormwater detention basins of different sizes for gradual release of retained stormwater into the receiving waters.

Urban Design features:

It is recognized that the physical appearance or "design" of appurtenances comprising the infrastructure, individually and collectively, impact and influence the physical appearance of the community where they are located. The development approach of the proposed industrial development would use such types of design features, building materials, layouts and operational measures that would positively affect the appearance of the proposed development. Examples of mitigation of visual impact are the vegetative buffer zones, significant planting of trees within the industrial development, green walls around selected buildings and the avoidance of light pollution emanating from the proposed site. The proposed Kapa’a Light Industrial Park would therefore be consistent with the planning principles and guidelines for urban design of the Koolaupoko Sustainable Community Plan.

5.4 County Special Management Area

Approximately 90 percent ~~A portion~~ of the land parcel designated as TMK 4-2-015:006, which is part of the proposed site, is within the County Special Management Area. A Special Management Area permit must be obtained from the City and County of Honolulu in order to allow the development of the Kapa'a Light Industrial Park on that portion of the parcel TMK 4-2-015:006.

Special management areas (SMA) are regulated on the County level as part of Hawaii's Coastal Zone management (CZM) program, under Chapter 205A, Hawaii Revised Statutes (HRS). The SMA Permit system regulates development within geographically defined areas that extend from the shoreline inland as delineated in zoning maps. A development which is subject to SMA program is defined as follows:

1. Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste;
2. Grading, removing, dredging, mining, or extraction of any materials;
3. Change in the density or intensity of use of land, including but not limited to the division or subdivision of land;
4. Change in the intensity of use of water, ecology related thereto, or of access thereto; and
5. Construction, reconstruction, demolition, or alteration of the size of any structure.

Table 5.1 delineates which specific SMA guidelines, described under HRS 205D-26, apply to the proposed project, how the proposed project is complying with the requirements and how the project will implement mitigation measures to minimize possible adverse impacts delineated in the guidelines.

The proposed project does not qualify as a SMA minor permit and therefore County procedures under the Special Management Area use permit apply. The process includes a thorough review by the agencies involved, and public hearings will be required. The public will have sufficient opportunity to be involved in the SMA permit process and will be asked to provide input in possible improvements of the design approach of the project.

It is expected that the duration of the SMA use permit will last approximatelyfour to five months from the acceptance of the SMA application to the decision by the City Council. The process includes an agency review and public hearing, followed by a report to the City Council. The City Council then reviews the case and takes action in form of a resolution, which includes a public hearing.

Table 5-1 Compliance of proposed project with HRS 205A-26 SMA Guidelines
(Table 5-1 is a new table added to the DEIS content)

No. in HRS § 205A-26	**Description of SMA guidelines**	**Project conforms to guidelines**	Comments or proposed measure to minimize impacts
1	**Reasonable terms and conditions set by the authority in order to ensure compliance:**		
1(A)	Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;	Project conforms	The proposed project will not alter access to public owned or used recreation areas or natural reserves
1(B)	Adequate and properly located public recreation areas and wildlife preserves are reserved;	Project conforms	The proposed project will reserve public recreation areas and wildlife preserves
1(C)	Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources;	Project conforms	Measures are taken under the design approach to manage solid and liquid waste in an environmentally friendly way and minimize impacts
1(D)	Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake.	Project conforms and provides measures to provisions that apply	The proposed project will implement, among other measures: • A comprehensive system of measures to decrease the visual impact; • A comprehensive stormwater management system to improve the existing drainage situation and effectively control and minimize adverse runoff effect on adjacent water bodies; • A comprehensive soil stabilization effort to minimize erosion and siltation. This effort will include the improvement of

No. in HRS § 205A-26	Description of SMA guidelines	Project conforms to guidelines	Comments or proposed measure to minimize impacts
			vegetated land around the site perimeter to restored habitat under the sustainable design approach.
2	**The authority, e.g. county planning commission, needs to ascertain that:**		
2(A)	That the development will not have any substantial adverse environmental or ecological effect, except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Such adverse effects shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect, and the elimination of planning options;	Project conforms	The applicable design measures will be described in the project updated Masterplan and the sustainable design approach that is formulated to acquire LEED Silver certification upon completion of the project
2(B)	That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature;	Project conforms	The proposed project is consistent with objectives, policies, and special management area guidelines, as well as other legislature guidelines.
2(C)	That the development is consistent with the county general plan and zoning. Such a finding of consistency does not preclude concurrent processing where a general plan or zoning amendment may also be required.	Project conforms	The proposed project is consistent with the general plan but requires a zone change for two of the three contiguous land parcels that comprise the proposed site

No. in HRS § 205A-26	Description of SMA guidelines	Project conforms to guidelines	Comments or proposed measure to minimize impacts
3	**The authority, e.g. county planning commission, shall seek to minimize, where reasonable**		
3(A)	Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;	Project conforms	The development of the proposed project will not dredge or place fill into or adjacent to bay, estuary, salt marsh, river mouth, slough or lagoon; the entire development will NOT include any water bodies an designated wetland areas
3(B)	Any development which would reduce the size of any beach or other area usable for public recreation;	Project conforms	The proposed project will not reduce any beach or other area usable for public recreation
3(C)	Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach;	Project conforms	The proposed project will not restrict public access to portions rivers and streams; the public access to the Kapa'a Stream corridor will not be altered from the existing condition
3(D)	Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and	Project conforms	The proposed project will not interfere or detract for any line of sight towards the sea
3(E)	Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.	Project conforms	The proposed will not adversely affect water quality in adjacent water bodies and designated wetland areas; the development will not be built on or within designated wetland areas or wildlife habitats. The proposed site is

No. in HRS § 205A-26	Description of SMA guidelines	Project conforms to guidelines	Comments or proposed measure to minimize impacts
			a former landfill that will be redeveloped using a wide range of low impact development technologies, therefore existing or potential agricultural uses of land are not adversely affected.

CHAPTER SIX - CUMULATIVE AND UNAVOIDABLE IMPACTS, SHORT-TERM USES TO LONG-TERM PRODUCTION , UNRESOLVED ISSUES

Please Note: This is a new Chapter Six that has been added to the FEIS document. The Chapter Six that was part of the DEIS has been deleted. All of the text in this Chapter Six is new. The new text in Chapter Six is not underlined to identify it as added or modified text to the DEIS, as is done in the other sections of this FEIS.

Chapter Six summarizes the project's cumulative and unavoidable impacts, the relationship between short-term uses and long-term Productivity, and key impact mitigation measures. This chapter also discusses unresolved issues, including both areas of disagreement and uncertainties in the project plan.

6.1 Relationship between Short-term Uses and Long-term Productivity

The site development and construction of buildings on the proposed site would require short-term uses of land and other resources. This chapter discusses how short-term uses of the proposed project would affect the long-term productivity of the natural and human resources.

The terms "short-term" refers to temporary impacts during construction and site development of the proposed project and "long-term" refers to the benefits if the proposed project during its operational life. The relationship between short-term uses and long-term productivity would not be appreciably different between the two action alternatives.

6.1.1 Short-term Uses and Related Impacts

In general, site development and construction of buildings of the proposed light industrial park would result in short-term construction-related impacts such as interference with traffic on the affected roads and intersections, increased air emissions through the generation of limited dust and the use of construction equipment, increase in ambient noise levels by the increased traffic and construction activities, disturbance of wildlife as well as increased stormwater runoff. These impacts would be temporary and would occur only during construction and development of the proposed park, and they are not expected to alter the long-term productivity of the natural environment. Impacts during the construction are discussed in Section Four of this EIS.

The planned development scheme of the proposed project can be divided into two different categories or phases of short-term impacts;

Phase 1, impacts from work associated with site preparation, which will include limited grading, construction of roadways, parking areas and other traffic areas, installation of utilities, landscaping and construction of vegetated buffer zones at the perimeter of the proposed site. Most of the work associated with site preparation will last approximately six to nine months, while the most intensive impacts during grading would require approximately three to four months. Since most of the soil disturbance will occur during Phase 1, most of the related impacts will happen during this phase.

Phase 2, Impacts from the construction of individual warehouses and ancillary structures, which will include the construction of the building shell, the development of the area in immediate vicinity of the buildings and the build-out of the interior of the warehouse to fit the tenant's needs. While the construction of individual warehouses will require about 3-4 months each, warehouses are installed one after the other and not all at once. The estimated time for all buildings to be added to the proposed development is approximately 15 to 17 years, which is dependent on the rate at which industrial space is absorbed in the region.

6.1.2 Long-term Productivity Benefits to the Local Economy

The proposed project would increase long-term productivity of the Koolaupoko region by strengthening the economic infrastructure and assist in diversifying the local economy. While there is currently a significant undersupply of industrial zoned land in the region the proposed project would provide urgently needed industrial space. The proposed project will create at least 600 new full-term positions to the region, where it is estimated that approximately 60% or more of the new positions will be taken by residents of the region. The project will generate an estimated $1.9 million and $8.8 million in taxes for the City and County of Honolulu and the State of Hawaii, respectively.

The proposed project may potentially reduce longer commutes for certain employees who are residents of the region, if they are able to change their place of work from the leeward side to the proposed project. It may also offer the potential of shorter trips for some customers and service providers, who can provide or receive services or products in a location closer to their base.

Any discussion about long-term productivity needs to consider the important goal for Hawaii of implementing more sustainability. Important foundations of a sustainable Hawaii include the diversification of the local economy, increasing local production of food and goods, conserving energy and water as well as reducing the amount of imported energy in the form of petroleum. An important objective for a more sustainable Hawaii is the reduction of miles travelled, in order to save petroleum and energy. Locating the place of employment, commerce and recreation closer to the residents is one measure that is regarded as effective to lower traffic volume on an island wide level. The proposed project will provide industrial space to businesses, especially smaller local businesses to grow and relocate to more effective place of business, so that the region can be served with essential services from within the region.

The low-impact development of the proposed project will serve as an important example that industrial development can occur in an environmentally friendly way and in a manner that is supportive and respectful to the community and its cultural values.

6.1.3. Relationship between Short-term Uses and Long-term Productivity of the Environment

This section discusses the relationship of short-term uses and long term productivity of the environment for several areas of significance.

Land Use: Under the Preferred Alternative, construction of the proposed project would convert approximately 21 acres from pervious to impervious area. The approximately 21 acres of currently pervious area is graded but has no continuous vegetation cover. Since the 21 acres of land that will be converted to impervious land is entirely located on former, not redeveloped landfill area, no presently open space with vegetation, agricultural land or land with mature trees will be lost. Furthermore, no aquatic resources or wetland areas will be converted to impervious and non-vegetated land. Part of the sustainable design approach of the proposed project is the conversion of approximately eight acres of the proposed site to restored habitat by planting native or adaptive plants and removing the current invasive plant species found on part of the proposed site. Of these eight acres, about two acres is presently not vegetated land. These two acres would be converted to restored habitat and would therefore increase the extent of land with a permanent plant cover. The net result of the long-term productivity of the environment will be positive since the quality of habitat will be increased from the present conditions.

Water Resources: Construction of the proposed project will result in short-term disturbances to surface water and ground water resources. There would be minimal consumption of surface water and groundwater resources during the construction phase. There would be no disturbances to floodplains, designated wetland areas and water bodies. There would be no long-term loss of functions, such as erosion and flood control, water-quality protection, aquatic-habitat, recreational uses and aesthetic appearance of adjacent wetland areas and water bodies. No major construction activities would be near or adjacent to water bodies and the only construction activity planned near water bodies would involve the installation of overflows of the detention ponds and stormwater discharges. This limited construction would involve minor modification of the stream banks or boundaries of wetland areas, and any fill to be deposited into stream beds or wetland areas will be only incidental. The size of the areas near water bodies that might be affected by construction will be small in relation to the overall area of adjacent wetland area and water bodies and would therefore not affect long-term productivity of the area. Under the Preferred Alternative the proposed stormwater management system would result in a long-term improvement of the run-off to the receiving waters with resulting improvements of current impacts on water quality, stream bed erosion and subsequent sedimentation in the downstream marsh. This would improve the long-term productivity of the water bodies directly affected by the proposed project.

Biological Resources: The construction of the proposed project would result in some short-term and long-term impacts to some vegetation and wildlife resources. During construction, some vegetated areas at the perimeter of the site (mostly those containing invasive plant species) would be removed and replaced with a wider buffer zone panted with native and adaptive species. There are some mature trees at the perimeter of the site, which would not be removed and measures will be taken that these trees will not be damaged during construction. The time to replenish the size of vegetation that will be removed at the site perimeter is estimated five years, therefore no long-term loss of habitat must be considered. There is currently a population of non-native wildlife on the not yet developed portions of the site, such as feral cats and domesticated birds, which make a home primarily within the site perimeter. During construction this wildlife population will be temporarily removed by avoidance but it is expected that domesticated bird population will soon return and find a more extensive habitat in the restored habitat at the site perimeter. The applicant plans to control the feral and non-native wildlife populations with predator management programs that will be designed and implemented following guidelines of the U.S. Fish and Wildlife Service (USFWS).

The project site is adjacent to the Kawainui Marsh which is home to several federally listed water birds. The proposed site itself, especially the land that will be used as the development footprint is presently not identified as habitat for endangered species. The design approach will implement measures to avoid attraction of endangered wildlife to the developed land. Such measures have been proposed by the USFWS in include the avoidance of creating open water surface ponds within the proposed project site. Implementing such measures will avoid attracting endangered wildlife to the proposed site where they could be subjected to increase predator threat.

Concluding, the long-term productivity for biological resources will not be adversely affected by the proposed project.

Traffic related impacts: During construction there will be traffic due to trucks transporting construction material or equipment to and from the proposed site and from construction personnel driving to and from the site. Although grading within the upper portion of the site will be minimal since this part of the site is already formed as a near even plateau, there will be some volume of grading within the lower portion of the site. The design approach for the grading will result in a near zero net volume of soil (difference between cut and fill). Green waste that is currently processed on the lower portion of the site will supply some top soil to be used in areas that will be converted from graded land to vegetated buffer zone and in areas that require top soil additions. This will minimize the amount of soil and top soil that has to be transported to or from the site, and thus minimize heavy-truck traffic.

After full build-out, the proposed project will result in increases of traffic on the adjacent roadways and affected intersections. While the estimated increase in traffic will remain under the level of service (LOS) threshold that would imply significant traffic impacts on the adjacent Kapa'a Quarry Road (according to the current TIAR), the increased traffic volume will cause some long-term impacts with regard to traffic-generated air quality and noise impacts, as well as increased incidences of accidents and wildlife collisions. Furthermore, in its current condition the quarry road causes some problems relative to road safety. The increased traffic volume generated by the proposed project might increase the magnitude of these problems if not effectively mitigated. Long-term loss of productivity of the environment caused by increased traffic will include avoidance of wildlife resulting in loss of habitat. Section Four suggests some traffic impact mitigation measures, which include measures to control the speed on the quarry road and raising the awareness of drivers to drive responsibly to avoid incidences of wildlife killed by traffic.

Air quality and noise: During construction there will be impacts on the air quality, such as dust and exhaust, caused by soil disturbance and construction equipment. There also might be potential impacts from accidental leaks or spills from hazardous substances, such as fuel. Measures will be implemented to minimize any leaks or spills by using appropriate BMPs. Emission from harmful paints and solvents will be minimized by selecting only those paints and other construction material that is low in volatile organic compounds (VOC), in accordance with the sustainable design approach and the LEED certification goals. After construction there will be increased air quality impacts resulting from the increase in traffic, as delineated in Section Four.

During construction there will short-term noise generated directly by construction equipment and activities and indirectly by construction related traffic. The level of noise generated during the Phase 1, site development, (e.g. from heavy equipment) will be higher than noise during the construction Phase 2, when individual warehouses will be built on the prepared site. Therefore, the most noticeable short-term level noise will occur during a period of about three to four months. Short-term noise during construction of the individual warehouses will be exclusively generated during the construction of the building shell, which will take about two months per warehouse structure. The build-out of the interior of warehouses, which follows the construction of the building shell, will result in minimal increases of short-term noise levels. Long-term noise during operations will be mitigated through several measures that include orienting large warehouse doors away from the marsh, installing noise barriers to shield adjacent areas that are most sensitive, housing noisy equipment indoors or under noise attenuating containments, and avoiding unnecessary idling of heavy trucks.

The sustainable design and the selected LEED certification approach as well as guidelines of the industrial park operator will implement several mitigation measures that will decrease the long-term loss of productivity due to traffic related and other causes of air quality and noise impacts.

Concluding, the long-term beneficial effects of the proposed project would outweigh the potentially significant, but mitigable short-term impacts to the environment resulting primarily during initial construction and site preparation.

6.2 Irreversible and Irretrievable Commitment of Resources

By definition an irreversible commitment of resources indicates a loss of future options, such as consumption of a non-renewable resource or of such a resource which is only renewable over a long time. On the other hand, an irretrievable commitment of resource indicates functions of a resource that cannot be exercised for the duration of the project. This section briefly discusses irreversible and irretrievable commitments of resources for the project. For the sake of brevity it is assumed that irreversible and irretrievable commitments of resources will not significantly differ between the action alternatives. In cases where there are significant differences between the two action alternatives the Preferred Alternative is mentioned directly.

The development of the proposed Kapa’a Light Industrial Park would result in commitments of resources. Some resources committed could be recovered in a relatively short period of time, while in other cases, resources would be both irreversibly and irretrievably committed by virtue of being consumed or by the long of period of time that resources would be committed to the proposed action. Resources expended for the development of the proposed project would be offset by the creation of needed facilities and the resulting operational benefits. Construction of the proposed Kapa’a Light Industrial Park would augment the economic viability of the Koolaupoko region and would provide urgently needed industrial space for light industrial activities.

Land use: The conversion of approximately 22 acres of pervious to impervious land (in all three land parcels and under the Preferred Alternative) could be considered irreversible commitment. Two acres would be converted from presently developed (graded) land to open land thereby offsetting a part of the losses. Under the Preferred Alternative measures will be implemented to reverse some of the adverse impacts by implementing rainwater harvesting and use of collected rainwater for irrigation. The land that is converted from pervious to impervious land is not of environmentally high value. The land that will be used to construct the proposed project was created by landfill and no previously undeveloped open space, agricultural land or wildlife habitat would be used. The proposed industrial park would be developed in accordance to LEED standards for sustainable project development. The project team would implement building approaches that would be consistent with the intent and objectives of sustainable site development.

Biological resources: Biological resources lost during the development are expected to be minimal and not irreversibly lost. Rather, the biological resources will be irretrievable for the duration that it takes for the vegetation to regenerate. It is expected that the vegetation that is reintroduced at the site perimeter will require approximately five years to reach the comparable size and structure of the existing vegetation at the site perimeter. The restoration of currently sparsely vegetated land at the perimeter of the site to restored habitat would augment biological resources and diversity at the site.

Surface water and groundwater resources: Changes in site drainage and harvesting of rainwater for subsequent use in irrigation could be considered as irretrievable commitment of water resources. Capturing rainwater and using it for irrigation of newly developed restored habitat areas would result in loss of surface water to the atmosphere and would reduce the amount of direct water runoff.

Energy and materials: Construction and operation of the proposed project would result in irreversible commitments of energy and materials. The proposed project would require energy in form of electricity and transportation fuel, mainly diesel fuel. Since approximately 90% of electricity on Oahu is generated by fossil fuel, most of the electricity used during construction and operation would be considered irreversibly committed. Under the Preferred Alternative a significant amount of renewable energy will be created onsite; therefore this portion of energy used would be considered irretrievable committed. The construction of the proposed project would require an irreversible commitment of various construction materials, such as aggregate, concrete, steel, wood and other building materials. Some of building material might be recyclable or represent rapidly renewable material, but these materials would still be considered irreversibly committed.

Construction waste: The disposal of construction and demolition debris in landfill can be considered as irreversible commitment of landfill area. As part of the low impact development approach and LEED certification goals, a significant portion of the construction and demolition debris would be reused or recycled. Therefore the scope of irreversible use of landfill would be reduced.

Transportation Fuel: The construction and operations phases of the propose project would result in irreversible commitment of fossil fuels such as diesel fuel and gasoline for the transport of goods and for transporting people to and from the proposed site. The proposed project would reduce the amount of miles travelled by avoiding long commutes and trips between windward and leeward Oahu by employees and customers of businesses that would relocate to the proposed site. Therefore the irreversible commitment of transportation fuel and greenhouse gas emissions associated would be reduced on an island wide level.

Visual Impact: The construction of the proposed project will cause irreversible and irretrievable changes in the near and distant views from viewplanes around the Kawainui marsh, Kailua town and adjacent roads and freeway. The proposed visual impact mitigation, such as the vegetative buffer zones around the site perimeter along the quarry road would significantly reduce the intensity of the visual impact from viewplanes on the quarry road and around the Kawainui

Marsh to such an extent that the proposed project would be essentially be camouflaged behind a screen of thick vegetation and earth berms. The proposed visual impacts mitigation measures could however not completely mitigate the visual impact from portions of the adjacent H3-Freeway.

6.3 Significant and Unavoidable Impacts

This section summarizes the significant adverse impacts from the proposed project, which are the effects on natural and human resources by the proposed project. The significant impacts are mitigated using the most effective measures that can be considered practical. Most of the significant adverse impacts can be reduced to a less-than-significant levels, but some remain unavoidable impacts even after mitigation measures for the alternatives. The following discusses significant impacts and to what extent they can be mitigated. Some impacts have consequences that are identified as unavoidable, to some extent, even with mitigation measures. Most of the unavoidable adverse impacts would not vary substantially between the two action alternatives, though the Preferred Alternative will offer a more comprehensive and effective range of mitigation measures.

Different types of significant adverse impacts and unavoidable consequences are summarized in the following:

Soils: During construction, a fraction of topsoil that would be graded, stockpiled, and replaced would be mixed, buried, or lost from the site because of wind and water erosion, which will result in a significant impact if not mitigated properly. It is the responsibility of the contractor to develop, implement and enforce a comprehensive erosion control plan to properly mitigate the impact to less-than-significant levels. While the grading and stockpiling of soil will result in impacts the final soil condition would improve relative to the present condition. At present, the surface soil condition at the proposed site consists of graded layers of coarse gravel. There is a very limited existing and non-permanent vegetation cover within the area of the lower portion of the site that will be used for the development footprint. This existing vegetation cover is not considered a permanent and effective soil stabilization, since the vegetation cover consists of invasive plant species that grow on the those parts of the site which are not used for green waste processing and stockpiling of inert material. With the stated mitigation measures impacts on soil would be reduced to less-than-significant levels.

Traffic: Construction and operation of the proposed light industrial park will cause increased traffic volume and will therefore affect the traffic on two adjacent roadways and at three intersections that are directly affected. The traffic impact will remain below significant levels for the first couple of years into the project development. A current traffic impact analysis report (TIAR) conducted for this environmental review shows that the level-of-service (LOS) on the adjacent Kapa’a Quarry Road and the Kapa’a Quarry Access Road as well as three affected intersections will remain at a less-than-significant level through the mid-point of development schedule for the proposed project (midpoint around the year 2016 to 2017), even without mitigation measures. With the projected growths in background traffic and traffic volume generated by the proposed project, at the time of full-build the LOS would, however, fall below a threshold value and would result in significant impacts without mitigation measures. Properly designed mitigation measures will be implemented at a time after the mid-point of the development to reduce the impacts to less-than-significant levels. Heavy-truck traffic requires extensive mitigation measures in order to reduce impacts below significant levels.

In order to have more up-to-date information for the selection of future traffic impact mitigation measures at project mid-point the applicant has agreed to carry out a new, follow-up TIAR. As stated earlier, the DoT has requested that the current TIAR be revised during the zone change request. Please refer to Section 6.7 for more information. Furthermore, traffic safety impacts arise from current conditions on the Kapa’a Quarry Road. The issue of identifying the range of the problems and their effective mitigation as well as clarifying how the responsibility for the road improvements would be distributed between the involved parties is still an unresolved issue, discussed in Section 6.7.

Air Quality: Construction of the proposed project can cause significant impacts to the local and regional air quality. During the construction, especially the site development of the lower portion of the site, soil disturbance and vehicle traffic on unpaved roads would produce short-term fugitive dust emissions. Construction equipment would emit tailpipe emissions, including particulate matter from equipment and vehicles with diesel engines. The general contractor would be required to reduce emissions through good operational practices, which would include, but would not be limited to watering or chemical stabilization of unpaved roads and disturbed soil areas, avoiding soil track out on adjacent roadways through a dedicated tire wash installation and other additional means, posting speed limits, discourage equipment idling, establish speed limits, using well maintained equipment and scheduling construction activities to reduce multiple emission sources occurring simultaneously. With the stated mitigation measures the air emissions generated during construction would be effectively limited in time and intensity to less-than-significant levels.

During the operations phase of the proposed light industrial park significant impacts to the regional air quality could be caused primarily by traffic inside the proposed project and on adjacent roadways. Mitigation measures will be implemented to reduce such impacts to less-than-significant levels. Some minimal air emissions caused by business operations in the proposed project could result in adverse impacts, which will be properly mitigated. The type of industrial activities under the applied land use category, Limited Industrial (I-1), would exclude any business activity that will generate significant sources of air emissions.

Noise: During construction there would be an increase in ambient noise. This would be short-term adverse impacts because of the temporary nature of the construction phase. During normal operations of the light industrial park, noise impact from heavy truck and vehicle traffic would create adverse impacts. Traffic noise would adversely impact unpopulated areas at the eastern perimeter of the Kawainui marsh. Residential areas would not be primarily affected since increased traffic, especially heavy truck traffic, will not traverse residential areas. Noise could affect wildlife, which might increasingly avoid the area close to areas with high noise. The increase in traffic generated by the operation would be gradual, however, and be linked with the pace of additions of buildings. Noise associated with the operation of the light industrial park levels would therefore increase gradually which would limit the degree of wildlife avoidance from the area. Habituation to noise typically occurs when wildlife get accustomed to noise, which would be a natural mitigation measure of noise impact.

Native Vegetation/Wildlife habitats at the project site: Clearing existing vegetated land at the perimeter of the site would result in short-term changes in the composition and structure of the vegetation and therefore would result in significant adverse impacts. The development plans include installation of restored habitat at the perimeter of the site, which would replace the existing earth berms and vegetation. It is an unavoidable impact that the protective function of the existing earth berms and vegetation thereon would be lost for duration of approximately five years until the native and adaptive plant species of the restored habitat can offer the same extent of habitat. After the five years the restored habitat will offer better habitat as under the existing conditions. While the vegetative buffer zone at the perimeter of the site is regenerating, some of the habitat of domesticated birds at the site will be lost to a certain extent and the existing population of birds at the site will be reduced. After the restored habitat is providing the required basic habitat conditions for domesticated birds the population is expected to return and thrive better than at the present, because a planned control program will remove a part of the feral predators (i.e. feral cats, rats, etc.).

Impacts to endangered species: At the present time the proposed site is not a habitat for endangered water birds which use the adjacent Kawainui Marsh as habitat. There is a risk that endangered water birds might be attracted to open water ponds within the proposed project, and, as a result, face increased danger from predators. Thus, the proposed project has changed the configuration of detention ponds to below ground detention basins as the most effective mitigation measure against bird attraction. Upon communication with the U.S. Fish and Wildlife Service, these mitigations will reduce the impacts to less-than-significant levels.

Light pollution: Light pollution is defined as a significant adverse impact associated with light from the site shining into adjacent areas or up into the sky. Light pollution can adversely affect wildlife by reducing their ability to navigate and move effectively, reduction in habitat through avoidance and, indirectly, reduction in food supply (insects). Light pollution can adversely affect humans by glare and sky-glow, which causes adverse impacts on traffic and night sky access. As part of the sustainable design approach, the proposed project will implement measures to control interior and exterior lighting to achieve effective mitigation within the portions of the site that are adjacent to the Kawainui Marsh and wetland areas in the Kapa’a Stream corridor. The exterior lighting will adopt the most stringent standard “Dark”, which is recommended, for example, in national parks, and exterior light density will only be used for safety and comfort with negligible amounts of light trespassing the site boundary. With the mitigation, light pollution impacts can be reduced to less-than-significant.

Land Use – Conversion to impervious land: About 21 acres of former landfill area will be utilized to develop the proposed project. Under the Preferred Alternative approximately 15 acres will be converted from pervious to impervious land, through construction of impervious roadways and building rooftops. The rest of the approximately six acres within the development footprint would remain pervious landscaped and parking area. While mitigation would reduce the impacts, the conversion from pervious to impervious land would be an unavoidable impact. Although an unavoidable impact, sealing the surface of the former landfill with impermeable surface layers and restricting the infiltration of surface water into the landfill will be an appropriate approach for the redevelopment of landfills.

Land Use – Conversion to industrial land uses: Two out of the three contiguous land parcels on which the proposed project will be built are presently zoned as General Preservation (P-2) and will be converted to industrial use, e.g. Limited Industrial (I-1) land use. The land area that will be used for the development footprint of the proposed light industrial park in these two land parcels is limited to 21 acres of a total 57 acres. The remaining 36 acres will remain open and vegetated land, among it 15 acre of designated wetland area within the Kapa’a Stream corridor. The conversion of preservation land to industrially zoned land is an unavoidable impact.

Water Quality Impacts from stormwater runoff: Significant adverse and short-term impacts to water quality could occur during site development, especially within the lower portion of the proposed site. Turbidity and sedimentation might be temporarily increased during a period of about three to four months when the lower site is graded, internal roadways are built and limited utility trenching occurs. Effective best management practices will drastically minimize the extent of impacts on the adjacent water bodies and wetland areas. The impacts from stormwater runoff on the water quality during normal operation of the project will be minimal and represent those fractions of water pollutants that cannot be removed from the stormwater discharge into the receiving water. After site preparation, a comprehensive stormwater treatment system will be implemented that will reduce high runoff rates, which can reduce streambed erosion and subsequent sedimentation. Effective treatment units will remove at least 80% of the suspended solids and virtually all floatables and entrained oil and grease. While even the best treatment system cannot eliminate all impacts from residual peak runoff rates and pollutants contained in the stormwater discharge, the removal rates of the proposed drainage system will drastically improve the existing runoff conditions at the site. With the extent of mitigation applied to the quantity and quality of stormwater runoff, effects will be reduced to less-than-significant levels.

Water impacts from onsite wastewater treatment: Significant adverse impacts from on-site wastewater treatment could occur when untreated wastewater or wastewater effluent with only partial treatment reaches surface water or groundwater water or otherwise affects natural or human resources. The proposed site is not connected to the municipal sewer system and therefore the required on-site wastewater treatment needs to accomplish the degree of treatment that is necessary to reduce significant impacts to less-than-significant levels.

There will be two types of on-site wastewater treatments on the proposed site. The upper portion of the site uses conventional septic systems, comprising each one septic tank and one leach field, to treat wastewater. This system of treatment is effective for the upper portion of the site because of its relative large horizontal and vertical distance between point-of-injection and the receiving water bodies and thick layers of unsaturated soil. This approach reduces the impacts to less-than-significant impacts.

Since the lower portion of the site is closer to environmentally sensitive areas and would result in situations where the point-of-injection is close to water bodies or saturated soil layers, a septic system approach is selected that has higher initial removal rates than conventional septic systems. Therefore, the on-site wastewater treatment for the lower portion of the site will use highly effective alternative septic systems that add aerobic, filtering and adsorption process steps to the conventional septic systems, thereby significantly increasing the treatment effectiveness of septic systems. These mitigation measures will reduce the impacts to less-than-significant.

Furthermore, the EPA has released actual field data that suggest the expected (average) treatment efficiency of the selected alternative septic systems to be higher than conventional central wastewater plants. Therefore on a net-regional level the impacts would not be higher for the on-site wastewater treatment versus the wastewater treatment in a central wastewater treatment plant. In addition, an approximately one-mile long force sewer connection from the proposed site to the next take-over-point of the municipal sewer would result in significant impacts during construction and operation.

Water and Energy use: Construction and operation of the proposed project will result in use and consumption of energy, water and communication networks. Trenching for utility installation will result in significant impacts through fugitive dust and some quantity of stormwater runoff, but the proposed mitigation measures will significantly reduce any such impacts to less-than-significant levels.

<u>Upon completion of the proposed project and under the low impact development approach of the Preferred Alternative, energy and water consumption would be reduced relative to conventional warehouse designs. While the absolute uses of water and energy would increase on an island-wide level, due to increased business activities occupying the new industrial floor space, the low impact development approach of the proposed project and the energy efficient building designs will lessen the anticipated increases in water and electricity use.</u>

The applicant is in the process of installing a significant capacity of onsite renewable energy generation, which will supply a considerable part of the project's electricity needs, thereby decreasing the supply of energy needed from the island- wide electricity grid. The resulting net electricity supply that has to be provided by the island wide grid is not known at this time and depends on the actual capacity of the PV installations. Similarly, the water consumption at the proposed site will increase and will create additional demand on the island water supply system. The proposed project will implement significant water saving in comparison to conventional warehouses. Therefore the amount of increased water use that will result from the additional floor space developed under the project will be less than conventional warehouse designs would require.

~~On an island wide level the development of the new industrial park will not result in the addition of a large amount of industrial space on Oahu. Rather, the newly developed space will largely replace industrial space that is being lost due to rezoning and due to warehouses being too old to provide a cost effective use of industrial space. Therefore on an island-wide level the absolute consumption of electricity and water will be positively affected by providing energy and water efficient industrial floor space to replace older and less effective space.~~

Waste, byproducts and hazardous materials: Unintentional or accidental release of waste, byproducts and hazardous materials would cause a significant adverse impact. With a comprehensive plan to avoid any dangerous spills and without the need to store and handle significant volumes of such agents on the construction site, the associated impacts can be reduced to less-than-significant. Similarly, the generation of solid waste, such as construction and demolition waste, plastics, cardboard, paper, metal, wood and other inorganic solid waste, can cause significant adverse impacts at the site if not properly mitigated. The planned mitigation measure will manage solid waste in such a manner that impacts will be reduced to less-than-significant levels. .

A construction waste management program is part of the sustainable design approach of the proposed project. It requires a minimum of 50% of the non-hazardous construction and demolition debris to be diverted from landfills and incineration plants facilities, through either reuse or recycling. Construction and demolition debris that cannot be diverted will be disposed of in active, permitted solid waste facilities on Oahu. The use of landfill area and volume for the deposit of waste represents an island-wide impact that cannot be avoided. The impacts from removing waste from the site will be mitigated through scheduling the resulting heavy truck traffic in times of off-peak hours to less-than-significant levels.

A comprehensive recycling and waste management program will be implemented during operation of the industrial park, which will lower the risk of uncontrolled disposal of solid waste at the site. Special care will be exercised by the park operator that no litter and waste is discarded on the adjacent land, especially in the adjacent Kapa'a Stream corridor or the adjacent Kawainui Marsh. Furthermore, during operation any hazardous material and byproducts, as well as solid waste, which cannot be recycled, will be collected and properly disposed of at active and permitted facilities.

The uncontrolled discharge of stormwater associated with industrial activities is a significant adverse impact, and will be mitigated by the fact that all tenants in the new industrial development be covered by the NPDES permit for stormwater runoff associated with industrial activities., All operations will be located inside or under structures, therefore offering exemption through non-exposure.

Visual Impact: The presence of the proposed light industrial park will cause aesthetic impacts, especially early in the project when the lower portion of the site would be exposed to observers until the vegetative buffer zones around the site perimeters re-establish. This short-term visual impact is an unavoidable impact that all developments face when new landscaping replaces older vegetation.

After reestablishing the vegetation at the site perimeter, the visual impact of the warehouse structures and roadways within the proposed site will be mitigated and only a small visual impact will remain from viewplanes around the marsh and from Kailua. This will reduce impact to less-than-significant levels. A certain degree of visual impact from short sections of adjacent H-3 Freeway will remain unavoidable, even with the proposed extensive visual impact mitigation.

Public Safety: Construction activities will result in some degree of unavoidable potential impact with regard to public safety, due to transport of construction material to and from the proposed site. The level of risk will be lowered in that most of the construction related traffic is scheduled to arrive or depart the site during off-peak hours. Appropriate mitigation such as traffic controls during the movement of large loads on the road will help to lower the risks.

Socioeconomics: The construction and operation of the proposed light industrial park would affect population, housing, employment and public services in the Koolaupoko region. Since the main construction activities are associated with site preparation, which will occur during a relatively short period of the entire project, it is unlikely that a significant number of construction workers would move to the region to reside there permanently. Once site preparation is complete, subsequent construction of the warehouses themselves would represent less construction activity, spread over a longer time frame. Therefore, it impacts from construction workers moving into the region are expected to be minimal.

During operation, it is anticipated that at least 600 full time employees will find work in the newly developed light industrial park. It is unavoidable that a portion of these new employees would move to the region, thereby directly affecting housing and public services. There are two aspects that will limit the impacts from new employees moving into the region. First, the possible influx of new employees, some with families, will occur over a period of about 15 years. Thereby the local housing market and public services will have adequate time to adjust to the new residents. Second, it is predicted that the population in the Koolaupoko region will decline by about 1,000 residents in the next 20 years, due to fewer births, more deaths and some out-migration of adults from the region, thereby compensating the influx of new employees into the region.

Health and safety of work force: A potential for injuries or fatalities to construction workers and employees during operation of the propose project is an unavoidable impact. Even the best safety programs and best management practices would limit, yet not completely eliminate, the potential injuries or fatalities. Consequently, an increase in traffic volume, either the increased traffic volume generated by the proposed project or the background traffic that is predicted to grow independently of the proposed project, will typically result in a higher number of traffic incidents.

6.4 Summary of Mitigation Measures to Lower Significant Adverse Impacts

Table 6-1 summarizes the mitigation measures that are suggested in this EIS and that will reduce most impacts identified to less-than-significant levels. Table 6-1 furthermore summarizes those impacts that cannot be mitigated below a less-than-significant level, even with mitigation measures, rendering them unavoidable impacts.

The significant impacts are very similar between the two action alternatives. The Preferred Alternative has a broader range and more effective mitigation measures than the other action alternative. Table 6-1 only suggests mitigation measures under the Preferred Alternative.

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
Soil: A total of 27.3 acres of soil will be directly affected from the demolition and construction through grading, excavation, placement of fill, mixing, and soil augmentation. The resulting impacts are loss of top soil, fugitive dust, soil erosion, entrainment and runoff and sedimentation. Further impacts include compaction of soil and resulting disturbance of soil	Prior to construction, a sediment and erosion control plan will be developed in accordance with local ordinances and the goals of the sustainable design approach of the project. The sediment and erosion control plan includes BMPs to control runoff erosion and sedimentation. BMPs can be generic but also site-specific; examples of mitigation measures are protective devices to control drainage flow, erosion control matting, rip-rap, sedimentation traps and temporary and permanent reseeding. Areas outside the development foot print will be	LTS

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
structure, increasing risk of erosion.	aerated and reseeded. The proposed mitigation measures are discussed in more detail in Section 4.2.3.	
Traffic Impact before the mid-point of the project development is reached: The traffic volume on adjacent roads and intersections that are affecting by the proposed project will increase, thereby impacting the traffic conditions. The level of service (LOS), however, will stay better than D and E for affected roadway sections and intersections, respectively	As per the current_TIAR no traffic mitigation measures are required to keep LOS below the critical threshold that would signify unsatisfactory condition. A revised TIAR will be submitted with the zone change request application to verify or change this conclusion. It is proposed in the EIS that traffic impact mitigation measures will be developed after a new, follow-up TIAR is completed at project mid-point, to verify and update predicted traffic volume for project full-build and develop mitigation measures for full-build at that time.	LTS (without mitigation)
Traffic Impact at full build-out of the project: The current prediction of traffic volume at full build-out indicates that there will be significant impacts on (at least) intersections that are affected by the project. The predicted LOS without mitigation would reach E and F, which will be a significant impact.	The current TIAR and EIS proposes to conduct a new, follow-up TIAR at project development mid-point to better determine the traffic conditions at the completion of the project, e.g. full build out. The new, follow-up TIAR will include a new traffic count to verify how the actual traffic growth rates on the affected roadways and intersections compare to the predicted growth estimate that was used in the current TIAR. With the new information on traffic conditions, future traffic impact can be more precisely predicted and effective mitigation measures can be developed. Recommendations, such as possible mitigation measures, are presented in Section 4.9.	LTS
Air quality impacts during construction: Possible significant impacts to air quality are possible during construction, if not mitigated.	Mitigation measures will follow through good operational practices. With these mitigation measures in place the impacts will be reduced to less-than-significant. Mitigation measures are described in Section 4.6	LTS

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
Specifically fugitive dust and emission from tail pipe emissions need to be mitigated.		
Air quality impacts during operation: Possible significant impacts to air quality can occur during operation, if not mitigated. Specifically emission from tail pipe emissions and the use of products containing VOCs have to be mitigated.	Mitigation would be directed to lower tail pipe emissions, especially from heavy trucks and other diesel fuel powered equipment that can discharge quantities of particulate matter. With these mitigation measures in place the impacts will be reduced to less-than-significant. Mitigation measures are described in Section 4.6	LTS
Noise during construction: Possible significant impacts due to noise can occur during construction, if not mitigated. There are two phases in the construction that create different types of noise, the site preparation work and the construction of individual warehouses.	Mitigation during site preparation would be mainly to reduce noise from heavy machinery and trucks. With these mitigation measures in place the impacts will be reduced to less-than-significant. Mitigation measures are described in Section 4.7	LTS
Noise during operation: Possible significant noise impacts can occur during operation, if not mitigated.	Mitigation during operation would include measures to attenuate noise from traffic and noise from machinery used in the business operations of companies in the park. With these mitigation measures in place the impacts will be reduced to less-than-significant levels. Mitigation measures are described in Section 4.7	LTS
Native Vegetation/Wildlife Habitats at the project site, short-term impacts: The existing vegetation at the site perimeter would be cleared to make space for the restored habitat at the site perimeter. This will result in an unavoidable short-term impact	Since the significant impact is a result of clearing vegetation at the site perimeter, necessary to install the higher and wider earth berms and vegetative buffer zones, this clearing cannot be mitigated. The existing vegetation at the site perimeter consists mostly of invasive plant species. The new vegetative buffer zones that will replace the old vegetation will have native and adapted plant species. These plants will	UAI

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
on wild life habitat.	offer a higher quality of vegetation cover and wildlife habitat than the existing vegetation on the site. Mitigation measures are described in Section 4.4	
Impacts to endangered species: Significant Impacts can arise when endangered water birds are attracted to open water ponds in the proposed park. The adjacent Kawainui marsh is home to four federally listed water birds and any impact must be mitigated.	Mitigation measures will be implemented to avoid attraction. The most effective mitigation is to place the detention ponds and rainwater catchment below ground. With these mitigation measures in place the impacts will be reduced to less-than-significant levels. Mitigation measures are described in Section 4.4	LTS
Light pollution: Light pollution can adversely affect natural and human resources and can represent a significant adverse impact on the environment and community. The proposed site is adjacent to the important Kawainui Marsh; this calls for effective mitigation measures.	The light pollution mitigation strategy of the proposed project is part of and is delineated in the sustainable design approach. A comprehensive mitigation strategy includes lowering the lighting density and light trespassing for interior and exterior light sources. With these mitigation measures in place the impacts will be reduced to less-than-significant levels. Mitigation measures are described in Appendix 4 of this EIS.	LTS
Land Use –conversion to impervious land: The conversion of approximately 15 acres of land (under the Preferred alternative) which will be converted from pervious to impervious land, through construction of impervious roadways and building rooftops, is a significant impact. This impact is an unavoidable impact, which is lessened by	The conversion of land use from pervious to impervious land cannot be mitigated per se, since it is a definite act to change the permeability of a significant area. Therefore it is an unavoidable impact. (However, since the projects site is a former landfill, partially sealing the surface and reducing water infiltration into the landfill body, and therefore reducing the amount of leachate will have positive environmental benefits.)	UAI

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
low impact development strategy of the project. .		
Land Use – Conversion to industrial land uses: The industrial development of the two parcels is a significant impact. This impact is an unavoidable impact.	The conversion of land use from preservation to industrial land use cannot be mitigated per se, since it is a definite act to change the type of land use at the site. Therefore it is an unavoidable impact. (However, since the projects site is a former landfill which will be redeveloped to accommodate a light industrial park, no quality open space, agricultural land, wildlife habitat, or place of high recreational value will be used for the project. This fact lessens the impact for the community and the environment)	UAI
Water Quality impacts from stormwater runoff during construction: Significant impacts from stormwater runoff can occur during construction. During construction soils are exposed and increase the risk of soil erosion, entrainment and transport to water bodies. The presence of important and environmentally sensitive aquatic habitats downstream of the proposed site emphasizes the importance of mitigating these significant impacts.	A comprehensive mitigation plan is presented in Section 4.3. These mitigations will include best management practices (BMPs) which will reduce erosion, entrainment of soil in water drainage from the site and subsequent release of entrained soil to the water bodies. With these mitigation measures in place, the impacts will be reduced to less-than-significant levels. Mitigation measures are described in Section 4.3.	LTS
Water Quality impacts from stormwater runoff during operation: Significant impacts from stormwater runoff can occur during operation of the proposed industrial park. Changing pervious to	The proposed project will have a comprehensive system to manage stormwater. High runoff rates are reduced by temporarily detaining the stormwater on the site and releasing the water at a lower flow rate after the storm event. Part of the stormwater will be collected and used together with harvested rainwater from rooftops	LTS

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	Mitigation measures / Comments	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
impervious land increases the runoff flow rates. This can result in streambed erosion and subsequent sedimentation. Soil, debris and hazardous material can be entrained in the runoff and enter the natural environment. The presence of important and environmentally sensitive aquatic habitats downstream of the proposed site emphasizes the importance to mitigate these significant impacts.	for irrigation. Pollutants in the stormwater will be removed to a high degree through an integrated treatment system. Soil erosion will be reduced through stabilization of the soil and extensive vegetation cover. With these mitigation measures in place, the impacts will be reduced to less-than-significant levels. Mitigation measures are described in Section 4.3. The applicant had previously proposed to develop a 13-acre wildlife habitat and wetland restoration project within the Kapa'a Stream corridor and on his property. This initiative has been discontinued because of possible impacts due to the removal of significant wetland vegetation to construct water bird habitat. The applicant intends to support future initiatives to improve the water treatment capabilities and therefore the water quality of the Kapa'a Stream. One immediate initiative will be the installation of approximately eight acres of restored habitat at the perimeter of the proposed site. This added vegetation is intended to improve the water quality in the adjacent Kapa'a Stream.	
Water impacts from onsite wastewater treatment: Significant adverse impacts can occur when wastewater is released to the environment without receiving a satisfactory degree of treatment to remove organic matter, nutrients, harmful bacteria and other harmful agents. The proposed site is not connected to the municipal sewage system and therefore an effective on-site treatment system has to be installed to mitigate any	The proposed site will have a comprehensive system of wastewater treatment that will treat the wastewater to a satisfactory level so that it can be released to the environment without resulting in significant impacts:. • The upper portion of the site has favorable soil conditions and vertical distances to the receiving waters for the installation of a series of conventional septic systems. Each of these septic systems has one septic tank and one leach field. The wastewater is first retained in the anaerobic septic tank and its effluent is then released to the leach field, where aerobic treatment processes reduce the organic matter and other harmful agents to a low	LTS

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
significant impacts. The water bodies and aquatic habitats that are adjacent to the site are susceptible to discharge of polluted water and require a thorough and comprehensive treatment of wastewater generated on the site.	levels. • The lower portion of the project site is immediately adjacent to sensitive water bodies and wetland areas. This and other site conditions require the use of more advanced treatment processes than conventional septic systems. Consequently, alternative septic systems are used to add aerobic, filtration and adsorption processes to the conventional septic system process and therefore significantly increase the removal rates of organic matter, nutrients, suspended matter and bacteria. The effluent of the alternative septic system can be used for below-ground irrigation and infiltration in a leach field. The proposed treatment systems are delineated in Section 4.8. The mitigation measures can reduce the significant impacts to less-than-significant levels.	
Increased electricity and water use: The addition of a significant amount of floor space can affect the energy and water supply in a significant way and cause significant local and regional impacts. Effective energy and water saving measures are required to mitigate the impacts.	The addition of approximately 600,000 sqft of leasable floor space will result in a substantial increase in energy and potable water demand at the project site. The low impact development approach for the proposed project will implement effective measures to significantly save electricity and water. The mitigation measures are described in Section 4.8 and in Appendix 4 of the EIS. The proposed project will implement energy savings technologies to lower the electricity demand by at least 30% below that of conventional warehouses. The applicant has started to install a sizable capacity of on-site renewable energy (photovoltaic panels) on existing warehouses to provide a portion of the demand. The proposed project will decrease the water demand in the buildings by at least 40% through the use of water saving fixtures and the	LTS

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	**Mitigation measures / Comments**	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
	use of recycled water for sewage conveyance. The proposed project will not use potable water for irrigation but will use recycled wastewater or harvested rainwater for irrigation. As a result the project can reduce the impacts resulting from higher demand to less-than –significant levels.	
Solid waste and hazardous material during construction: Significant impacts occur when solid waste and hazardous material are released into the environment. Effective disposal and control measures are required to mitigate any resulting impacts.	A comprehensive waste management program will be implemented during construction to reduce construction and demolition debris by at least 50% through recycling and reuse. It is an unavoidable impact that the remaining 50% of the debris will be transported to active landfills, thereby creating impact on the use of landfills. Any unintentional and accidental spills or release of hazardous material will be reduced by implementing best management procedures. Hazardous waste material will be collected and properly disposed of at active facilities that are permitted to receive such waste. Mitigation measures are presented in section 4.8.	UAI
Waste, byproducts and hazardous material during operation: Significant impacts occur when solid waste, production byproducts and hazardous material are released into the environment. Effective disposal and control measures are required to mitigate any resulting impacts.	Recyclable material will be collected by means of a comprehensive recycling system. The rest of the waste and production byproducts waste will be disposed of in active landfills. Hazardous waste material will be collected and properly disposed of at active facilities that are permitted to receive such waste. It is an unavoidable impact that landfill capacity will be used for the disposal of waste. Mitigation measures are presented in section 4.8.	UAI
Visual Impact during construction: The presence of the proposed light industrial park will cause significant aesthetic impacts during	The lower portion of the site will create more visual impacts than the upper portion, since the upper portion is farther away from the adjacent roads and hidden behind an effective screen of high trees.	UAI

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	Mitigation measures / Comments	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
construction, when the existing vegetation at the site perimeter of the lower portion of the site is removed, thereby exposing the site to observers on the quarry road.	At present the lower portion of the proposed site is surrounded by vegetative buffer zones along the site perimeter, which is adjacent to the quarry road and the quarry access road. For the construction of the permanent and improved vegetative buffer at these locations the existing vegetation will be removed. This will expose the lower portion of the site, especially to motorists who pass the site on the quarry road. Therefore, this short-term visual impact can be considered unavoidable.	
Visual Impact during operation: The presence of the proposed light industrial park will cause significant aesthetic impacts during operation. The addition of a significant number of warehouses will be noticeable from near and distant view plane and requires comprehensive mitigation.	Trees will be added to the existing screen of tall trees at the eastern boundary of the upper portion of the site. This will reduce any remaining visual impact from near and distant views. A new vegetative buffer zone, with taller trees and higher earth berms than in the existing buffer zone, will be constructed around the lower portion of the site. A comprehensive visual impact analysis (in Appendix 8 of this EIS) shows that visual impacts can be mitigated to less-than-significant levels to most of the near and distant view planes.	LTS
Public safety: Construction related to the project will result in some degree of impact on the public safety, which cannot be avoided.	Even with mitigating measures such as traffic controls and scheduling of transport to and from the site, some degree of impact remains and is therefore unavoidable.	UAI
Health and safety of workforce: Injuries and fatalities to construction workers and employees of companies in the completed park cannot be completely	Even the best safety programs and best management practices would limit, yet not completely eliminate the potential for injuries or fatalities. Therefore some degree of impact remains and is therefore unavoidable. The nature of the proposed light industrial park,	UAI

Table 6-1 Summary of impacts and mitigation measures to lower level of impact significance and remaining unavoidable impacts (eight pages)

Description of significant impacts	Mitigation measures / Comments	Significance with mitigation
		LTS=Less than significant ; UAI = unavoidable impact
mitigated and may cause a significant impact.	however, excludes industries which might have a higher accident level.	
Socio economic: The possible influx of employees to the Koolaupoko region could cause significant impact to public services and housing in the region.	Only a small number of the estimated approximately 600 new employees will relocate to the Koolaupoko region and will therefore create an additional demand on public services and housing. The estimated development of the proposed light industrial park would occur in a relatively long period of some 15 to 17 years to full build-out. In approximately the same time period the population in the region is expected to decline by approximately 1,000 residents, due to lower birth rate, higher death rate and anticipated out-migration of residents from the region. Therefore, the net result of the in-migration and the declining population will reduce the impacts to less-than-significant levels.	LTS

6.5 Justification for Proceeding with the Project despite Unavoidable Effects

Despite some unavoidable impacts, the proposed project should be implemented because potentially adverse impacts will be localized, temporary and mitigated to less-than-significant levels. The unavoidable impacts, delineated in the prior sections, are impacts that cannot be completely mitigated, even with mitigation effort. The type and scope of consequence of such unavoidable impacts, identified for this project, however, are not of such significance that they warrant interruption of the proposed project.

Most of the impacts of the project that have potentially significant adverse effect on the environment can be mitigated to such an extent that impacts are reduced to less-than-significant levels. The applicant has committed to using a low impact development design approach that includes state-of-the-art sustainable building and development technologies. But some impacts cannot be entirely mitigated. The visual impact mitigation, for example, reduces the adverse visual impact for most of the near and distant views, but one remaining view on the proposed project from the H3-freeway cannot be completely mitigated and remains unavoidable. The traffic impact is another important adverse effect that is important to the public, but which will be mitigated to the extent possible. While most traffic impact from cars and light trucks can be mitigated, heavy truck traffic is a special case that would require extensive mitigation measures in order to reduce impacts below significant levels.

The proposed project will offset the level of impacts that remain after comprehensive mitigation measures with the following benefits:

- Provide the Koolaupoko region and specifically the greater Kaneohe and Kailua area with urgently needed industrial space.
- Short-term and long term economic benefits will occur from construction and operation of modern, energy efficient and environmentally friendly facilities.
- Provide adequate capacity for future growth of local companies close to the place of residence of the owners and employees, who are residents of the Koolaupoko region.
- Reduce the need for long commutes and long trips by employees and customers of companies that currently service the windward region from leeward locations.
- Support innovative developers to build showcase industrial facilities that are built on sustainable development principles, and that implement integrated renewable energies and highly effective energy reduction, assets that will be indispensible in a future sustainable Hawaii.
- Contribute to providing a strong economic infrastructure for a diversified economy that advances Hawaii's plans for more local production of goods and food.
- Redevelopment of a former landfill area that reduces the need to use more valuable land to develop industrial space in the region or that allows for the retirement of older facilities on land that can be use more beneficially, such as developing housing or commercial space within or close to denser populated areas.

6.6 Cumulative Impacts

In accordance with environmental guidelines and regulations, cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions ..." (40 CFR 1508).

Cumulative impacts can best be analyzed through the identification of the scope of the analysis and the description of cumulative effects and their consequences. The cumulative impact analysis for the proposed project evaluates the following aspects of the analysis:

- Significant cumulative effects identified for the proposed project are as follows:

  - **Transportation infrastructure in the area:** The proposed project will increase traffic on adjacent roadways and intersection, resulting in impacts on the environment (air quality, noise effect of wildlife, wildlife collision, etc.) and the community (reduction in level-of-service, increased congestion, increased incidences of accidents)
  - **Water quality:** The proposed project affects the water quality through activities during construction and operation; water quality is affected through stormwater runoff and onsite treatment of wastewater
  - **Visual impact:** The proposed project will add a significant number of structures and will affect the aesthetic condition at the site.

- Establishing the geographic extent where impacts have significant effect or consequences:
  - **Areas close to the proposed project site:** The most direct impacts of the proposed project will be near the proposed site, which is in the lower part of the Kapa'a valley. Since the valley boundaries also delineate the watershed boundaries, more distant consequences include the entire Kapa'a watershed.
  - **Regional area that is affected:** The regional area that is most significantly affected by cumulative impacts is the Kawainui Marsh. Some types of impacts affect the environment and community on a larger geographic scope and might include island-wide consequences.

- Establishing the time frame in which impacts have to be considered:
  - **Past actions:** The appropriate time frame for past actions is about eight years ago; this was the point in time when the rate of growth of new warehouses in the upper portion of the site started to accelerate; other activities that are in a more distant past are also considered,
  - **Present actions:** Present actions describe the pertinent impacts as they are active today
  - **Reasonably foreseeable future actions:** Future actions are those that can be assumed to happen within the next six years. This time frame coincides with the planned date of the new, follow-up traffic impact analysis report at mid-point of project development

- Other actions concerning natural and human resources:

  Hawaii's important move towards more sustainable resource consumption: The need for Hawaii to align its future visions and developments towards more sustainability has never been greater. While there have been numerous initiatives to move Hawaii towards sustainability over the past 30 years, some notable recent initiatives underline the urgency to commit to sustainable development principles. Two recent sustainability initiatives are the Hawaii Clean Energy Initiative and the Hawaii 2050 Sustainability Plan. The proposed project will contribute to achieving some important goals of these important initiatives.

By using low impact development strategies, the proposed project will contribute to the goals the Hawaii 2050 initiative since natural resources will be used responsibly and respectfully, and will therefore be preserved for future generations. By operating the light industrial park in a sustainable fashion the proposed park will be a prototype of making living sustainably a part of our daily practice in Hawai‘i.

The Hawaii Clean Energy Program emphasizes the need to provide up to 70% of the predicted energy needs of Hawaii in the year 2030 with clean energy technologies, e.g. through renewable energies and energy conservation. Hawaii is facing the challenges of a changed global energy world more intensely than any other state in the nation, since about 90% of Hawaii’s energy is still generated by imported petroleum. Since the era of easy and cheap oil is coming to an end and the world faces a volatile and tight oil supply market in the years to come, Hawaii needs to implement every development program with a comprehensive view on sustainable technologies and measures. Developments with significant long-term investments, such as the proposed project, need to significantly reduce energy and water use, increase the amount of electricity generated by renewable technologies, and reduce transportation fuel to the extent possible, by bringing the location of employment, commerce and recreation closer to the consumer and resident.

The proposed light industrial contributes to such goals by providing the residents of Koolaupoko with employment opportunities and services by companies that can find industrially zoned space within the region. This reduces the need for long commutes and trips between windward to leeward Oahu. With the proposed light industrial park companies will have the opportunity to serve the needs of the Koolaupoko region from within the region, and thus reduces the consumption of fuel and greenhouse gas emissions.

An increase of local production of products, food and indigenous energy is recognized as an important contribution to lower imports of good and energy to Hawaii. Spending large amounts of transportation fuel and paying large amounts of revenue to import energy is not sustainable for Hawaii’s economy over the long run. Implementing these strategies will require a more diversified economy, companies to provide the products and services and industrial space to allow these companies to operate and grow. Any consideration of cumulative impacts of the proposed project needs to consider these important relationships.

Tables 6.2 through 6.4 present a discussion of significant cumulative impacts on the transportation infrastructure of the area, on water quality as well as on the aesthetic appearance. The discussion of cumulative impacts in Tables 6.2 through 6.4 correlates geographic scope and time frame for every significant cumulative impact

Cumulative impacts on the transportation infrastructure in the area: Adverse impacts of increased traffic volume result in decrease of level-of-service increase and increases in congestions, traffic incidences resulting in accidents, wear and tear on road infrastructure.

Associated impacts from traffic are adverse effects to air-quality, noise, wildlife and runoff from roadways.

Table 6.2 Cumulative impacts on the transportation infrastructure in the area

Table 6.2	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	Affected areas or environment: Kapa'a Quarry Road and Kapa'a Quarry Access Road Three intersections: quarry road with (1) Kalanianaole Hwy. Mokapu (2) Blvd. (3) quarry access road	Affected areas or environment: On a regional level the quarry road is a road used by residents to connect between Mokapu Blvd. and Kalanianaole Hwy. This traffic volume represents the background traffic that has to be considered to assess the future traffic volume.
Past actions:	The local sources of traffic (within the Kapa'a valley) have been as follows: • The older warehouse development on the project sites started some 20 years ago and has grown continuously to its present size. The facilities generate heavy-truck and light vehicle traffic • The quarry, under various past owners, has been mining rock and producing ready-mix concrete; mostly heavy-truck traffic • The former landfill generated heavy-truck traffic volume until its closure in the 1980s • The Kapa'a Refuse Transfer Station is used to transfer waste from locally operating	In the past the background traffic has been increasing on the quarry road. • The route over the quarry road can avoid some congested roads in Kailua. • Developments that have directly affected the traffic on the quarry road in the past decade include the Le Jardin Campus at the south end of the quarry road and the construction of a small number of natural habitat developments and trails by community groups along the marsh side of the quarry road.

Table 6.2	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	garbage collection trucks to transport trucks that carry the waste to active leeward landfill and waste incineration facility; the facility also serves the residents, who can drop quantities of domestic waste; heavy-trucks and vehicles and light trucks. • The model airplane park is a popular recreational destination; only vehicle or light trucks	
Present actions:	The local sources of traffic (within the Kapa'a valley) have been as follows: • The warehouse development has grown to about 280,000 sqft. of floor space; the facilities generate heavy-truck and vehicle traffic. • Traffic generated by the remaining land uses in the Kapa'a valley includes the quarry, refuse transfer station and model Airplane Park. These uses have been relatively stable in the past couple of years. These four land uses contribute most, if not all of the local traffic to and from the valley.	The traffic situation within the affected regional areas has been growing slowly in concert with overall increasing traffic volumes on Oahu's roads. The number of natural habitat developments and trails by community groups along the marsh side of the quarry road has been steady over the past couple of years.
Reasonably foreseeable future actions:	The reasonable foreseeable development of local sources of traffic (within the Kapa'a valley) have been as follows: • The proposed project will add about 600,000	The following trends are expected to affect the volume of background on the quarry road and affected intersections: • It is expected that the background traffic

Table 6.2

Time frame of cumulative impacts	Geographic Scope of Listed Significant Cumulative Impacts Areas affected that are close to the proposed project site:	Regional area that is affected
	sqft. of floor space, thus about tripling the existing amount of industrial space. This will generate a significant increase in heavy-truck and light vehicle traffic. The project will foster alternative modes of transportation in order to reduce the traffic volume. • Upon consultation with Ameron there are no planned expansions or reduction in plant facilities and mining operations at the quarry; therefore the traffic volume should stay similar in the foreseeable future. • Traffic generated by the Kapa'a Transfer Station is expected to remain constant for the foreseeable future. The volume and type of waste might be changing with the increase of recycling in the community, but this is not expected to change the traffic to and from the facility appreciably. • The traffic volume to the model airplane parks is expected to remain constant for the foreseeable future since no known additions are known at this time. Other considerations: • The Kapa'a quarry has been mentioned over the years as an alternative site for a landfill. At the present there is no evidence that	volume generated on the regional level will either grow slightly or stay constant. The Koolaupoko region is expected to have a slightly shrinking population of the next decades resulting in less traffic generated. Since the population grows older there might be less commuter traffic using the quarry road. • The increasing trend towards sustainability will reduce the individual traffic and foster alternative modes of transportation, thereby slightly lowering traffic. • In the foreseeable future there will be the following developments along the quarry road: - The Kawainui Marsh Restoration project, a joint project of DLNR and U.S. Army Corp of Engineers has received approval and construction work will start at the end of 2011. It is expected that the construction traffic will not overlap with intensive phases of construction of the proposed project. After completion it is expected that most of the visitors to the new park will use approach the park on the quarry road from the Kalanianaole Hwy. side, therefore reducing the traffic

Table 6.2

	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	actual plans have been developed to convert the quarry from its present mining and processing functions to a landfill site.	impact on the rest of the quarry road. - Possible, but not confirmed, is the development of a Hawaiian cultural and educational center in the southern section of the quarry road. This facility would generate some construction related heavy-truck traffic and vehicle traffic during operations.

Cumulative impacts on water quality: Adverse impacts to water quality include effects from increased runoff volumes from impervious areas resulting in streambed erosion and subsequent sedimentation, discharges to entrained solids and other pollutants contained in runoff to receiving water, discharges of treated wastewater that migrates to the receiving waters, and diversion of water from runoff into the receiving water thereby lowering the water flow in streams and other water bodies.

Associated impacts from impaired water quality are adverse effects to aquatic resources due to an increase in organic loading, increase of eutrophication, increased toxicity from other water pollutants, reduction of aquatic habitat due to sedimentation, and reduction of functions of downstream wetland areas and water bodies for flood control and reduction in pollutants.

Table 6.3 Cumulative impacts on the water quality

Table 6.3	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	Affected areas or environment: Areas include the Kapa'a Stream corridor and the drainage canal along the quarry road directly downstream of the project.	Affected areas or environment: On a regional level water quality is affected by contribution of a number of land uses upstream of the proposed site and within the Kapa'a watershed. Water quality in the Kawainui Marsh is affected by the water quality in the Kapa'a Stream, which is the main drainage for the Kapa'a watershed and directly drains into the marsh.
Past actions:	The land on which the proposed project site is located was once a wetland area that was connected to the Kawainui Marsh. Landfill operations resulted in the creation of a landfill area of 45 acres, consisting of mostly quarry overburden and tailings and some quantity of solid municipal waste. This landfill area will be used for the proposed project. The landfill is on	The Kapa'a watershed has been significantly altered over the past decades. The watershed was once directly connected to the adjacent Kawainui Marsh until an elevated roadway was built across the lower boundary of the watershed, thereby separating the direct drainage pathways of the watershed to the marsh. The main land use of the Kapa'a watershed remained

Table 6.3

	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	top of indigenous soils and is not sealed by an artificial impermeable filter. A drainage ditch was constructed downstream of the site along a portion of the quarry road. This drainage ditch functions as a drainage canal and conveys water to the Kapa'a Stream. Surface runoff and seepage from the upper portion of the site landfill reached the Kapa'a Stream. Surface runoff and seepage from the lower portion of the site landfill reached the Kapa'a Stream, the wetland area that formed in the lower stretches of the Kapa'a Stream corridor and water seepage from the lower portion of the site collected in the drainage ditch. After the warehouses were added and impermeable pavement was installed on parts of the upper portion of the site the quantity of surface runoff increased. Over the years drainage inlets were installed that collect and convey runoff to the stream corridor. One detention pond with an armored spillway was installed, which avoids scouring in the slopes at the perimeter of the upper portion of the site. The drainage situation at the lower portion of the site has not been markedly changed over the years and site drainage through direct runoff and infiltration and subsequent seepage. Wastewater treatment has been carried out with	agricultural and cattle ranching until the start of quarry and landfill operations. These intensive quarry and landfill activities as well as the construction of the H3-Freeway have adversely affected the Kapa'a watershed. The Kapa'a Steam has been significantly affected through changes of the stream bed to its present location and form and causing impacts due to high TSS and other water pollutants from increase runoff. The drainage system of the Kawainui Marsh was altered through the changing drainage from the watershed and the changed stream bed of Kapa'a Steam. The marsh received significant qualities of sediments that were eroded and entrained solids from the watershed. The Kapa'a valley has not been not connected to the municipal sewer system, due to the very limited quantity of wastewater produced and the fact that no gravity sewer system is available and feasible. Septic systems and cesspools have been used in the valley to treat wastewater onsite.

Table 6.3	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	onsite septic systems	
Present actions:	Drainage of the present site consists of: In parcel TMK 4-2-15:001 (portion of): The 4.4 acres of graded elevated plateau areas has some surface runoff from the side to the Kapa'a stream corridor and to a flood basin at the eastern boundary. Most of the drainage occurs through infiltration into the landfill body. In parcel TMK 4-2-15:008: Drainage from 16 acres of impermeable area occurs through a number of drainage catch basins and one detention pond to the Kapa'a Stream corridor. There is some runoff to vegetated land in parcel TMK 4-2-15:006: Drainage from 6.2 acres of graded and pervious land occurs mostly through infiltration. In parcel TMK 4-2-15:006: Drainage from about 19 acres of graded and pervious land occurs through runoff to the Kapa'a Stream corridor and through infiltration into the landfill body. Some quantity of seepage is to the drainage canal along the quarry road. At present there are seven active septic systems each with a septic tank and leach field, all within parcel 4-2-15:008. There are no active cesspools on the property.	The drainage situation in the watershed is characterized by the closure and redevelopment (some quantity of vegetation and resulting soil stabilization) of the landfill areas and expansion the warehouse development at the proposed site. In its present condition the proposed project site contributes about 16% and 15% of the entire watershed in TSS baseload and TSS 2% event load, respectively. Section 3.2.3 of this EIS delineates the present drainage and water quality conditions within Kapa'a watershed. At present the water quality of the Kapa'a Stream is primarily affected from a high TSS content. This causes related consequences of higher turbidity also in the Kawainui Marsh. During periods of intensive storm events water levels in the stream increase significantly and cause the transport of volumes of sediments and other pollutants to the downstream wetland. There are a limited number of septic systems installed at the active land uses in the Kapa'a valley, which include the quarry, the transfer station and the existing warehouse development. The existing septic systems are considered to result in less-than-significant cumulative impacts. At the perimeter of the marsh and adjacent to the

Table 6.3

Time frame of cumulative impacts	Geographic Scope of Listed Significant Cumulative Impacts: Areas affected that are close to the proposed project site:	Regional area that is affected
		water shed the model airplane park has a number of portable toilets and the City and County backyard, a distance further to the south at the quarry road has an existing septic system.
Reasonably foreseeable future actions:	Under the preferred alternative the drainage systems will be expanded and the quality and quantity of the stormwater runoff will be improved: In parcel TMK 4-2-15:001 (portion of): All drainage from the impermeable areas (rooftops and roadways) will be collected and treated before being discharged through one new detention pond. In parcel TMK 4-2-15:008: All drainage from the newly formed impermeable areas (rooftops and roadways) will be collected and treated before being discharged through one new detention pond. In parcel TMK 4-2-15:006: All drainage from the newly formed impermeable areas (rooftops and roadways) will be collected and treated before being discharged through one new detention pond (below ground). Rainwater from the warehouse roofs and sections of the roads will be collected and stored in below-ground cisterns for subsequent irrigation of the restored habitat at	In the foreseeable future no changes in the land use are identified that would significantly alter the overall drainage condition of the watershed, except the new drainage system at the proposed site. The drainage system of the proposed project will improve the overall drainage condition in the watershed and will therefore improve the water quality in the Kapa'a Stream and the downstream marsh and wetland areas. Since the proposed site represents only a relatively small area of the entire watershed, cumulative impacts from the proposed project are limited. An overall improvement of the water quality in the Kapa'a watershed will require a determined effort to improve the land that contributes most of the adverse impacts on the water quality. It is the hope of the applicant that the comprehensive treatment approach of stormwater discharge from the proposed project, with its sustainable design elements, will play a

Table 6.3

	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	the perimeter of the development footprint and of landscaped areas inside the development. Some quantities of rainwater will be used for irrigation or will be removed by evapotranspiration. The stormwater runoff quality will be improved through the installation of pre-treatment units that remove sediments, oil/grease and floatable debris. Stormwater quantity will be improved be retaining stormwater in a system of rainwater harvesting and detention ponds. The volume of water seeping into the drainage canal along the quarry road will be reduced since less water will infiltrate into the lower portion of the site, due to covering the landfill with impermeable pavement and structures. The onsite wastewater systems will install more conventional septic systems and alternative septic systems in the upper and lower portions of the site, respectively, to serve the added 600,000 sqft. of industrial floor space	positive example for possible improvements in the watershed. In the foreseeable future no additional wastewater treatment systems are anticipated in the Kapa’a watershed, other than those planned in conjunction with the proposed project. Therefore, with the planned onsite technologies outlined for the proposed site, cumulative impacts from the discharge of treated wastewater in the watershed will remain at less-than-significant levels.

<u>Cumulative impacts on the visual impacts</u>: Effects on the aesthetics of the area around the proposed site, observed from near and distant view planes, are due to the presence of various industrial structure in the Kapa'a Valley. The Kapa'a valley has an open space appearance, although at present, there are several industrial buildings in the valley. The impacts on aesthetics are not clearly quantifiable, because of their subjective nature to the observer. (a comprehensive visual impact assessment is presented in Appendix 8 of this EIS).

Table 6.4 Cumulative impacts on the visual impacts

Table 6.4	Geographic Scope of Listed Significant Cumulative Impacts	
Time frame of cumulative impacts	**Areas affected that are close to the proposed project site:**	**Regional area that is affected**
	<u>Affected areas or environment:</u> Viewplanes in the immediate vicinity are from the quarry road, quarry access road and the model airplane park.	<u>Affected areas or environment:</u> More distant viewplanes are from the H3-Freeway, the Mokapu Boulevard, as well selected public places or parks around the Kawainui Marsh
Past actions:	• Before the start of quarry and landfill operation in the Kapa'a Valley, some 50 years ago, the proposed site was a pasture and forested land and with continuous vegetation cover. • After the quarry and landfill operation commenced the views of the site changed to exposed soil and landfill. • Around the mid-1970s the landfill activities stopped at the proposed site. The upper portion of the site remained an area of graded soil surface with intermittent vegetation. The lower portion of the site was not in use and invasive vegetation covered	During quarry and landfill operations the distant views of the valley from Kailua and the adjacent roads were characterized by large portions of exposed rock and soil. The quarry operation at the top of the valley was visible including tall process equipment. The proposed site had views of exposed soil but the view on the proposed site was somewhat less pronounced in comparison with the exposed area on the flanks of the mountains and hills surrounding the Kapa'a valley. After the completion of the landfill operations the land was replanted at the exposed hills and at the lower portion of the project site. The restored

Table 6.4	Geographic Scope of Listed Significant Cumulative Impacts	
	the surface of the landfill. • Starting in the late 1990s the existing warehouse development has expanded in the upper portion with vegetation present only at the site perimeter. At the eastern boundary of the upper portion trees were added to provide for a row of taller trees to shield the view on the upper portion. The lower portion of the site was used for green waste processing and was surrounded by a narrow screen of vegetation that shielded views.	landfill areas started to blend into the surrounding vegetation of the valley. During the late 1990s and early 2000s the industrial development in the upper portion expanded slowly, while the site remained graded but without vegetation. During the same time the lower portion of the site was used for green waste processing. This resulted in a varying extent of vegetation in the lower portion, since vegetation was cleared on parts of the lower portion of the site that were used for green-waste processing. The construction of the refuse transfer station added one landmark that could be observed from distant viewplanes.
Present actions:	The appearance of the proposed site has not changed significantly over the past several years. Within the upper portion of the site more warehouses are added to the development within a compact portion of the site, thereby not altering the characteristic view of this industrial development from the quarry access road. The warehouse structures and other installations of the upper portion of the site are visible from the quarry access road and from a short stretch on the H3-Freeway, through breaks in the otherwise dense buffer zone on the southern side of the H3-Freeway. The lower portion of the site is partly used for	The distant views of the Kapa’a valley have not noticeably changed over the past years, except for the appearance of the lower portion of the proposed site.

Table 6.4	Geographic Scope of Listed Significant Cumulative Impacts	
	green waste processing and deposits of gravel. Vegetation cover is lost and recedes, depending on the extent of the use of the land. The lower portion is hidden from view from the quarry road and quarry access road by a buffer of smaller trees and shrubs and an approximately 5 foot high earth berm.	
Reasonably foreseeable future actions:	The near distant views of the proposed site will be improved by the addition of vegetation at the perimeter facing the quarry road and quarry access road. • The existing tree line at the eastern boundary of the upper portion will be expanded with several new trees in order to mitigate the remaining long distant visual impacts resulting from the warehouses. • The existing buffer around the lower portion of the site will be replaced by increasing the height and widths of the earth berms with native and adaptive plants and higher trees than there are at the present. This new buffer will reduce the near distant visual impacts of the new development in the lower portion to a less-than-significant levels. Other visual impact mitigation measures are planned, including green walls on the side of the warehouses that face the quarry road and Kailua.	For the foreseeable future the distance views of the Kapa’a valley will not change in a significant level and will remain characterize by open space. • The visual impacts from the quarry and the refuse transfer station will remain unchanged. • There are no indications about using parts of the valley in the foreseeable future as a new landfill. Therefore the vegetation cover on the southern side of the valley should remain unchanged. • The development of the upper portion of the site will be entirely hidden by the added line of trees. • The lower portion of the site will have several structures interwoven with roadways, parking areas and landscaped areas. • The visual impacts assessment in Appendix 8 of this EIS suggests that practically all distant view will be mitigated by the added vegetation at the site perimeter. The only

Table 6.4	Geographic Scope of Listed Significant Cumulative Impacts	
		view that cannot be fully mitigated is the distant view from a short section of the H3-Freeway.

6.7 Unresolved Issues

There are a number of unresolved issues, which can be categorized in two types of issues:

- Uncertainties about certain technical details of the project that affect the magnitude of project impacts. As the proposed project moves from initial concept design to a more detailed design phase, certain design features will be updated and can be expressed in more specific quantitative and qualitative technical terms.
- Areas of disagreement about necessary environmental actions.

The following three sections discuss the two categories of unresolved issues listed above.

6.7.1 Updating the Project Masterplan for Zone Change Permitting

As the project continues in the design process and enters the next phase of the permitting process (e.g. the zone change and SMA permit application), the design of system components, which were initially defined and developed in the concept design phase, will be updated and more design details will be developed. This is an accepted part of the design process, since it is often not practical and effective to define details of the design components too early in the process.

The concept design presented in this FEIS includes definition of the system components, how these components operate, and how they interact with each other. In addition, the initial concept design predicts the type and anticipated magnitude of environmental impacts.

The design phase that follows from this initial design will be carried out during the preparation of the project master plan that will be submitted for the zone change application. The project master plan will elaborate develop more detailed technical descriptions, and will include the following as major sections:

- **Updating the layout of the proposed light industrial park:**

  The updated layout of proposed development will delineate all pertinent information about sizes and locations of structures, roads, off-street parking, drainage system, gray water/harvest rainwater systems, utilities, onsite wastewater treatment systems with leach fields/subsurface irrigation, landscaped area, and restored habitat (e.g. the vegetative buffer zones around site perimeter). The layout will include the planned warehouses and possibly a small base yard, which if included would reduce development density from the original plan.

(This section of the Masterplan will provide more detailed information as was requested by the State Office of Environmental Quality Control, the UH Environmental Center, and the Kailua Neighborhood Board)

- **Updating the drainage system:**

The updated drainage system will delineate all low impact development technologies that are presented in the EIS and produce technical drawings and calculations so that system components such as runoff conveyance using pipes, culverts, swales and overflow discharge as well as all process vessels can be sized more precisely . The free surface detention ponds that were part of the original drainage systems will be located below ground following USFWS requirement to avoid attracting endangered water birds to open water ponds in the newly developed industrial park.

The updated layout of the park and the reduction in planned floor space by 10% will necessitate changes in the drainage system, including sizes and location of the pre-treatment units upstream of the detention ponds, the location and dimensions of the now under-ground detention ponds, configuration of the drainage system discharge to the to the receiving waters, interconnecting to rainwater recycling (where applicable) and other system components. The updated system will enable the design team to make predictions of the various anticipated rain events and plan the drainage systems accordingly. The drainage system will not change the basic system design of the site drainage, and the resulting impacts of the updated drainage system will be equal or lower than assumed for the EIS.

(This section of the Masterplan will provide more detailed information as was requested by the Kailua Neighborhood Board, State Office of Environmental Quality Control, and the UH Environmental Center)

- **The rainwater harvesting systems and irrigation system:**

The system of the rainwater harvesting and irrigation system will be delineated in more detail, including the required capacity of the below-ground catchment basins (part of the detention basin system) and interconnecting conveyance of harvested rainwater.

(This detailed design information is required as part of the updated drainage system)

- **Identifying the load bearing capacity of the landfill surface, lower portion of the site:**

As delineated in the EIS (Section 4.2.) the actual load bearing capacity will be determined, and the kind of foundation that will be needed for the hard (e.g. structures, buildings) and soft (e.g. roads, parking areas, landscaped areas) site uses within the proposed light industrial park will be specified in more detail.

(This section of the Masterplan will provide more detailed information as was requested by the State Office of environmental Quality Control, the Kailua Neighborhood Board, and Hawaii's Thousand Friends)

- **Assessing of onsite renewable (photovoltaic) energy generation to be installed:**

  The photovoltaic (PV) capacity to be installed on the warehouse roof over the future years will be assessed and delineated in the updated project masterplan. The actual PV capacity to be installed will be dependent on land use codes, available PV installation incentives / credits and the ability to net-meter or consume the electricity generated onsite. A more in-depth analysis of the PV capacity to be installed will determine what the actual demand for energy and power will be at the proposed site.

  (This detailed design information is required to assess the electricity supply required from the island wide grid)

6.7.2 Revisions and Updates to the Traffic Impact Analysis Reports (TIAR)

As agreed upon with the State Department of Transportation (DoT), the applicant will produce one revised TIAR during the upcoming zone change request and one new, up-dated TIAR at project midpoint:

(1) Revised TIAR in conjunction with the zone change permitting process:

The State DoT has requested re-analyzing of certain parts of the current TIAR, which is submitted with this FEIS, using additional traffic impact analysis calculations (refer to the letter by DoT, dated April 2, 2011, In Appendix 1). Specifically, the DoT has stated that the calculation methodology for the LOS of intersections might result in LOS levels that are too optimistic ,and that more traffic mitigation might be needed than that proposed in the current TIAR.

Upon a request by the applicant, the DoT has agreed that the revisions to the current TIAR may be carried out during the zone change permit applications (refer to the letter by DoT, dated August 31, 2011, in Appendix 1). The revised TIAR will be subject to DoT review and approval and will use updated trip generation rates delineated in the master plan for the zone change request. This procedure will allow the applicant to better address the shortfalls and uncertainties of the current TIAR and develop the revised TIAR using more updated design information.

(It should be noted that the revised TIAR will not include a study of current road problems. This study will be conducted as part of the masterplan of the zone change request. This study is described in Section 6.7.3 under the header "Unsafe traffic conditions on Kapa'a Quarry Road".)

(2) New, follow-up TIAR at project midpoint:

It is further agreed by the applicant that a completely new TIAR, including a new traffic count, will be created at the development midpoint of the project, anticipated to be in 2016 - 2017. The development midpoint has been defined as the time in the project development schedule, when about 50% of the planned floor space is built. The new, follow-up TIAR will measure the actual traffic volume and composition (e.g. vehicles and heavy trucks) at the project development midpoint. The measurements will make it possible to correlate the actually occurring traffic volumes at midpoint with the assumption in the current and revised TIAR. The new- follow-up TIAR will then define new design baseline and trip generation rates that will enable the design team to better select and implement effective traffic mitigation measures for the full build-out of the proposed project.

6.7.3 Areas of Disagreement about Necessary Environmental actions

This section discusses three areas of disagreement in regard to what actions should be taken to mitigate impacts.

A. Unsafe traffic conditions on Kapa’a Quarry Road:

As stated by several commenters (Honolulu Police Department, Kailua Neighborhood Board, Lani-Kailua Outdoor Circle) the current traffic conditions on the Kapaa Quarry Road result in a safety situation that needs to be improved. This in an existing problem and is therefore not directly related to the proposed project, e.g. even if the proposed project were not realized the existing traffic problems should still be mitigated. Since the proposed project will increase the traffic volumes, the impact of the unsafe traffic conditions would be greater. There are two aspects that need to considered to address this unresolved issue, (1) what improvements should to be made and (2) which party is responsible for the identified improvements:

<u>What road improvements are needed:</u> A analysis of the traffic problems existing on the quarry road and what mitigation should be used will be conducted in conjunction with the master plan for the zone change request. This analysis of road problems is in addition to the revised TIAR, since the revised TIAR only quantifies expected traffic conditions on the basis of LOS.

<u>Which party is responsible for upgrades as mitigation measures</u>: It remains an unresolved issue and an area of disagreement about which party is responsible to upgrade various sections of the quarry road. At this point it is presumed that the responsibility will be somehow divided between (1) the existing activities served by the road, (2) the proposed industrial park and (3) the owners of the quarry road and three intersections affected by

the quarry road, since the road serves as an important shortcut between Mokapu Boulevard and Kalanianaole Highway. The issue of how the responsibility is divided will need to be addressed prior to implementation of the road improvements.

B. Requests for more environmental precautions:

There remain areas of disagreement about some actions and/or measures, which some commenters deem as appropriate, but which the applicant regards as exceeding a level of reasonable or practical impact mitigation response. Such areas include the following;

Request by the Kailua Neighborhood Board for the installation of air and water quality monitoring stations before the EIS is accepted is considered to be a disproportionate measure. Monitoring is considered by the applicant to be a part of the permitting process and not part of the EIS. For example, installation of water quality monitoring wells could be required as a permitting requirement. Monitoring of water quality could be prescribed in conjunction with a NPDES permit.

Request by Hawaii's Thousand Friends for the implementation and monitoring of Wasteload Allocations as part of the EIS is considered by the applicant to be a disproportionate measure. If so requested by the Hawaii Department of Health (DoH), the proposed project will submit an implementation and monitoring plan for the WLA at the time of a NPDES permit request. The state is implementing EPA approved Total Maximum Daily Loads (TMDL) Waste Load Allocation (WLAs) through the enforcement of the NPDES permit conditions. At the time of permit application, the WLA implementation plan would identify and delineate the efficiencies of the water quality mitigation measures to lower pollutants in accordance to the TMDL for the Kapa'a Stream.

Request by Hawaii's Thousand Friends to assure that drainage canal along the quarry road is lined is considered by the applicant to be a disproportionate measure. The canal is not lined at the present time, and lining it would require the City and County of Honolulu, which maintains the drainage canal, to alter the canal banks and stream bed and maintain a low enough water level in the canal through mechanical means, since water would no longer infiltrate or flow freely toward the Kapa'a Stream.

While the proposed project endeavors to implement a comprehensive mitigation process which is consistent with the low impact development approach used for portions of the proposed site that are closest to environmentally sensitive areas, the pertinent measures are based on a reasonable and practical level of mitigation. As correctly stated by the commenter (i.e. Hawaii's Thousand Friends) no amount of mitigation can fully protect the stream and the marsh, or fully ease the traffic impacts and visual impacts.

C. Rare failures of mitigation measures:

Some commenters indicate that there might be rare, yet possible instances, when proposed mitigation measures are rendered inadequate or not efficient enough to result in the level of intended reduction of effect on the environment. Such rare failures modes might include the following:

The Lani-Kailua Outdoor Circle points out that the comprehensive low impact development approach under the LEED certification goal cannot control forces of nature such as extreme floods and earthquakes, or prevent unintended consequences due to mismanagement or lack of compliance. Extreme natural events can indeed surpass the design envelop of the proposed mitigation measure and negatively affect mitigation effectiveness. Such events are, however, rare and do not impede the low impact design intent of the proposed projects.

The Environmental Center points out that various mitigation measures that are based on innovative low impact technologies and processes might prove less effective than intended, thereby rendering lower mitigation effectiveness than considered in the design. Furthermore the Environmental Center points out that insufficient maintenance might result in lower mitigation effectiveness than anticipated in the design. While low impact development technologies and strategies are indeed relatively new, the type of impact mitigation technologies and strategies selected for the proposed project do not represent overly innovative technologies and strategies and therefore the probability of actual performance being significantly below design assumptions should be relatively low. Problems in maintenance and operating of the mitigation measures would have relatively short feedback loops, therefore lowering the potential of failure.

The Environmental Center points out risks associated with a shorter project implementation than the 15 to 17 years planned in accordance with the projected absorption of industrial space in the Koolaupoko region. A faster regional absorption might occur, although it is not considered likely. A faster absorption would require the expedited implementation of mitigation measures and possibly a slight adaptation of mitigation strategies.

Furthermore, there remains the inevitability of accidents, fires, human errors, faulty design or construction and people not following rules, which would constitute risks of environmental damage. While it might not be possible to implement measures or contingency plans for every possible rare failure mode, it is important that the operator of the proposed industrial park retain operational flexibility in order to react to such rare events in the most practical and effective way. Emergency response plans and preventive strategies that are developed and maintained through cooperation of park management and tenants can be very effective to limit negative effects.

CHAPTER SEVEN - AGENCIES, ORGANIZATIONS AND BOARDS CONTACTED

The following agencies, organizations and boards were contacted in course of this environmental view.

City and County of Honolulu
Department of Transportation Services
Transportation Planning Division
650 S. King Street 3rd Floor
Honolulu, Hawaii 96813

City and County of Honolulu
Kailua Neighborhood Board No. 31
Planning & Zoning Committee
P.O. Box 487
Kailua, Hawaii 96734

City and County of Honolulu
Department of Facility Management
Transportation Planning Division
650 S. King Street 3rd Floor
Honolulu, Hawaii 96813

Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, HI 96813-2404

Honolulu Fire Department
Aikahi Fire Station
45 Kaneohe Bay Dr
Kailua, Hawaii 96734

Honolulu Police Department
Kailua City Police Station
219 Kuulei Road, Kailua, Hawaii 96734
Oahu Transit Services Inc.
811 Middle Street
Honolulu, Hawaii 96819

State of Hawaii
Department of Business, Economic Development & Tourism
Office of Planning
235 S. Beretania Street, Suite 600
Honolulu, Hawaii 96813

State of Hawaii
Department of Health
Clean Water Branch
919 Ala Moana Blvd., Room 301
Honolulu, Hawaii 96814

State of Hawaii
Department of Health
Wastewater Branch
919 Ala Moana Blvd., Room 301
Honolulu, Hawaii 96814

State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, HI 96813

State of Hawaii
Department of Health
Indoor and Radiological Health Branch
919 Ala Moana Blvd., Room 301
Honolulu, Hawaii 96814

Natural Resources Conservation Service
United State Department of Agriculture
Hawaii Field Office
99-193 Aiea Heights Drive, Suite 109
Aiea, Hawaii 96701

Department of the Army
U.S Army Corps of Engineers
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

U.S Department of the Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Hawaiian Electric Company (HECO)
820 Ward Avenue
Honolulu, Hawaii 96814

Kailua Chamber of Commerce
600 Kailua Road, Suite 107
Post Office Box 1496
Kailua, Hawaii 96734

Harold K.L. Castle Foundation
1197 Auloa Road
Kailua, HI 96734

State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Water Resources Research Center / Environmental Center
University of Hawaii at Manoa
2500 Dole Street, Krauss Annex 19
Honolulu, Hawaii 96822

Department of Environmental Services
1000 Uluohia Street, Suite 201
Kapolei, Hawaii 96707

Ameron Hawaii
2344 Pahounui Drive
Honolulu, Hawaii 96819-2220

Grace Pacific Corporation
949 Kamokila Blvd, Suite 100
Kapolei, HI 96707

CHAPTER EIGHT - LIST OF PERMITS AND APPROVALS

Permits and approvals that are either required or might be required, pending a decision by the permitting agency, are as follows:

Permit description	Permitting agency	Description
Permits related to water resources management: 1. Stream Channel Alteration Permit 2. Well abandonment permit	State Department of Land and Natural Resources Commission on Water Resource Management	1. Permit required if any stream bed or stream bank is altered in any way. The need for this permit will be determined after the design is completed 2. Permit required prior to sealing a well
National Pollutant Discharge Elimination System (NPDES): 1. Storm Water Runoff 2. Hydrotesting 3. Dewatering Permit	State Department of Health Clean Water Branch	1. Permit is required for storm water discharges from construction activities including clearing, grading and excavation activities 2. Discharge of non-polluted hydrotesting water 3. Discharge of dewatering effluent from construction activities.
Construction related permits 1. Building Permit 2. Grading Permit 3. City Trenching Permit	Department of Planning and Permitting City and County of Honolulu	1. Permits are required for the construction of any building or structure 2. Permit required for grading which changes drainage patterns with respect to properties abutting the construction site 3. Permit required for trenching any public facility
Road construction related permits: 1. Road construction related permits 2. Right-of-Way Permit 3. Street Usage Permit	Department of Transportation Services City and County of Honolulu	1. Permit is required for any construction activities within the City and County of Honolulu right-of-way; 2. Permit needed for work within City and County roadways 3. Permit needed for work within City and County roadways

Permit description	Permitting agency	Description
Noise Variance Permit	State Department of Health	Permit may be required for unusually loud construction activities or night work.
~~Underground Injection Control (UIC) permit~~	~~State Department of Health Safe Drinking Water Branch~~	~~Permit for injection well for sewage, industrial/commercial, or aquaculture-related wastewaters~~
Individual Wastewater System (IWS)	State Department of Health Wastewater Branch	Permit required for septic tank system
Permits for work in navigable waters of the US 1. Section 10 Rivers and Harbors Act 2. Section 404 of Clean Water Act	U.S. Department of the Army Corps of Engineers	1. Permit needed prior for any construction in, over or under navigable water of the U.S. 2. Permit needed for discharge of dredge and/r fill material into waters of the U.S, including wetlands
Section 401 of Clean Water Act (Water Quality (401) Certification)	State Department of Health Clean Water Branch	Certification is required if seeking a Federal license or permit for activities involving the possibility of discharge into navigable waters (certification required for Section 10 and Section 404 permits)
Special Management Area (SMA) permit	Department of Planning and Permitting City and County of Honolulu	Major Special Management Area (SMA) permit is required for the development of the lower portion of the proposed site
Section 10 Endangered Species Act	United States Department of the Interior Fish and Wildlife Services	Incidental take permit may be required if aspects of the project endanger listed species

LIST OF PREPARERS

Manfred Zapka, PhD, PE, Principal
LEED-AP, CEM, CBE
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawaii 96828, USA
Tel: 808-265-6321
sustainabledc@gmail.com

Phyllis C. Horner, PhD, LEED GA, Senior Consultant
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawaii 96828, USA

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REFERENCES

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Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Engineering • Strategy • Change Management
www.sustain-HI.com

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Volume II

APPENDICES

Appendices 1 though 9

September 2011

Prepared by

Sustainable Design & Consulting LLC

Technical and Organizational Sustainability Consultants

Honolulu, Hawaii

www.sustain-hi.com

Final Environmental Impact Statement
for the proposed
Kapa'a Light Industrial Park, Kailua, Hawaii
List of Appendices 1 through 9

No.	Description / Title	New for FEIS or previously submitted with the DEIS
1	**Comments Received and Responses Given:** Appendix presents letters to stakeholders and comments received by stakeholder for the Draft Environmental Impact Statement (DEIS) and the Environmental Impact Statement Preparation Notice (EISPN)	<u>Appendix was created new for this FEIS; It contains some material that was presented with the DEIS</u>
2	**Market Study:** Appendix presents findings about the ability of the Koolaupoko region to absorb the planned amount of new industrial space added to the existing warehouse development	Appendix was already published as part of the DEIS; no changes were done to the content
3	**Survey of Existing Businesses at the Project Site:** Appendix presents findings of a survey of businesses which lease industrial space in the existing warehouse development at the proposed project site	Appendix was already published as part of the DEIS; no changes were done to the content
4	**Sustainable Design Approach:** Appendix presents a detail concept plan for the design and construction of the proposed project that will satisfy the requirements to achieve LEED Silver certification upon completion of the proposed project	Appendix was already published as part of the DEIS; no changes were done to the content
5	**Traffic Impact Analysis Report:** Appendix presents the TIAR that was conducted for this environmental review. The TIAR assesses the anticipated traffic impacts of the proposed project	Appendix was already published as part of the DEIS; no changes were done to the content
6	**Sight Distance AnalysisStudy:** Appendix presents the sight distance analysis that was conducted for this environmental review. The assessment evaluates if the proposed driveways for the proposed project would have adequate sights	<u>Appendix was revised for this FEIS, four drawings of Driveway No. 1 were revised and pertinent text was revised, in response to comments received to the DEIS</u>
7	**Water Resources Assessment for the Project Site:** Appendix presents the results of an investigation of water resources at the site	Appendix was already published as part of the DEIS; no changes were done to the content
8	**Visual Impact Assessment Study:** Appendix presents a visual impact assessment of the proposed project by evaluating existing viewplanes and the consequences of the proposed project by means of a photographic documentation and a virtual realty model of the completed future development	<u>Appendix was revised for this FEIS, one new viewplane was added, in response to comments received to the DEIS</u>
9	**Information about Previously Conducted Archeological survey:** Appendix presents information about previously conducted archeological survey, which is cited in the DEIS	Appendix was already published as part of the DEIS; no changes were done to the content

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 1:

Comments Received and Responses Given

Appendix 1 contains changes from Appendix 1 of DEIS

September 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

Appendix 1 of the FEIS is an appended version of the Appendix 1 that was part of the DEIS.

Appendix 1: Comments Received and Responses Given

The appended FEIS Appendix 1 presents as follows:

- Mailing list for the DEIS
- Copies of letters with comments sent by DEIS stakeholders and responses by Consultant
- Mailing list for the EISPN
- Copies of letters with comments and recommendations sent by EISPN stakeholders

Mailing list for the DEIS: The following 39 stakeholders received the DEIS Volume I :Main Report and Volume II; Appendices on Data-CD, per regular mail:

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
1	Ahahui Malama I Ka Lokahi P.O. Box 751 Honolulu, Hawaii 96808 Attn.: Office of the President
2	Mr. John Harrison, President Hawaii Audubon Society 850 Richards Street, Suite 505 Honolulu, Hawaii 96813
3	Kawai Nui Heritage Foundation C/o Ms. Susan Miller 1030 Aoloa Place, Apt. 102 B Kailua, Hawaii 96734
4	Ms. Joan Fleming, President Lani-Kailua Outdoor Circle 653 Milokai Street Kailua, HI 96734
5	Ms. Donna Wong, Executive Director Hawaii's Thousand Friends 25 Maluniu Avenue, Suite 102 #282 Kailua, Hawaii 96734
6	Kailua Bay Advisory Council 629-A Kailua Road, Suite #3 Kailua, Hawaii 96734
7	Mr. Puna Nam, President Kailua Chamber of Commerce Post Office Box 1496 Kailua, Hawaii 96734

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
8	Mr. Bill Lane, Account Manager Hawaiian Electric Company, Inc. P.O. Box 2750 Honolulu, Hawaii 96840
9	Mr. Henry Curtis, Executive Director Life of the Land 76 North King Street, Suite 203 Honolulu, Hawaii 96817
10	Mr. Robert D. Harris, Director Sierra Club of Hawaii Chapter P.O. Box 2577 Honolulu, Hawaii 96803
11	Mr. Randy Ching, County President The League of Women Voters of Honolulu 49 South Hotel Street, Room 314 Honolulu, Hawaii 96813
12	Todd Cullison, Executive Director Hui o Ko`olaupoko 1051 Keolu Drive #208 Kailua, HI 96734
13	Mr. Chuck Prentiss, Chair Kailua Neighborhood Board No. 31 Neighborhood Commission Office 530 South King Street, Room 406 Honolulu, Hawaii 96813
14	Kailua Satellite City Hall 1090 Keolu Drive, # 110 Kailua, Hawaii 96734

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
15	Mr. Wayne Hashiro, Manager Honolulu Board of Water Supply 630 South Beretania Street Honolulu, HI 96813-2404
16	Mr. Wayne Yoshioka, Acting Director City and County of Honolulu, Department of Transportation Services 650 S. King Street, 3rd Floor Honolulu, Hawaii 96813
17	Mr. Tim Steinberger, Director City and County of Honolulu Department of Environmental Services 1000 Uluohia Street, Suite 212 Kapolei, HI 96707
18	Mr. George K. Miyamoto, Acting Director City and County of Honolulu Department of Facility Management 1000 Uluohia Street, Suite 215 Kapolei, HI 96707
19	Mr. Louis M. Kealoha, Chief of Police Honolulu Police Department 801 South Beretania Street Honolulu, Hawaii 96813
20	Mr. Kenneth G. Silva , Fire Chief Honolulu Fire Department 636 South Street Honolulu, HI 96813

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
21	Mr. Gary Cabato, Acting Director City and County of Honolulu Department of Parks and Recreation 1000 Uluohia Street, Suite 309 Kapolei, I 96707
22	Collins D. Lam, P.E., Acting Director City and County of Honolulu Department of Design and Construction 650 S. King Street Honolulu, HI 96813
23	Dr. Pua Aiu, Administrator State Historic Preservation Div., DLNR Kakuhihewa Building 601 Kamokila Blvd., Suite 555 Kapolei, Hawaii 9670
24	Dr. Neal Palafox, Director Department of Health, State of Hawaii Kinau Hale 1250 Punchbowl Street Honolulu, Hawaii 96813
25	Mr. Orlando Dan Davidson, Executive Officer Land Use Commission, State of Hawaii DBEDT P.O. Box 2359 Honolulu, Hawaii 96804-2359
26	Richard C. Lim, Interim Director Department of Business, Economic Development & Tourism (DBEDT) No. 1 Capitol District Building 250 South Hotel Street, 5th Floor Honolulu, Hawaii 96813

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
27	Dr. Elizabeth Raman, Energy Program Specialist, State Energy Office Hawaii State DBEDT, Strategic Industries Div. PO Box 2359 Honolulu, Hawaii 96804
28	Mr. Brian Gibson, Executive Director Oahu Metropolitan Planning Organization Ocean View Center 707 Richards Street, Suite 200 Honolulu, Hawaii 96813
29	Glenn Okimoto, Interim Director Department of Transportation State of Hawaii 869 Punchbowl Street Honolulu, Hawaii 96813
30	Mr. Clyde Namu'o, Chief Executive Officer Office of Hawaiian Affairs 711 Kapiolani Boulevard, Suite 500 Honolulu, Hawaii 96813
31	Ms. Mary Lou Kobayashi, Administrator Office of Planning, State of Hawaii, DBEDT P.O. Box 2359 Honolulu, Hawaii 96804-2359
32	Mr. William J. Aila Jr., Interim Chairperson Department of Land and Natural Resources State of Hawaii 1151 Punchbowl Street, Room 130 Honolulu, Hawaii 96813

No.	Mailing list of DEIS to Selected Governmental Agencies, Community / Advocacy Group and Public Libraries, as listed
33	Mr. Lawrence T. Yamamoto, State Conservationist USDA NRCS, Pacific Islands Area State Office P.O. Box 50004 Honolulu, Hawaii 96850
34	Lt. Col. Douglas Guttormsen, District Commander US Army Corps of Engineers Honolulu District, Bldg. 230, CEPOH-EC-R Fort Shafter, Hawaii 96858-5440
35	Dr. Loyal Mehrhoff, Field Supervisor Pacific Islands Fish and Wildlife Office 300 Ala Moana Boulevard Room 3-122, Box 50088 Honolulu, Hawaii 96850
36	Mr. Guilherme R. Costa, Conservation Specialist Oahu Soil & Water Conservation District 99-193 Aiea Heights Drive, Suite 109 Aiea, Hawaii 96701
37	Mr. Philip Moravcik, Environmental Coordinator University of Hawaii, Environmental Center Krauss Annex 19 2500 Dole Street Honolulu, HI 96822
38	Kailua Public Library 239 Kuulei Road Kailua, HI 96734 Attn.: Mr. Tom Coleman
39	Kaneohe Public Library 45-829 Kamehameha Highway Kaneohe, HI 96744 Attn.: Ms. Cindy Chow, Branch Manager

January xx, 2011

Sample transmittal letter for DEIS to stakeholders on DEIS distribution list (two public libraries received separate cover letters)

Mr. or Ms ……
xxxxxxxxxxxxxx
xxxxxxxxxxxxxxx
xxxxxxxxxxxxxx

Subject: **Draft Environmental Impact Statement (DEIS)**
Kapa'a Light Industrial Park in Kailua, Oahu, Hawaii
Request for comments on the DEIS

Dear xxxx

On behalf of Kapa'a I, LLC, 905 Kalanianaole Hwy., Kailua, HI 96734, Sustainable Design & Consulting LLC (SDC) is submitting the DEIS for the proposed Kapa'a Light Industrial Park (KLIP) project in the Koolaupoko District of Oahu, for your review and comment. The City & County of Honolulu, Department of Planning & Permitting (DPP) has instructed us that the Office of Environmental Quality Control, State of Hawaii (OEQC) will publish the DEIS in *The Environmental Notice* on February 8th, 2011 (the text of publication notice is attached to this letter). The date of publication marks the start of the 45 day public review period during which stakeholders are invited to submit their comments. With the publication date of February 8th, we will be accepting comments through Friday, March 25th, 2011.

To reduce hard copies printed and in keeping with an environmentally friendly spirit, we are sending you the DEIS in electronic format. On the enclosed CD please find two PDF files, (1) DEIS Volume 1: Main Report, and (2) DEIS Volume 2: Appendices.

If you have questions, please call Dr. Manfred Zapka (SDC) at 808-265-6321 or email to sustainabledc@gmail.com. Please send 2 copies of any written comments via regular mail, one to SDC, and the other to DPP. Addresses are:

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, HI 96828

Mr. Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, HI 96813

Sincerely,
Sustainable Design & Consulting, LLC

M. Zapka

Manfred Zapka, PhD, PE, LEED-AP, CEM
Principal and Senior Consultant

2 Enclosures: One Data-CD containing PDF files of DEIS main report and appendices
Text of Publication Notice

Sustainable Design & Consulting LLC
Engineering • Strategy • Change Management

February 9, 2011

Kailua Public Library
239 Kuulei Road
Kailua, HI 96734
Attn.: Mr. Tom Coleman or Branch Manager

Subject: **Draft Environmental Impact Statement (DEIS)**
Kapa'a Light Industrial Park in Kailua, Oahu, Hawaii
Request to make DEIS available to the public at your library

Dear Sir or Madam,

On behalf of Kapa'a I, LLC, 905 Kalanianaloe Hwy., Kailua, HI 96734, Sustainable Design & Consulting LLC is submitting the Draft Environmental Impact Statements (DEIS) for the proposed Kapa'a Light Industrial Park (KLIP) project in the Koolaupoko District of Oahu, Hawaii, to stakeholders and the public for review and comments. The Office of Environmental Quality Control, State of Hawaii (OEQC) has published the Draft EIS in the current *The Environmental Notice*, dated February 8, 2011, which marks the start of a 45 day public comment period.

This EIS is prepared pursuant to the requirements of Chapter 343, Hawaii Revised Statutes, Environmental Impact Statements. Besides being distributed in electronic version by OEQC, we have been instructed by the Accepting Authority, the City & County of Honolulu, Department of Planning and Permitting, that the DEIS should be made accessible to the public at public libraries in Kailua and Kaneohe.

Several weeks ago, we communicated with your library and arranged that your library will receive one data-CD containing the electronic version of the DEIS after the DEIS is published by OEQC. We are also sending herewith a copy of the first two pages of the current *The Environmental Notice*, which states the DEIS publication.

We would kindly request that you make the enclosed information accessible to the public in the framework of your library service until, at least, the end of the public review period, which is March 24, 2011. The applicant, Kapa'a I, LLC, and we, the consultants, very much appreciate your support in this matter. If you have questions please call Dr. Manfred Zapka, Sustainable Design & Consulting, LLC, at 808-265-6321 or per email at sustainabledc@gmail.com.

Sincerely,
Sustainable Design & Consulting, LLC

M. Zapka

Manfred Zapka, PhD, PE, LEED-AP, CEM
Principal and Senior Consultant

Encl.: One data-CD and one copy of the DEIS notice (only pages 1 and 2 of the Feb 8, 2011 OEQC notice)

P.O. Box 283267, Honolulu, Hawaii 96828, USA Tel: 808-265-6321 sustainabledc@gmail.com
www.sustainabledesignconsult.com

Sustainable Design & Consulting LLC
Engineering • Strategy • Change Management

February 9, 2011

Kaneohe Public Library
45-829 Kamehameha Highway
Kaneohe, HI 96744
Attn.: Ms. Cindy Chow, Branch Manager

Subject: **Draft Environmental Impact Statement (DEIS)**
Kapa'a Light Industrial Park in Kailua, Oahu, Hawaii
Request to make DEIS available to the public at your library

Dear Ms. Chow ,

On behalf of Kapa'a I, LLC, 905 Kalanianaloe Hwy., Kailua, HI 96734, Sustainable Design & Consulting LLC is submitting the Draft Environmental Impact Statements (DEIS) for the proposed Kapa'a Light Industrial Park (KLIP) project in the Koolaupoko District of Oahu, Hawaii, to stakeholders and the public for review and comments. The Office of Environmental Quality Control, State of Hawaii (OEQC) has published the Draft EIS in the current *The Environmental Notice*, dated February 8, 2011, which marks the start of a 45 day public comment period.

This EIS is prepared pursuant to the requirements of Chapter 343, Hawaii Revised Statutes, Environmental Impact Statements. Besides being distributed in electronic version by OEQC, we have been instructed by the Accepting Authority, the City & County of Honolulu, Department of Planning and Permitting, that the DEIS should be made accessible to the public at public libraries in Kailua and Kaneohe.

Several weeks ago, we communicated with you and arranged that your library will receive one data-CD containing the electronic version of the DEIS after the DEIS is published by OEQC. We are also sending herewith a copy of the first two pages of the current *The Environmental Notice*, which states the DEIS publication.

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Sincerely,
Sustainable Design & Consulting, LLC

M. Zapka

Manfred Zapka, PhD, PE, LEED-AP, CEM
Principal and Senior Consultant

Encl.: One data-CD and one copy of the DEIS notice (only pages 1 and 2 of the Feb 8, 2011 OEQC notice)

Text of the

Publication Form
The Environmental Notice
Office of Environmental Quality Control

Name of Project: ……….. Kapa'a Light Industrial Park

Applicable Law: ………… HRS 343-5(c)

Type of Document: …….. Draft EIS

Island: ……………………. Oahu

District: …………………... Koolaupoko

TMK: ……………………… (1) 4-2-15: 1 (por.), 6 and 8

Permits Required: ………. Zone Change, SMA, NPDES, Grading Permit, Building Permit

Name of Applicant or
Proposing Agency: ……. Kapa'a I, LLC
Address ……………….. 905 Kalanianaole Highway
City, State, Zip ………… Kailua, Hawaii 96734
Contact and Phone …… John King, (808) 853-4768

Approving Agency or
Accepting Authority: …… City and County of Honolulu, Department of Planning and Permitting
Address ………………... 650 South King Street, 7th Floor
City, State, Zip ………… Honolulu, Hawaii 96813
Contact and Phone …… Mike Watkins, (808) 768-8044

Consultant ………………... Sustainable Design & Consulting LLC
Address ………………… P.O. Box 283267
City, State, Zip ………… Honolulu, Hawaii 96828
Contact and Phone ……. Dr. Manfred Zapka, (808) 265-6321

Project Summary:

This Draft EIS was preceded by an EIS Preparation Notice (listed in the July 23, 2010 issue of the Environmental Notice) and by a Draft Environmental Assessment (listed in the January 8, 2009 issue).

The applicant, Kapa'a I, LLC, is proposing to expand its existing 22-acre light industrial park in Kapaa Valley on the windward side of Oahu. This area is currently zoned I-2 Intensive Industrial District. The applicant is seeking I-1 zoning for two adjacent areas now within the P-2 General Preservation District – an 11-acre area to the west, by the H-3 Freeway, and a 44-acre parcel to the east, just across Kapaa Quarry Road from Kawainui Marsh.

The proposed Kapa'a Light Industrial Park would be developed incrementally over a span of 18 years. Short-term construction impacts during this period would include increased vehicular traffic and heavy machinery operation, soil erosion, noise and air pollution, and water runoff. There would also be long-term impacts, mainly on vehicular traffic, utility systems, utilization of resources, noise levels, local social services and businesses, and visual character and ambiance. The Draft EIS goes beyond the Final EA in providing additional details on the project's anticipated impacts on Kawainui Marsh, traffic, visibility, etc. See also the <u>Appendix</u>.

Copies of letters with comments sent by DEIS stakeholders and responses by Consultant

The following is a list of letters with comments received from stakeholders::

No.	Date of letter	Letter from Agency or Organization
	4/21/2011	**Accepting Agency: City & County of Honolulu – Department of Planning and Permitting**
1	2/3/2001	Board of Water Supply
2	2/3/2001	City & County of Honolulu – Department of Parks and Recreation
3	2/10/2011	Honolulu Police Department
4	2/16/2011	Honolulu Fire Department
5	2/22/2011	State Department of Health – wastewater branch
6	2/24/2011	City & County of Honolulu – Department of Facility Maintenance
7	3/7/2011	USA Corp of Engineers
8	3/12/2011	Kailua Neighborhood Board No. 31
		State Department of Land and Natural Resources (DLNR); divisions
9	3/21/2011	DLNR Land Division
	1/27/2011	DLNR Division of State Parks (received as attachment to Letter No. 9
	1/27/2011	DLNR Engineering Division (received as attachment to Letter No. 9)
10	4/19/2011	DLNR – Aquatic Resources
11	3/22/2011	City & County of Honolulu – Department of Design and Construction
12	3/24/2011	The Lani-Kailua Outdoor Circle
13	3/25/2011	Water Resources Research Center – Environmental Center
14	3/28/2011	Hawaii's Thousand Friends
15	3/28/2011	State Department of Hawaiian Affairs
16	3/25/2011	State Office of Environmental Quality Control

No.	Date of letter	Letter from Agency or Organization
17	3/25/2011	Unites States Department of the Interior
18	3/25/2011	Department of Transportation Services
19	3/30/2011	State Department of Transportation (DoT)
20	4/06/2011	State Department of Transportation (DOT) follow up to letter 3/30/2011
21	8/31/2011	State Department of Transportation (DOT); response to request by applicant

Copies of letters with comments sent by DEIS stakeholders and responses by Consultant

The copies of the letter with comments from the accepting agency, City and County of Honolulu, Department of Planning and Permitting (DPP), as well as of 19 letters by stakeholders with comments to the DEIS are presented in the following.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

Letter from Accepting Agency DPP

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2011/ELOG-121 (mw)

April 21, 2011

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement for Kapa'a Light Industrial Park, Kailua, Koolaupoko, Oahu, TMK 4-2-15: 1 (por.), 6 and 8

As the accepting authority for your Draft Environmental Impact Statement (EIS) on the proposed Kapaa Light Industrial Park project in Kapaa Valley, we have the following comments.

The Final EIS should clarify whether or not your project will need to build a centralized private wastewater system instead of just more septic tanks, as suggested in the Department of Health comment letter dated February 2, 2011. If such a system is indeed required, then your Final EIS will need to discuss whether or not all industrial lots are to be served by such a system.

Second, please expand Section 4.13, Cumulative Impacts. According to the definition in the State's "Environmental Impact Statement Rules", cumulative impacts result not only from all the known or anticipated projects but also from all past actions. Thus, summary paragraphs are needed to explain such matters as: (1) the future combined stream flow in Kapaa Stream due to both existing conditions and your project's drainage improvements (comparable to Section 3.2.3), and (2) future traffic and road-safety conditions along the entire length of Kapaa Quarry Road.

Third, Chapter 6 needs to be totally rewritten. Only at the EA stage is there a requirement to discuss the significance criteria. We recommend that this chapter instead be a summary of key findings on required subjects such as: (1) the relationship between short-term uses and long-term productivity, (2) irreversible and irretrievable commitments of resources, (3) unavoidable adverse impacts, (4) cumulative and secondary impacts, (5) key mitigation measures, and (6) unresolved issues.

Another problem is that Chapter 6 misuses the term "significant impacts" in its attempt to claim that the project will be largely free of adverse environmental impacts. This term actually refers to the impacts before mitigation. Please acknowledge these impacts while proposing mitigation measures to minimize them. (See the EIS Rules, Subchapters 100-200-17 (L&M) and 11-200-23 (B).)

Fourth, we have the following technical concerns:

- The first paragraph of Chapter 1 should mention that the preparation of this EIS has been triggered by two needed permits: (1) the anticipated zone change, and (2) a Special Management Area Permit for the lower project area. This should also be stated in the Executive Summary.
- When discussing the social and utility-use impacts of future industrial tenants, it should be stated that only some industrial floor space will be occupied by businesses moving from elsewhere. We continue to question your assumption on page 298 that up to 70 percent of new floor space will be occupied by companies moving from elsewhere; our reading of the market study is that this proportion is likely to be no more than 24-40 percent. This also affects statements on pages 216 and 304 which claim that the project's impacts on islandwide energy consumption will be positive, despite the fact that the project at full buildout will use 2½ times more energy than today.
- In Section 4.14.9, if there are no existing utility poles along the section of Kapaa Quarry Road running from the project site to Kamehameha Highway (as Section 3.7.3 implies), then the EIS should discuss the impacts on the marsh of possibly constructing a new electrical power line along that route.
- In Section 4.12.2 and other discussions of demographic and employment impacts, you need to follow each introductory sentence regarding how the region's future population is projected to decline with another sentence stating that there are two separate causes of this decline: (1) fewer children being born and also more deaths due to higher numbers of elderly (a smaller or negative natural increase), and (2) more adult children and other residents moving out (also known as net outmigration, which is already discussed).
- In Section 3.11.1, you should replace all regional population data for the island's seven judicial districts with data for our eight official DP areas. You should also use our official data on the population of Kailua, Kaneohe, and the marine corps base. Also, you should refer to the year 2000 in the titles of Figures 3-42 and 3-43. All of this data is attached.
- In Section 6.1, part 12, we question your statement that "the Kapa'a Valley has an industrial appearance". Given the great amount of open space visible when looking up into the valley and given how well camouflaged the three most visible uses are – your existing industrial park, the City's refuse transfer station, and the green-waste facility on your project site's lower area – we see the valley as having more of an open-space and rural appearance from most vantage points.

Should you have any questions, please contact Mike Watkins of our staff at 768-8044.

Very truly yours,

for David K. Tanoue, Director
Department of Planning and Permitting

DKT:js
Attachment
Kapaa\DEIS comment

Population Estimates by Development Plan Area, 1980-2035

DP/SCP Area	Existing				Projected					
	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
PUC	417,240	432,023	419,333	417,336	418,664	427,429	432,487	437,818	442,994	447,715
Ewa	35,523	42,931	68,718	82,595	94,504	107,234	123,101	137,721	151,332	164,556
CO	101,685	130,526	148,186	157,008	158,965	161,999	166,078	171,595	177,029	181,423
EH	43,213	45,654	46,735	49,229	49,129	51,119	51,238	50,400	49,600	48,843
K'poko	109,373	117,694	117,999	117,004	114,209	115,631	116,118	114,975	113,243	111,594
K'loa	10,983	14,263	14,546	14,482	14,156	14,592	14,899	15,150	15,336	15,452
NS	13,061	15,729	18,380	18,118	17,724	18,325	18,770	19,126	19,375	19,517
Waianae	31,487	37,411	42,259	43,923	44,490	45,518	46,776	47,847	48,667	49,217
TOTAL	762,565	836,231	876,156	899,695	911,841	941,847	969,467	994,632	1,017,576	1,038,317

Source: 1980 to 2000, U.S. Census Bureau counts and DPP counts and estimates; 2005, DPP estimate (September 2009); 2010 to 2035, DBEDT & DPP projections (September 2009)

Year 2000 Estimates for Subareas of Koolaupoko

Subarea	Population
Kailua	41,607
Kaneohe	40,013
Mokapu*	11,827
Kahaluu	14,391
Waimanalo	10,161
TOTAL	117,999

*the marine corps base

Source: DPP estimate (September 2009)

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
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Response to letter from Accepting Agency DPP

September 14, 2011

Mr. David K. Tanoue, Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813
Attn.: Mr. Mike Watkins, Planner

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated April 21, 2011
Your Reference 2011 / ELOG-121 (mw)

Dear Mr. Tanoue,
We would like to thank you and your staff, especially Mr. Mike Watkins, for the valuable support and helpful comments during the entire environmental review period.

Beginning on the next page, we provide our responses to the comments and suggestions in your letter of April 21, 2011.

If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or email at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

Your comment page 1, 2nd paragraph	Clarification of the comments submitted by the Department of Health (DoH) Wastewater Branch in the February 2, 2011 (the correct date is February 22) letter of whether a centralized private wastewater system needs to be installed instead of adding more septic tanks.
Our response	Discussion and communication with DoH Wastewater Branch following the referred DoH letter have provided the clarification that your letter requested. A major issue of the DoH comments is the number of individual wastewater systems (IWS) that can be built on the proposed site. DoH interpreted that the maximum number for the entire site is 15 IWSs, or 15,000 gallons per day of total wastewater volume; but actually the maximum number for each land parcel is 15 IWS. Since the proposed development will be built on three land parcels, TMK 4-15-2:001 (portion of), 006 and 008, the total maximum number would be 45, considering that each parcel would have the maximum number of IWSs on it, which will not be the case.

Therefore, the proposed site development approach can use IWSs as the means of onsite wastewater treatment and does not have to implement a centralized private wastewater system.

The onsite wastewater systems will use two different types of septic systems in the upper and lower portion of the site. In the upper portion of the site, which includes the two land parcels TMK 4-2-15:001 (portion of) and 008, conventional septic systems will be used with each system consisting of a septic tank and a leach fields.

The lower portion of the field will use a more advanced septic system which has significantly higher pollutant removal rates than conventional septic systems. This more advanced septic system will include a septic tank effluent pumping (STEP) system that conveys the effluent of each septic tank to a system for further treatment and disposal in leach field or sub-surface irrigation. The advanced septic system in the lower portion of the proposed site is selected since the point of injection of the treated wastewater is closer horizontally to the receiving waters and vertically to saturated or impermeable soil layers.

The FEIS states the fact that IWSs are permissible wastewater treatment process for the proposed site and that no centralized private wastewater treatment plant will be required by DoH.

Your comment page 1, 3rd paragraph	Expand Section 4.13, Cumulative impacts in accordance with your recommendations
Our response	We have deleted the statement in section 4.13 which stated that cumulative impacts do not need to be addressed in the EIS. We have added a short discussion in Section 4.13 about the type of cumulative impacts addressed in the FEIS. We have added a more comprehensive discussion of cumulative impacts in Chapter Six.
Your comment page 1, 4th paragraph	Totally rewrite Chapter 6, omit the discussion of significance criteria and provide a summary of key findings on subjects that you delineate in your letter
Our response	We have rewritten Chapter 6 in accordance with your letter and recommendation.
Your comment page 1, 5th paragraph	Your suggestion to acknowledge “significant impacts” in Chapter 6 as impacts that are present before mitigation.
Our response	We have rewritten Chapter 6 in accordance with your letter and recommendation.
Your comment Techn. Concern page 2, 1st paragraph	Your suggestion that we indicate two permits as triggers for EIS
Our response	We will add language in Chapter 1 and Executive Summary
Your comment Techn. Concern page 2, 2nd paragraph	Your suggestion (A) that we change our statement on page 298 about the percentage of businesses that move from elsewhere to the region; your suggestion (B) that we change our assumption that the project would

	have positive impacts on the island-wide energy consumption
Our response	In response to your suggestion (A): We agree with you conclusions and have changed the FEIS accordingly. In response to your suggestion (B): We agree with you conclusions that the island wide use of energy will not be reduced but will increase since new business activities occupy new industrial space. The fact that the warehouse structure in the proposed light industrial park will use energy saving technologies will lessen the increase of use of electricity, rather than reduce it.
Your comment Techn. Concern page 2, 3rd paragraph	Your suggestion that the EIS discusses the impacts on the marsh of possibly constructing a new electric power line along the Kapa'a Quarry Road.
Our response	At this point in the design process it is not clear how and when the electric utility will address the need to implement new capacity to the Kapa'a Valley. The applicant has been installing a substantial capacity of photo-voltaic (PV) on the existing warehouses and also plans to add PV on future structures in the proposed development. Plans of how much PV capacity will be added are still being finalized by the applicant in cooperation with the electric utility. Based on current developments it is expected that there is no short-term need to add capacity, e.g. a new electric line to the existing electric grid connection. The electric utility has the final decision to change the supply configuration, e.g. add a new electric line. The impacts of such activity to the environment and community need to be addressed by the electric utility after the decision has been made if and how the connection to the supply to the Kapa'a valley from the island wide electric grid will be configured in the future. We have added language to Section 3.7.3 to emphasize that the assertion by Hawaiian Electric Company (HECO) about the need to add electric capacity from Kalanianaole Highway by means of a new line is

based on an older assessment by HECO. The older assessment by HECO did not consider more recent developments, such as the addition of significant additions of PV power in the existing warehouse development and the commitment by the applicant to add even more PV capacity on the planned warehouses in the upper and lower portion of the proposed industrial park. Furthermore, the older assessment of the need to add new capacity did not include the commitment of the applicant to implement higher energy savings through adoption of low-impact development technologies and the declared goal to attain LEED Silver certification for the proposed industrial park.

We have also added language to Section 4.8.4 to indicate that a more detailed assessment of impacts from installation of utility poles would have to be carried out by the utility. As discussed with your office, the applicant will assess the actual PV capacity to be added to the development in conjunction with the zone change request.

Your comment Techn. Concern page 2, 4th paragraph	Your statement about the need to elaborate on future demographic and employment impacts in the Koolaupoko region.
Our response	We have used in the FEIS your data to describe the expected demographic changes through 2030 that is provided in your letter.
Your comment Techn. Concern page 2, 5th paragraph	Your statement about the need to replace the population data from the seven judicial districts with data for the eight official DP areas.
Our response	We have used the demographic data that you provided in your subject letter. We have created three new figures to replace the older Figures 3-42, 3-43 and 3-44 to reflect the changed data. We have created a new table to indicate the population growth rates within the DP areas in accordance to your data. We have edited the text to reflect the changed data.

Your comment Techn. Concern page 2, 6th paragraph	Your suggestion that the Kapa'a valley has more open-space and rural appearance rather than an industrial appearance that was suggested in our text.
Our response	We agree that there is a lot of open-space in the Kapa'a Valley and that the valley depicts a rural appearance from many vantage points. We have changed the text at the referred locations in the text of the FEIS accordingly.

We fully agree with the need to “camouflage” the new structures, or hide them behind a screen of vegetation to the extent possible. We have indicated several visual impacts mitigation measures that would be used. Some of the measures that will qualify as visual impact mitigation will also serve functions delineated under the sustainable design approach of the proposed development. For example, the vegetated buffer zones around the lower portion of the proposed site will be part of the restored habitat area that will be developed around the development footprint. This area will be open and vegetated space, which will be planted with native and adapted plants, such as tall trees and bushes, and which will be irrigated with harvested rainwater and recycled wastewater.

Trees inside the development footprint and next to the buildings will provide shade (e.g. reduce non-roof heat island effect), reduce noise and will evaporate captured stormwater (e.g. part of the non-structural BMPs).

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

February 3, 2011

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
ANTHONY R. GUERRERO, JR.
WILLIAM K. MAHOE
THERESIA C. McMURDO
ADAM C. WONG

GEORGE "KEOKI" MIYAMOTO, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager

Letter No.1

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Your Letter Dated January 24, 2011 Requesting Comments on the Draft Environmental Impact Statement for the Proposed Kapaa Light Industrial Park in Kailua, TMK: 4-2-15:1, 6, 8

Thank you for the opportunity to comment on the proposed light industrial park.

The existing water system is presently adequate to accommodate the proposed development. However, please be advised that this information is based upon current data and, therefore, the Board of Water Supply reserves the right to change any position or information stated herein up until the final approval of your building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

The Board of Water Supply Rules and Regulations require the use of nonpotable water for the irrigation of large landscaped areas, if a suitable supply is available.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

cc: Mr. Mike Watkins, Department of Planning & Permitting

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

Response to letter No. 1

September 14, 2011

Mr. Paul S. Kikuchi, Chief Financial Officer
Board of Water Supply, City and County of Honolulu, Customer Care Division
630 South Beretania Street
Honolulu, HI 96843

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to the BWS letter dated February 3, 2011

Dear Mr. Kikuchi,

Thank you for your comments in your subject letter.

We offer the following responses to your comments and recommendations:

- The applicant will submit all required applications in time before commencement of construction and will pay the applicable fees.
- As per you instructions, the applicant will coordinate the fire protection requirement with the Honolulu Fire Department.
- The applicant will use sustainable design standards for the building, site development and landscaping and will extensively use non-potable water as well as reclaimed wastewater for irrigation. A part of the proposed development will be designed and constructed in accordance to requirements to achieve LEED Silver certification upon completion of construction. For about 23 acres of the proposed development, which includes about 10 acres of vegetated open and vegetated open space and restored habitat, it is planned that no potable water will be used for irrigation of landscaped areas.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or email at sustainabledc@gmail.com. Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

KAPOLEI HALE, 1000 ULUOHIA STREET, STE. 309 • KAPOLEI, HAWAII 96707
Phone: (808) 768-3003 • FAX: (808) 768-3053 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GARY B. CABATO
ACTING DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

Letter No.2

February 3, 2011

Mr. Manfred Zapka, PhD, PE, LEED-AP, CEM
Principal and Senior Consultant
Sustainable Design and Consulting LLC
P. O. Box 283267
Honolulu, Hawaii 96828

Dear Mr. Zapka:

Subject: Draft Environmental Assessment
Kapaa Light Industrial Park in Kailua, Oahu, Hawaii

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Kapaa Light Industrial Park in Kailua.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

Gary B. Cabato

GARY B. CABATO
Acting Director

GBC:jr
(400827)

cc: Mr. Mike Watkins, Department of Planning and Permitting

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

Response to letter No. 2

September 14, 2011

Mr. Gary B. Cabato, Director
Department of Parks and Recreation, City and County of Honolulu
1000 Uluohia Street Suite 309
Kapolei, HI 96707

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated February 3, 2011

Dear Mr. Cabato,

Thank you for your comments on our DEIS in your subject letter.

We understand that your department has no comments. As you suggest we will remove you as a consulted party to the remaining EIS process.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or email at sustainabledc@gmail.com. Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

P.O. Box 283267, Honolulu, Hawaii 96828, USA Tel: 808-265-6321 sustainabledc@gmail.com

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DELBERT T. TATSUYAMA
RANDAL K. MACADANGDANG
DEPUTY CHIEFS

OUR REFERENCE DMK-LS

Letter No.3

February 10, 2011

TO: DAVID K. TANOUE, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTN: MICHAEL WATKINS, PLANNER

FROM: LOUIS M. KEALOHA, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR KAPA'A LIGHT INDUSTRIAL PARK IN KAILUA, OAHU, HAWAII

Thank you for the opportunity to review the subject project.

During the construction phase as well as after its completion, this project will have a negative impact on the services provided by the Honolulu Police Department. The increase in traffic will cause a rise in the number of calls for service received by our department. The main roads surrounding the site are already taxed to their capacity. The increase in traffic may be more than these streets can handle.

Kapa'a Quarry Road is desperately in need of repair. The road is long and winding with hills, dips, and limited visibility. It has been the site of traffic fatalities in the past due to vehicles using it as a raceway.

We would like to recommend that the contractor call Major Susan Ballard of District 4 at 247-2166 to review the traffic plans after they have been completed.

If there are any questions, please have a member of your staff contact Major Ballard at the number above.

LOUIS M. KEALOHA
Chief of Police

By Dave Kajihiro
DAVE M. KAJIHIRO
Assistant Chief of Police
Support Services Bureau

cc: Dr. Manfred Zapka, Sustainable
Design and Consulting, LLC

September 14, 2011

Response to letter No. 3

Mr. Louis M. Kealoha, Chief of Police
Police Department, City and County of Honolulu
801 South Beretania Street,
Honolulu, Hawaii 96813
Attention: Mr. Dave M. Kajihiro, Assistant Chief of Police

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated February 10, 2011
Your reference: DMK-LS

Dear Mr. Kealoha,

Thank you for your comments in your subject letter. We also appreciate your department's willingness to discuss your comments and concerns further in the meeting we held in early June 2011.

We offer the following responses to your comments and recommendations:

We understand and agree with you that the probability of traffic incidents increases with increases in traffic volume on the roadways adjacent to and at intersections directly affected by the proposed project. This will have an impact on services provided by the Honolulu Police Department as the HPD receives more calls for assistance.

In a follow-up communication with HPD, it was discussed that high rates of serious accidents on the Kapa'a Quarry Road occur at night or during off-peak hours, when the quarry road is used as a "raceway". These time periods of the day or week are not likely the same time periods when most of the employees and customers of companies in the proposed light industrial park would use the road. Therefore, these serious traffic accidents cannot directly attributed to the proposed industrial development in the Kapa'a Valley, and we think that the rate at which serious traffic accidents would increase would be not at the same rate as the traffic increases due to the proposed project. Nevertheless, the probability of increased traffic accidents needs to be seriously considered and we have changed the text of the FEIS accordingly to include your comments.

The FEIS contains a traffic impact analysis report (TIAR) that predicts future traffic volumes and resulting level of service (LOS) for the roads and intersections that are directly affected by the proposed project. The results of the current TIAR indicate that the LOS levels of the affected roads and intersections would decline but that traffic mitigation measures would not be required before project midpoint, which is anticipated for 2016 or 2017. At project midpoint a new, updated TIAR, including a new traffic count, will be performed in order to identify and select effective traffic mitigation measures to be implemented before the project reaches full build-out.

As state in the FEIS, in the new Section Six “unresolved issues”, the State Department of Transportation (DoT) has requested that the current TIAR be revised. The DoT has agreed that the revisions to the current TIAR can be carried out in conjunction with zone change request. The revisions to the current TIAR will use news project design information to be developed in the updated project Masterplan for the zone change request.

Traffic analysis on the basis of LOS does not necessarily address all adverse traffic conditions on the Kapa’a Quarry Road that can affect road safety. As part of the Masterplan for the zone change an analysis of the current condition will identify what improvements could be selected to provide mitigation of the conditions which, as you state, are in desperate need of repair. As the project moves forward to the zone change application the applicant will be working with the HPD to develop the solutions that are best for the community and the project.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

ROLLAND J. HARVEST
DEPUTY FIRE CHIEF

Letter No.4

February 16, 2011

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement
Kapa'a Light Industrial Park
Kailua, Oahu, Hawaii

In response to your letter of January 24, 2011, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Provide a fire apparatus access road for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from a fire apparatus access road as measured by an approved route around the exterior of the building or facility. (1997 Uniform Fire Code, Section 902.2.1.)

2. Provide a water supply, approved by the county, capable of supplying the required fire flow for fire protection to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed or moved into or within the county.

   On-site fire hydrants and mains capable of supplying the required fire flow shall be provided when any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building. (1997 Uniform Fire Code, Section 903.2, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have any questions, please call Acting Battalion Chief Gary Lum of our Fire Prevention Bureau at 723-7152.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/KT:bh

cc: Mike Watkins, Department of Planning and Permitting

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.4

Mr. Kenneth G. Silva, Fire Chief
Honolulu Fire Department, City and County of Honolulu
636 South Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated February 13, 2011

Dear Chief Silva,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

The applicant will comply with the requirements stated in your letter as follows:

1. Fire apparatus access roads will be provided for every facility, building or portion of the building in accordance with the stated 1997 Uniform Fire Code

2. The existing industrial warehouse development is equipped with a fire water supply, including a 10-inch fire main that connects the fire water systems of the existing industrial development with the Board of Water Supply water main. The required firewater volume is available as required by local code. The fire water supply system of the proposed light industrial park will connect to the existing fire water supply using lateral mains. Sufficient fire hydrants will be installed in accordance with the stated 1997 Uniform Fire Code.

3. The applicant will submit civil drawings to the HFD for review and approval.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
ACTING DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

LUD 1 4 2 015 001-ID607
DEIS Kapaa Light Ind Park

February 22, 2011

Letter No.5

Mr. Manfred Zapka, PhD, PE, LEED-AP, CEM
Principal and Senior Consultant
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Mr. Zapka:

Subject: Draft Environmental Impact Statement (DEIS)
Kapaa Light Industrial Park in Kailua, Oahu, Hawaii
905 Kalanianaole Highway, Kailua, Oahu, Hawaii 96734 TMK (1) 4-2-015: 001

Thank you for allowing us the opportunity to review the subject document which proposes development of the Kapaa Light Industrial Park in Kailua, Oahu. We have the following information to offer.

The subject project is located in the critical wastewater disposal area as determined by the Oahu Wastewater Advisory Committee. We do not have any individual wastewater system (IWS) information on file for this property and the property is also not connected to the City and County of Honolulu sewer service system. However, we understand there are existing warehouses on the property.

Hawaii Administrative Rules, Chapter 11-62, Wastewater Systems, section 11-62-31.1(2)(B) states that for developments involving buildings other than dwellings, the total wastewater flow of the development shall not exceed 15,000 gallons per day. Based on the information provided in the document, it appears that the wastewater flow for the entire development may exceed 15,000 gallons per day. The installation of septic tank systems may not be allowed once design flows exceed 15,000 gallons per day. In other words, we cannot approve more than fifteen (15) IWSs designed at 1,000 gallons per day for the entire development. This number will include any existing septic tank systems and cesspools that are currently installed at the development site. A wastewater treatment plant may be required to be installed to handle the additional flows generated from the development.

Please provide our office with an inventory of the existing cesspools and septic tank systems located on the subject property. The information should include all of the businesses that the IWSs are currently serving and the estimated wastewater flows being discharged into each of the IWSs. A plot plan of the existing warehouses and locations of all existing IWSs should also be provided. Existing Cesspool Information Forms should be filled out and submitted to our office for documentation of all existing cesspools. As-built drawings of all existing septic tank systems should also be submitted. An Existing Cesspool Information Form is attached for your use. For the new proposed development, please provide the design calculations for the projected wastewater flows.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294 or fax to 586-4300.

Sincerely,

MARSHALL LUM, P.E., ACTING CHIEF
Wastewater Branch

LM:lmj

Attachment

c: DOH's Environmental Planning Office (EPO 11-006)
Mr. Mike Watkins, C&C of Honolulu, Dept. of Planning & Permitting

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.5

Mr. Marshall Lum, Acting Chief
State of Hawaii, Department of Health, Wastewater Branch
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated February 22, 2011
Reference LUD 1 4 2 015 001-ID607 DEIS Kapa'a Light Industrial Park

Dear Mr. Lum,

Thank you for your comments in your subject letter.

We offer the following responses to your comments and recommendations:

In the follow-up meeting to your letter at the Department of Health – Wastewater Branch (DoH-WWB) office on March 24, 2011, the following comments were discussed with you staff and the following conclusions were reached:

1. We confirm the DoH-WWB statement that the site is not connected to the City and County of Honolulu sewer service systems, and that there are existing warehouses on the property, which have individual wastewater systems (IWS).

2. DoH-WWB indicated that the 15,000 gallon per day limit of total wastewater flow, stated in the letter dated February 22, 2011, applies to one land parcel only. The proposed site, however, will have structures on three land parcels (e.g. TMK 4-2-15:001 (portion of), 006 and 008). Therefore the overall limit for the three parcels would be 45,000 gallons per day (e.g. 3 x 15,000 gpd) of total wastewater flow.

3. The anticipated wastewater flow will be significantly less than the 45,000 gpd limit flow rate and will therefore remain well under the limits. Therefore, the applicant will be able to use less than the allowable maximum of 15 IWSs on each land parcel to treat the wastewater from both the existing and the proposed industrial development.

4. As we indicated to you, the applicant will use water saving fixtures (i.e. such fixtures that comply with the EPA WaterSense requirements) in order to lower the water consumption in the buildings, which will result in lower wastewater volumes to be disposed of through the individual wastewater systems (IWS). The limit of daily wastewater flow into individual IWSs is 1,000 gpd as stated in the applicable State regulations.

5. Based on the information presented in our concept design of the proposed site (described in the DEIS) and discussed at the meeting, DoH-WWB would accept an “alternative” onsite wastewater treatment system in the lower portion of the proposed site that would include alternative septic system components. The objectives of using an “alternative septic system” is to significantly improve the effluent quality of the septic tanks by adding additional aerobic, filtration and denitrification treatment processes (e.g., significant reductions in BoD, nutrient, coliform bacteria, and TSS) before the effluent is released into an underground injection field or used in irrigation. The proposed concept design for the development in the lower portion of the site considers underground irrigation methods, in accordance with applicable State regulations of gray water and treated wastewater disposal in Hawaii.

6. DoH-WWB will be receiving documentation (including as-built drawings) of existing cesspools and septic tank systems located at the three parcels, as requested in subject letter.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GEORGE "KEOKI" MIYAMOTO
ACTING DIRECTOR

IN REPLY REFER TO:
DRM 11-117

Letter No.6

February 24, 2011

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement (DEIS)
Kapaa Light Industrial Park, Kailua, Oahu, Hawaii

Thank you for the opportunity to review and comment on the DEIS dated January 2011 for the proposed Kapaa Light Industrial Park project.

The majority of the proposed improvements will be located within privately-owned property and will have negligible impact on our facilities and operations.

It is our understanding that the proposed on-site project roadways, parking areas, drainage system, storm water detention basins and other roadway improvements will be privately owned and maintained and will not be dedicated to the City.

Should you have any questions, please call Charles Pignataro of the Division of Road Maintenance, at 768-3697.

Sincerely,

George "Keoki" Miyamoto
Acting Director

c: Department of Planning and Permitting – (Attn: Mike Watkins)

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.6

Mr. George Miyamoto, Deputy Director
Dept. of Facility Maintenance, City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, HI 96707

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated February 24, 2011
Reference DRM 11-117

Dear Mr. Miyamoto,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

We confirm that the majority of the proposed improvements will be located within privately owned land and will be privately owned and maintained. Furthermore, we confirm that the proposed on-site roadways, parking areas, drainage systems, stormwater detention basins and other roadway improvements will be privately owned and maintained and will not be dedicated to the City and County.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

March 7, 2011

Regulatory Branch

File Number POH-2010-00186

Letter No.7

Sustainable Design & Consulting, LLC
Attention: Dr. Manfred Zapka
Post Office Box 283267
Honolulu, Hawaii 96828

NO PERMIT REQUIRED

Dear Dr. Zapka:

We have received your letter dated January 24, 2011 requesting Department of the Army (DA) review and comment on the Draft Environmental Impact Statement (DEIS) for activities to develop the proposed Kapaa Light Industrial Park at TMKs (1) 4-2-015:008, 001 (portion) & 006 (por.) in Kailua, Island of Oahu, Hawaii.

We have completed our review of the submitted document pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404) and have determined the submitted documents accurately identify waters of the U.S., subject to U.S. Army Corps of Engineers (Corps) jurisdiction.

For your information, Section 10 requires that a DA permit be obtained from the Corps prior to undertaking any construction, dredging, or other activity occurring in, over, or under or affecting navigable waters of the U.S. For tidal waters, the shoreward limit of the Corps' jurisdiction extends to the Mean High Water Mark. Section 404 requires that a DA permit be obtained for the discharge (placement) of dredged and/or fill material into waters of the U.S., including wetlands. For tidally influenced waters, in the absence of adjacent wetlands, the shoreward limit of the Corps' jurisdiction extends to the High Tide Line, which in Hawai'i may be approximated by reference to the Mean Higher High Water Mark. For non-tidal waters, the lateral limits of the Corps' jurisdiction extend to the Ordinary High Water Mark or the approved delineated boundary of any adjacent wetlands.

The Kapaa Stream, with end terminus in Kailua Bay (a navigable water), including all adjacent wetlands are as such, waters of the U.S. under the regulatory jurisdiction of the Corps. Based on the information submitted in the DEIS, it appears these waters of the U.S. are not located within the limits of the proposed project boundary for development. We anticipate construction associated with **the proposed development and expansion of the industrial park will not result in the discharge of fill material into waters of the U.S. therefore, a DA permit will not be required.** We advise your client consult with this office prior to undertaking any other construction resulting in the discharge of fill material waterward of the Ordinary High Water Mark of the Kapaa Stream or the below the delineated boundaries of the adjacent wetlands. This determination does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Thank you for contacting us regarding this project and providing us with the opportunity to comment. Should you have any questions, please contact Ms. Jessie Pa'ahana at *808.438.0391* or via e-mail at *Jessie.K.Paahana@usace.army.mil*. You are encouraged to provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

for George P. Young, P.E.
Chief, Regulatory Branch

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.7

Mr. George P. Young, P.E., Chief, Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 7, 2011
Reference Your File Number: POH-2010-00186

Dear Mr. Young,

Thank you for your comments in your subject letter.

We offer the following responses to your comments and recommendations:

- We appreciate your concurrence that our documents have accurately identified water of the U.S., subject to the U.S. Army Corps of Engineers jurisdiction.
- We confirm that waters of the U.S., as identified in your letter, are not located within the limits of the proposed development.
- We will advise the applicant to consult with your office prior of undertaking any construction resulting in the discharge of fill material waterwards of the ordinary high water mark of Kapa'a Stream or below the delineated boundaries of adjacent wetlands.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

KAILUA NEIGHBORHOOD BOARD NO. 31

519 WANAAO ROAD • KAILUA, HAWAII 96734
PHONE (808) 768-3710 • FAX (808) 768-3711 • INTERNET: http://www.honolulu.gov
prentissc001@hawaii.rr.com.

March 12, 2011

Letter No.8

Mr. Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P O Box 283267
Honolulu, Hawaii 96828

Subject: Draft Environmental Impact Statement
Kapa`a Light Industrial park in Kailua

At the March 3, 2011 Kailua Neighborhood Board meeting the Board approved the following comments on the DEIS.

1. The drainage canal next to the quarry road will be the receiving area for runoff from the industrial park. That canal currently overflows in moderate rain events and during heavy rain Kapa`a Quarry Road is closed due to flooding. To what size will the canal be enlarged to accommodate the new flow from the rooftops and the increased impervious surfaces, as well as the existing deficiency in water storage capacity?
2. The DEIS did not discuss the possibility of the industrial park, proposed and existing, hooking up to the municipal wastewater system. Given the impaired condition of Kapa`a Stream, flooding conditions along Kapa`a Quarry Road and close proximity to Kawainui Marsh, ***a RAMSAR Wetland of International Importance and home to four endangered water birds***, discussion is needed on that alternative. This information must be provided in the FEIS.
3. The DEIS was deficient in its discussion on to what extent the proposed sewage system will remove contaminants including industrial waste. This must be discussed in the FEIS.
4. The DEIS section on view plans did not include the primary views from the H-3 Freeway and other view planes in Kailua. This must be contained in the FEIS.
5. The explanation that the LEED certification is only being sought for the lower 44-acre parcel and not the upper 11-acre parcel because of expenses and paperwork ignores the cumulative impact of the *entire* industrial park, existing and proposed on Kapa`a Stream and Kawainui Marsh. The FEIS must explain, other than costs, why LEED certification cannot be sought for the entire development.
6. The DEIS was silent on re-use of wastewater for the upper portion. Why wasn't water reuse discussed and evaluated for the upper portion of the site?

7. The DEIS states that a more detailed drainage study will be performed to determine the best method of water quality improvements for the upper portion of the site. Why wasn't that study conducted for this DEIS? If this DEIS is accepted will a supplemental EIS be required once such a study is completed?
8. The DEIS did not discuss the possibility of treating and reusing all storm water on site at both the upper and lower parcels instead of discharging into Kapa`a Stream and canal. Could all on-site storm water (both upper and lower) be treated and reused on site?
9. Currently Kapa`a Quarry Road does not have any bicycle lanes or road shoulders for bicyclists to safely ride on. So is it appropriate for the applicant to claim LEED points for on-site bicycle facilities for something that may or may not happen?
10. Kapa`a Quarry Road is already heavily used by heavy trucks going to and from the quarry, transfer station and the existing industrial park. It was recently mentioned that trucks loaded with blue rock from the Kailua/Kaneohe Wastewater Conveyance and Treatment Facilities tunnel through Oneawa Hill would take the rock to the Quarry. The DEIS is silent on the impact of additional heavy trucks on the Kapa`a Quarry Road in general and specifically on the slowly sinking area next to the canal and just below the proposed expansion.
11. Other than traffic counts why wasn't a study conducted on the safety, condition and stability of Kapa`a Quarry Road fronting the project? This information must be in the FEIS.
12. Why wasn't a study conducted on the cumulative impacts from the additional 600 employees by 2026, the estimated visitors to industrial businesses and all users of the road on Kawainui Marsh and the canal? This seems essential and relatively easy since the applicant John King owns the canal and that portion of the road?
13. Kawainui Marsh is already overwhelmed with runoff and leaching from the old landfill (model airplane field) in the marsh, the current landfill at the transfer station, the old landfill next the quarry road (built to capture contaminates), the Quarry, runoff from Kapa`a Quarry Road and H-3 and the existing 27.3 acre industrial park. Yet, the city has not monitored migration of ground water into the marsh since 2000 for toxic matter and whether there have been acute/chronic impacts upon the health and safety of the public, wild life and the environment.
14. Before this DEIS is accepted the applicant should install and pay for monitoring wells mauka of the canal and have government approved mitigation plans in place to prevent contaminants from reaching Kawainui Marsh and Kapa`a Stream. Since all water in Kawainui eventually migrates into Kailua Bay this data and action plan(s) is needed to protect human health, wildlife, Kawainui Marsh and the environment.
15. The DEIS does not evaluate the cumulative impacts of increased impervious surfaces, increased erosion, construction and dewatering activities over a 18 year period, increased deposit of storm and wastewater into Kapa`a Stream and Kawainui Marsh, cumulative visual impacts as industrial warehouses are added, or cumulative impacts from additional cars and trucks as workers and visitors go to the expanded industrial park. To state 'there are no other major projects planned in the vicinity and therefore there should be no significant cumulative impacts' is not sufficient. All the above mentioned impacts must be evaluated for their cumulative effects on air quality, traffic, view planes, Kawainui Marsh and Kapa`a Stream and mitigation in place before this DEIS can be accepted.
16. The DEIS did not adequately address single and cumulative impacts how dust created by earth moving equipment over 15 to 18 years, day-to-day fumes from paint, varnish, aerosol sprays and other solvents used in industrial and commercial activities will be prevented from

migrating into Kapa`a Stream and Kawainui Marsh. The applicant should have put in several air monitoring stations near Kapa`a Stream and Kawainui Marsh to understand how and to where toxic substances will travel. These monitoring stations must be in place, data evaluated and mitigation plans in place before this DEIS can be accepted.

17. The DEIS did not address the load-supporting capacity of either site especially the lower portion which is predominately landfill material. A load bearing study must be completed and evaluated before this DEIS can be accepted.
18. The DEIS does not identify the location of the leaching fields associated with the septic tanks or the capacity of each. This information must be in the FEIS and the sites evaluated for impacts on Kapa`a Stream and Kawainui Marsh.
19. The DEIS failed to conduct a thorough on-site aquatic resource survey describing wetlands, drainage ditches, gulches, gullies and streams and anticipated impacts from project components. This survey must be conducted before the DEIS is accepted.

Charles Prentiss

Charles A. Prentiss, Ph.D
Chairperson

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.8

Dr. Charles A. Prentiss, Chairperson
Kailua Neighborhood Board No. 31
519 Wanaao Road
Kailua, Hawaii 96734

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 12, 2011

Dear Dr. Prentiss,

We thank you for your subject letter in which you provided us with your comments on the Draft Environmental Impact Statement.

Our responses to your comments and recommendations are presented in the list starting on page two of this letter. For your convenience and ease of review we quote your specific questions followed by our responses.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

Question 1. *The drainage canal next to the quarry road will be the receiving area for runoff from the industrial park. That canal currently overflows in moderate rain events and during heavy rain Kapa'a Quarry Road is closed due to flooding. To what size will the canal be enlarged to accommodate the new flow from the rooftops and the increased impervious surfaces, as well as the existing deficiency in water storage capacity?*

Answer to question 1. There are currently no plans to change the dimensions of the canal. Under the proposed design for the lower portion of the project site, e.g., the portion of the project that is adjacent to the drainage canal, the canal remains outside the development site boundary of the project. Therefore the geometry of the canal will not be altered, except for some minor construction to install the new stormwater release pipe or swale.

At present the canal receives seepage from the upper areas (e.g. the lower portion of the site) as well as some volume of surface runoff from the adjacent roadways either as subsurface infiltration or surface flow, respectively. This drainage situation is delineated in the watershed hydrological model developed and analyzed by the DoH (DoH 2007) as well as from qualitative onsite observation.

Under the Preferred Alternative less water would be flowing into the drainage canal during moderate or heavy rain events. During moderate rain events a significant portion of the rainwater would be harvested from the rooftops and sections of impermeable roads and stored in below ground cisterns to be used for irrigation on approximately eight acres of restored habitat that surrounds the development footprint of the lower portion of the site as well as inside the development. Therefore a significant portion of the precipitation would be applied to vegetated areas, and water would also be lost through evapotranspiration.

At the present time, the highly pervious gravel surface of the landfill area results in rapid infiltration of a larger portion of precipitation and little is lost to evaporation. Under the proposed drainage systems a detention pond would be installed to reduce high discharge flow rates and release stormwater over a period of 24 to 48 hours after the rain event. This structural BMP would alleviate flooding of the canal and related impacts to the quarry road. In heavy rain events water flow in the Kapa'a Stream increases many times above the base flow rate, resulting, at times, in flooding of the areas close to the culvert under the quarry road. The proposed stormwater management system would alleviate the flood occurrence resulting from typical rain events, flooding of the lower sections of the Kapa'a Stream can be attributed to heavy rain events when high discharge resulting from the entire watershed hydrology and not only to the proposed site requires appropriate discharge into the adjacent wetland area.

While the proposed drainage system of the preferred alternative would alleviate the currently observed flood events in the vicinity of the drainage canal there might be measures to alleviate flooding even more by modifying the canal in the confluence of the canal with the Kapa'a Stream. It has been observed that the canal bed contains significant deposits just upstream of the confluence that impede discharge of water from the canal to the Kapa'a Stream.

Alterations of the any stream bed in the vicinity of the proposed site, including the drainage canal, are not intended or anticipated within the scope of the propose project.

Question 2. *The DEIS did not discuss the possibility of the industrial park, proposed and existing, hooking up to the municipal wastewater system. Given the impaired condition of Kapa'a Stream, flooding conditions along Kapa'a Quarry Road and close proximity to Kawainui Marsh, a RAMSAR Wetland of International Importance and home to four endangered water birds, discussion is needed on that alternative. This information must be provided in the FEIS.*

Answer to question 2. The FEIS includes a discussion of why onsite wastewater treatment is preferred. The possibility of a forced sewer that conveys wastewater from the proposed site to the municipal wastewater treatment plant was initially considered but not pursued further, since on-site wastewater treatment was found to result in no significant impacts. The selected onsite wastewater treatment technologies selected are especially environmentally friendly since they are part of a comprehensive water management approach of the sustainable design for the proposed project. With regard to wastewater treatment, the preferred alternative uses a comprehensive wastewater management approach as part of the LEED Silver certification plan that comprises the use of non-potable water for sewage conveyance and the onsite infiltration of all reclaimed wastewater.

The Preferred Alternative includes the use of a septic tank effluent pumping (STEP) system in the lower portion of the proposed project site to convey the effluent of approximately 8 to 10 septic tanks near individual warehouses to two to more alternative septic systems, which would be located at the perimeter of the development footprint. These alternative septic systems would feature advanced wastewater treatment process consisting of recirculating sand filters to treat the septic tank effluent using aerobic decomposition, filtration and adsorption processes. An alternative septic system would also include an anaerobic pump well that receives the effluent from all connected septic tanks as well as the discharge of the recirculating sand filters. Since the pump well has sufficient organics (from the effluent of the septic tanks) as well as sufficiently nitrification of the effluent in the upstream sand filter, the pump well can functions as an effective denitrification process chamber. The alternative septic systems would thus remove significantly more nutrients than can be achieved in regular septic systems. Most of the wastewater in the alternative septic systems is circulated over the sand filter and a small portion of the circulating wastewater is continuously withdrawn from the systems and is discharged to below ground irrigation areas. As described in the FEIS, the effectiveness of removal of BoD, TSS and nutrients in the alternative septic systems is sufficient to ensure safe infiltration and subsequent release to the adjacent receiving waters (e.g. Kapa'a Stream and wetland areas). The FEIS elaborates on the high achievable removal rates for the indicated pollutants of such systems, which are confirmed by the EPA (see EIs for references).

The alternative of a forced wastewater main serving the proposed project would pump raw sewage to the municipal sewer system. At the point of injection into the municipal sewer systems, the wastewater from the proposed development would represent a significant point source of most likely anaerobic wastewater volumes. The forced wastewater main would require a significant amount of energy during operation and would deprive the area at the site of a significant volume of reclaimed wastewater for irrigation purposes. The onsite wastewater treatment and usage of reclaimed wastewater on-site can be considered as the preferred solution to treat the wastewater from the proposed development in an environmentally responsible way.

Therefore the alternative of a forced main from the proposed site to the closest or most appropriate take-over-point (TOP) of the municipal system is not selected.

Question 3. *The DEIS was deficient In Its discussion on to what extent the proposed sewage system will remove contaminants including industrial waste. This must be discussed in the FEIS.*

Answer to question 3. The type of wastewater that will be admitted into the on-site wastewater system will be wastewater suited for typical septic systems; e.g. building occupants will be advised not to discharge harmful agents and objects that could clog the septic system. As is presently the established procedure in the existing warehouse development, tenants are required to discharge wastewater containing harmful substance in an environmentally and occupationally safe way. For example, waste water, which contains waste oil or grease (e.g. from motor washing or car maintenance areas) needs to be collected in a receiving and storage tank that has effective oil separation capabilities, before the treated water can be safely discharged while the separated oil and grease is separately disposed of.

Question 4. *The DEIS section on view plans did not include the primary views from the H-3 Freeway and other view planes in Kailua. This must be contained in the FEIS.*

Answer to question 4. A comprehensive visual impact analysis is provided in Appendix 8 of the DEIS. The visual impact analysis presents an assessment of primary views from the H-3 and other view planes in Kailua. The assessment uses eight prominent view planes at roads, public places and two Heiaus to conduct a thorough analysis of visual impacts from the proposed development. The visual impact assessment of the FEIS was appended to incorporate one additional viewplane from the trail along the flood control levee. The appended visual impact analysis report is presented in the FEIS.

Question 5. *The explanation that the LEED certification is only being sought for the lower 44-acre parcel and not the upper 1-acre parcel because of expenses and paperwork ignores the cumulative impact of the entire industrial park, existing and proposed on Kapa'a Stream and Kawainui Marsh. The FEIS must explain, other than costs, why LEED certification cannot be sought for the entire development.*

Answer to question 5. The primary objective of the applicant is to concentrate the implementation of sustainable building and site development to the lower portion of the site which is directly adjacent to environmentally sensitive areas, such as the Kawainui Marsh and the designated wetland area in the Kapa'a Stream corridor. The LEED certification approach of the project has two key objectives:

> Objective 1: To develop and implement an integrated systems approach of low impact development technologies to mitigate those impacts of the proposed project that need foremost impact mitigation. At the top of the list of impacts are water related impacts, due to the close proximity to the marsh and wetland areas; followed by other impacts such as

reduction of light pollution and reduction of traffic through fostering alternative modes of transportation. The proposed sustainable design approach of the proposed project that will satisfy the requirement for LEED Silver certification has therefore strategically selected low impact development measures for optimized impact mitigation.

Objective 2: The LEED certification goal of “Silver” is a significant commitment of the applicant to develop in a way that supports the “Triple Bottom Line”, which is to optimize and balance benefits to the environment, the community and the economy. With committing to developing the site according to LEED Silver certification requirements the applicant is pursuing a third party review of design and construction that the targeted impact mitigation strategy is indeed implemented. Thus, the community can rely on more than verbal commitment of “developing green”, to make sure that the project will indeed be developed in accordance to low impact development goals.

Under LEED certification standards the applicant can choose which credit categories will be used to arrive at the required number of credit points for the LEED Silver certification. As mentioned earlier, the choice of credit points in the LEED certification strategy of the proposed project, however, concentrates on those credit points which will result in the mitigation of impacts that are most important for the adjacent wetland and marsh areas. For the lower portion of the proposed site, the most immediate and important impacts to the marsh are water related. Mitigating water related impacts in the lower portion of the site requires using more advanced green building and site development technologies and methods than the upper portion of the site. This is due to the following facts:

- The vertical and horizontal distance from the point of injection of the septic leach fields to saturated or impermeable soil layers and the receiving waters, respectively, is significantly larger in the upper portion. In the lower portion of the site the vertical and horizontal distances are smaller and therefore removal rates of pollutants in the septic tank effluent must be thoroughly treated by effective mitigation before the wastewater is released into the soil. The advanced septic systems of the on-site wastewater treatment systems in the lower portion of the site will ensure that risks of contamination by organic pollutants, suspended solids and nutrient in the effluent will be effectively mitigated.
- As part of the sustainable design approach of the development footprint within the lower portion of the proposed site will be surrounded by several acres of open land that will be upgraded to

restored habitat conditions by using native or adapted plants. Irrigation of selected parts of the restored habitat areas will either use harvested rainwater, gray water or reclaimed wastewater. The gray water and reclaimed wastewater (e.g. effluent from the alternative septic systems) will be used in below ground irrigation systems. This larger area of open land is not available at the boundaries of the development footprint of the upper portion of the proposed site.

- The close proximity of the lower portion of the proposed site to the marsh requires highly effective systems of stormwater treatment and both structural and non-structural BMPs will be used to enhance quantitative and qualitative quality of the stormwater discharge from the site.

In addition to the water related impact mitigation measures, the sustainable design approach and the LEED certification strategy of the development has selected other credits that will significantly reduce impacts to the marsh and community. These selected credit categories include reduction of light pollution to reduce impacts on the bird population and the night sky quality, avoiding building and cleaning materials that contain harmful agents, strict avoidance of any littering and implementing a comprehensive recycling program, and promoting the use of low emitting vehicles and carpools to lower traffic impact.

The applicant is not opposed to developing the entire park to LEED certification requirements. The intended design approach will use measures of low impact design and construction whether LEED certification will be sought for the upper portion of the site or not. Designing the upper portion of the site in accordance to the requirements of LEED certification would not include the same impact mitigation strategy as used in the lower portion of the site. The upper portion of the site could however be designed “green” and be eligible for LEED certification without the need for a verifiable mitigation strategy through a LEED certification. The applicant will determine what low impact development measures and technologies will be used for the final design.

Question 6. *The DEIS was silent on re-use of wastewater for the upper portion. Why wasn't water reuse discussed and evaluated for the upper portion of the site?*

Answer to question 6. There are several reasons why re-use of wastewater is not considered in the upper portion of the site, such as:

- The distance between injection point and water table in the upper portion is sufficiently large to ensure that a thorough treatment of the septic tank effluent occurs within the leach fields of the upper portion of the site. Therefore conventional septic systems will be sufficient to remove pollutants from the wastewater.
- The upper portion of the site lacks surrounding vegetated areas that could be used for controlled below-ground irrigation. The lower portion of the site, on the other side, will have about 10 acres of restored habitat and open space, including vegetative buffer zones, in which the discharge from the alternative septic systems will be distributed through below ground irrigation and disposal.

The alternative septic systems that treat the wastewater in the lower portion of the site are part of the sustainable design approach and exemplary performance credit is sought under the LEED Silver certification approach for the lower portion of the site.

Question 7. *The DEIS states that a more detailed drainage study will be performed to determine the best method of water quality improvements for the upper portion of the site. Why wasn't that study conducted for this DEIS? If this DEIS is accepted will a supplemental EIS be required once such a study is completed?*

Answer to question 7. The current stormwater management approach will result in a comprehensive treatment of stromwater discharges from the lower and upper portions of the site. Assessments in the DEIS have concluded that stormwater discharges from the future development will be lower than the quantity and quality of stormwater discharge of the present conditions.

The final drainage system will depend on the final layout of the industrial park and might have slight modifications relative to the stormwater management system proposed in the DEIS. Final site drainage systems that deviate from the proposed system that is presented in the DEIS will be assessed in regard to their efficiency of removing pollutants and shaving off high peak discharge rates. When it can be shown, by analysis, that drainage systems which are different from the drainage systems design proposed in the DEIS will result in lower impacts to the environment then no supplemental EIS will be required.

An updated project Masterplan will be developed for the zone change request. This updated Masterplan will contain a revised layout of the proposed project and a revised drainage plan. Some parts of the drainage systems have been changed from the original design concept, which is presented in the FEIS, since several low impact development features have been added. An example is the design update to place basins for stormwater detention and rainwater catchment below-ground detention ponds to avoid attraction of endangered water birds to the project site. The updated Masterplan is listed under unresolved issues in the FEIS.

Question 8. *The DEIS did not discuss the possibility of treating and reusing all storm water onsite at both the upper and lower parcels instead of discharging into Kapa'a Stream and canal. Could all on-site storm water (both upper and lower) be treated and reused on Site?*

Answer to question 8. Under the present design of the proposed light industrial park stormwater would not be reused in the upper portion to the same extent as panned for the lower portion. The applicant has, however, not ruled out to capture and use rainwater within the upper portion of the site and use the water for certain applications, such as sewage conveyance, custodial use, and small area irrigation.

If the need for irrigation of the lower portion of the site proves to be larger than can be provided by rainwater harvesting from warehouse roofs and sections of the roads in the lower portion of the site, then rainwater might also be harvested on roofs in the upper portion of the site and conveyed to application points in the restored habitat surrounding the lower portion. One area that would benefit from harvesting rainwater in the upper portion of the site would be the area between the upper and lower portion of the site, which contains the steep area that will be converted to restored habitat. A decision about these possible design changes of the drainage systems will be made in the final design phase.

Question 9. *Currently Kapa'a Quarry Road does not have any bicycle lanes or road shoulders for bicyclists to safely ride on. So is it appropriate for the applicant to claim LEED points or on-site bicycle facilities for something that may or may not happen?*

Answer to question 9. The LEED certification approach considers a range of alternative transportation strategies, including promoting the use of bicycles to commute and visit the proposed site. Measures to promote bicycle use would include providing a bicycle friendly infrastructure within the proposed warehouse development with secure bike racks and shower facilities, as required under the attempted LEED credit.

Long term plans in the Koolaupoko Sustainability Plan call for promoting the use of bicycles and the proposed project is supporting this goal for alternative transportation in the region. Therefore it is a prudent design approach to foster the implementation of a wide range of alternative transportation mode and incentives.

As you indicate in your letter, there is “bicycle unfriendly” situation along the quarry road. The applicant agrees to that the situation for bikers along the quarry road and around the marsh needs to be improved.

One promising way of providing a safe and attractive bike way would be the construction of the proposed marsh perimeter pathway, which could be used by bicyclists to reach the proposed site in a safe manner. The masterplan of the proposed marsh perimeter path suggests that about 1,300 feet of this path would be situation over the property of the applicant. The applicant has indicated that he would provide easement and/or donate land for the construction of the marsh perimeter pathway in this section. This section of the proposed perimeter pathway alignment is directly adjacent to the proposed site and on land that is currently occupied by the drainage canal. The drainage canal could be modified (i.e. partially or total filled) to allow installation of the bikeway and/or a widening of the quarry road in this section. There are no current plans existing that would alter the drainage canal and any alternatives of the drainage canal would have to occur under a separate project.

Question 10. *Kapa'a Quarry Road is already heavily used by heavy trucks going to and from the quarry, transfer station and the existing industrial park. It was recently mentioned that trucks loaded with blue rock from the Kailua/Kaneohe Wastewater Conveyance and Treatment facilities tunnel through Oneawa Hill would take the rock to the Quarry. The DEIS is silent on the impact of additional heavy trucks on the Kapa'a Quarry Road in general and specifically on the slowly sinking area next to the canal and just below the proposed expansion.*

Answer to question 10. The TIAR indicates the predicted increase of heavy truck traffic and the resulting impacts on the quarry road. The FEIS also evaluates the impact of increased traffic with regard to of noise and air pollution. Heavy truck traffic impacts created by other possible future projects that would affect the level of service on the streets adjacent to the proposed project are discussed under cumulative impacts in the FEIS (see the newly added Chapter Six in the FEIS).

In regard to your specific questions:

<u>Possibility of taking spoil of the Kaneohe/Kailua Wastewater Conveyance and Treatment project to the quarry:</u> While it is not yet definitely decided what alternative route will be used for the Kaneohe/Kailua Wastewater Conveyance and Treatment project, the gravity tunnel through Oneawa Hills would produce more spoil that has to transported and removed from the construction sites in Kaneohe and Kailua. Based upon communication with and publication by the County Department of Transportation Services (e.g. FEIS for the Kaneohe-Kailua Sewage Conveyance Facility) it is unlikely that muck and spoil of the tunnel construction would be transported to any facility or land within the Kapa’a Valley. The spoil and muck from the construction of the tunnel represent useful construction material and fill material that could be sold or given away by the contractor. At the present it appears that the likely use of spoil and muck would be for the Waimanalo Gulch Sanitary Landfill. The transport of the material to this end use destination would be over the H3-Freeway and would not directly affect the quarry road and its two intersections at Kalanianaole Highway and Mokapu Boulevard.

<u>Allegedly sinking area of quarry road next to the canal:</u> Communication with the City and County indicates that the referred to road segment is structurally stable after a restoration in the 1980s. At that time fill was placed into the drainage canal which slightly widened the road and

P.O. Box 283267, Honolulu, Hawaii 96828, USA   Tel: 808-265-6321   email:sustainabledc@gmail.com   www.sustain-HI.com

provided shoulder area as well as provided more lateral stability of the road base course body. The FEIS concludes that there are no current stability problems of the sections of the road that are next to the drainage canal.

Question 11. *Other than traffic counts, why wasn't a study conducted on the safety, condition and stability of Kapa'a Quarry Road fronting the project? This information must be in the FEIS*

Answer to question 11. A traffic count was conducted as a required project task of a comprehensive traffic impact analysis report (TIAR) study in order to determine the present traffic conditions at the roads adjacent to the proposed site and at intersections that would be affected by the proposed development. The traffic count was then used to establish the existing (baseline) traffic conditions for both cars and light trucks as well as for heavy trucks and quantify and qualify the traffic generated by the existing warehouse development.

Future traffic volumes were assessed by a process that uses trip generation rates for the intended land use (e.g. warehouse operations) for the proposed project. This process calculates anticipated future project generated traffic volumes by applying a unit factor of traffic volume rates per unit of space with the planned space. Another part of future traffic is the background traffic, this means the traffic that would be present without the proposed project and which develops independently of the project. The background traffic is expected to grow at a certain rate per year in the coming decades; these growth rate assumptions are referenced in the TIAR. The overall expected traffic volume in the future is a superposition of the anticipated future background traffic and the traffic generated by the proposed project.

The results of the TIAR showed that the level of service (LOS) on the affected roads would not fall below LOS D. In fact the roads remain at a higher LOS at the time of full built. This suggests that, on the basis of traffic volume, the traffic conditions on the roads adjacent would not be expected deteriorate below unsatisfactory conditions. The result of the TIAR for the three intersections, which would be affected by the proposed projects, showed that some form of traffic impact mitigation measure would be recommended, such as additional right or left turn and deceleration lanes, by the time of full build.

The TIAR delineates the expected traffic conditions for two different times during the development of the proposed project. These two points in time, which are major project development milestones, are represented by (1) the completion of the development in the upper portion of the proposed site (around 2016) and (2) the completion of the lower portion of the site, which is also the completion of the entire project (around 2026). This timeline of anticipated development milestones is based on the anticipated absorption rate of the newly developed industrial space of the proposed project.

The TIAR recommends that a new, updated TIAR be conducted after the anticipated completion of the milestone (1), e.g. completion of the upper portion of the site, in order to refine the predictions for the traffic conditions at time of full build out and use actual traffic development from the present to milestone (1) to revise the traffic trip generation rates and the actual growth in background traffic.

The TIAR anticipates that no mitigation measures will be required before the completion of milestone (1), e.g. completion of the upper portion of the site. The TIAR suggests some possible traffic mitigation measures for the time of full build, but these traffic mitigation measures are only for illustration since the new TIAR would conclude and propose traffic mitigation measures at a later stage.

The State Department of Transportation has requested a revised TIAR to be submitted as part of the zone change permit application. The revised TIAR will be developed using the updated design information in the updated Masterplan for the zone change permit application. In addition to the LOS-based analysis in the TIAR an analysis of the current traffic problems on the quarry road will be conducted as part of the updated Masterplan. The completion of the revised TIAR and the analysis of road problems are described in the section “unresolved issues” in the FEIS.

Question 12. *Why wasn't a study conducted on the cumulative impacts from the additional 600 employees by 2026, the estimated visitors to industrial businesses and all users of the road on Kawainui Marsh and the canal? This seems essential and relatively easy since the applicant John King owns the canal and that portion of the road?*

Answer to question 12. The DEIS has evaluated and assessed impacts from increased employment in the proposed light industrial development. Impacts on the region from the new residents moving into the region as a result of new employment in the proposed light industrial park could include impacts on public services.

New demographic data (submitted by DPP) suggests that the Koolaupoko region is expected to have very little population change in the next 20 years (e.g. 2010 through 2030) when compared with other areas of Oahu (please refer to Section Three of the FEIS). It is estimated that the number of residents in the region will decrease by about 1,000 residents, due to lower birth rates, higher death rates and out-migration from the region. Based on the market study and a survey of existing employment characteristics an analysis in the EIS indicates that a maximum of 260 new and out-of-the-region employees would find work in the proposed light industrial park. Of these 260 future employees only a fraction is expected to move into the region. Based on these predicted population changes it can be deduced that the project related in-migration of residents into the Koolaupoko region would not result in a significant changes in population, in fact given the project alone there would still be a decrease in population numbers. It is therefore not expected that the project would have significant impacts on the quality and availability of public service in the region.

An assessment of cumulative impacts is presented in the FEIS.

Question 13. *Kawainui Marsh is already overwhelmed with runoff and leaching from the old landfill (model airplane field) in the marsh, the current landfill at the transfer station, the landfill next the quarry road (built to capture contaminates), the Quarry, runoff from Kapa'a Quarry Road and H-3 and the existing 27.3 acre industrial park. Yet, the city has not monitored migration of ground water into the marsh since 2000 for toxic matter and whether there have been acute/chronic impacts upon the health and safety of the public, wild life and the environment.*

Answer to question 13. The comprehensive stormwater drainage approach of the proposed project, which is part of the sustainable design approach, will decrease impacts and not increase impacts on the receiving waters. Decreasing impacts from the proposed site will decrease the overall watershed impacts on the Kapa'a Stream and consequently the Kawainui Marsh. The pertinent analyses in the EIS are based on the water quality model in the 2007 TDML study of the DoH (DoH, 2007).

Question 14. *Before this DEIS is accepted the applicant should install and pay for monitoring wells mauka of the canal and have government approved mitigation plans in place to prevent contaminants from reaching Kawainui Marsh and Kapa'a Stream. Since all water in Kawainui eventually migrates into Kailua Bay this data and action plan(s) is needed to protect human health, wildlife, Kawainui Marsh and the environment.*

Answer to question 14. We have been in communication with the DoH wastewater branch and our on-site wastewater treatment approach has been approved. The selected septic system with septic tank eluent pumping (STEP) systems and centralized alternative septic system treatment will significantly remove harmful components of the wastewater onsite. The comprehensive stormwater approach will effectively mitigate impacts and will reduce rather than increase runoff loading for TSS, nutrients, and other pollutants. Under the new drainage system, less stormwater will infiltrate into the ground and therefore less water will migrate towards the Kawainui Marsh. As a result of the of the sustainable design approach a significant part of the stormwater will not infiltrate in the 23 acres landfill area (the area which is the lower portion of the proposed site) but will be diverted to effective stromwater treatment and rainwater harvesting with subsequent irrigation and loss of stormwater through evapotranspiration.

The applicant will work with the DoH or other agencies if the installation of monitoring wells will be a requirement of applicable permits. Your request to install monitoring wells is also discussed in the section “unresolved issues” of the FEIS.

Question 15. *The DEIS does not evaluate the cumulative impacts of increased impervious surfaces, increased erosion, construction and dewatering activities over a 18 year period, increased deposits of storm and wastewater into Kapa'a Stream and Kawainui Marsh, cumulative visual impacts as industrial warehouses are added, or cumulative impacts from additional cars and trucks as workers and visitors go to the expanded industrial park. To state there are no other major projects planned in the vicinity and therefore there should be no significant cumulative impacts' is not sufficient. All the above mentioned impacts must be evaluated for their cumulative effects on air quality; traffic, view planes, Kawainui Marsh and Kapa'a Stream and mitigation in place before this DEIS can be accepted.*

Answer to question 15. Cumulative impacts and their proposed mitigation are discussed in new Section Six of the FEIS.

Question 16. The DEIS did not adequately address single and cumulative impacts how dust created earth moving equipment over 15 to 18 years, day-to-day fumes from paint, varnish, aerosol sprays and other solvents used in industrial and commercial activities will be prevented from migrating into Kapa'a Stream and Kawainui Marsh. The applicant should have put several air monitoring stations near Kapa'a Stream and Kawainui Marsh to understand how and to where toxic substances will travel. These monitoring stations must be in place, data evaluated and mitigation plans in place before this DEIS can be accepted.

Answer to question 16. Possible dust associated with construction activities construction would primarily occur during the grading and site development, at the start of the development. In the upper portion of the site there will be only limited grading since the site have been graded before and the final grade will only vary slightly from the present grade. Therefore the development of dust from grading in the upper portion of the site will be limited to only several weeks. In addition, effective best practices will be required by the contractor as part of the contract, in order to reduce the dust generation.

In the lower portion of the site construction activities that would generate dust, such as grading and construction of roads and other infrastructure, would be conducted within 6 – 9 months' timeframe and not over a period as long as 18 years. As pointed out in the DEIS, the development of the lower portion of the site would commence with the construction of the construction of the earth berms and planting of tree and bushes at the perimeter of the lower site. With these perimeter zones in place the site would be graded with effective and completed perimeter containment in place. This containment would hold back contaminated surface runoff from site during construction and would also help to mitigate air and noise impacts. During earth work activities effective dust mitigation measures would be employed. Impact from dust during operation should therefore be limited to the initial construction phase.

After final grade has been established, soil areas will be stabilized until the individual warehouses will be built within the site limits. The construction of the individual warehouses would not create significant dust emission.

Best management strategies will be part of the construction management plan and measures described therein will be enforced during the construction. Such measures would effectively mitigate the release of hazardous agents as a result of spills or leaks, so that no hazardous agents would be accidentally released to the adjacent aquatic bodies.

Emissions of hazardous agents, such as day-to-day fumes from paint, varnish, aerosol sprays and other solvents would be effectively mitigated and minimized in accordance to low impact development LEED certification requirements and applicable county and state codes. The LEED certification approach used for the warehouse development requires the use of low VOC materials, paints, solvents and other agents. Tenants leasing space within the proposed warehouse development would be required by contractual agreements to abide by an environmentally friendly operation within the proposed light industrial park.

Question 17. *The DEIS did not address the load-supporting capacity of either site especially the lower portion which is predominately landfill material. A load bearing study must be completed and evaluated before this DEIS can be accepted.*

Answer to question 17. An analysis of the load bearing capacity of the soil and the resulting requirements for the foundation of the buildings will be conducted in the detailed design phase of the project. The updated Masterplan for the zone change request will contain a discussion about load bearing capacities of former landfills and specific construction techniques for buildings situated on formatter landfills. The issue of loadbearing capacity of the proposed site is described in the section “unresolved issues” in the FEIS.

Question 18. *The DEIS does not identify the location of the leaching fields associated with the septic tanks or the capacity of each. This information must be in the FEIS and the sites evaluated for impacts on Kapa'a Stream and Kawainui Marsh.*

Answer to question 18. For the upper portion of the site the septic systems (tanks and leach fields) will be located next to the warehouses, following the design approach used for the existing septic systems in the upper portion of the site.

In the lower portion the septic tanks will be located next to the warehouses and a STEP system will convey the effluent of individual septic tanks next to the warehouses to multiple alternative septic systems, which will be located at the perimeter of the site. The pollutant removal efficiency of the effluent of the alternative septic treatment systems (e.g. recirculating sand filters) is sufficiently high so that the treated wastewater can be re-used for below ground irrigation at the perimeter of the site.

The final locations of the alternative septic systems would be decided in the final design; though it has been decided that these locations would be at the perimeter of the development footprint of the lower portion of the site, e.g. next to or within the vegetated buffer zones which surround the development footprint. Although the alternative septic systems produce wastewater effluent that has a high quality than the effluent of typical municipal wastewater plants and therefore causes fewer impacts, the final locations of the alternative septic systems would be with at least a 100-foot set back from wetland areas and other water bodies.

The updated layout of the proposed project, which will contain the locations of the leach fields, will be contained in the updated Masterplan of the zone change request. Refer also to the section “unresolved issues” in the FEIS.

Question 19. *The DEIS failed to conduct a thorough on-site aquatic resource survey describing wetlands, drainage ditches, gulches, gullies and streams and anticipated impacts from project components. This survey must be conducted before the DEIS is accepted.*

Answer to question 19. A comprehensive water resources investigation was conducted on the request of USA-CoE, which approved the field investigation. The aquatic water resources study is presented in Appendix 7 of the EIS.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Letter No.9

March 21, 2011

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement for the Kapa'a Light Industrial Park in Kailua, Oahu

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Engineering Division, Division of State Parks, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Charlene E. Unoki

fo Russell Y. Tsuji
Administrator

Cc: Department of Planning & Permitting

5463

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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DEPT OF LAND &
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809
Phone: (808) 587-0433
Fax: (808) 587-0455

January 27, 2011

Attachment to Letter No.9

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x ~~Commission~~ on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –
x Historic Preservation

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2011 FEB 16 P 2:56
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Draft Environmental Impact Statement for Kapaa Light Industrial park
LOCATION: Island of Oahu
APPLICANT: Sustainable Design & Consulting LLC on behalf of Kapa'a I, LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 2/15/11

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

Department of Land and Natural Resources
State of Hawaii

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809
Phone: (808) 587-0433
Fax: (808) 587-0455

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2011 FEB 23 A 10: 21
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

January 27, 2011

Attachment to Letter No.9

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –
x Historic Preservation

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Draft Environmental Impact Statement for Kapaa Light Industrial park
LOCATION: Island of Oahu
APPLICANT: Sustainable Design & Consulting LLC on behalf of Kapa'a I, LLC

'11 FEB 02 PM02:32 ENGINEERING

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: ______________________
Date: 2/17/11

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/CharleneUnoki
Ref: DEISKapaaLightIndustrialPark
Oahu.823

COMMENTS

(X) **We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zones D, X and A. The National Flood Insurance Program does not have any regulations for developments within Zones D and X, however, it does regulate developments within Zone A as indicated in bold letters below.**

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

(X) **Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.**

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

(X) **Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.**

( ) Mr. Carter Romero at (808) 961-8943 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Ms. Wynne Ushigome at (808) 241-4980 of the County of Kauai, Department of Public Works.

( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: ______________________________

( ) Other: ______________________________

Should you have any questions, please call Ms. Suzie Agraan of the Planning Branch at 587-0258.

Signed: ______________________
CARTY CHANG, CHIEF ENGINEER

Date: 2/17/11

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.9

Mr. Russel Y. Tsuji, Administrator
State of Hawaii, Department of Land and Natural Resources
Land Division
P.O. Box 621
Kapolei, Hawaii 96809

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 21, 2011

Dear Mr. Tsuji,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

We confirm that other than the comments from Engineering Division and Division of State Parks, the Department of Land and Natural Resources has no further comments.

- Engineering Division: The proposed project development will comply with regulations of Flood Insurance Rate Map (FIRM) Zone A and specifically with rules and regulations of the National Flood Insurance Program (NFIP) and 44 CFR.
- Division of State Parks: We confirm that the Division of State Parks does not have any comments on the DEIS.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Letter No.10

April 19, 2011

Dr. Manifred Zapka
Sustainable Design & Consulting, LLC
Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement for the Kapa'a Light Industrial Park in Kailua, Oahu

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to Division of Aquatic Resources for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Charlene Unoki

Charlene Unoki
Assistant Administrator

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LD

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809
Phone: (808) 587-0433
Fax: (808) 587-0455

AQUATIC RESOURCES: 3643

DIRECTOR	
COMM. FISH.	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
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January 27, 2011

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –
x Historic Preservation

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Draft Environmental Impact Statement for Kapaa Light Industrial park
LOCATION: Island of Oahu
APPLICANT: Sustainable Design & Consulting LLC on behalf of Kapa'a I, LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: ______________
Date: 13 Apr 2011

RECEIVED
FEB 8 2011
AQUATIC RESOURCES

STATE OF HAWAII
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

MEMORANDUM

TO: Robert T. Nishimoto, Environmental Program Manager Av
FROM: Glenn R. Higashi, Aquatic Biologist GRH
SUBJECT: Draft Environmental Impact Statement for Kapa'a Light Industrial Park
Comments Charlene Unoki, Assistant Administrator
Requested By: Land Division
Date of Request: 1/27/11 Date Received: 2/8/11

Summary of Project

Title: Draft Environmental Impact Statement for Kapa'a Light Industrial Park
Project By: Sustainable Design & Consulting LLC on behalf of Kapa'a I, LLC
Location: Kapa'a Valley, Kailua, Island of O'ahu – TMK 4-2-15:001 (portion of), 006 and 008

Brief Description:

The applicant, Sustainable Design & Consulting LLC on behalf of Kapa'a I, LLC is proposing the development, construction and operation of a proposed light industrial park, the Kapa'a Light Industrial Park in Kailua, Island of Oahu. The Preferred Alternative would add approximately 606,000 square feet of industrial space to an already 283,000 square feet existing warehouse development at the site. The proposed industrial space would provide much needed industrial space to the Koolaupoko region and would result in an increase in the workforce of approximately 600 new employees at the site. The Preferred Alternative would develop approximately 60 percent of proposed site with a low impact development approach designed to achieve LEED Silver certification. The low impact development approach will greatly reduce impact to environmentally sensitive adjacent wetlands and streams.

Comments:

The proposed project is not expected to have any significant impact on the aquatic resource values in the area if the applicant follows the Preferred Alternative approach. By committing to design and construction of the proposed project to the requirements of the U.S. Green Building Council's Leadership in Environmental and Energy Design (LEED) rating system and achieving LEED Silver certification for the portions of the site that are closest to the most environmentally sensitive portions of the proposed site, it would insure the largest commitment of environmental mitigation measures and protect the aquatic ecosystem. Mitigation measures should be implemented to avoid any significant impacts to the environment and community, such as measures to protect and monitor the water quality in the Kapa'a Stream and adjacent wetland.

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.10

Ms. Charlene Unoki, Assistant Administrator
State of Hawaii, Department of Land and Natural Resources
Land Division
P.O. Box 621
Kapolei, Hawaii 96809

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated April 19, 2011

Dear Ms. Unoki,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

We confirm that other than the comments from Division of Aquatic resources, the Department of Land and Natural Resources has no further comments.

- Division of Aquatic Resources: The applicant greatly appreciates your endorsement of the measures contained in the sustainable design approach for the proposed project. As you point out, the project will design and construct areas that are closest to environmentally sensitive portions of the proposed site with sustainable building and site development technologies. These sustainable design and construction measures were selected both to satisfy requirements under the LEED Silver certification standard and to mitigate those types of impacts, e.g. impact to water resources, which are most important to the adjacent Kawainui Marsh and other aquatic bodies. For years the applicant has been actively supporting the community to improve the wetland areas adjacent to his property, for example by sponsoring community initiatives and by removing large debris (i.e. abandoned cars) at the perimeter of the Kawainui Marsh that could threaten the aquatic resources. The applicant greatly appreciates your support for measures to develop the proposed light industrial park using effective mitigation measures to protect the interests of the community and the environment.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

COLLINS D LAM, P.E.
ACTING DIRECTOR

LORITA M. KAHIKINA, P.E.
DEPUTY DIRECTOR

Letter No.11

March 22, 2011

Dr. Manfred Zapka
Sustainable Design & Consuting, LLC
P.O. Box 283 267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

Subject: Draft Environmental Impact Statement (DEIS)
Kapaa Light Industrial Park in Kailua, Oahu, Hawaii

Thank you for inviting us to review the above Draft Environmental Impact Statement (DEIS) for the Kapaa Light Industrial Park in Kailua. The Department of Design and Construction has the following comment:

Regarding Table 4-12, Expected LOS for Background Traffic plus Project Related Traffic, will the increase in LOS on the adjacent public roadways require the installation of street lights and other traffic control devices in the development of this project?

Should you have any questions, please contact Gerald Hamada at 768-8427.

Very truly yours,

for Collins D. Lam P.E.
Director

CL:pg(400817)

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.11

Mr. Collins D. Lam, P.E., Director
City and County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 22, 2011

Dear Mr. Lam,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

The Traffic Impact Assessment Report (TIAR), conducted for the environmental review of the proposed project, suggests that no traffic mitigation measure are required as a result of level-of-service (LOS), at least until the major first phase of development has been completed (e.g. at the projected midpoint of the project development schedule, e.g. 2016 to 2017, or when about 50% of the planned floor space has been added). The current TIAR recommends that a new, updated TIAR should be conducted at that point in time to ascertain if the projected traffic volumes have indeed grown as expected. Conducting a new TIAR at this point in the future would provide better information about the actual development of the traffic around the proposed project and facilitate the choice if and what traffic mitigation measures should be applied as the project is heading to full completion.

The State Department of Transportation (DoT) has requested that the current TIAR be revised and agreed that the revisions be carried in conjunction with the zone change application. The revised TIAR will use design information of the updated Masterplan for the zone change request.

Without committing to a specific traffic mitigation plan at this time, installing street lights or other control devices, as suggested in the letter, might be appropriate traffic impact mitigation measures. A further analysis in conjunction with the new TIAR would have to address if such control devises and strategies are applicable given the close proximity to the marsh.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM

CC: Department of Planning and Permitting, Mr. Mike Watkins

THE LANI-KAILUA OUTDOOR CIRCLE
P.O. Box 261
Kailua, Hawaii 96734

Letter No.12

March 24, 2011

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, HI 96828

Mr Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, HI 96813

Dear Dr. Zapka,
Dear Mr. Watkins,

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Kapa'a Light Industrial Park in Kailua, Oahu.

The Lani-Kailua Outdoor Circle Board has considered the proposed zoning change and potential impact the zone change and expansion would have on Kawai Nui Marsh. As you may know, the Kawai Nui/Hamakua Complex was designated a Ramsar Wetland of International Importance in 2005 after a collaborative effort led by one of our members, Muriel Sato.

After considerable review, the Lani-Kailua Outdoor Circle supports the "No-Action Alternative" of no further addition of warehouse space on the portions of the site covered in the Kapa'a Light Industrial Park (KLIP) project DEIS.

This decision is based on:
1. the need to maintain Preservation zoning to protect our watersheds, in particular, Kawai Nui Marsh and Kapa'a Stream that drains into Kawai Nui Marsh and
2. the determination that sediment and contaminant run off from the Kapa'a Light Industrial Park during its construction and operation would have unavoidable, detrimental and long term negative impacts on Kaiwai Nui Marsh, Kapa'a Stream and Kailua Bay

COMMENTS

1. Protecting Preservation zoned land is essential to maintaining Kapa'a Valley, Kapa'a Stream and Kawai Nui Marsh watershed's function as a water purification system.

The water flowing from Kapa'a Valley headwaters passes through the proposed development site, so reduction in water quality along the route would reduce water quality in Kawai Nui Marsh and Kailua Bay.

Kawai Nui marsh provides critical habitat for terrestrial and wetland animal species including endemic endangered waterfowl such as the Hawaiian Coot, the Hawaiian Stilt, the Hawaiian Moorhen and the Hawaiian Duck.

2. Although the plan proposes a comprehensive design approach to achieve LEED Silver Certification within the lower portion of the proposed site, underground seepage is less manageable especially in this former landfill and the proposed technical remediation options cannot control forces of nature such as extreme floods and earthquakes, or prevent unintended consequences due to mismanagement or lack of compliance by future lessees.

Extreme flooding of Kapa'a Quarry Road occurred as recently as February 2011. (Ref: "Flooding Closes Kapaa Quarry Road in Kailua, Star Advertiser February 11, 2011)

3. Catastrophic septic tank failure while "very uncommon" cannot be ruled out nor can the failure of the leach field. Due to its proximity to Kaiwai Nui Marsh, the environmental consequences of a system failure would be severe.

4. Construction on compromised unstable former landfill sites would further compound existing environmental hazards.

Development of parcel TMK 4-2-015:006 would unearth an old landfill covering a residential dump, and development of a segment of TMK 4-2-015:008 would disturb a plateau constructed from tailings and overburden from the original Kapa'a Quarry operation.
(http://.aecos.com/KOOLA/Kapaa_subbasins.html).
Run-off would enter Kawai Nui Marsh, which is downhill from both construction sites.

5. Kapa'a Quarry Road cannot safely handle the increase in traffic.

At build out, the proposed project would have double the number of warehouses and triple the industrial space and workforce (estimated aprox. 600 employees).
Kapa'a Quarry Road is a historically dangerous road with narrow lanes used by residential and commercial traffic.
(Ref: "Kailua Residents React to Another Fatal Accident on Kapaa Quarry Road", Report by Leland Kim for KHNL Hawaii News)

7. An Industrial Park would have a negative visual effect by altering expansive mauka and wetland views from H3, the Pali and Kaha Park.

Very Truly Yours,

Joan W. Fleming

Joan W. Fleming, President
Lani-Kailua Outdoor Circle

cc: Gary Gill, David Smith, Chuck Prentiss, Jill Tokuda, Ikaika Anderson, Pono Chong, Chris Lee, Cynthia Thielen, Pohai Ryan

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

September 14, 2011

Response to letter No.12

Ms. Joan W. Fleming, President
Lani-Kailua Outdoor Circle
P.O. Box 261
Kailua, Hawaii 96734

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 24, 2011

Dear Ms. Fleming,

We thank you for your subject letter in which you provided us with your comments on the Draft Environmental Impact Statement.

Our responses to your comments and recommendations are presented in the list starting on page two of this letter. For your convenience and ease of review we follow the order of your specific questions with our responses to each.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

Responses to your comments and recommendations in your letter dated March 24, 2011

First of all the applicant and we, the consultants, fully share your concern for the wellbeing of the community and the environment. In particular, your dedicated focus is on the preservation of a valuable Kawainui Marsh, a wetland area that has been recognized by being listed in the Ramsar List of Wetlands of International Importance.

The applicant fully supports community efforts to preserve the environment and he has been financially supporting community groups (i.e. donating funds and land to create a pathway at the perimeter of the marsh) and has also donated personnel and heavy equipment to clean the marsh (i.e. in 2010 removing close to 50 abandoned cars along the marsh perimeter between the proposed site and Kalanianaole Highway). The applicant has committed to design and build the proposed light industrial park with low impact and sustainable building and site development technologies. In order to strengthen his commitment to developing "green", the applicant has chosen to design and construct the portions of the proposed light industrial park that are closest to environmentally sensitive land, in accordance to the requirements of the Leadership in Energy and Environmental Design (LEED) Silver certification standard.

The LEED Silver certification will not merely serve as a convenient "marketing" plaque, but the LEED Silver certification is intended by the applicant as an important indicator to guarantee to the community that low impact development approaches are indeed used in the development as promised. As you might know, a design and construction project needs to qualify and be awarded a certain number of credit points within the LEED certification system to qualify for four LEED certification levels upon completion of the project. The applicant has decided that he will pursue the LEED Silver certification goal, which represents an advanced certification level and therefore a design that conforms to an advanced degree of using low impact development technologies and approaches.

The LEED certification procedure also entails an independent audit by a third party to ensure that the design and construction has indeed been carried out to strict certification standards.

In the LEED certification process the applicant is free to select those credit points that he deems most important and effective. For the proposed project the applicant has selected credits that will effectively mitigate such impacts that are most important to the adjacent marsh as well as the Kapa'a Stream and adjacent delineated wetland area. In doing so the sustainable design approach for the development is strategically aligned with the need to emphasize the mitigation of certain impacts to preserve a healthy environment around the proposed site. The specific LEED certification approach of the proposed project will first of all satisfy all water resources related credit points (including pursuing two bonus points for exemplary performance e for innovative wastewater systems and comprehensive stormwater treatment) as well as reduction of light pollution, lowering the traffic by supporting alternative modes of transportation, avoidance of impacts from waste and trash, avoidance in use of hazardous construction and cleaning agents, and lowering energy and water usage, to name the most important mitigation measures, which directly result from pursuing the LEED approach of the proposed project.

The proposed development footprint is strictly confined to previously developed land (e.g. graded) and no presently open land with natural vegetated land will be used to build structures. The conversion of Preservation zoned land will be confined to landfill areas that are bare and graded at present, without any permanent vegetation and that do not currently represent habitat for endangered species. In fact, as part of the sustainable design approach, approximately about eight acres of land surrounding the development footprint of the portion of the site that is closest to the marsh will be converted to restored habitat featuring native and adaptive plants. Some of the land that will be restored habitat in the future is barren and not vegetated landfill area today. Therefore, the proposed project will not convert precious naturally vegetated land; rather the development will use land that has been degraded in the past by landfill over the Kapa’a valley.

Developing landfill area is typically more costly and technically demanding than a regular construction site. Developing landfill areas instead of open space, however, is preferable for the community, since it converts land to land uses that are of more use and value to the community than the status quo.

By selecting those sustainable technologies, which can best mitigate key site specific impacts, the proposed development will be reducing selected impacts rather than increasing them. Specifically, the design of the proposed light industrial park will ensure that effective Best Management Practices (BMPs) will be implemented, both during the construction phase as well as during regular operations. For example, the vegetative buffer zone around the development footprint of the lower portion of the site, which will contain an earth berm with dense vegetation including tall trees and bushes, will be constructed before the mass grading of the site occurs. Therefore, the berms will create a physical containment on all side of the project side and runoff, and with it all suspended solids and pollutants, will be effectively retained on the site and not flow untreated into the receiving waters.

The proposed light industrial park will benefit the Koolaupoko region by strengthening its economic infrastructure and improving the local economy. As mentioned in the DEIS, the

Koolaupoko region is lacking an adequate supply of industrial space, which causes companies serving the windward side and residents residing in this region to cope with long drives and commutes. In fact, the Koolaupoko region has only approximately 20% of the island wide per capital allowance of industrial space. Even at full build the proposed project will increase the per capita allowance for the region to a mere 40%.

As the era of cheap energy comes to an end Hawaii's future will pivot around a more effective use of fossil energy and, increasingly, clean and renewable energy. An important ingredient of a sustainable future of Hawaii will be locating places of employment, commerce and recreation closer to the communities and foster food and light manufacturing closer to the consumer. Such economic development will necessitate a robust light industrial infrastructure, such as the proposed light industrial park, to provide support and appropriately designed and located space to the many local companies, many of them "home grown", within the region.

In the following we offer our responses to your specific comments. We have numbered the responses in accordance to your numbering conventions;

1. Protecting preservation zoned land:

As delineated in the EIS the applicant intends to apply for a zone change only for those portions of land that are presently developed, e.g. which are graded and are not open space. No presently naturally vegetated land will be used for the development. Rather, the proposed sustainable design approach will convert approximately eight acres of land that is either graded but not vegetated or that presently has low quality vegetation (e.g. with invasive plant species) to restored habitat with native or adapted plant species. No parts of the proposed foot print will occupy land that can be regarded as habitat for endangered water birds.

The present runoff conditions from the site will be improved through a comprehensive system to minimize or treat stormwater runoff. The comprehensive measures to mitigate specifically aquatic resources, which are integral part of the sustainable design approach, will assist in improving the water quality in the receiving waters, which include the Kapa'a Stream and the Kawainui Marsh. Our conclusion that water quality in the Kapa'a Stream can indeed be improved by our proposed sustainable design approach used baseline data, analysis and hydrological models of the Kapa'a watershed performed by the State of Hawaii, Department of Health (DoH).

The applicant is working with the U.S. Fish and Wildlife Service to develop and implement site specific mitigation measures that will avoid endangered water birds from seeking habitat in the new development, thus exposing them to increased predation risk by feral cats and other non-native predators. The design of the proposed project will include the avoidance of ponds with free water surfaces which could attract endangered water birds. At present the proposed project site is not habitat of endangered species and the future development will not endanger or encroach on important wildlife habitats.

2. Flooding of quarry road and seepage from the landfill:

The comprehensive stormwater plan for the site provides an effective mitigation approach against impacts from stormwater runoff. In the lower portion of the proposed site the comprehensive measures under the proposed stormwater system design includes measures to decrease stormwater runoff by collecting rainwater from roofs and sections of the road and using the harvested rainwater for irrigation of landscaped areas that surround the development. Infiltration of water in this restored vegetated areas as well as evapotranspiration will reduce the direct runoff into the receiving waters. Furthermore, by creating impermeable areas and fully treating the runoff or using it for irrigation, the amount of water that infiltrates into the landfill area of the lower portion of the site will reduce seepage from that landfill body. As delineated in the EIS the design approach for the portion of the site that is closest to sensitive wetland areas is using design strategies of the “sealed tomb” type of landfills, where infiltration into the landfill body is curbed by portions of impermeable surface layers of the landfill area. The proposed layout of the site would still allow some infiltration of precipitation, but this would be within the densely vegetated areas at the site perimeters, where water is held in the upper layers of top soil and much of the water would be lost through evapotranspiration.

It is acknowledged that natural occurrences of extreme floods might overcome any drainage systems. The prevailing design standard for drainage systems applies a “design rain” with defined recurrence intervals, for example a 10- or 20 years design rain. The proposed development would similarly apply such standards to size the drainage system. The often cited flooding of sections of the quarry road, which necessitates road closure, can be primarily attributed to the specific drainage condition of the Kapa’a watershed. The Kapa’a Stream is the drainage conduit for approximately 90% of the Kapa’a Valley. The streambed of the Kapa’a Stream has been changed due to landfill over the past several decades and the increased amount of runoff from land within the Kapa’a valley has resulted in changed hydrological conditions and a higher probability of flooding. During extreme storm events the stream flow increases significantly causing flooding condition upstream of the culvert under the quarry road. A remedy of such adverse condition requires a broader approach than just an optimization of the drainage of the proposed site. Specifically, while the expected significant improvements of the site drainage under the proposed design approach of the project will lower stormwater impacts from the proposed site, such improvement cannot compensate for causes that result from other areas within the Kapa'a watershed.

3. Catastrophic failure of the leach field:

The DEIS discusses at length mechanisms, which are most responsible for a "catastrophic" failure of the septic system. As pointed out in the DEIS, the main culprit of septic system failure is not the structural failure of the septic tank but a failure of the leach field. Catastrophic failure of septic tanks, such as rupturing of the tank shell, is quite rare, if the septic tank is adequately dimensioned, fabricated and installed. Failure probability of the tank structure is furthermore significantly reduced by regular and maintenance of septic systems professionals.

According to the US-EPA, failure of a septic system is more frequently caused by failure of the underground injection field, or "leach fields". Failure modes are addressed in the DEIS and include mainly organic overloading, which results in clogging, inadequate and non-uniform distribution of the wastewater in the field. Other failure modes can be attributed to limited distance of the injection point of the septic system effluent to the receiving water or, in vertical direction, to the water table or impermeable strata. All possible failure modes have been considered for the proposed onsite wastewater systems and the resulting approach of onsite wastewater treatment systems significantly lowers any failure potential.

For the upper portion of the proposed site the horizontal and vertical distances between point of injection and receiving water or water table is significantly larger than the minimum requirements, therefore conventional septic systems are used and are considered a safe and adequate way to treat the wastewater onsite.

For the lower portion of the proposed site, which is closest to environmentally sensitive wetland areas, advanced septic systems are used that include individual septic tank close to the warehouses and a septic effluent tank pumping (STEP) systems that conveys the effluent of the septic tank overflow to multiple alternative septic systems at the perimeter of the site. The alternative septic systems have significantly higher treatment efficiencies than conventional septic systems since they add aerobic, filtering and denitrification treatment process steps. According the EPA the average effluent of the type of alternative septic systems (e.g. recirculating sand filters) that is selected for the proposed project is lower than in typical municipal wastewater systems. Especially important for the site is the fact that the type of alternative septic system selected for the proposed project decreases the amount of nutrients in the effluent to much higher degree than conventional septic systems or typical municipal wastewater plants. A high removal rate of nutrients is important since the site is close to aquatic bodies and sensitive wetland areas.

Since the treated wastewater effluent of the alternative septic systems has high treatment efficiency, the effluent can be used in below ground irrigation, besides being disposed of in conventional leach fields. It is also important to bear in mind that the cleaner wastewater effluent from the alternative septic systems significantly reduces the risk of a failure of leach fields since the effluent has a significantly lower organic concentration and is essentially free of suspended particles.

By using innovative wastewater approaches the applicant wants to ensure that the environment is effectively protected from wastewater that has not been properly treated before its release to the receiving waters.

4. Construction on former landfill area

The development footprint of the proposed project will only use land that is on existing landfill area. No parts of the proposed project will be built on land that presently has natural vegetation, including large and mature trees, designated wetland areas and aquatic bodies.

The selected design approach of the proposed project comprises a grading approach under which the cut and fill budget of grading would be made neutral, which means that limited volumes of soil will be removed from or brought to the project site. The landfill material consists mostly of quarry tailings and overburden and therefore most of the land fill material could be used to form the final topography.

Top soil would be used to form a certain amount of landscaped area, such as between and around the warehouses, where a significant amount of the required would be taken from green waste conversion, which is presently ongoing at the site. The rest of the development footprint of the proposed site would be covered with impermeable pavement of traffic areas and impermeable roof areas of the warehouses. Other areas within the development footprint would be either landscaped or will have open grid pavement (e.g. pavement which has at least 50% space that are occupied with vegetation). The result of the grading and development of the site would be comprehensive soil stabilization.

The potential or soil erosion and contaminated runoff are typically highest during the construction phase. In the upper portion of the site the extent of required grading is very limited since the land has already been converted to an about level plateau. Therefore the amount of contaminated runoff will be limited and can be managed with conventional BMPs. The lower portion of the site has a higher potential of run off because more grading is required and because the land has more slope. The design approach for the lower portion of the site surrounds the site with about 1,500 feet of stabilized earth dam, which would serve as a vegetated buffer zone around the site and would be planted with larger trees and shrubs. These earth dams would provide a containment structure to keep runoff on the site during grading and site development. This approach would significantly reduce the likelihood of untreated runoff being discharged from the site during storm events.

5. Traffic impacts

The Traffic Impacts Assessment Report (TIAR) conducted for the environmental review of the project has determined that the roads affected by the project are sufficient to ensure no unsatisfactory decrease of level-of-service (LOS). As discussed with the Honolulu Police Department (HPD) there are certain safety concerns with traffic on the quarry road, particularly when drivers surpass the speed limits and "use the road as a raceway" (quote). Most of the serious accidents are result of unsafe driving during the off-peak evening hours or at night. At those times the proposed project does not contribute significantly to the traffic volume on the quarry road.

Appropriate and effective mitigation measures to improve the traffic safety on the quarry road, especially in the vicinity of the proposed project site could include road surface improvements, changes of the road geometry and strict enforcement of the speed limits on the quarry road by other than static traffic control measures, as well as possible structural changes of the affected intersections.

The State Department of Transportation has requested that the current TIAR be revised during the zone change application process. The revised TIAR will use design information of the updated Masterplan for the zone change request. In addition to the revision of the TIAR an analysis of current problems and possible improvements of the Kapa'a Quarry Road will be carried out in conjunction with the updated Masterplan for the zone change request.

7. Visual Impacts:

The FEIS (Appendix 8) contains a comprehensive visual impact analysis. The proposed visual impact mitigation strategy will include installing vegetative buffer zones with tall trees on all sides of the development, trees and so-called "green walls" (e.g. walls of buildings that feature a lattice as a support for plants growing p along the walls) inside the development and appropriate color scheme for the warehouse and other ancillary structures to blend into the natural surroundings as much as possible. The visual impacts analysis has identified that the proposed measures, listed above, are indeed very effective to mitigate the visual impacts from more distant viewplanes that have a line-of-sight toward the proposed site.

When the visual impact mitigation measures are fully developed (e.g. the trees around the site have to grow, which requires a couple of years) the proposed development will be nearly “invisible” from view planes around the marsh, especially from popular sites, public parks and two Heiaus. The proposed construction of the site will be visible to some extent from a short section of the H3-Freeway, where there are breaks in the otherwise dense vegetated buffer on the southern side of the H3-Freeway.

With regard to close-up views of the proposed development, there are two locations of interest. First, motorists on the quarry road passing the site will not see the warehouses within the lower portion of the site, since the structures would be hidden behind the vegetated buffer zone along the quarry road and the quarry access road. The upper portion of the site is presently not visible to passing motorists on the quarry road and would remain “invisible” in the future. Second, visitors to the model airplane park, which is adjacent to the project site, might see the rooftops of some of the warehouses in the lower portion, which are closest to the quarry road. The proposed vegetated buffer zone would be a very effective visual impact mitigation measure to hide the rest of the buildings. The remaining visual impact of the top section of the front row of warehouses could be further reduced by using “green walls” on the warehouse walls that face the quarry road. The applicant will implement significant structural and passive measures to lower the visual impact to the extent possible.

Summarizing, we hope that our response has addressed all of your important comments and recommendations. As pointed out, the applicant has and will continue to support activities of community groups to protect and preserve the environmentally sensitive areas around his property. For many decades the applicant has been part of the Windward community, and is committed to his responsibility to the community and the environment while pursuing his commercial goals, which will support the local economy.

Water Resources Research Center
Environmental Center

UNIVERSITY of HAWAIʻI
MĀNOA

March 25, 2011
RE: 0806

Letter No.13

Kapaa I, LLC
c/o John King
905 Kalanianaole Highway
Kailua, HI 96734

Dear Mr. King,

Draft Environmental Impact Statement
Kapaa Light Industrial Park, Kailua, Koolaupoko, Oahu

Kapaa I, LLC proposes to rezone fifty-five acres adjoining Kawainui Marsh from P-2 General Preservation to I-1 Industrial, and construct thirty new warehouses—with a total area of about 606,000 square feet—on this acreage and an adjoining twenty-two acre parcel that is zoned I-2, yielding a total developed area of twenty-seven acres.

This review of Kapaa I, LLC's Draft Environmental Impact Statement (DEIS) is a service activity of the Environmental Center to help determine and maintain the optimum quality of the environment. It is not intended to represent the official views of the University of Hawaii. The objectives of our review process are to enhance environmental consciousness, encourage cooperation and coordination, and facilitate public participation. These comments were drafted with the assistance of David Penn, Environmental Center.

General Comments

The proposed action would intensify the industrial usage of Kapaa valley and produce long-term impacts on vehicular traffic, utility systems, utilization of resources, noise levels, local social services, visual character and ambiance, and land surface permeability and hydrologic response. Even with mitigation, it appears that the impacts on vehicular traffic and visual character and ambiance would be particularly obvious. Therefore, we suggest that the FEIS highlight these components of the analysis in ways that best help the approving agencies to make their decisions about the relationship between the environmental costs and social benefits of the proposed action.

The proposed development approach incorporates numerous assumptions about the expected performance of various environmental management measures, many of which are relatively untested in a local setting. As you implement these kinds of measures on-site, we suggest that you collaborate with neighboring landowners and resource managers, other

2500 Dole Street, Krauss Annex 19 Honolulu, Hawaiʻi 96822
Telephone: (808) 956-7361 Fax: (808) 956-3980
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watershed health and low-impact development practitioners, the University of Hawaii, and our wider island community in order to generate quantitative information about the environmental results obtained that can be used to support islandwide sustainable development efforts. However, along with this suggestion comes our concern that the FEIS provide greater detail about how long-term maintenance of pervious pavement, drainage filtration systems, underground catchments and traps, and extended detention ponds will be accomplished, including the disposal of recovered material.

In addition to our general comments, we have a few specific comments about alternatives analysis and LEED certification strategy; pace of development and nature of businesses; wastewater treatment and disposal; NPDES permits for discharges of stormwater associated with industrial activities; stormwater and non-stormwater discharges from other point and nonpoint sources; and uncertainty of site details, input rates, and cumulative impacts.

Alternatives Analysis and LEED Certification Strategy

The DEIS suggests that “the lower portion of the site has the largest need for effective and comprehensive impact mitigation” because it is closer to Kawainui Marsh and is partially within the SMA (p. ES-5). However, the upper portion of the site may experience higher and more intense rainfall than the lower site; has steeper and larger streamside hillslopes, and steeper stream gradients, than the lower site; and allows heavier industries (I-2 zoning) than the lower site. Therefore, we suggest that the FEIS further explore the possibility that more intensive mitigation measures, such as LEED certification, may have greater positive impact when implemented on the upper portion of the site.

Previous investigations suggest that the fill underlying at least part of the upper portion of the site consists of quarry tailings and overburden, not trash (Walter Lum Associates, Inc., 1983, Kapaa Valley Industrial Development Preliminary Soil Reconnaissance, cited on page 3-13 of the 2007 Kapaa Stream TMDL, State Department of Health). Therefore, we suggest that the FEIS provide additional empirical information about the nature of the fill material underlying the upper portion of the site. If this fill is relatively clean, then we suggest that the FEIS address an alternative that would take greater advantage of the permeability and filtering capability of this fill for drainage purposes, potentially reducing the need for more intensive drainage management solutions on this portion of the site.

Pace of Development and Nature of Businesses

The DEIS proposes that “by stretching out the development over 15 to 17 years, impact will be limited and the effectiveness of mitigation measures can be continuously examined and streamlined to ensure effective impact mitigation” (p.ES-4). We suggest that FEIS (1) include greater detail about how this would be accomplished, and (2) address the possibility that a combination of market forces and developer finances might cause this development timeline to be compressed.

The DEIS states that “[t]he proposed project intends to primarily serve local and subregional demand of industrial services or small manufacturing companies. It is not the intention of the proposed project to lease space to companies that serve an island-wide market, or whose operations would include handling, manufacturing or transporting materials or products that have a high risk of adverse impacts to the environment” (p. ES-6). These are laudable intentions, and we suggest that the FEIS identify what assurances would be available to ensure that they are carried out.

Wastewater Treatment and Disposal

The existing and proposed installation of septic systems in quarry and trash-derived fill raises important questions about treatment efficacy and pollutant transport and fate. Therefore, in order to provide greater transparency about the individual wastewater system (IWS) approval process that would be conducted by the State Department of Health (DOH) we suggest that the FEIS include (1) percolation test results from a range of existing and potential on-site disposal systems (OSDS) installation locations, and (2) a recitation of how the proposed leach fields would comply with DOH requirements for minimum lot size, maximum density, and stream setbacks.

NPDES Permits for Discharges of Stormwater Associated with Industrial Activities

Under the Clean Water Act, business activities conducted in an industrial park may require NPDES general permit coverage for discharges of stormwater associated with industrial activities, as determined by the Standard Industry Code (SIC) of the business activity and the extent of its exposure to direct rainfall. We suggest that the FEIS discuss the extent to which such permit coverage is or may be required within the industrial pack, including an inventory of SICs associated with existing and proposed businesses on site that identifies (1) those SICs that require this type of NPDES coverage, and (2) existing businesses that were issued or require this type of NPDES coverage.

Stormwater and Non-stormwater Discharges from other Point and Nonpoint Sources

A need for underground injection control (UIC) permits is noted on page ES-6 of the DEIS, and UIC is included in the list of permits and approvals on pages 308-309. However, it is unclear exactly what kinds of flows and materials would be discharged into the proposed injection wells, and what other kinds of unregulated fluid disposal methods would be used. For example, would any of the proposed subsurface drainage collection and treatment devices trigger UIC permitting requirements? To what extent what would these devices, or other collection and disposal methods (e.g. seepage pits, trenches) be used for managing non-stormwater discharges, such as process water and wash water generated by industrial park tenants?

Because of the interconnectedness of drainage system architecture and runoff impacts in the Kapaa watershed, we suggest that the FEIS give greater prominence to explaining how the operation of the proposed site drainage and stormwater management system will be coordinated with related efforts of other parties (particularly NPDES permittees) to achieve overall water quality goals in Kapaa Stream and the greater Kailua Bay watershed.

Uncertainty of site details, input rates, and cumulative impacts

We suggest that the FEIS utilize additional details about site characteristics and estimated pollutant input rates to finalize the impact analysis and to specify selected alternatives. For example, page E-6 of the DEIS suggests that either two detention ponds or an existing drainage area would be used for stormwater management, but we are uncertain about the final decision and its potential impacts.

We also suggest that the FEIS adopt a more holistic approach to cumulative impact assessment. Just because "[t]here are no other major projects planned in the vicinity of the site does not necessarily mean that "there should be no significant cumulative impacts" (page ES-10). Cumulative impacts accumulate over time as well as in space, therefore we suggest that cumulative impact assessment consider how the weight of the proposed action (1) adds to and augments the impacts accrued by major projects that were already developed in the area, and (2) would grow and change during and beyond the industrial park's usable life.

Thank you for the opportunity to comment on this Draft Environmental Impact Statement (DEIS). We hope that our comments will help the City & County of Honolulu to weigh carefully whether the social benefits of the proposed action would justify the environmental impacts that would likely occur. When the Final EIS is distributed, please send one printed copy to the Environmental Center.

Sincerely,

P Moravcik

Philip Moravcik
Water Resources Research Center

cc: State of Hawaii Office of Environmental Quality Control (OEQC)
Chittaranjan Ray, Interim Director, Water Resources Research Center, UH Manoa
Mike Watkins, City & County of Honolulu Department of Planning & Permitting
Manfred Zapka, Sustainable Design & Consulting LLC

Response to letter No.13

September 14, 2011

Mr. Philip Moravcik
Water Resources Research Center / Environmental Center
University of Hawaii at Manoa
2500 Dole Street, Krauss Annex 19
Honolulu, Hawaii 96822

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letters dated March 25, 2011
Reference 0806

Dear Mr. Moravcik,

We would like to thank you and Mr. Penn for your comprehensive comments and recommendations in your subject letter. We greatly value your comments and recommendations which will assist us to further refine our approach and consider effective impact mitigation.

We would like to offer the following responses to your comments and recommendations, in the same order as presented in your letter:

General Comments:

All impacts, which you delineate in your letter, have been addressed in the DEIS. The two impacts which, as you state, would be particularly obvious, even with mitigation, are vehicular traffic and visual ambiance.

With regard to vehicular traffic, the applicant has committed to implement measures that would reduce the projected trip generation from the proposed project. Such measures are alternative modes of transportation for employees and visitors to the proposed industrial park. The LEED strategy for the proposed project incorporates alternative modes of transportation as an important part of the sustainable site development. The applicant supports that the public transportation system will connect the Kapa'a valley to the island public transportation system. Since no such plans by the transportation authority on Oahu exist at the present time, the applicant would consider installing a private shuttle service at the time when development of the park has progressed and there is enough demand for a shuttle service by the future tenants.

As part of the LEED certification approach, the proposed development would also provide bicycle friendly facilities. Although the quarry road is at present not an easy route for bicyclists, it is hoped that at some time in the future there will be a safe and attractive way for bicycles and pedestrians to reach the Kapa'a valley and the proposed project site, from the South and/or North, e.g. from the Kalanianaole Highway and/or Mokapu Boulevard, respectively. One possible and possibly preferable way to realize safe driving conditions for bicyclists would occur if the long-planned marsh perimeter path is realized soon. This path would connect the proposed site with Kailua by means of a safe and scenically beautiful path to bike and walk.

In addition to bicycle friendly facilities and access to alternative modes of transportation, and also as part of the LEED certification strategy, the applicant will be providing preferred parking for car and van pools as well as for low–emitting vehicles. The applicant has been installing a significant number of photovoltaic (PV) panels and the park might offer day-time charging of electric vehicles, as part of the green development strategy of the proposed site. (To lead by example, the applicant has been using an all-electric personal vehicle for a couple of years.)

The traffic impact analysis report (TIAR) conducted for the environmental review indicates that the affect roads would remain above a level-of-service (LOS) that is defined as providing satisfactory traffic conditions. The State Department of Transportation has requested that the current TIAR, which is submitted with this FEIS, be revised in conjunction with the zone change request. The revised TIAR will be based on design information in the updated Masterplan for the zone change request. In addition to the LOS based analysis an analysis of existing traffic problems on the quarry road will be carried out in conjunction

The mitigation of the visual impact is a key objective of the applicant. As a minimum, the applicant has committed to install vegetative buffer zones around the development, especially around the lower portion of the site, which is closest to environmentally sensitive areas and to the Kailua community. The vegetative buffer zones would have a dense screen of trees and shrubs, which would provide effective visual impact mitigation for mostly lateral views. In addition to the trees at the perimeter of the development, the applicant plans to plant trees in the interior of the development. While trees within the development would lower non-roof heat island effects, the trees would also provide visual impact and help to blend the warehouses into the surrounding area. As an additional measure to lower the visual impact, the applicant is considering "green walls" for the walls facing east for buildings closest to the quarry road. Our visual impact analysis (Appendix 8 of the DEIS) shows that visual impact could be indeed significantly mitigated with the selected mitigation measures.

It is, however, not possible to "hide" all of the structures of the proposed development behind a continuous screen of trees and other natural vegetation, especially from a more oblique view plane, such as from parts of the H3-Freeway. The ambiance of the Kapa'a Valley is characterized by open space, vegetated areas consisting of tall trees and wetland vegetation areas, existing structures and some larger process facilities (i.e. transfer station, the existing warehouse development and the quarry processing plant) as well as the H3-Freeway. The design approach of the project endeavors to blend the structures and other features of the proposed into the existing ambiance at the site as much as possible.

The LEED strategy for the proposed development has emphasized the water resources credit categories. The water resources mitigation measures selected for the LEED approach will implement effective impact mitigation measures for the aquatic bodies, especially the wetlands adjacent to the proposed site. In the selected LEED certification approach all credit points of the water resource category will be attempted; in fact the proposed measures under the stormwater and wastewater credit categories will qualify the project to receive exemplary performance bonus credits for the comprehensive stormwater management plan and innovative wastewater technologies.

All measures that are selected for the sustainable design approach are based on proven technologies and operational procedures. No "exotic" new sustainable technologies are selected that might bear risk of performance below expectations. The assumptions made in the DEIS about the effectiveness of certain sustainable technologies are conservative, and therefore the applicant is not promising more than can be safely achieved with the design and the technology selected in the basic design.

The long-term maintenance of the selected low impact technologies will be carried out by the applicant or his designated operator. Without exception, the selected low impact technologies are operationally mature and tested technologies. The projected effectiveness of these technologies and processes used in the analysis for the DEIS is baked by reported experiences by the vendor or independent agencies, such as the EPA.

For example, the maintenance of pervious pavement, e.g. mostly open grid for parking areas, requires no special maintenance know-how, since it is used in many site development projects. Another example is the planned drainage infiltration procedure of the alternative septic systems effluent by means of below ground irrigation systems, which is a proven technology for on-site wastewater and gray water disposal. A third example is the type of pretreatment units for the storm water runoff treatment, which will be installed upstream of the detention ponds. Such pre-treatment units are sediment, debris and nutrient catchment units, which are installed throughout the nation. The fourth example is the type of alternative septic system, which far outperforms the treatment effectiveness of conventional septic systems. These systems have been installed in larger numbers and represent a proven technology with EPA reporting on the high treatment efficiencies. Presently, the applicant operates a number of septic tanks which are pumped at shorter intervals, where the septic sludge is being disposed of by a certified pumper in accordance with county ordinances.

Alternatives Analysis and LEED certification strategy

The decision to develop the lower portion of the site to LEED Silver certification standards was motivated by the objective to ensure that a comprehensive mitigation strategy is employed for those areas of the proposed site that are closest to sensitive areas (e.g. Kawainui Marsh and the wetland area in the Kapa'a Stream corridor). The applicant is pursuing a strategy of focusing the bulk of sustainable development measures in the lower portion of the site. The fact that the lower but not the upper portion of the site is within the SMA district emphasizes the need that the lower portion be developed with low impact building technologies and site development measures. The applicant is not, however, opposed to consider LEED certification for the upper portion of the site.

Development and Nature of Business:

The predicted length of the development of the proposed project to full build-out is approximately 15 to 17 years. This length of development is based on the predicted time period it will take the Koolaupoko region to absorb the approximately 600,000 square foot of additional industrial space. It is planned to develop the proposed project in a series of phases, where the two major development milestones are the development of the upper and the lower portion of the site.

In both the upper and lower portion of the site the sequence of construction will be similar, which first entails the site preparation, including establishing final grade, installing roadways, parking areas and landscaped areas, followed by the construction of individual warehouse structures. The extent of the site preparation is different for the upper and the lower portions of the site. In the upper portion of the site the existing grade is very close to the final grade, thus site preparation would require only very limited grading. Grading in the lower portion of the site would be more extensive.

Once the site is prepared, individual warehouses and ancillary structures, as needed, will be built in accordance of the actual absorption rate of the industrial space in the region.

Since the site preparation, including grading, road construction and infrastructure development, at the beginning of the project will cause more impacts than the construction of individual warehouses, the overall impacts will not differ significantly between scenarios that differ in the date of full built out. A longer development period, as delineated in the EIS, has benefits of specifically reducing traffic impacts and implementing traffic impact mitigation measures over time and adapting the traffic mitigation the actual traffic situation.

But again, if the development time were ten years rather than 15 years there would be little consequence on the ability to mitigate impacts. The one obvious consequence would be to conduct a new traffic impact assessment not after about seven years, e.g. at project midpoint, but maybe already after four to five years. The new TIAR would then be used to strategically design and implement traffic mitigation measures, if they are deemed necessary at this time.

The intended market of the proposed light industrial park are new companies, companies that are relocating and new branch operations from existing companies. One important objective for these companies is being able to serve the windward from a place of operation within the region. A survey conducted for the EIS indicated that close to 60% of the employees of companies that lease industrial space in the existing warehouse development reside in the greater Kailua–Kaneohe region. Furthermore, about 85% of the companies presently leasing space are smaller companies with up to nine employees. Those companies typically operate closer to the place of residence of the proprietor. It is expected that this trend will continue also in the future. There can of course be no assurance that companies which serve an island market will not seek space in the proposed industrial park. In the end, the location of the park and the resulting advantages in regard to costs and convenience of employment and service providers closer to home, will be the determinate factors that mostly windward companies will seek to lease space in the proposed light industrial park.

Speaking about the future of business cannot be done without considering initiatives to develop Hawaii in a more sustainable manner. Among many other good strategies to implement more sustainability in Hawaii's economy and way-of-life, it is important to bring the place of employment, commerce and recreation closer to the residents. Increased food production in Hawaii and using more indigenous forms of energy will lower the amount of shipping outside products and energy to the islands. Lowering transportation fuel in the future will be a key objective as the world transitions away from conventional forms of energy; where petroleum plays a key role. Since Hawaii is enormously dependent on imported petroleum such measures that decrease transportation fuel and fuel for electricity generation will need to be implemented at a larger scale in Hawaii. The proposed project of providing more industrial space at a location where it is urgently needed will assist Hawaii's economy and residence in reaching more sustainability.

The key challenge for the proposed light industrial park is to implement the project, which obviously creates significant benefits of the community, using low impact building technologies and thereby lowering the impacts to the environment and the community as much as is economically feasible.

Wastewater treatment and Disposal

Consultations with the DoH wastewater branch have determined that the proposed on-site wastewater treatment design would be consistent with standards and that a system using the proposed number of individual treatment units would approved. The current on-site wastewater treatment for existing warehouses within the upper portion of the site is using conventional septic systems. The new warehouse that will be built within the upper portion of the site will also treat the wastewater with conventional septic tanks. Percolation tests have been conducted before construction of these septic systems and the tank capacity and dimensions (e.g. hydraulic loading) of the leach fields concur with the code requirements.

For the lower portion of the proposed site warehouses will collect wastewater in conventional septic tank, one septic tank per approximately two warehouses (depending on the size of the warehouses). The individual septic tanks will be connected via a septic tank effluent pumping (STEP) systems. The effluent within the STEP system will be conveyed to two or more alternative septic systems at the perimeter of the development footprint in the lower portion of the site. The type of alternative septic system selected for the lower portion of the proposed site will use recirculating sand filters, which add aerobic digestion, filtration and adsorption processes to the treatment steps in conventional septic systems. Alternative septic systems with recirculating sand filters and an anaerobic sump pump are highly efficient and robust wastewater treatment systems, which, according to the EPA, have significantly higher BOD, TSS and nutrient removal rates than conventional septic systems.

Furthermore, since the treated wastewater effluent will be used for drip irrigation as the preferred below ground disposal technology of choice, the filtered effluent will offer little operational difficulties such as clogging and poor distribution due to organic overloading. As pointed out in the DEIS the location of effluent injection, e.g. application in irrigation, will be at the perimeter of the lower portion of the site. Landscaping will occur in these perimeter areas and the configuration of the effluent injection fields will be in accordance with standard requirements, including the require setback from wetlands and streams.

NPDES Permits for Discharges of Stormwater Associated with Industrial Activities

The EIS discussed issues of stormwater associated with industrial activities and states that no business activities in the future development would have pollutants exposed to direct rainfall, since all business activity would be conducted within the warehouses, and therefore businesses would be exempt from the NPDES permit requirement of stormwater discharge that is associated with industrial activity. In cases where precipitation could come into contact with listed equipment and/or stored agents the operator will need to communicate with DoH to satisfy all NPDES permit requirements.

Stormwater and Non-stormwater discharges from other Point and Nonpoint Sources

The EIS listed the underground injection control as a “possible” permit requirement. At this point it is not anticipated that such a permit will be required under the current design of the proposed light industrial park. Therefore the underground injection permit will be removed from the list of possible permits.

Uncertainties of the site details, input rates and cumulative impacts

The expected quantitative and qualitative levels of impacts delineated in the EIS are based on the layout and configuration of the proposed project resented in the concept design of the EIS. Since the EIS is only the first step in the permitting process the project design will be refined for the subsequent zone change request and SMA permit application.

Specifically, an updated Materplan will be developed in conjunction with the zone change request. The updated Masterplan will be provided more detailed design information than the concept design of the proposed light industrial park, such as updated site plans, updated drainage system, revised traffic analysis, rainwater harvesting system, identification of the load bearing capacity of the soil on the former landfill, and assessing the capacity of installed photovoltaic energy generation. The updated Masterplan is delineated in the FEIS as an “unresolved issue”.

Furthermore, as you recommended, the FEIS contains a discussion of cumulative impacts. This discussion is resented in the new Section Six of the FEIS.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

Hawaii's Thousand Friends

25 Maluniu Ave., Suite 102., PMB 282 • Kailua, HI 96734 • Phone/Fax: (808) 262-0682 E-mail: htf@lava.net

March 28, 2011

Letter No.14

Mr. Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P O Box 283267
Honolulu, Hawaii 96828

Subject: Kapa`a Light Industrial Park in Kailua
Draft Environmental Impact Statement

Hawaii's Thousand Friends has the following comments, questions and concerns regarding environmental impacts from the proposed industrial park expansion and zone change requested in this DEIS.

To understand the single and cumulative environmental impacts on Kapa`a Stream and Kawainui Marsh it is important to know the history of the 853-acre Kapa`a Valley where the Kapa`a Industrial Park is located.

- In 1949 Kapa`a Quarry operations began and farming was still active.
- In 1952, a raised roadbed Kapa`a Quarry Road segregates approximately 35 acres of wetland from the main Kawainui Marsh.
- In1965 now fallow agriculture land and enclosed 35-acre wetland area became a refuse dump. Overburden from the quarry was used to cover the refuse. The fill raised the land level an estimated 6-20 feet over about 23 of the 35 acres in the lower wetland area. Immediately south of this filled refuse area, overburden from the quarry created a flat 22-acre plateau at an elevation of about 40 feet over the previous agricultural lands and stream channel. The fill pushed the streambed near its present course and isolated the drainage canal/pit along the quarry road from any surface water flow. This is the area the applicant is seeking rezoning from P-2 to I-1.
- 1970, City and County opened a controlled Kapa`a landfill within the old quarry excavation. This landfill received about 4.5 million tons of municipal solid waste until closure in 1996.

- In 1972, H-3 construction filled the eastern side of Kapa`a streambed. Numerous drainage crossings were made through the foundation of the freeway. When the section of freeway through the valley was completed, it created approximately 13 acres (2% of the watershed) of additional impermeable surface.

- In 1975 (approx.), first 2 warehouse buildings were constructed on the 22-acre quarry-fill plateau. This is the beginning of the Kapa`a Industrial Park.

- In 1990s, a dozen 2000 sq. ft. Quonset huts were constructed on the quarry-fill plateau.

- In 2010 there were 31warehouses with 283,00 sq. ft. of leasable space on the existing I-2 (Intensive Industrial) zoned 27.3 acre industrial park.

- In 2011 the applicant is seeking to expand the existing industrial park, which is zoned I-2 (heavy industrial) by requesting a zoning change from P-2 (General Preservation) to I-1 (Light industrial) for two parcels an 11-acrea area by H-3 and a 44-acre parcel next to Kapa`a Quarry Road

- The new development would add 35 new warehouses and approximately 606,000 sq. ft of industrial space and at build out the estimated added work force would be approximately 600 employees, double the number of warehouses and triple the industrial space and workforce currently there.

Kapa`a Stream

The two mile long Kapa`a Stream, adjacent to Kapa`a Industrial Park and the receiving water body for runoff and effluent from the industrial park, flows to Kawainui Marsh and beyond to the Oneawa Canal, Kailua Bay, and Pacific Ocean, has a baseflow averaging about 1 cubic foot per second beginning at an elevation of about 115 feet near the central part of the 825-acre Kapa`a watershed. During non-runoff conditions this baseflow is sufficient to feed at least two year-round pools along its length before entering a permanent channel at sea level of Kawainui Marsh.

Kapa`a Stream is a Class 2 Inland Stream (DOH Water Quality Standards §11-54-5.1). The objectives of Class 2 waters, as they apply to Kapa`a Stream, are to protect its uses for recreational purposes, the support and propagation of fish and other aquatic life, and agricultural.

Kapa`a is identified as a TMDL (Total Maximum Daily Load) Stream in order to achieve and maintain water quality standards and identify the total loads of suspended solids, nitrogen, phosphorus, and metals that can be delivered to Kapa`a Stream without violating Hawaii's water quality standards.

The 2004 DOH List of Impaired Waters prepared under Clean Water Act §303(d) identified water quality in Kapa`a Stream as impaired because of elevated concentrations of turbidity, total suspended solids, nutrients, and metals in the stream. High levels of turbidity and suspended solids have historically resulted from storm runoff and discharges of wash water from the quarry. With nutrient (nitrogen & phosphorus) and metals contamination have been found in monitoring wells around the unlined landfills adjacent to the stream. Other water contamination sources include light industry operations and erosion in upstream conservation lands.

Development in the Kapa`a 850 acre watershed in past 60 years has included:

- Major quarry activities in 2 locations
- Two municipal landfills
- One unrecorded County refuse disposal landfill
- Deposition of quarry materials over wetlands and mid-valley stream course, construction of H-3 through the center of the valley, development of Kapa`a Quarry Road and development of multiple light industrial business uses on lands filled over the historical streambed.

All these activities have had significant impacts on the stream and water quality and it is doubtful that any significant length of the present streambed is in its original condition or location.

The 2006 DOH Total Maximum Daily Loads (TMDLs) for Total Suspended Solids, Nitrogen and Phosphorus in Kapa`a Stream Report set forth a roadmap to improve water quality by requiring the respective permittees, the City and State DOT, to develop Wasteload Allocation (WLA) implementation and monitoring plans for no more than one newly approved TMDL submittal per year.

Given the protected status of the Kapa`a Steam and receiving waters of Kawainui Marsh and the magnitude of government and community resources already dedicated to repairing and managing these wetlands, it was hoped that the permittees would address each of the Wasteload Allocations (WLA) identified in the report within one year of the approval of the TMDLs.

Each of the WLA was to identify specific actions targeted to achieving the needed reductions of total suspended solids, total nitrogen, and total phosphorus. Each of the WLA monitoring plans is required to specify the water quality monitoring and activity tracking necessary to demonstrate compliance with the assigned WLAs.

In addition the 2006 report recommended that other NPDES permits that regulate discharge to Kapa`a Stream be revised to incorporate provisions consistent with the WLAs.

The DEIS does not discuss the industrial parks current storm water discharge amounts and contents that discharge into Kapa`a Steam. Nor does the DEIS provide an inventory of tenants of who are covered by or required to be covered by NPDES permits especially those with related industrial discharges. Is the industrial park required to develop Wasteload Allocation implementation and monitoring plan(s)? If yes, is that plan(s) available for review? If not, the applicant must explain why a WLA is not required for the industrial park and individual businesses. Until this information is provided this DEIS cannot be accepted.

2.9.2 Making Changes to the Drainage Canal Along the Quarry Road

The space mauka of the Quarry Road, illustrated by Figure 2-12, holding extraordinarily pollute waters and algae has never been described as a "canal" or "drainage canal" in other projects or proposed actions taken or to be taken at this location by its earlier owner/users, such as Ameron Kapa`a Quarry (formerly located at the proposed site), or the Honolulu Department of Public Works (DPW) who used the former quarry pit and the adjacent Kapa`a hillside for the Kapa`a landfill, beginning in 1972. Indeed, this label was not given to these stagnant, fetid waters mauka of the Quarry Road in the federally funded Coastal Zone Management Fund, entitled as the "Kawainui Management Plan" created by the State Department of Planning and Economic, Development (chaired by the state's chief planner, Hideto Kono), aided by representatives of the Army Corps of Engineers, the State agencies of DOFAW and the Historic Preservation Office, with citizen groups such as The Outdoor Circle and the Congress of the Hawaiian People. Hawaii's Thousand Friends is unaware that any of the subsequent Kawainui Plans created jointly by the U.S. Army Corps of Engineers and the State lead agency, DOFAW, have ever called these waters a canal.

The waters are there because DPW, in order for them to be in concert with the federal Clean Water Act, were required to prepare lined pits below the monumental landfill, to allow liquid drainage from the landfill to be scientifically tested regularly in order that its many and varied pollutants were known and dealt with in order that they might not reach the Kawainui Wetlands. The materials contained in the landfill were known to contain materials no longer legal to be placed in landfills.

Ownership of the responsibility to protect Kawainui's waters go with the land owner, and we further believe these pits (NOT a canal) need to continue to be re-lined (to prevent leaching) and that samples be taken for laboratory testing on a regular basis; the results to be provided to state and federal agencies charged with protection of the Kawainui waters, and to the benefit of the public investment in the area. The Marsh was purchased with federal funds on behalf of the four endangered wildlife species whose habitat it is. Additional public funding has been provided to DOFAW and the COE for long-range planning for limited public use at Kawainui. Thus, tax-supported agencies have embarked on marsh restoration through eliminating uses harmful to its waters. Heretofore, the County has NOT spent "public money ... continuously.... to improve its appearance," but because it was mandated to prevent leaching or run-off of contaminants into the protected wetlands. The public federal and state funds already expended for the purchase and protection of the Kawainui Wetlands and its waters, which drain to the sea, cannot be compromised for an adjacent and private profit purpose.

That the alternative the present landowner requests, to fill the existing drainage pits (NOT a canal!) and manipulate the waters via "A drainage pipe ... installed at the bottom of the canal trough to collect and convey drainage water towards the Kapa`a Stream" is wholly unacceptable. His intention to "beautify" an area of interest to him begs his larger need to protect public property and to realistically deal with the undesirable fact that this great landfill will continue to leach its noxious pollutants into the marsh for years to come, facts he must accept and deal with. His proposal, in effect, is an opportunistic request that he be allowed to shirk his own responsibility for protecting Kawainui from further man-initiated damage.

This plan will not enhance the decades-long public expectations for the publicly-owned and revered "Kawainui Cultural, Archaeological and Historic District," now also recognized under the Ramsar Convention as *A Wetland of International Importance*.

Specific Questions

1. The DEIS is silent on whether all or portions of the industrial park businesses will be opened 24 hours or what the hours of lighting at the park would be. How might 24 hour lighting affect migrating water birds and birds in Kawainui Marsh? How would 24-hour noise pollution affect nesting birds?
2. Since Koolaupoko is projected for negative growth for the foreseeable future where is the need to change a 22-acre area and a 44-acre parcel from P-2 to 1-1 Light Industrial and what population will the new industrial park serve?
3. The DEIS states "Air quality impacts would be primarily from increased traffic. Some minor air impacts within the proposed project could result from dust and the operation of engines. Major air impacts are expected from diesel operated vehicles."

   This statement seems to only refer to projected traffic within an expanded industrial park and trucks that currently use Kapa`a Quarry Road. There is no mention of other Quarry Road users and the cumulative impacts such as the possible 100 trucks operating 20 hours a day for 6 months carrying blue rock to Kapa`a Quarry from the Kaneohe-Kailua Wastewater Conveyance and Treatment facilities Project if the Oneawa Hills alternative is chosen. Before the DEIS is approved **all** cumulative impacts from diesel operated vehicles on air quality must be evaluated for impacts to Kapa`a Stream and Kawainui Marsh

4. The DEIS states that "The development of the landfill area will reduce problems of soil erosion and resulting runoff" but fails to explain how soil erosion and runoff will be reduced when the current pervious surface will be converted to a impervious surface. Since soil runoff eventually ends up in Kapa`a Stream and Kawainui Marsh a comprehensive explanation of this statement must be provided before this DEIS can be accepted.
5. The DEIS states "Drainage will be by shallow swales in the roadways, below ground pipes and channels. There will be two detention ponds, sized according to code, which will drain the storm water from primary treatment in the detention

ponds into the open space north of the existing development" but fails to identify where the "open space" is and whether the open space is Kapa`a Stream corridor as is now the practice.

6. Section **2.9.6 Development of the upper portion without approved zone change** identifies 6.2 acres of presently graded land in TMK 4-2-15:008 and zoned I-2 (Intensive Industrial) that could be paved and 9 new warehouses could be built adding a total floor space of 182,000 sq. ft. In other words if this DEIS and the re-zoning are not approved the landowner is not denied use of his property.
7. The DEIS states that the industrial park is not connected to the municipal sewer system since there is no gravity sewer or forced wastewater main serving the property or along Quarry Road. If the Oneawa Hills route is selected for the Kaneohe-Kailua force main then there is an opportunity for the industrial park to hook up to that force main. This opportunity must be explored before this DEIS is accepted because wastewater cannot continue to be dumped into Kapa`a Stream and migrate to Kawainui Marsh and Kailua Bay.
8. The DEIS states that that there will be regular inspection of erosion and sediment control BMPs especially after each rainfall but is silent on who will conduct the inspection and what is the course of action if any of the containment procedures is breached. Before this DEIS is accepted this information must be provided to ensure that Kapa`a Stream and Kawainui Marsh are protected against any adverse and unnecessary sediment loading.
9. The DEIS states that 21.7 acres would be converted from pervious to impervious surfaces – 10.6 in the upper section and 11.1 in the lower portion and that rain and runoff from "impervious surfaces in the upper portion would be directed to the Kapaa Stream corridor where the water would infiltrate and recharge the groundwater table in the wetland area". It is unacceptable to keep directing polluted runoff into Kapa`a Stream. As an impaired waterbody under the Clean Water Act and a TMDL site all efforts must be made to improve Kapa`a Stream water quality and reduce total suspended solids, total nitrogen, and total phosphorus levels. Kapa` a Stream cannot continue to be the repository for polluted runoff and effluent.
10. The DEIS states that the lower 44-acre portion is a mixture of landfill and quarry material. So the acknowledgement that "Potential building limitations for soils might include limitations to load-supporting capacity of soil within the lower portion" leads us to believe that soil testing for stability, depth and weight capacity for this and other areas has not been conducted. In other words the applicant is seeking a zone change before know if the ground is suitable for development. Information on the stability of the soil is vital and must be provided before this DEIS is accepted and zoning changes approved. This information is vital because once zoning is changed to allow industrial uses there is no denying development no matter how unstable the soil.
11. The DEIS states "It is **assumed** that the overall removal rate of storm water pollutants by the combined system of pre-treatment units and extended detention ponds would exceed 80%." (Emphasis added). The DEIS is a disclosure document and outcomes should not be assumed but only facts should be presented. Before this DEIS is accepted a comprehensive analysis of ALL pre-treatment units and detention ponds must be conducted and included in the FEIS.

12. The DEIS acknowledges that the "US Fish and Wildlife Service has indicated the possibility of an impact on the water bird community, especially attracting endangered water bird species to water ponds even those ponds which have only intermittent free water surfaces. The final design of the detention ponds would consider mitigation and avoidance measures to counter attraction to the detention ponds" yet there is no description of the types of mitigation and avoidance measures that would be used. As more and more waterbirds are attracted to newly created wetlands and habitat in Kawainui Marsh the more likely the waterbirds are to be attracted to the detention ponds. Before this DEIS is accepted a full and comprehensive description of mitigation and avoidance measures must be provided, reviewed and accepted by the U.S. Fish and Wildlife Service.
13. Section **4.8.2 Impacts on Wastewater System** states that septic tanks with leach fields will be used but the DEIS does not identify where the leach fields will be located and their impact(s) on the environment. This information must be provided and evaluated for impacts to the environment before the DEIS is accepted.

    This information is critical in light of another statement in the DEIS that "On site wastewater treatment systems in the lower portion would be closer to surface and ground water than such systems in the upper portion. The infiltration points of several leach fields in the lower portion of the site would have short vertical and horizontal distances to travel, and there would be a probability of insufficiently treated wastewater reaching the ground table and/or seeping into the Kapaa stream corridor or drainage canal." (Emphasis added)

    With information in the DEIS suggesting that "insufficiently treated wastewater" could reach Kapa`a Stream or the "drainage canal"/pit which leaches into Kawainui Marsh Hawaii's Thousand Friends once again stresses the importance of the industrial park hooking up to the City's municipal sewage system.

    It is the City and the landowner's, applicant, responsibility to ensure that the "drainage canal"/pit is lined and the water tested so that pollutants are prevented from entering Kawainui Marsh and eventually migrating into Kailua Bay. It crucial for the City and the applicant to create a plan outlining a water testing schedule and explaining how and when the canal/pit will be lined before the DEIS is accepted.

14. The DEIS clearly misses the point of assessing cumulative impacts from not only within the project area and but also including actions/projects around the study area when it states "Both action alternatives could potentially result in cumulative impacts if they were adding to impacts generated by other future projects" and "Since no additional project of the nature of the proposed project or other development project is known that might be implemented in the vicinity of the proposed project no cumulative impacts are expected under both action alternatives."

    The DEIS does not take into consideration cumulative impacts from construction of restrooms with leachfields and truck traffic associated with the expansion of the model airplane park directly across Kapa`a Quarry Road from the proposed industrial park expansion and within the boundary of Kawainui wetland.

Nor does the DEIS consider additional heavy truck traffic from the Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project should Oneawa Hills be selected as the preferred alternative or increased truck and car traffic as DLNR's project to open wetlands at Kawainui Marsh for waterbird habitat proceeds and more and more people visit the newly created wetlands.

The DEIS does not take into consideration traffic to and from the existing transfer station and quarry nor does it explore the cumulative impacts should Kapa`a Quarry be chosen as the next landfill site.

Before the DEIS can be accepted all impacts from within the existing industrial park and proposed expansion and outside current uses and proposed projects must be evaluated for their cumulative impacts on Kawainui Marsh.

15. In a 7/28/10 letter the Army Corp recommended that a thorough aquatic resource survey, describing any wetlands, drainage ditches, gulches, gullies, streams on-site. Was such a survey conducted?

16. In a **8/11/10 letter the DOH Safe Drink Water Branch** recommends that the drinking water and non-potable irrigation water systems be carefully designed and operated to prevent cross-connections and backflow conditions. They went on to "strongly encourage" the project owners to develop a water system management plan detailing the quality of the non-potable water, who will be responsible for and how the drinking water and non-potable systems will be operated and actively managed. Did the applicant create the recommended plan? It was not in the DEIS.

17. **It is unacceptable to state,** "Due to the considerable dimensions of the marsh, most of the environmental consequences of the proposed project would only affect a small part of the marsh. The impacts and mitigation measures discussed hereafter are therefore only limited to an area of the marsh that is directly adjacent to the proposed site."

This comment treats Kawainui, the receiving water body for all of Kapa`a Valley, like it is an inanimate object and not influenced by actions mauka of the marsh. This is totally wrong.

While separated from what is now considered Kawainui Marsh, there once was a 35-acre wetland mauka of Kapa`a Quarry Road which was part of the same wetland now called Kawainui Marsh. In the 1960s the 35-acre wetland was used as a landfill and now the applicant is seeking to use this former wetland turned landfill as an industrial park. Though artificially bifurcated by Kapa`a Quarry Road Kawainui is still connected by tidal action and water leaching under Kapa`a Quarry Road.

At about 1,000 acres Kawainui is the largest remaining emergent wetland in Hawai`i and Hawaii's largest ancient freshwater fishpond. Kawainui provides habitat for four of Hawaii's endemic and endangered waterbirds, and a migration path from the ocean to mountain streams for indigenous and endemic amphidromous fish and crustaceans, including indigenous goby, endemic goby, endemic eleotrid and endemic shrimp. Kawainui contains archaeological and cultural resources, including ancient lo`i and is eligible for listing on the National Register of Historic Places. Kawainui/Hamakua Marsh Complex is Hawaii's and the Pacific's only *Wetland of International Importance* under the Ramsar Convention.

Kawainui has undergone significant decline in area and quality. In general, neither the quality of water of the streams entering Kawainui nor the quality of the estuarine water draining the marsh meet Hawaii's Water Quality Standards. In addition the marsh contains heavy metals, including chromium, lead, and mercury.

Needless to say this DEIS and the project that is proposed is totally deficient in scope and understanding of the surrounding environment. With this statement there is no way this DEIS can be accepted as complete and comprehensive.

In conclusion, it is unwise to sacrifice the public interest that is vested in preservation land, Kapa`a Stream and Kawainui Marsh in order to simply accommodate financial interests. Note that no matter what the promises of the petitioner are, there is no control over anything once the re-zoning is granted. All and any uses under I-1 Industrial are allowed.

The risks to Kawainui Marsh and Kapa`a Stream are manifold and Hawaii's Thousand Friends does not see how they can be mitigated. Traffic impacts on Kawainui cannot be mitigated and neither can the impact on the view plains.

Increased runoff and effluent continually 365 days a year migrating forever into Kapa`a Stream and Kawainui Marsh cannot be mitigated.

Hawaii's Thousand Friends cannot support giving over preservation land to help destroy what is a scenic resource and expose Kawainui Marsh a *Wetland of International Importance* under the Ramsar Convention to the pollution risks associated with the proposed expansion of industrial use. Future generations would be sure to exclaim, "How could they let that happen." And the "they" would be us.

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September 14, 2011

Response to letter No.14

Hawaii's Thousand Friends
25 Maluniu Avenue, Suite 102, PMB 282
Kailua, Hawaii 96734

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letters dated March 28, 2011

Dear Sir or Madam,

Thank you for your comments and recommendations in your subject letter.

In this letter we offer our responses to your comments and recommendations, grouped according to the issues discussed in your letter.

The applicant is a strong supporter of community activities that preserve the environment and particularly the Kawainui Marsh and the adjacent land and wetland areas, since they are important for our community. On many occasions the applicant has donated financial and logistic assistance to community groups who work for improvements and conservation of the environment and foster public information and educational opportunities.

While the applicant wants to develop the proposed site into a light industrial park that can provide urgently needed industrially zoned land to businesses in the greater Kailua and Kaneohe region, he has committed to develop the proposed industrial park along comprehensive low impact development plan, that is designed to achieve the Leadership in Environmental and Energy Design (LEED) Silver certification, in order to minimize impacts to the environment and community to the extent possible.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins.

The following are our responses to the comments in your subject letter, grouped according to the issues discussed in your letter.

On the first two pages you provide a description of the historic development of the Kapa'a valley, including the proposed site, and the proposed development goals of the proposed project, the Kapa'a Light Industrial Park. We would like to add to your description that the of the applicant intends to build a light industrial park on about 26.5 acres of land that is located within approximately 58 acres of land that is currently zoned as General Preservation. In addition, the applicant plans to expand the existing industrial warehouse development because the Koolaupoko region is significantly undersupplied with industrial zoned land and many windward companies cannot find space to expand and relocate within the region.

On page two and three your letter discusses the Kapa'a Stream with regard to its function as the main discharge for the Kapa'a watershed area. Your letter quotes the 2006 State of Hawaii Department of Health (DoH) Total Maximum Daily Loads (TMDLs) for Total Suspended Solids, Nitrogen and Phosphorus in Kapa'a Stream report and suggests the implications of the TDML program for the Kapa'a Stream. Our analysis of the contribution of the proposed site to the overall discharge in the Kapa'a watershed and the Kapa'a Stream uses data on the hydraulic model, assumptions and result reported in this 2006 DoH Study. The quantity and quality of stormwater runoff from the proposed site would be significantly reduced in comparison to the current situation because presently un-stabilized soil areas would be either stabilized with added vegetation or with pervious and impervious pavement and a host of structural BMPs would be installed, as further delineated later in this letter.

Under the Preferred Alternative of the proposed project and in the lower portion of the site, where the soil erosion potential is larger than in the upper portion of the site, analysis of the future runoff indicates that the TSS loading would be reduced by at least 80% relative to the current levels of TSS. This reduction of runoff loading is achieved by a combination of structural and non-structural BMPs. The non-structural measures include comprehensive soil stabilization on all parts of the development. Under the current situation all soil in the lower portion of the site is not stabilized. This can result in soil erosion, entrainment and subsequent discharge of suspended solids into receiving water (e.g. Kapa'a Stream and wetland area). Structural BMPs will comprise inlet filter basins and sedimentation traps that will also remove all floatables and oil and grease from the runoff before the runoff enters detention ponds (e.g. the below ground detention ponds which also function as rainwater catchment).

Stormwater runoff stored in the detention ponds is then released to the receiving water with low discharge rates over a 24 to 48 hour period, thus in a manner the shaves off high run and thus significantly reduces streambed erosion and subsequent sedimentation. As a change from the original concept design the applicant will now utilize below-ground detention basins since all open water surface ponds should be avoided to protect endangered water birds.

The analysis conducted for the EIS shows that the discharge of TSS and nutrients will be reduced to such a level that conforms to the objectives of the TDML study and program. The applicant supports effective initiatives and programs to improve the quality of aquatic water bodies in the vicinity of the proposed site, especially the Kapa'a Stream which runs through the applicant's property for approximately one fifth of its entire stream length.

The applicant was in contact with the DoH and discussed proposals to improve the quality of the Kapa'a Stream corridor by means of a restored wetland area and an integrated wildlife habitat. This project was discontinued because of concerns that the removal of a significant amount of wetland vegetation would decrease the water treatment capacity of the lower stretches of the Kapa'a Stream. The applicant is still very interested and will continue to work with the community as well as the state and federal agencies to implement initiatives that improve the environmental and water quality of the land and he aquatic bodies in the vicinity of the proposed projects site.

Page 4 – Making Changes to the Drainage canal Along the Quarry Road

We understand that you do not agree with our use of the designator "canal" for the open drainage feature along the quarry road, just adjacent to the proposed site. We believe that our use of the term "canal" to describe this water body is consistent with literature cited in the DEIS. Furthermore, our use of the term "canal" or "drainage canal" has not been objected to in communication with other County, State or Federal groups.

The drainage canal is referred as a "canal" in the 2006 TDML report issued by the DoH (DoH, 2006); this report that has been quoted by you above. The purpose of the canal, in the watershed model of the DoH report 2006, is to drain stormwater from the sub-basin K of the watershed to the Kapa'a Stream. The sub-basin K represents the lower portion of the proposed site. In the hydraulic model of the DoH report the stormwater flows from the canal to the Kapa'a Stream, where the confluence of the drainage canal and the Kapa'a Stream is just upstream of the culvert under the Kapa'a Quarry Road.

Discussions with environmental experts, such as the University of Hawaii, Water Resources center, have corroborated our understanding that the current function of the drainage canal is to drain stormwater from the area mauka and adjacent to the lower portion of the proposed project site and convey it to the Kapa'a Stream, from where it drains into the Kawainui Marsh. We could not ascertain if the initial intent of the drainage canal at the time of its construction was different from the current function as an unlined drainage canal.

Moreover, your reference to the canal as a lined pit into which water would drain and be contained, without drainage, raises the question of how the water captured in the lined pit would be removed. Since the lining would prevent infiltration and there would apparently be no direct exchange with the Kapa'a Stream, the only way to remove water volume, other than periodic removal of water from the area by means of a tanker truck, would be by means of evaporation. Since it has been reported that surface runoff from the adjacent roads and the site enters the currently unlined drainage canal and causes flooding on adjacent roadways, it appears that lining and hydraulically isolating the "pit" would create more problems rather than improve the situation.

Under the Preferred Alternative less water will infiltrate into the landfill area and thus less seepage can be expected to leave the landfill body and enter the drainage canal. Therefore less potentially contaminated waters would enter the canal and eventually flow towards the Kapa'a Stream.

The referred to "alternative" of replacing the canal with the drainage pipe that would discharge seepage and surface runoff to a point just upstream of the confluence of the Kapa'a Stream and the drainage canal is a possible future scenario that has only been stated as a possible scenario. The applicant does not intend to further analyze or implement such a scenario, since the applicant does not intend to alter the dimensions and geometry of the drainage canal. Thus, the "alternative" is a hypothetical situation introduced by the applicant in conjunction with plans by the community to build a marsh perimeter bike and pedestrian pathway within the space that is currently occupied by the canal.

To reiterate, the current development would not seek any changes to the drainage canal. A possible future alternative configuration of the drainage canal, e.g. placing a drainage pipe in the gravel filled current canal bed, would focus on increasing the safety of the quarry road and creating space for the planned Kawainui Marsh perimeter pathway. The marsh perimeter path masterplan suggests that a portion of the perimeter pathway would use land that is currently occupied by the drainage canal. The applicant would support and potentially co-fund to install an approximate 1,300 long portion of the marsh perimeter path on his property along the drainage canal.

The applicant will not seek any changes to the drainage canal against the expressed intentions of the community. The assertions made in the letter that the applicant is using an "opportunistic request" to change the drainage canal in his favor portrays the applicant in an unduly negative light. It should be noted that the applicant has been actively supporting community efforts to improve the marsh and mitigate impacts. For example, in 2010 the applicant used his personnel and heavy equipment to remove about 40 abandoned cars along the quarry road and therefore avoid potential oil and other pollutants entering the marsh.

The applicant also recently donated about two acres of his property for the use of a community group that provides educational and recreational opportunities at the south western perimeter of the marsh. He actively supports the initiative to develop a cultural center at the perimeter of the marsh that would provide educational facilities and opportunities to residents and visitors alike. Therefore, while your letter might suggest that the applicant's plan to develop a portion of his property as a light industrial park is not enhancing public expectations for the revered "Kawainui Cultural, Archaeological and Historical District", the active support of the applicant for such initiatives and his commitment to develop with low impact technologies is a clear indication of his intentions to conserve our precious natural resources. The applicant appreciate if his intentions to invest in "green" developments were well received by the community and groups such as Hawaii's Thousand Friends.

Specific questions:

Question 1	The DEIS is silent on whether all or portions of the industrial park will be opened 24 hours or what the hours of lighting at the park would be. How might 24 hours lighting affect migrating water birds and birds in the Kawainui Marsh? How would 24-hours noise pollution affect nesting birds?
Our response	The future composition of tenants (e.g. businesses) in the proposed extension of the existing industrial park is expected to be similar to the current mix of tenants and businesses. The current tenants represent businesses, which operate mostly during the day, such as small wood manufacturing, building service and repair shops/businesses. While a certain level of activities during the night cannot be ruled out there should be very limited activities in the industrial park during the night, thus noise impacts should be very low and light pollution impacts should be limited, further reduced by the planned mitigation measures. The proposed development will implement active mitigation measures to

reduce light pollution as part of the LEED Silver certification goal of the development. The sustainable design approach of the EIS delineates mitigation measures how light pollution from interior and exterior light sources will avoided to achieve the most stringent light pollution reduction standard (e.g. IESNA RP-33 standard LZ zone "dark") set forth by the Illuminating Engineering Society of North America (IESNA). Typical developments in urban areas (e.g. the propose site is located in the State Urban district) would require less stringent light pollution mitigation efforts to achieve LEED credit, but the applicant has opted to go beyond the standard mitigation strategies for urban developments since the proposed development is close to the Kawainui Marsh.

Question 2	Since Koolaupoko is projected for negative growth for the foreseeable future where is the need to change a 22-acres area and a 44-acre parcel from P-2 to L-1 Light Industrial and what population will the new industrial park serve?
Our response	According to a recent estimate by DPP the Koolaupoko population will shrink by about 1,000 residents through the year 2030, due to outmigration from the area and other demographic changes in the population of the region (i.e. lower birth and increased death rates per number of residents due to an older population). This is a noticeable but not a significant change from the present approximately 118,000 residents that reside in the Koolaupoko region.

The need for the proposed project is not motivated by a significant increase in population but by the fact that the Koolaupoko region is currently significantly undersupplied with industrial space. Such industrial space is needed by companies that provide typical services to the region from within the region. According to the market study conducted for this EIS process the Koolaupoko region provides only about 20% of Oahu's average per capital allowance of industrial space (Note: Oahu's per capita allowance is the available industrial space on Oahu divided by the number of residents).

Using Oahu's average allowance of industrial space of approximately 39 square foot per resident the existing industrial space in the Koolaupoko region serves only about approximately 24,000 residents. Thus at present there is an amount of industrial zoned space missing in the region that is equal to serving about 90,000 residents. Adding the approximately 600,000 square feet of industrial space in the proposed light industrial park would lower the under supply from 90,000 to 75,000 residents. Therefore the proposed addition of 606,000 would serve approximately 15,500 additional residents in the region, using the average Oahu availability of industrial space. In summary, the proposed addition of approximately 606,000 square feet of industrial space would still not be enough to provide the service required to adequately supply the region.

Direct consequences for companies, which wish or serve the region but do not have their place of business within the region, are long commutes and drives for their employees and customers who are residing in the Koolaupoko region, respectively.

Impacts that result from long commutes and trips required to reach businesses that cannot find adequate space within the region include, among others, increased traffic with associated discharge of greenhouse gases and consumption of petroleum as well as increased costs for businesses employees and customers.

Question 3	Recommendation to address cumulative impacts
Our response	Cumulative impacts have been be addressed in the new comprehensive Section 6 of the FEIS.
Question 4	The DEIS states that, quote:"The development of the landfill area will reduce problems of soil erosion and resulting runoff' but fails to explain how soil erosion and runoff will be reduced when the current pervious surface will be converted to an impervious surface. Since soil runoff eventually end up in Kapa'a Stream and Kawainui Marsh a comprehensive explanation of this statement must be provided before the DEIS can be accepted.

Our response

The sustainable design approach for the lower portion of the proposed light industrial park delineates the measures that will be used to significantly reduce soil erosion and avoid polluted run-off from entering the receiving waters without adequate treatment. At present the pervious surface in the lower portion of the proposed site does not have permanent vegetation, thus making the soil prone to erosion and increasing the probability of runoff containing entrained soil particles at locations of significant slopes and surface water flow in storm events.

The proposed measures to avoid soil erosion and entrainment of soil and their subsequent discharge to the receiving waters include comprehensive vegetative cover for soil stabilization, installation of sedimentation traps that also remove all floatables and oil from the runoff, detention ponds and catching a significant portion of regular storm events and using it for irrigation and thus stimulating evapotranspiration rather than runoff. All of the proposed measures working in concert offer an advanced and comprehensive strategy of stormwater treatment; the measures are described in detail in the DEIS.

When referring to stormwater runoff there are two parameters, quality and quantity of stormwater runoff that affect the overall magnitude of the stormwater impact:

Quality of stormwater runoff: Measures to limit the pollution of the stormwater runoff are reduction of entrainment and elimination of entrained material from the runoff. Reduction of entrainment is achieved by stabilizing soil areas as well as avoidance of solid debris and harmful liquid substances that can be entrained. Elimination of the entrained material can be achieved by installing the proposed pre-treatment units upstream of the detention ponds, which eliminate all floatable debris, settable sediments and oil & grease contained in the runoff.

Quantity of stormwater runoff: Measures that are proposed for the development include detention ponds that catch high discharge rates and release water subsequently at lower discharge rates from the temporary storage volume of the detention ponds. Furthermore the proposed stormwater management includes catchment and use of stormwater for irrigation and disposal on vegetated areas, mainly at the perimeter of the development footprint (e.g. restored habitats) as well to less degree inside the development for landscaped areas. In addition, some of the precipitation is harvested and used in the buildings for wastewater conveyance and other appropriate greywater applications. The wastewater is then treated and subsequently distributed on the vegetated area at the perimeter of the development. Water is lost by evapotranspiration and only a fraction of the water that is distributed on the vegetated area would be surface runoff; which in turn has passed through a biological filter of denser vegetation.

In addition to surface runoff also seepage out of the landfill can add to the overall stormwater impact. The proposed site is a former landfill area. Avoiding rainwater infiltration into the landfill would avoid problems with seepage running out of the landfill. Allowing water into a landfill is typically a means to accelerate decomposition of the organic waste and reach equilibrium in regard to chemical and biological processes within the landfill body. The landfill that will be the future project site was closed to landfill deposits of quarry and domestic waste several decades ago and therefore it can be assumed that the landfill body has reached a chemical and biological equilibrium with most of the organics being decomposed.

Infiltration of precipitation into the landfill would serve the function of avoiding high surface runoff rates and retaining the rainwater inside the landfill for subsequent release at lower discharge rates. Since the quality of the runoff out of the landfill body could entrain and transport smaller soil particles, especially at higher flow rates, it is of advantage to limit the amount of water that infiltrates into landfill body.

Therefore, a combination of controlling and treating all of the surface runoff, using captured rainwater for irrigation and allowing only a portion of the precipitation to infiltrate into the landfill is deemed the preferred approach to a low impact stormwater management system.

This comprehensive stormwater treatment approach is part of the sustainable design approach of the proposed development. In the LEED certification strategy the stormwater management approach will be submitted to earn exemplary performance credits for low impact use of important water resources.

Since the concept design, that has been developed for the EIS is being

P.O. Box 283267, Honolulu, Hawaii 96828, USA Tel: 808-265-6321 email:sustainabledc@gmail.com www.sustain-HI.com

	elaborated and refined as the project progresses, an updated project Masterplan will be developed in conjunction with the zone change request. The identification of soil bearing capacity of the landfill in the lower portion of the site will be part of the updated project Masterplan.
Question 5	The DEBE states "quote: Drainage will be in shallow swales in the roadways, below ground pipes and channels. There will be two detention ponds, sized according to code, which will drain the stormwater from primary treatment in the detention ponds into open spaces north of the existing development" but fails to identify where the "open space" is and whether the open space is Kapa'a Stream corridor as is now the practice.
Our response	The proposed drainage system of the upper portion of the proposed site (e.g. portions of the parcels TMK 4-2-15:001 and 008) consists of a combination of stormwater surface swales or channels that convey the stormwater to a two-step treatment system consisting of pre-treatment catchment unit and detention ponds. Downstream of the detention pond the stormwater is then discharged to open space adjacent to the development. The current design calls for discharge of the stormwater from the detention pond into the Kapa'a Stream corridor, via an armored spillway to the valley floor in order to avoid erosion of the sloped area below the detention pond. The current design follows established good management practices and lowers the impacts of stormwater discharge into the receiving water. An alternative to discharging the stormwater from the detention pond into the Kapa'a Stream corridor would be to use the settlement/flood basin that is located at the north-west boundary of the proposed site, within parcel TMK 4-2-15:001. This area could receive stormwater runoff from the newly developed area of the upper portion of the site. The flood basin at the west boundary of the landfill area in parcel TMK 4-2-15:001 was used for the discharge of stormwater from the upstream quarry. The stormwater discharge from the quarry entered the parcel TMK 4-2-15:001 through an energy dissipation chute and dispersed on the settlement/flood basin where the discharges water infiltrated and flowed underground to the Kapa'a Stream.

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Under this alternative stormwater management the stormwater from the entire or parts of the upper portion would be conveyed towards the settlement/flood basin. One or more pretreatment units would be installed just upstream of the discharge to the settlement/flood basin to remove all floatable debris as well as oil and grease from the stormwater runoff. Under this alternative a detention pond would not be required since the settlement basin would act as a natural flood plain.

At this point the current design approach is using the Kapa'a Stream corridor as the direct recipient of the stormwater discharge. The alternative approach of using the settling basin as the receiving area for the stormwater discharge is only mentioned as an alternative. The alternative approach has not been analyzed in detail, e.g. in regard to creating open water areas that could attract endangered water birds. It is planned to investigate this alternative drainage approach in the updated Masterplan for the zone change request.

Question 6	Development of the upper portion of the site without approved zone change – In other words if this DEIS and the re-zoning are not approved the landowner is not denied use of its property.
Our response	The applicant is presently using his property in accordance with the current land use ordinances. As the letter correctly points out, the development of industrial space within only parcel TMK 4-2-15:008 would not require a rezoning by the applicant. Limiting the development of industrial space to this parcel alone would, however, make the plan of a comprehensive industrial development impossible, thereby making it impossible to provide a significant amount of much needed industrial space to the Koolaupoko region. As a consequence of curbing the expansion of the park to only the upper portion of the park only 5,000 additional, rather than the 15,500 planned, resident equivalents in the Koolaupoko region could be served by companies leasing space in the newly developed warehouses within the already properly zoned parcel TMK 4-2-15:008. A somewhat minor remedy for the applicant would be to seek an "as high as possible" development density for the already zoned parcel to accommodate as

much industrial space as possible in accordance with land use ordinances. This approach would not be the preferred one since the project might have little space left to accommodate the sustainable and low impact building technologies that are planned under the proposed development approach.

The Koolaupoko Sustainable Community Plan has identified the need for more industrial space within the region and recommends using and expanding the area in the Kapa'a valley that is currently used for light industrial space. Therefore the plan of the applicant is in conformance with sustainability plans of the community.

While your assertion might be correct that the applicant will benefit from his commercial endeavor of developing new industrial space, it is also the community that will benefit directly from added industrial space and new businesses and keeping expanding businesses within the region. Limiting the development to only one parcel that is already zoned as industrial space would deprive the region of needed light industrial space. The key of creating a win-win situation is to react to the need for more light industrial space within the region AND to develop these industrial spaces with low impact development strategies to minimize the impacts to the environment and the community.

Question 7	Recommendation to investigate connecting the proposed site to the municipal sewage system
Our response	Connecting the proposed site to the municipal sewer system has been considered and analyzed; but is not considered as a viable alternative for the proposed project. The suggestion in your letter to connect the proposed industrial park to the new sewer conveyance that will connect the Kaneohe wastewater pre-treatment plant with the Kailua wastewater plant appears not to be technically feasible and would result in more rather fewer impacts (i.e. electric power, which is derived from imported oil, for pumping, trenching along the quarry road and through possibly residential areas, microtunneling to tie into the gravity tunnel, etc.). The anticipated completion date of the Kaneohe-Kailua wastewater treatment and conveyance project is around 2017 (according to

communication with the City and County of Honolulu Department of Environmental Services), which would make it impossible for the proposed development to have a final wastewater discharge in operation for several years. Furthermore the geometry and alignment of the gravity tunnel route below the Oneawa Hill route would require a very costly installation of an approximately 6-inch forced main. In addition to this, your suggested solution would require crossing of several streets and neighborhoods.

In the absence of a connection to the municipal sewage system, using septic systems for onsite wastewater treatment is a well-tested and reliable process of treating wastewater discharges. According to the EPA, well designed and constructed onsite wastewater treatment is a valid and environmentally friendly alternative of treating domestic and commercial wastewater.

An approximately 1.2 miles long forced wastewater main would require a significant amount of electricity (80% of the electricity in Hawaii is generated by imported oil) to pump the wastewater from the proposed site to an appropriate take-over-point of the municipal sewer systems. The effluent characteristics of the wastewater treated in the central wastewater plant would not guarantee a cleaner effluent.

Furthermore, the most likely take-over-point for the sewage that would be pumped from the proposed site would be approximately 400 feet mauka of the intersection Mokapu boulevard and Oneawa Street, at the terminus of the sewer main that serves the adjacent residential buildings. From an initial capacity estimate it is doubtful that the existing sewer system could easily accommodate the added sewage quantity.

An on-site wastewater treatment system offers advantages and environmentally friendly performance. Currently, there are seven operating septic systems in the upper portion of the development, each with an individual leach field. The vertical distance between the point of injection and saturated water layers is adequate to ensure good treatment effectiveness in the unsaturated soil below the point of injection. The additional septic systems in the upper portion of the proposed site will likewise offer appropriate site specific conditions for an effective on-site wastewater treatment using conventional septic systems. The proposed on-site wastewater system for the lower portion of the site will use septic tank effluent pumping (STEP) systems where individual septic tanks will pump their effluent to several alternative septic systems at the perimeter of the development.

The type of alternative septic system that is proposed for the project includes aerobic and anaerobic treatment process steps in addition to the standard treatment process in conventional septic systems. According to US-EPA, the additional process steps result in removal effectiveness in regard to suspended solids, organic loading and nutrients that is higher than for standard municipal wastewater treatment plants.

Therefore, summarizing, connecting the proposed site to a central wastewater treatment facility via a long force wastewater main would not result in lower impact to the environment and community.

Question 8	About regular inspection of erosion and sediment control BMPs and procedures of rectifying any breach of the containment measures.
Our response	As described in the DEIS, a soil erosion management and control plan will be developed and submitted for approval by the contractor before construction can commence. The BMPs proposed for the construction will be described in this plan and responsibility and procedure for inspection and measures in case of failure will be delineated in the plan. The contractor will be responsible to adhering to the plans and the penalties for non-compliance are significant. The inspection and maintenance of the structural BMPs during operation of the park will be carried out by or on behalf of the park operator, e.g. the applicant. Maintenance of the proposed structural BMPs will include periodic pumping of the sediment traps, cleaning of the catchment basins to remove floatables and replacing filters that remove oil and grease from the runoff. Furthermore, the integrity of the vegetated area and other soil stabilization measures as well as the irrigation system, which will ensure by the landscape maintenance crew.
Question 9	About converting pervious to impervious surfaces and the need for

	comprehensive measures to improve the water quality of the Kapa'a Stream
Our response	The applicant fully agrees with the letter that is it unacceptable to direct polluted runoff into the Kapa'a Stream. Therefore a comprehensive stormwater management approach will ensure that runoff is thoroughly treated before the stormwater enters the Kapa'a Stream corridor. The comprehensive treatment approach under sustainable design approach will ensure that stormwater is treated and managed appropriately before discharge into the Kapa'a Stream corridor occurs. The non-structural and structural BMPs used in the comprehensive stormwater treatment approach are described in detail in the EIS. The sustainable design approach of the proposed site includes harvesting rainwater and using it for irrigation of the restored habitat at the perimeter of the development footprint. Using harvested rainwater and collected stormwater for irrigation will ensure that less and more thoroughly treated stormwater will enter the Kapa'a Stream and wetland areas adjacent to the proposed. Furthermore some volume of the harvested rainwater that is used for the irrigation will be lost by evapotranspiration, thus reducing the amount of stormwater that will be discharged to the receiving waters.
Question 10	Loadbearing capacity of the soil within the lower portion of the proposed site.
Our response	The proposed site is a former landfill area, which contains a combination of inert waste (i.e. tailings and overburden of the now discontinued quarry operations) and municipal solid waste (MSW). In accordance with literature reviewed for the EIS we understand that the landfill should be composed of mostly inert waste and some quantity of municipal waste. Redevelopment of landfill areas that consists mostly of inert material is perhaps the easiest type of landfill to redevelop as environmental problems are minimal and conventional geotechnical ground improvement techniques can be used. Landfills that consist mainly of MSW are the most common forms of landfill and redevelopment of this type of landfill needs to consider more engineering and environmental aspects, such as

differential settlement, decomposition of organics resulting in gaseous and liquid agents that leave the landfill and need to be mitigated with appropriate measures.

Redevelopment of landfills, both for inert waste material and MSW, can use a wide range of established building and development technologies, depending on the type of uses, such as soft (i.e. landscaping, parks, etc.) and hard uses (i.e. buildings, infrastructure), or the amount of gas and leachate generated in the landfill, among others design considerations.

The right foundation technology is dependent on the vertical and lateral load bearing capacity of the land fill material and whether or not landfill gas might migrate out of landfill body. As a rule of thumb, redevelopment of closed landfills for hard use, such as intended for the proposed project, should not start within 10 years of the closure of the land fill operations. For the proposed project landfill operation discontinued more than 40 years ago and therefore the landfill should have reached a degree of stability that is necessary to substantially mitigate the engineering and health and safety concerns associated with waste degradation.

In general, there are two types of foundations used in landfill redevelopment- deep and shallow foundations. The proposed warehouses are relative light structures that could use shallow foundations, such as raft foundations. If found necessary some form of deep foundation might be considered for selected buildings, though deep foundations using piles are not anticipated to be extensively used for the proposed site, if at all.

The soil bearing capacity in the upper portion of the site has been investigated and the experience with the existing buildings at the site indicates that normal foundations can be used on the structurally stable land.

The soil bearing capacity within the lower portion of the proposed site and the most suitable type of foundation will be determined before construction of the structures will commence. At that time it will be determined which approach will be most appropriate for the foundation of the planned traffic areas and warehouse buildings. In addition to the buildings, an appropriate building approach must also be applied to the paved traffic area to avoid possible problems arising from differential settling. Even if differential settling might occur there are tested and state-of-the-art construction and building methods available to manage unfavorable site conditions, which might occur but which are not expected given the experiences with the existing use and structures within the lower portion of the proposed site.

It should be noted that the intended use of the proposed site will be warehouse structures and possibly smaller baseyard operations. The business plan of the applicant does not comprise any high rise buildings or process facility, which would require advanced load bearing capability. The intended structures for the proposed site will use conventional foundations, such as slab-on-grade foundation. The present use of the site has indicated that the sub-grade represents a stabilized body that is deemed suitable for the intended type of structures.

It should also be noted that construction on landfills typically requires more effort in design, construction and operation and redevelopment of landfills is more costly that developing regular construction sites. The big benefit to the community is that redeveloped landfill area frees more valuable land for other developments in the community and therefore reduces the urban sprawl and resulting ecological stress to the environment.

The updated project Masterplan will address issues of soil bearing capacity using the more detailed layout information of the project.

Question 11	The DEIS states "quote: It is **assumed** (emphasis added) that the overall removal rate of storm water pollutants by the combined systems of pre-treatment and extended detention ponds would exceed 80%. The DEIS is a disclosure document and outcomes should not be assumed but only facts should be presented.
Our response	The reference to the "assumed", "anticipated" or "expected" treatment effectiveness in the EIS does not suggest that uninformed estimates are being used. Rather, cited references have been used to select assumptions of the treatment effectiveness, which are then used in the analysis. This approach is a scientifically correct method and should not be confused with estimating possible outcomes without substantiating

references.

The degree of effectiveness of treatment systems, such as pre-treatment units, detention ponds or alternative septic systems can be assumed for the proposed application by using actual field data that has been collected (e.g. by the manufacturer with citing what method has been use) or by using "expected" efficiency rates stated in scientific literature (e.g. publication by the EPA). In conventional process modeling "expected" or "assumed" values of parameter are used and applied to the quantities of the case to be analyzed.

For the analysis of the proposed project, for example, a combination of pre-treatment and detention ponds should result in treatment efficiencies of about 90% removal rates. A more conservative 80% is assumed for the proposed treatment system since the requirement of LEED certification calls for an 80% removal rate; which will be surpassed by the actually expected treatment effectiveness.

Typically pollution removal effectiveness of treatment processes or equipment is given as a range of removal rates rather than one fixed removal rate. Thus, probability and not fixed numbers is the basis for the determination of removal effectiveness and no single tests. The determination of water quality in Hawaii is likewise based on a probabilistic approach and not on a single value determination.

The combination of extended detention ponds and pre-treatment sedimentation traps represents a treatment system for which the overall removal effectiveness has not been reported in the literature. Thus it is prudent and pragmatic to assume that the removal effectiveness of two treatment units, using different treatment processes, operating in series is higher than one unit by itself. More specifically, since the TSS removal rate of the pre-treatment units is approximately 80% and that of an extended detention pond approximately 50%-60%, it is legitimate to consider "or assume" that the overall removal rate of the two treatment units will be higher than the highest removal effectiveness of the two individual treatment units. Therefore the FEIS will retain the reference to "assumed" treatment effectiveness.

Question 12	Measures to be taken to avoid attracting water birds to the proposed detention ponds – mitigation and avoidance measures to be accepted by the U.S. Fish and Wildlife Service
Our response	Correspondence with the U.S. Fish and Wildlife Service (USFWS) has identified appropriate mitigation measures to avoid attracting endangered water birds to ponds, which have a free surface for a specified duration of time. As a result of the discussion with the USFWS and considerations of alternatives to conventional detention ponds with free surfaces the applicant now considers using underground detention and rainwater catchment basins, which would avoid ponds with free surfaces. The areas above these below ground water storage basins would be used as open space or as parking areas. The USFWS is in agreement that avoiding free water surfaces within the development would be an effective avoidance measure. The underground detention units would be designed to accommodate typical rain events and the stormwater collected within these underground storage volumes would be released within 2-3 days following the storm events. In case of larger storm events some volume of stormwater would overflow into smaller detention ponds with open water surfaces; such occurrences are anticipated about twice a year. Water in these open detention ponds would then be released within 12-24 hours of the rain event. Based upon communication with the USFWS, these infrequent instances of free water surfaces would be negligible and would not represent a persistent attraction to endangered water birds. Previous recommendations by the USFWS were to implement predator management programs where concerned with situations when frequent water surfaces would be present within the proposed development. By installing the proposed underground detention ponds the need for predator management to protect endangered wildlife is no longer required.

Question 13	Impacts on wastewater systems – identification of the location of the leach fields and their impact on the environment

Our response

The EIS describes in detail the treatment processes, removal effectiveness and proposed locations of the future septic systems. (Refer also to the sustainable design approach in the appendix of the DEIS).

As noted in the EIS the conventional septic systems in the upper portions of the proposed site will each have one septic tank and one leach field located next to each other. These septic systems will be located adjacent to the warehouses they serve.

In the lower portion of the proposed site the septic systems will be built and operated in the context of a septic tank effluent pumping (STEP) system. Under this system approach septic tanks will be located next to the warehouses and the effluent of each septic tank will be pumped to one or more advanced septic systems which will be located at the perimeter of the site. The treated wastewater of the alternative septic systems is suitable to be applied on land with below-surface irrigation systems within vegetative buffer zones and restored habitat areas.

The type of alternative septic system selected for the proposed development will include aerobic recirculating sand filters and an anaerobic denitrification process step. According to field tests referenced by US-EPA the effluent of the advanced septic systems has higher removal rates for TSS, BoD and nutrients than conventional municipal treatment plants.

The DEIS indicates that, according to guidelines published by the US-EPA for receiving waters that require advanced wastewater treatment, the nitrogen removal rate of the onsite wastewater treatment should be above 50%. This is not achievable by means of conventional septic systems but the advanced septic systems proposed by the applicant have nutrients removal rates around 70%, as referenced in the EIS.

Your letter makes reference to a statement in the EIS "There might be a possibility of insufficiently treated wastewater reaching the groundwater table and/or seeping into the Kapa'a Stream corridor or canal". The statement must be considered in the appropriate context since this statement indicates the applicant's motivation to hose alternative (advanced) septic tank treatment, which is possibility of insufficient vertical distance between the point of injection and groundwater table of impermeable soil strata which would impede proper treatment efficiencies in the soil layers below leach fields.

Thus, the statement should not be read as an indication of insufficient attention to properly treat the wastewater at the site. Rather, since there might be some degree of probability that conventional septic systems with conventional leach field treatment process might not deliver the quality of onsite wastewater treatment that the applicant sees fit to mitigate wastewater related impacts, the applicant will employ more advanced wastewater treatment systems.

Our response to your comment about the necessity of lined drainage canal was already discussed earlier in this letter.

Question 14	Discussion of cumulative impacts
Our response	A more detailed discussion of cumulative impacts will be presented in the FEIS. With regard to your specific issues that would contribute to cumulative impacts, we offer you the following response: Model Airfield: It is our understanding that the expansion of the new restrooms at the model airfield is still under consideration and, if built, there would be only a very limited number of the restrooms added. Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities: While it is not yet decided what alternative route will be used for the project, the gravity tunnel through Oneawa Hills is the design alternative that would produce more spoil which has to be removed from the construction sites in Kaneohe and Kailua. Based upon communication with and publication by the County Department of Transportation Services (e.g. FEIS for the Kaneohe-Kailua Sewage Conveyance Facility) it unlikely that spoil of the tunnel construction would be transported to any facility or land within the Kapa'a valley. The spoil and muck from the construction of the tunnel represent valuable construction and fill material that can be sold or given

away by the contractor. At the present it appears that the likely use of spoil and muck would be for the Waimanalo Gulch landfill. The transport of the material would be over the H3-Freeway and would not directly affect the quarry road and its two intersections at Kalanianaole Highway and Mokapu Boulevard.

The DLNR project to open wetland area in the Kawainui marsh: The proposed site of the wetland restoration area is at the southern end of the quarry road and close to the intersection with the Kalanianaole Highway. To our knowledge the project has not received final funding and it is not clear when the majority of actual project work would be carried out. After completion of the project it is expected that most of the visitors would reach the future site from the Kalanianaole Highway. Therefore most of the traffic would not affect the roads adjacent to the proposed light industrial park.

Kapa'a Transfer Station: According to communication with the City and County there no significant changes in traffic volume are anticipated for the transfer station.

Ameron Quarry as a possible future sanitary landfill: The City & County has been investigating alternative sites on Oahu for installing sanitary landfills. The Ameron quarry in the Kapa'a Valley has indicated as one possible alternative, but there are no plans at present to convert the quarry into a landfill.

Ameron Kapa'a quarry: Ameron uses the quarry and its facilities to mine and prepare aggregate for fill and produce ready concrete for delivery to construction sites. Communication with Ameron has indicated that no significant reductions or expansions of production facilities in the quarry are planned at this time. Therefore the traffic volume generated by the Ameron facilities on the quarry road and quarry access road is not expected to significantly change in the future. Changes in daily traffic volume depends on the amount of business rather than long-tem development plans.

Question 15	Aquatic resource survey recommended by the U.S. Army Corp of Engineers
Our response	An aquatic resource assessment was conducted and was presented in the Appendix of the DEIS. The U.S. Army Corp of Engineers (USACoE) has accepted the aquatic resource assessment presented in the DEIS.
Question 16	Letter of the DoH Safe Drinking Water Branch – designing, constructing and maintaining parallel potable and not potable systems in the buildings.
Our response	The project will use harvested rainwater, reclaimed wastewater and graywater to replace potable water for various water uses, such as custodial water use, sewage conveyance and irrigation. The final construction of the water systems will abide by all code requirements to separate and designate potable from non-potable water. These requirements will be specific on engineering drawings and design specifications. The sustainable design approach of the proposed project delineates the use of graywater and reclaimed wastewater. Detailed measures, such as clearly labeling pipe that convey non-potable water, will be part of the detailed design and the actual installation of the graywater systems. Furthermore the contractors will have to abide by the guidelines for use of graywater promulgated by the DoH.

Question 17	Unacceptable to treat the Kawainui Marsh as an inanimate object and not consider actions mauka of the marsh – Impacts not only localized but entire marsh has to be considered …
Our response	The applicant has committed to pursue a business development project in the most environmentally friendly way. In due process, the applicant has committed to developing the proposed light industrial park in accordance to state-of-the-art sustainable development technologies. The applicant has made his commitments to the environment and community quantifiable in the form of applying for LEED Silver certification (LEED typically awards certification only after completion of construction; but in the case of core-and-shell certifications which the proposed project is pursuing a so-called "pre-certification" is possible, which includes a third party review of the design approach). A LEED silver certification is considered an advanced approach to develop in a low impact development manner; such development is respectful to the environment and the community. Contrary to the statements in your letter, environmental impacts of the development have been addressed at length in the DEIS. The environmental review contained in the DEIS is fully cognizant of the surrounding environment and the mitigation measures and low impact development approach that is proposed for the light industrial park addresses impacts that are local, regional and even global (e.g. by way of energy reduction and associated greenhouse gas reduction). For example the applicant's installation of significant capacities of photovoltaic on the warehouses is not directly protecting the Kawainui Marsh, but directly helps to reduce Hawaii's high dependence on imported oil and reduces the discharge of greenhouse gases, all impacts that act statewide and on a global scale. We agree that the Marsh is a living ecosystem and that is why the applicant has proposed a sustainable design approach for the light industrial park. **The need to increase sustainable communities in Koolaupoko region:**

We full heartedly agree with your thoughtful and fitting sentence with which you are closing your letter. In this sentence, which truly summarizes the essence of proactive stewardship of the environment and community, you state that we need to judge our actions with taking responsibility for the coming generations. While there are many definitions of sustainability, the one we can most likely relate to suggests that sustainable systems provide for present needs without eroding the resource base to satisfy the needs of the coming generations. In regard to the Kawainui Marsh this means that every development that affects the marsh has to be carried out in a way that significantly minimizes those impacts to that might erode the marsh's ability to restore a natural equilibrium. But sustainability also relates to the ability of the community to provide for basic and important services to the population and support a healthy local economy, while resulting in a low ecological footprint.

Your letter correctly states that impacts do not stop at the site boundary or are only limited to the area nearby the development. As a consequence impact mitigation needs also to look at issues that go beyond the site and immediate adjacent areas. While using the LEED certification requirements as a quantifiable commitment to develop "green" and thus strategically mitigate such impacts that are the most important for the Kawainui marsh and the community, the sustainable design approach for the proposed development places a high importance on mitigating such impacts that affect the immediate areas around the site, while also giving due considerations for impacts that are more generic and not site specific, but more island-wide

Proposed mitigation measures that address impacts affecting the immediate areas around the site, e.g. the Kawainui Marsh, include most of all water related impacts. Effective mitigation measures selected for the project include a comprehensive stormwater treatment design. These measures address both quantitative and qualitative treatment parameters, such as high efficiency irrigation that includes a reduction of fertilizers and pesticides used for the landscaped areas, rainwater harvesting to lower the use of potable water, and innovative wastewater technologies, which significantly exceeds the treatment efficacy of conventional on-site wastewater systems. The water related mitigation measures mitigate mainly site adjacent impacts such as the avoidance of release of polluted water to the receiving waters, avoiding stream bed erosion and related sedimentation problems in the marsh and drastically lowering any remaining nutrients in wastewater. Other impacts of water related impact mitigation that are not limited to the immediate vicinity to the proposed site, is the significant (at least 40%) reduction of water consumption in the buildings. This impact mitigation serves to limit impacts on the site infrastructure but also, on a larger scale, lowers water consumption on an island-wide scope and therefore fosters the protection of Oahu's aquifers.

Similarly, the LEED credit category "sustainable sites" provides for site specific and island-wide impact mitigation. Under this LEED category Site specific mitigation measures include restoration of habitat with native and adapted plant types, reduction of light pollution and avoiding the use of previously naturally vegetated area for the development. Under the LEED credit category "energy and atmosphere" category island wide impact mitigation address lowering of electricity consumption that is derived from the island grid (e.g. generated by fossil fuel, mainly imported oil), onsite electricity generation with renewable energy technologies and lowering the emission of greenhouse gases and substances that endanger the ozone layer.

The LEED credit categories "materials" addresses the need for a responsible use of resources through recycling and reuse, as well as preferably using materials and goods that are manufactured or extracted locally, thus supporting the local economy and avoiding significant consumption of transportation fuels.

Conclusion — Public interest should not be sacrificed to financial interests – reference how future generations will see the project

Our response — The proposed project follows the "triple bottom line" of optimizing the interrelated benefits of economy, ecology and community. The triple bottom line is the basis for the LEED green development certification standard. Following the triple bottom line the applicant can pursue his commercial development in a manner that reduces the impacts on the community and the environment.

The applicant understands the full weight of responsibility of developing the proposed light industrial park with a high degree of sustainable design and construction technologies. The close distance to the Kawainui Marsh places a special requirement on effectively mitigating any water related impacts as well as other impacts that will result from the construction and operation of the proposed light industrial park close to the main population centers of the Koolaupoko region. The applicant will continue to work closely with the community to ensure that the community remains informed and will be able to give valuable input in the design of the light industrial park. The proposed project will serve the windward community for many decades to come and therefore a successful design of the project will benefit from a proactive working relationship with the community.

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD11/4147C

March 28, 2011

Letter No.15

Manfred Zapka
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawai'i 96828

Re: Draft Environmental Impact Statement
Kapa'a Light Industrial Park
Kapa'a, Kailua, Island of O'ahu

Aloha e Manfred Zapka,

The Office of Hawaiian Affairs (OHA) is in receipt of your January 24, 2011 request for comments on a draft environmental impact statement (DEIS) to support the development of the proposed Kapa'a Light Industrial Park (project) in Kailua on the Island of O'ahu. The 27-acre project would be developed over the next 15-17 years on portions of three contiguous tax map key (TMK) parcels (parcels) owned by Kapa'a I, LLC (applicant). The project is considered an expansion of the existing 22-acre light industrial park which is situated on one of the three parcels. The entire project area is situated within the State Land Use Urban District, where the proposed light industrial uses are allowed. Approval of a City and County of Honolulu-Department of Permitting and Planning (DPP) Change in Zoning (CIZ) for two of the parcels from General Preservation (P-2) to Light Industrial (I-1) is required to facilitate the project. The DEIS is a primary support document for the CIZ and a Special Management Area Use Permit-Major which is also required.

A final environmental assessment (FEA) has been produced for the project. By letter dated May 27, 2010, the DPP determined that following a review of the FEA, an environmental impact statement is required. The CIZ originally proposed for two parcels (P-2 to Heavy Industrial (I-2)) in the FEA has been revised and the revision is explained in the DEIS (Chapter 2.9.1). A 15-acre "wildlife habitat and wetland restoration project" described in the FEA is no longer proposed by the applicant (DEIS, Chapter 1.5.3 and 2.9.3).

The DEIS (Chapter 3.10.5) details the traditional and historic land uses of Kapa'a, which includes the internationally recognized Kawainui Marsh. Quarry operations which began in the 1950's (and continue today) and a landfill (which was closed circa 1990 and replaced by a refuse transfer station) brought significant change as fill material became available and was used in the initial industrial development of Kapa'a in the mid-1970s (DEIS, Chapter 3.10.1 and 3.10.7). While OHA recognizes that the project will be developed on land created by fill material, any potential secondary and cumulative impacts of the project on stream water quality, wetlands and

Kawainui Marsh and the native species within them must be carefully considered. The best management practices and short and long term mitigation measures detailed in the DEIS (Chapter 4.1- 4.4) must be implemented and employed to their fullest potential to address this important issue.

OHA appreciates that the applicant assessed the potential direct impacts of the project on Pahukini Heiau, which is located outside of, but in the general proximity of the project area (DEIS, Chapter 4.5). We were especially interested to review the visual impact assessment (DEIS, Appendix 8) which was conducted for the project and described that the "direct line of sight" between the project and Pahukini Heiau is obstructed by trees and vegetation. From certain Native Hawaiian perspectives, the surrounding landscape is of critical importance for traditional cultural practitioners and this may be applicable for those with connections to Pahukini Heiau. While trees and vegetation currently obstruct the "direct line of sight" between the project area and Pahukini Heiau, we recommend coordination between the applicant and adjacent landowners to ensure that visual impacts on removing the trees and vegetation is assessed should it be considered in the future.

We applaud the applicant for their commitments to ensure the project is consistent with the long term vision, policies and guidelines of the Ko'olaupoko Sustainable Community Plan (DEIS, Chapter 5.3.2). OHA advocates that any specific comments and concerns expressed by the broad range of stakeholders (DEIS, Chapter 9) who were provided with the opportunity to review the DEIS are afforded consideration. Thank you for the opportunity to provide comments. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

ʻO wau iho nō me ka ʻoiaʻiʻo,

Clyde W. Nāmuʻo
Chief Executive Officer

C: Mike Watkins- City and County of Honolulu, Department of Permitting and Planning

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September 14, 2011

Response to letter No.15

Mr. Clyde W. Nãmu'o, Chief Executive Officer
State of Hawaii, Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Kapa'a, Kailua, Island of O'ahu
Response to your letter dated March 28, 2011
Reference HRD 11/4147C

Dear Mr. Nãmu'o,

Thank you for your comments in your subject letter. We offer the following responses to your comments and recommendations:

We confirm your summary of the proposed project and your understanding of the intent of the development of the light industrial park. As you note in your letter, the applicant has changed the original proposal of rezoning from P-2 to I-2 to P-2 to I-1. This significant change was a result of careful deliberation of the design team and the declared alignment of the proposed light industrial park as an industrial park that should serve the Koolaupoko region's need for local and light industrial activities; such as "buy and grow local".

The development approach of the applicant is solidly based on the need for sustainable solutions for the region. This includes bringing the place of employment, commerce and recreation closer to home and avoid impacts to the community and environment that is attributable to increased traffic. The proposed industrial park will provide much needed industrial space in the Koolaupoko region and will shorten long commutes and visits by customers to companies which presently serve the windward side from places of business on the leeward side. In doing so the proposed project will strengthen the region and will be consistent with goals and policies that promote a future of Hawaii that is more sustainable, which will include reductions in energy use for transportation and provide opportunities to produce and buy more goods and food "made in Hawaii".

While the proposed development will add to strengthening the long term goals of the region, the applicant is fully cognizant of his responsibility to the community and the natural environment to develop with the smallest impacts to the community and the environment. The applicant has decided to not only making verbal commitments about environmental mitigation, but he has made a firm commitment to developing "green" by seeking Leadership in Environmental and Energy Design (LEED) Silver certification for the portion of the proposed site that is closest to the marsh and adjacent wetland areas. The

LEED Silver certification documents that the design and construction of the proposed project follows low impact development standards; and an independent third-party audit of design documents and completed construction will ensure that plans to build green are actually implemented as planned and in accordance with well established green building technologies.

The applicant is fully aware of his responsibility towards respecting and preserving cultural and natural treasures of the region. For years the applicant has worked with and supported local community groups to preserve the adjacent Kawainui Marsh. In 2010 the applicant contributed significantly to the cleanup of many abandoned cars along the Kapa'a Quarry Road. Also recently the applicant has actively supported community efforts to establish a nature trail and restored wetland within the marsh by donating land for a parking lot that can hold school buses.

As discussed in the DEIS, the proposed project will not directly affect any known cultural assets. In addition the park will not create visual impact from important historical places such as the adjacent Pahukini Heiau, nor will the proposed site be visible from more distant places of historical significance around the Kawainui Marsh, such as the Ulupo Heiau. The applicant takes considerable pride in your favorable review that his proposed project will positively affect the long term goals of a sustainable Koolaupoko region. The applicant is part of the community and will consider all input of the community and stakeholders, as you recommend in your letter.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

NEAL ABERCROMBIE
Governor of Hawaiʻi

GARY HOOSER
Director

STATE OF HAWAIʻI
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street
Leiopapa A Kamehameha, Suite 702
Honolulu, Hawaiʻi 96813

Telephone (808) 586-4185
Facsimile (808) 586-4186
Electronic Mail: oeqc@doh.hawaii.gov

Letter No.16

March 25, 2011

David K. Tanoue, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaiʻi 96813

Subject: Draft EIS for the Kapaʻa Light Industrial Park, Kailua, Koʻolaupoko, Oʻahu, TMK: 4-2-15: 1 (por.) 6 and 8

Dear Mr. Tanoue:

The Office of Environmental Quality Control published the subject draft EIS in The Environmental Notice on February 8, 2011. The proposed project will intensify light industry activity in Kapaʻa Valley and inadvertently incur impacts to the surrounding environment. The Office of Environmental Quality offers these comments:

1. Please include a list of acronyms in the final EIS, preferably in the beginning, following the table of contents. For example, including biological oxygen demand for the acronym "BOD" on the second paragraph, page 15 (page 46 in the PDF version) would be helpful.

2. Section 3.10.1 on Land Use and Ownership, pages 140-141, discusses land use over the decades but mentions little about ownership; please include information about ownership over the decades or maybe delete ownership from the section.

3. We understand your reasoning about the Leadership in Energy and Environmental Design (LEED) certification for the lower portion only. However, because of the project's proximity to the wetland and marsh, acquiring LEED certification for the upper portion is practical in providing better protection from the development's impacts.

4. The first paragraph of page 171 discusses building limitations because of the soils load-supporting capacity at the lower portion. Please elaborate on the soil load-supporting capacity at the lower portion on the final EIS.

5. The second to the last paragraph on page 173 says, "If impacts would occur from construction activities, these are expected to be minor and of short duration, occurring primarily during storm events." We recommend extra attention to best management practices (BMPs) to mitigate adverse anticipated impacts during storm events.

6. Pages 179 and 180 discuss drainage design. The implication is that a final design has not been determined. Please include the final drainage design or plans of drainage alternatives on the final EIS.

7. The traffic studies evaluated levels of service up to 2026. We recommend implementation of traffic mitigation sooner than projected if impacts to the level of service worsen before 2026.

8. We encourage the applicant's option of providing a shuttle if no public transportation service is available, as discussed in section 4.9.9.

Finally, thank you for the opportunity to comment on this project. The impacts are significant but we hope that the applicant's continued dialogue with the permitting agencies and stake-holders will facilitate unresolved matters before the final EIS for the subject project. Feel free to contact us at (808) 586-4185 if you have further questions.

Sincerely,

Herman Tuiolosega

Herman Tuiolosega
Planner

copy: Kapa'a I, LLC
Sustainable Design & Consulting, LLC

Sustainable Design & Consulting LLC
Engineering / Technology • Strategy • Change Management
www.sustain-HI.com

Response to letter No.16

September 14, 2011

Mr. Herman Tuiolosega, Planner
State of Hawaii, Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
TMK 4-2-15: 001 (portion of), 006 and 008
Response to your letter dated March 25, 2011

Dear Mr. Tuiolosega,

Thank you for your comments in your subject letter.

We offer the following responses to your comments and recommendations, as they are numbered in your letter:

1. Include a list of acronyms in the FEIS:

   We have added a list of acronyms in the FEIS.

2. Address issue of land ownership:

   We have followed your recommendations relative to the land ownership and delete reference to ownership in this section

3. LEDD certification for the upper portion:

   The sustainable design approach and the LEED strategy described therein delineates that the LEED certification for the lower portion of the site is focused on mitigating the impacts that are most important for the adjacent wetland areas. The lower portion of the site is within the Special Management Area (SMA) district and the SMA determination emphasizes the need for low impact development particularly in this area that is closest to environmentally sensitive areas.

   The proposed development will be developed and built in accordance to LEED Silver certification requirements and LEED certification will only awarded after an independent third-party audit certifies the successful realization of the sustainable design goals in the completed construction. This ensures to the public that the development is indeed built "green". The applicant is not opposed to implement sustainable building and site development strategies for the upper portion of the site. But even without actually applying for LEED certification, all development will support those impacts that are most important to the proposed site, such as resource

P.O. Box 283267, Honolulu, Hawaii 96828, USA Tel: 808-265-6321 sustainabledc@gmail.com

conservation (e.g. efficient water and electricity infrastructure), onsite renewable energy, comprehensive stormwater discharge, light pollution and supporting alternative modes of transportation.

4. Elaborate on the soil load bearing capacity of the lower portion:

   We have added a comprehensive discussion about soil load bearing capacity of the lower portion in the FEIS. Furthermore, an updated project Masterplan will be developed in conjunction of the zone change request. This updated Masterplan will contain further analysis of the soil capacity of the landfill area.

5. Attention to BMPs

   While the DEIS has already addressed BMP, we have added further details of BMPs in the FEIS.

6. Final drainage design:

   The updated design of the drainage system will be addressed in the updated project Masterplan for the zone change request. He FEIS delineates updating of technical details of the design, such as the layout of the park and the drainage system, in new Section Six under of unresolved issues. The updated layout of the proposed light industrial park is being developed and this layout will have slight changes relative to the design of the warehouses and roadway systems delineated in the concept design that was presented with the EIS. For example, the applicant is considering whether to develop a part of the property that will be rezoned as a base yard. This would alter the drainage and roadway systems. The nature of the development, e.g. the commitment to use low impact development strategies would, however, not be affected.

   As we had discussed, the EIS is only the first step in the permitting process that is required to rezone the property and start development of the proposed light industrial park. Thus after the EIS is accepted, the applicant will need to apply for a zone change and a SMA permit before proceeding with the project. The applicant will closely cooperate with the accepting agency, the City and County of Honolulu, Department of Planning and Permitting, to ensure all prerequisites are in place for a successful zone change application. The creation of a more complete and updated project Masterplan of the development, which includes a final drainage plan, is be required for the zone change request.

7. <u>Evaluate traffic level before 2026:</u>

The DEIS proposes to carry out a new, follow-up traffic impact analysis report (TIAR) at about midpoint of the project, which is represented by the completion of about 50% of the planned new industrial space or after the upper portion of the site is fully developed and the development of the lower portion of the site would commence. The main objective of the new, follow-up TIAR is to verify that the trip generation rates that were correctly assumed in the original TIAR. A new, follow-up TIAR will identify if the actual traffic volume generated by the project and the background traffic has indeed grown at the estimated rates delineated in the DEIS.

In the new, follow-up TIAR mitigation measures will be selected and designed on the basis of actual traffic volume identified at the mid-point of the project. This approach will make any traffic impact analysis more accurate and will provide more appropriate and effective traffic impact mitigation measures for the time after project midpoint and up to full build-out of the project, when traffic impacts will require some form of mitigation

The State Department of Transportation (DoT) has requested revisions to the current TIAR, which is submitted with the FEIS. The DoT has accepted the request of the applicant to submit a revised TIAR in conjunction with the zone change request. The updated project Masterplan for the zone change request will provide more detailed design information of the proposed project, which will then be used for the new traffic analysis. In addition to the LOS based traffic analysis, and as part of the updated project Masterplan, an analysis will be carried out of the current traffic problems on the Kapa'a quarry road which affect traffic safety on that road. The process of revising the current TIAR is delineated in the new section Six of the FEIS under "unresolved issues".

8. <u>Private Shuttle:</u>

The applicant is prepared to implement a private shuttle service if public transportation service will not serve the proposed project site, e.g. the Kapa'a valley. The scope of such shuttle service will depend on the demand for such alternative transportation services developed by the companies within the proposed light industrial park.

We have been forthcoming in keeping a continuous dialogue with agencies and other stakeholders. We have conducted several meetings and engaged in other communications with County and State agencies as well as stakeholders from the community.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

MAR 25 2011

In Reply Refer To:
2011-TA-0126

Letter No.17

Dr. Manfred Zapka
Sustainable Design and Consulting, LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Subject: Technical Assistance for the Kapaa Light Industrial Park Draft Environmental Impact Statement, Oahu

Dear Mr. Zapka:

The U.S. Fish and Wildlife Service (Service) is in receipt of your letter dated January 24, 2011, requesting comments on the Draft Environmental Impact Statement (DEIS) for the development of the Kapaa Light Industrial Park in Kailua, Oahu. These comments are provided in accordance with the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.: 87 Stat. 884); and other authorities mandating Federal oversight of environmental resources including the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.). We previously provided comments on the Draft Environmental Assessment in February 2009 (Service File 2009-TA-0094) and on the Preparation Notice in August 2010 (Service File 2010-TA-0407).

The proposed project is to expand the existing commercial and light industrial warehouse park on three, contiguous land parcels, located in the Kapaa Valley, windward Oahu. The Kapaa III property borders the Kawainui Marsh and Kapaa Stream, a critically important wetland complex and the largest remaining wetland in the State of Hawaii. These wetlands are occupied by the federally endangered Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian moorhen (*Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*) and Hawaiian duck (*Anas wyvilliana*), as well as populations of migratory waterfowl and shorebirds protected under the MBTA. The developers had previously planned a 15-acre wildlife habitat and wetland restoration project, with funds supplied the U.S. Department of Agriculture, National Resources Conservation Service (NRCS). However, the DEIS states that the wetland creation portion of the project has been removed (potentially indefinitely) due to concerns regarding water quality, function of the wetland and endangered species issues.

In past letters, we provided comments regarding the potential for the detention ponds to attract breeding waterbirds to the site, creating an "attractive nuisance." The preferred alternative includes detention ponds and the DEIS states: "Therefore the detention ponds will be typically completely empty and will only be filled or partly filled on rare occasions. There will be no permanent large residual water surface in the detention ponds that could attract a permanent habitat for the endangered water birds that were mentioned in the letter." It is not clear how it has been determined that the detention ponds will not retain water particularly during prolonged or intense rain events. Ponded water does not have to be permanent to attract Hawaiian stilts especially during the breeding season. Hawaiian stilts are readily attracted to ephemeral water sources and there have been many instances of stilts nesting at unsuitable sites where food and cover is absent. We recommend if the detention ponds hold standing water for more than a week during the breeding season (mid-February through August) or more than two weeks during the rest of the year, deterrents, such as "bird balls," netting, or some type of permanent cover, should be used to reduce the attractiveness of the site. If these measures are not used, then the Final EIS needs to explain the rationale as to why run-off or major rain events will not pool water in the detention ponds and how the applicant will ensure listed waterbirds will not be attracted to the site. This discussion should also further describe the proposed predator management program, outlining in detail the invasive species removal program. In addition, the DEIS indicates that the use of underground cisterns will reduce the amount of water held in detention ponds. We recommend increasing either the number of cisterns or the size of the cisterns to further reduce or eliminate the need for water to be collected in detention ponds.

The Service acknowledges and appreciates that the DEIS incorporates several measures to promote native wildlife and habitats, including shielding of exterior lights, use of native vegetation in landscaping projects, and implementation of a predator control program for invasive species. We also recommend the use of sturdy, animal-proof, garbage containers that reduce the attraction of the area to non-native and feral species, such as feral cats, rats, mongoose, and house mice. The proposed project has also incorporated the use of construction and management Best Management Practices (BMPs) to minimize impacts to Kawainui Marsh and surrounding watershed. To assist you, we have attached a copy of our recommended BMPs to reduce the potential for sedimentation and erosion. We suggest you incorporate the applicable practices into your project plans.

If, during the construction or operation of this project, it is found that listed Hawaiian waterbird species are being attracted to the site, the project manager should contact our office immediately. Additional conservation measures may be necessary to avoid the take of listed species. If take of listed species cannot be avoided, it may be necessary to consult with us pursuant to section 7(a)(2) of the ESA or apply for an incidental take permit under section 10(a)(1)(b) of the ESA. If, in the future, the applicant proposes to develop the 15-acre wetland site to improve water quality, we recommend contacting our office early in the planning process so we can help minimize potential impacts to listed waterbirds.

We appreciate your efforts to conserve listed species. If you have questions, please contact Aaron Nadig or Michelle Bogardus, Consultation and Habitat Conservation Planning Program (phone: 808-792-9400, fax: 808-792-9581).

Sincerely,

Patrick Ashfield

for Loyal Mehrhoff
Field Supervisor

Enclosure

U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices

The U.S. Fish and Wildlife Service recommends that the measures below be incorporated into projects to minimize the degradation of water quality and minimize the impacts to fish and wildlife resources.

1. Turbidity and siltation from project-related work shall be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

3. Dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat shall be replaced.

4. All project-related materials and equipment (dredges, barges, backhoes, etc.) to be placed in the water shall be cleaned of pollutants prior to use.

5. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.

6. All debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site.

7. No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities. This shall be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) to prevent attraction and introduction of non-native species.

8. Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

9. Any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable.

10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

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September 14, 2011

Response to letter No.17

Ms. Loyal Mehrhoff, Field Supervisor
U.S. Fish and Wildlife Services, Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 25, 2011
Your reference: 2011-TA-0126

Dear Ms. Mehrhoff,

Thank you for your comments and recommendations in your subject letter.

We offer the following responses to your comments and recommendations, grouped according to the issues discussed in your letter.

<u>Previously planned 15-acre wildlife habitat and wetland restoration project:</u>

We confirm your statement that the applicant no longer pursues plans to establish a wildlife habitat and engage in wetland restoration within the Kapa'a Stream corridor as was described in the Environmental Assessment of the proposed project that preceded the DEIS. As you stated, the decision of the applicant to discontinue the project was due to concerns regarding effect on water quality when removing a significant amount of vegetation in the designated wetland, endangered species issues and well as other functions of the wetland. The decision of the applicant should not, however, be interpreted as a lessening of his concern and enthusiasm to implement measures that will conserve precious natural resources and wildlife. The applicant has committed to develop the proposed light industrial park with a host of low impact development strategies and technologies.

<u>Possible attraction of water birds to detention ponds:</u>

The DEIS has followed the guidance given in your earlier letters on attraction avoidance measures. The applicant favors underground cisterns not only for collecting of rainwater but also for stormwater detention. Using underground water catchment would obviously prevent impacts of attracting water birds. If above-ground water detention is needed in addition to the below ground units the applicant confirms that deterrents, such as delineated in your letter, will be used, since the function of the detention ponds is obviously to retain some volume of water and the detention ponds will have a free surface at some time during and after significant storm events.

Infrequent storm events could produce an accumulation of stormwater through overflow the underground detention basins and cisterns and could produce free water surfaces in the catchment areas (supplemental detention ponds). This occurrence would, however, be infrequent enough to be negligible and would not be a persistent attraction to endangered water birds.

Predator management and invasive species removal programs and BMPs:

Since attraction from free water surfaces in the development will no longer be present, predator management programs are no longer needed to protect endangered wildlife. The applicant might decide to implement management programs for control of non-native and feral species, such as feral cats, rats, house mice, etc. to protect his property. The final design will incorporate your guidelines on invasive species removal, where applicable. Your list of recommended BMPs, which was attached to your letter, has been included in the FEIS.

Measures promoting native wildlife and habitats:

We appreciate your support for our proposed approaches to ensure wildlife and restore habitat. Your recommendations in regard to use of animal-proof garbage containers will be added to the FEIS.

Recommendations if water birds are found at the site:

The applicant will implement your recommendations if water birds are found at the site during construction and operation. The proposed site is currently not a habitat for listed Hawaiian water birds and it is very unlikely that unintended take of listed species would occur at the newly developed industrial site. Therefore it is not anticipated that an incidental take permit under section 10 of the ESA is required.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

KENNETH TORU HAMAYASU, P.E.
DEPUTY DIRECTOR

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TP1/11-400696R

March 24, 2011

Letter No.18

MEMORANDUM

TO: DAVID K. TANOUE, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: WAYNE Y. YOSHIOKA, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
KAPA`A LIGHT INDUSTRIAL PARK IN KAILUA, OAHU, HAWAII

This responds to your January 24, 2011, memorandum requesting our review and comments for the subject project.

Our Traffic Engineering Division (TED) has the following comments:

- Page 220, Please verify the dates of the footnotes for Figure 4-9
- Page 224, Figure 4-13, the heading should be replaced with "PM peak distribution of generated trip for in and out bound project traffic"
- Page 225. the LOS footnote should be replaced with "LOS level requires mitigation as unsatisfactory traffic conditions occur"
- Section 4.9.6 – The mitigation measures which affect the traffic operations along Kapa`a Quarry Road should be implemented as part of the first increment of the project.

- Appendix 6, Page 3 if the Sight Distance Analysis, Figures SDA-5 and SDA-6; For driveway number one located off of Kapa`a Quarry Access Road, the proposal to relocate the crosswalk away from the access road would not only detract from a continuous path for pedestrians but would decrease visibility between pedestrians and motorists turning off the access road.

Our Public Transit Division (PTD) has the following comments:

- TheBus service at the two key intersections listed below will be impacted by the subject project; therefore the potential impacts of the project on transit (i.e. bus operations, bus stops, etc.) during construction, and after the project is completed should be studied.

    - Kapa`a Quarry Road with Mokapu Boulevard and Kalanianaole Highway
    - Kapa`a Quarry Road and Kapa`a Quarry Access Road

- Construction notes shall include the following transit note: "This project will affect bus routes, bus stops, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 848-6016 and paratransit operations: 454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction."

Prior to the start of the project, all affected Neighborhood Boards, residents, and businesses should be informed about the scope and duration of the project.

Thank you for the opportunity to review this matter. Should you have any further questions on the matter, you may contact Virginia Bisho of my staff at Local 85461.

WAYNE Y. YOSHIOKA
Director

September 14, 2011

Response to letter No.18

Mr. Wayne Y. Yoshioka, Director
City and County of Honolulu, Department of Transportation Services
650 South King Street 3rd Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letter dated March 24, 2011
Your reference: TP1/11-400696R

Dear Mr. Yoshioka,

Thank you for your comments and recommendations in your subject letter. We offer the following responses to your comments and recommendations, grouped according to the issues discussed in your letter.

Our responses to comments of the Traffic Engineering Division (TED):

- Footnote of Table 4-9; has been corrected from 2016 to 2026.
- Caption of Figure 4-13; has been changed to "PM-peak".
- Caption of Table 4-12 has been corrected in accordance with your letter
- We propose to assess, design and implement traffic mitigation measures for the quarry road after a new, follow-up traffic impact assessment report (TIAR) is concluded. The analysis of the current TIAR suggests that no mitigation measures would be required prior to midpoint of development of proposed project. Consequently the new, follow-up TIAR is presently scheduled for the year 2016, which represent midpoint of development schedule. The new, follow-up TIAR will determine if the actually occurring traffic conditions at the time of new TIAR deviates from the expected trip generation volumes of the proposed project and the growth of the background traffic. The State Department of Transportation (DoT) has requested revisions to the current TIAR. DoT has accepted that the revision of the current TIAR will be carried out in conjunction with the zone change request.
- We have changed the location of the crosswalk in accordance to your suggestions.

Our responses to comments of the Public Transit Division (PTD):

- As stated above based on the current TIAR no significant impacts are expected until the midpoint of the development schedule, e.g. when approximately 50% of the planned floor space has been added or sometime in 2016 to 2017. Therefore, no concrete traffic impact mitigation measures are planned at this point. Rather, it is proposed that a new TIAR will be carried out at midpoint of development schedule, and at this point in time impacts of the project on the transit will be analyzed and mitigation measures, if found necessary, will be selected and designed.

- As per your recommendation the following notes will be included in construction notes: "This project will affect bus routes, bus stops, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 848-6016 and paratransit operations: 454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction."

As you recommend the applicant is in contact with stakeholders, including the Kailua Neighborhood Board, and has been informing the public about the proposed project for the past three years. More public involvement is planned as part of the zone change and Special Management Area (SMA) permit application. Both permits are required before the project can be implemented.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha Manfred Zapka

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
Ford N. Fuchigami
Jan S. Gouveia
Randy Grune
Jadine Urasaki

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
DIR 0109
STP 8.0388

March 30, 2011

Letter No.19

Mr. Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Watkins:

Subject: Kapaa Light Industrial Park
Draft Environmental Impact Statement (DEIS)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands the applicant, Kapaa I, LLC is proposing to expand its existing 22-acre light industrial park by 55-acres. The proposed expansion would be developed incrementally over 18 years. Access to the project will be from Kapaa Quarry Access Road.

The DOT Highways Division has not completed its review of the project and will provide comments as necessary.

DOT appreciates the opportunity to provide comments. If there are any questions or the need to meet with the Highways staff please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

ET:km

c: Dr. Manfred Zapka, Sustainable Design & Consulting, LLC

bc: HWY-P, STP(ET)

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
JAN S. GOUVEIA
RANDY GRUNE
JADINE URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

STP 8.0397

RECEIVED

'11 APR 14 A11 :33

DEPT OF PLANNING AND PERMITTING
CITY & COUNTY OF HONOLULU

April 6, 2011

Letter No.20

Mr. Mike Watkins
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Watkins:

Subject: Kapaa Light Industrial Park
Draft Environmental Impact Statement (DEIS)

The State Department of Transportation (DOT) previously commented on the DEIS for the subject project in its letter STP 8.0388 dated March 30, 2011 (attached). DOT now offers the following supplemental comments provided by the DOT Highways Division staff.

DOT's comments regarding the TIAR are as follows:

1. The Traffic Impact Analysis Report (TIAR) is unacceptable and needs to be revised, as discussed below and submitted for DOT's review and approval.

2. While the TIAR states that it will evaluate level of service (LOS), based on delay, volume to capacity (V/C) results shown in various tables would indicate a one or two level difference in LOS from delay-based LOS. This discrepancy should be addressed.

3. The calculations for the Kapaa Quarry Road intersections at Mokapu Boulevard and Kailua Road need to be provided. More discussion should also be provided for the Kapaa Quarry Road and Mokapu Boulevard intersection.

4. While the TIAR recommended some mitigation measures, we recommended that it be supported by the appropriate calculations along with some discussions of the effects. The TIAR should also address LOS F conditions even though it may not be the result of the subject project.

5. DOT agrees with the TIAR recommendation that the TIAR be updated in or around the buildout of Phase C (2016) and before the start of Phase D to evaluate and validate the project conditions and see whether adjustments are necessary.

DOT appreciates the opportunity to provide comments. If there are any questions, including the need to meet with Highways Division staff, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Attachment: Ltr STP 8.0388 dtd 3/30/11

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-PS gla
2.9422

August 31, 2011

09-01-11 A11:16 IN

Letter No.21

Mr. David K. Tanoue
Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Tanoue:

Subject: Kapaa Light Industrial Park
Draft Environmental Impact Statement (DEIS)
Kailua, Oahu, Hawaii
TMK: (1) 4-2-015:001 (por), 6 and 8

With reference to comment 1 in our letter to you dated April 6, 2011 regarding the subject DEIS, at the request of Mr. Manfred Zapka, the consultant for the Kapaa Light Industrial Park, we have agreed that the Revised Traffic Impact Analysis Report (TIAR) can be submitted with the project's zone change request. This will allow the applicant to expedite the permitting process and better address the inadequacies and shortfalls of the TIAR, subject to our review and approval.

If there are questions, please contact Ken Tatsuguchi, Engineering Program Manager, Highways Division, Planning Branch, at 587-1830. Please reference file review 2011-053.

Very truly yours,

Jadine Urasaki

for GLENN M. OKIMOTO, Ph.D.
Director of Transportation

c: Manfred Zapka, Sustainable Design & Consulting, LLC

bc: STP, HWY-PS (2011-053A)

RI:ac

September 14, 2011

Response to letters No.19, No.20 and No.21

Dr. Glenn M. Okimoto, Director of Transportation
State of Hawaii, Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Draft Environmental Impact Statement – Kapa'a Light Industrial Park
Response to your letters dated March 30, 2011 and April 6, 2011
Reference DIR 0109 – STP 8.0388 and STP 8.0397, respectively
Project meeting with DoT staff on June 7, 2011
Response to your letter dated August 31, 2011, reference HWY-PS 2.9422

Dear Dr. Okimoto,

Thank you for your comments and recommendations in your two letters dated March 30, 2011 and April 6, 2011. In addition we thank your agency very much that you have agreed, in your letter dated August 31, 2011, to our request that the revised TIAR can be submitted with the project's zone change application.

Your March 30, 2011 letter suggested that the Department of Transportation (DoT) had not completed the review of the DEIS at the time of the communication.

Your April 6, 2011 follow-up letter submitted supplemental comments and offered a number of comments and recommendations. On June 7, 2011 we had the opportunity to meet with staff members of your department to discuss the two communications.

The applicant agrees and looks forward to working with the DoT on revising the Traffic Impact Analysis Report (TIAR) so that all areas of the traffic analysis are carried out DoT approval. The applicant had requested that the revision to the TIAR be part of the zone change application rather than preparing a revised TIAR for the Final EIS (FEIS). Your agency has agreed that the revised TIAR can be submitted with the project's zone change request.

In the following we present our detailed responses to your comments and recommendations, as delineated in your letter dated April 6, 2011.

A. The applicant will work with the traffic consultant during the zone change request to amend the present TIAR and address the areas that DoT considers need further elaboration and analysis. The recommended amendments of the TIAR will include providing more details of source data and calculation methods and results, discussion of LOS results if found different between the two calculation methodologies used in the TIAR (e.g. time of delay versus V/P ratio) and providing complete description of assumptions including references used. The applicant will contact DoT prior to completing the revised analysis to discuss how issues raised by DoT will be addressed in detail.

B. The current TIAR, which was completed and submitted for the DEIS, recommends that in the course of the proposed project a new traffic count be conducted to ascertain whether the initially used assumptions on growth traffic volumes and trip generations should be revised as the first part of the project is being completed. In keeping with this recommendation the applicant and DoT agree that a new TIAR should be conducted around the year 2016 or 2017, which is the projected time when the development in the lower portion of the proposed site would commence (in accordance to the predicted rate of adding industrial space). Since the actual rate of absorption of the new industrial space in the region, and therefore the pace of adding warehouses and/or industrial space in the proposed development, might differ from the projected project schedule, it was agreed that a new, updated TIAR should be conducted when approximately 50% of the planned industrial space is developed and leased. With a planned total new industrial space of about 600,000 square feet, the new TIAR would then be conducted after 300,000 square feet of industrial space have been added to the available space at the time of acceptance of the FEIS.

C. The concept design presented in the DEIS assumed that the proposed light industrial park will be composed only of warehouses, although other land uses would be permitted under the intended zone change to Limited Industrial (I-1) land use for the proposed site. Therefore, the trip generation rates in the current TIAR calculate the traffic volume generated by the proposed industrial development on the basis of "1,000 sqft per warehouse". However, the applicant considers developing a portion of the land as a base yard, which could result in an overall trip generation that differs from the traffic volume generated by having only warehouses in the development. The revised TIAR will use design information of the updated project Masterplan for the zone change request.

We thank you for your interest in reviewing our DEIS. If you have further questions please contact Dr. Manfred Zapka at 808 265-6321 or e-mail at **sustainableDC@gmail.com.** Your subject letter and our response letter will be presented with the Final EIS.

Aloha

Manfred Zapka, Ph.D., P.E., LEED-AP, CEM
Principal and Senior Consultant

CC: Department of Planning and Permitting, Mr. Mike Watkins

Mailing List for the EISPN

Mailing list for recipients of EISPN

Governmental Agencies and Community / Advocacy Groups: EISPN document containing the FEA report and appendices was sent as data-CD

Public Library: EISPN document containing the FEA report and appendices was sent as hard copy (to Kaneohe Public Library) and as data-CD (to Kailua Public Library)

No.	Mailing List for the EISPN to Governmental Agencies or Community / Advocacy Group
1	Ahahui Malama I Ka Lokahi P.O. Box 751 Honolulu, Hawaii 96808
2	Mr. John Harrison, President Hawaii Audubon Society 850 Richards Street, Suite 505 Honolulu, Hawaii 96813
3	Kawai Nui Heritage Foundation C/o Ms. Susan Miller 1030 Aoloa Place, Apt. 102 B Kailua, Hawaii 96734
4	Ms. Joan Fleming, President Lani-Kailua Outdoor Circle 653 Milokai Street Kailua, HI 96734
5	Ms. Donna Wong, Executive Director Hawaii's Thousand Friends 25 Maluniu Avenue, Suite 102 #282 Kailua, Hawaii 96734
6	Kailua Bay Advisory Council

No.	Mailing List for the EISPN to Governmental Agencies or Community / Advocacy Group
	629-A Kailua Road, Suite #3 Kailua, Hawaii 96734
7	Mr. Puna Nam, President Kailua Chamber of Commerce Post Office Box 1496 Kailua, Hawaii 96734
8	Mr. Bill Lane, Account Manager Hawaiian Electric Company, Inc. P.O. Box 2750 Honolulu, Hawaii 96840
9	Mr. Henry Curtis, Executive Director Life of the Land 76 North King Street, Suite 203 Honolulu, Hawaii 96817
10	Mr. Robert D. Harris, Director Sierra Club of Hawaii Chapter P.O. Box 2577 Honolulu, Hawaii 96803
11	Mr. Randy Ching, County President The League of Women Voters of Honolulu 49 South Hotel Street, Room 314 Honolulu, Hawaii 96813
12	Mr. Chuck Prentiss, Chair Kailua Neighborhood Board No. 31 Neighborhood Commission Office 530 South King Street, Room 406 Honolulu, Hawaii 96813
13	Kailua Satellite City Hall 1090 Keolu Drive, # 110

No.	Mailing List for the EISPN to Governmental Agencies or Community / Advocacy Group
	Kailua, Hawaii 96734
14	Dr. Pua Aiu, Administrator State Historic Preservation Div., DLNR Kakuhihewa Building 601 Kamokila Blvd., Suite 555 Kapolei, Hawaii 9670
15	Dr. Chiyome Fukino, Director Department of Health State of Hawaii Kinau Hale 1250 Punchbowl Street Honolulu, Hawaii 96813
16	Mr. Orlando Dan Davidson, Executive Officer Land Use Commission, State of Hawaii DBEDT P.O. Box 2359 Honolulu, Hawaii 96804-2359
17	Theodore E. Liu, Director Department of Business, Economic Development & Tourism (DBEDT) No. 1 Capitol District Building 250 South Hotel Street, 5th Floor Honolulu, Hawaii 96813
18	Mr. Brian Gibson, Executive Director Oahu Metropolitan Planning Organization Ocean View Center 707 Richards Street, Suite 200 Honolulu, Hawaii 96813
19	Dr. Brennon T. Morioka, Director Department of Transportation, State of Hawaii Aliiaimoku Building

No.	Mailing List for the EISPN to Governmental Agencies or Community / Advocacy Group
	869 Punchbowl Street Honolulu, Hawaii 96813
20	Mr. Clyde Namu'o, Chief Executive Officer Office of Hawaiian Affairs 711 Kapiolani Boulevard, Suite 500 Honolulu, Hawaii 96813
21	Mr. Abbey Seth Mayer Office of Planning, State of Hawaii, DBEDT P.O. Box 2359 Honolulu, Hawaii 96804-2359
22	Ms. Laura H. Thielen, Chairperson Department of Land and Natural Resources, State of Hawaii 1151 Punchbowl Street, Room 130 Honolulu, Hawaii 96813
23	Mr. Lawrence T. Yamamoto, State Conservationist USDA NRCS, Pacific Islands Area State Office P.O. Box 50004 Honolulu, Hawaii 96850
24	Lt. Col. Douglas Guttormsen, District Commander US Army Corps of Engineers Honolulu District, Bldg. 230, CEPOH-EC-R Fort Shafter, Hawaii 96858-5440
25	Dr. Loyal Mehrhoff, Field Supervisor Pacific Islands Fish and Wildlife Office 300 Ala Moana Boulevard Room 3-122, Box 50088 Honolulu, Hawaii 96850

No.	Mailing List for the EISPN to Governmental Agencies or Community / Advocacy Group
26	Mr. Guilherme R. Costa, Conservation Specialist Oahu Soil & Water Conservation District 99-193 Aiea Heights Drive, Suite 109 Aiea, Hawaii 96701
27	Kailua Public Library 239 Kuulei Road Kailua, HI 96734 Attn.: Branch Manager
28	Kaneohe Public Library 45-829 Kamehameha Highway Kaneohe, HI 96744 Attn.: Branch Manager

Copies of letters with comments and recommendations sent by EISPN stakeholders

There were eight comments received from the published EISP by the following agencies:

1. Department of the Army, Corp of Engineers, District Honolulu, dated July 28, 2010
2. Oahu Metropolitan Planning Organization (Oahu MPO), dated August 2, 2010
3. State of Hawaii, Department of Health, Clean Water Branch, dated August 5, 2010
4. State of Hawaii, Department of Health, Safe Drinking Water Branch, Environmental Management Division, dated August 11, 2010
5. State of Hawaii, Department of Health, Indoor and Radiological Health Branch, dated August 11, 2010
6. United States Department of the Interior, Fish and Wildlife Services, Pacific Islands Fish and Wildlife Office, dated August 20, 2010
7. State of Hawaii, Department of Land and Natural Resources (DLNR), Land Division, dated August 24, 2010
8. State of Hawaii, Department of Transportation, dated September 1, 2010
9. Hawaiian Electric Company, Inc, dated October 12, 2010

The copies of the letters by stakeholders with comments to the EISPN are presented in the following

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

July 28, 2010

Regulatory Branch

File Number POH-2010-0186

Sustainable Design & Consulting, LLC
Attention: Dr. Manfred Zapka
Post Office Box 283267
Honolulu, Hawaii 96828

Dear Dr. Zapka:

We have received your request for the Department of the Army to review and comment on the Environmental Impact Statement Preparation Notice (EISPN) for the proposed Kapaa Light Industrial Park at TMKs (1)4-2-015:008, 001 (portion) and 006 (por.) in Kailua, Island of Oahu, Hawaii. We have assigned the project the reference number **POH-2010-0186**. Please cite the reference number in any future correspondence concerning this project. We completed our review of the submitted document pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404).

Section 10 requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging and other activities occurring in, over, or under navigable waters of the U.S., including the upper limit of adjacent wetlands. The line of jurisdiction extends to the Mean High Water Mark for tidal waters. Section 404 requires that a DA permit be obtained for the discharge (placement) of dredge and/or fill material into waters of the U.S., including wetlands. The line of jurisdiction extends to the Mean Higher High Water Mark for tidally influenced waters, the Ordinary High Water Mark for non-tidal waters and the approved delineated boundary for wetlands.

Based on the information provided in the EISPN, the project site appears to be absent of navigable waters subject to Corps jurisdiction, therefore Section 10 authorization may not be required for the proposed activity. We understand from the EISPN and resources available to the Corps, the Kapaa Stream traversing the subject property discharges into the Kawainui Marsh, terminating in Kailua Bay, a traditionally navigable water. As such, the Kapaa Stream is a water of the U.S., subject to Corps jurisdiction. Also be advised that any adjacent wetlands and tributaries or drainage canals discharging into the Kapaa Stream may also be subject to Corps jurisdiction. Should the scope of the proposed work involve the discharge of fill or dredged material below the Ordinary High Water mark of the Kapaa Stream or below the approved delineated boundary of the Kawainui Marsh, a **DA permit will be required**.

The EISPN does not provide sufficient information to allow the Corps to determine if the project site encompasses additional unidentified waters of the U.S. or whether such waters are proposed for impact, which may require authorization under Section 10 and/or Section 404. When developing the Environmental Impact Statement (EIS), we recommend you conduct a thorough aquatic resource survey, describing any wetlands, drainage ditches, gulches, gullies, streams, etc., on-site, especially those that may be impacted by any of the proposed project components. In addition, include sufficient information concerning the scope of work, including the use of Best Management Practices, i.e. silt fences and sandbag berms within the vicinity and in close proximity to the Kapaa Stream, the Kawainui Marsh and all other potentially regulated bodies of water.

Only the Corps of Engineers has the authority to determine if any of these aquatic features are or are not waters of the U.S., potentially subject to regulation under Section 10 and/or Section 404. As such, we encourage the applicant to submit a request for an approved jurisdictional determination (JD) for these water bodies. Your request to the Corps should include descriptions of aquatic features proposed for impact, including whether or not they are tidally influenced, flow duration of each feature and the flow path of each feature into navigable waters. For instance: "the unnamed ditch contains flow for two consecutive weeks annually and, from the project impact site, flows for 700 linear feet prior to discharge into X Stream. X Stream flows year-round and flows 1,200 feet prior to discharge into the Pacific Ocean. The lower 200 linear feet of X Stream is influence by the tide." For wetlands, you should submit a wetland delineation conducted in accordance with the Corps of Engineers 1987 Wetland Delineation Manual and the Hawai'i and Pacific Islands Regional Supplement. We recommend the applicant also provide a vicinity map, map of the water bodies and flow paths and on-site photographs so the Corps may prepare an approved JD, if necessary.

If any water bodies are determined to be waters of the U.S., the applicant must obtain authorization from the Corps prior to discharge of dredged or fill material into these water bodies. Fill material, permanent or temporary, may include, but is not limited to: rock, dirt, sand, sandbags, concrete, piping a water of the U.S. or diverting a water of the U.S. into a pipe. Dewatering effluent from dredging, including filtered and treated effluent, is also considered fill, requiring authorization under Section 404 prior to discharge in waters of the U.S. The applicant should contact the Corps to determine if any of the proposed work constitutes a "discharge of fill" and submit an application and associated drawings that meet our drawing recommendations found at *http://poh.usace.army.mil/EC-R/EC-R.htm*. The Corps will then review the application to ensure it complies with all necessary federal laws and regulations. Note that if the fill results in the loss of waters of the U.S. and/or associated functions, the applicant may be required to provide compensatory mitigation for any unavoidable impacts. A request for an approved JD can be submitted prior to, or concurrently with, an application for the proposed work.

Thank you for contacting us regarding this project and providing us with the opportunity to comment. Should you have any questions, please contact Ms. Jessie Pa'ahana at *808.438.0391* or via email at *Jessie.K.Paahana@usace.army.mil*. Please be advised you can provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

OahuMPO

Memorandum

To: Manfred Zapka, PhD, PE, LEED-AP
Sustainable Design & Consulting LLC

From: Executive Director

Date: August 2, 2010

Subject: Comments on EISPN for Kapa'a Light Industrial Park in Kailua, Oahu, Hawaii

The OahuMPO is a transportation planning and programming agency that coordinates with both the State and the City and County of Honolulu. Our Oahu Regional Transportation Plan (ORTP) 2030 identifies long-range transportation issues, needs, goals, and objectives. The Transportation Improvement Program (TIP) FFYs 2011-2014 schedules projects from the ORTP 2030 for construction or implementation.

Staff has reviewed the EISPN for Kapa'a Light Industrial Park in Kailua, and has identified the TIP projects on the enclosed list as being in the same general vicinity of the proposed light industrial park. More details about these projects and our full TIP can be reviewed on our website at: http://www.oahumpo.org/programs/tipcurrent.html.

I hope this information is helpful to you. If you have any questions, please contact Senior Transportation Planner Lori Arakaki at (808) 587-2015.

BRIAN GIBSON

Enclosure

Oahu Metropolitan Planning Organization
Ocean View Center / 707 Richards Street, Suite 200 / Honolulu, Hawaii 96813-4623
Telephone (808) 587-2015 • (808) 523-4178 / Fax (808) 587-2018 / email: ompo001@hawaii.rr.com
OahuMPO@OahuMPO.org

OahuMPO COMMENTS
KAPAA LIGHT INDUSTRIAL PARK IN KAILUA, OAHU
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

FFYs 2011-2014 TRANSPORTATION IMPROVEMENT PROGRAM PROJECTS IN THE VICINITY		
PROJECT NUMBER	**PROJECT NAME**	**PROJECT DESCRIPTION**
OS14	Guardrail and Shoulder Improvements, Various Locations	Install and upgrade guardrails to bridge end post connections, bridge railing, guardrail end terminals, crash attenuators, miscellaneous drainage, and other appurtenant improvements. Guardrail projects in the area include: • H-3 Freeway • Kalanianaole Highway, Vineyard Boulevard to Kailua Road • Kamehameha Highway, Pali Highway to Kahekili Highway
OS28	Interstate Route H-3, Safety Improvements, Vicinity of Kamehameha Highway Off-Ramp to Kaneohe Marine Corps Base Hawaii	Project involves improvements such as the installation of milled rumble strips on shoulders, pavement markings, and signage.
OS29	Interstate Route H-3, Seismic Retrofit, Halekou Interchange	Retrofit the interchange structure to meet current seismic standards.
OS30	Interstate Route H-3, Seismic Retrofit, Kapaa Quarry, Structure Nos. 1 & 2 (Inbound & Outbound)	Retrofit the interchange structure to meet current seismic standards.
OC4	Bridge Inspection and Appraisal	Inventory, inspect, and appraise City bridges, including underwater inspection, surveys, scour survey/evaluation, and preparation of plans for bridge repairs. Bridges in the area include: • Auloa Road Bridge at Kahanaiki Stream • Auloa Road Bridge at Maunawili Stream

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD / CWB

08012PMT.10

August 5, 2010

Dr. Manfred Zapka, PhD, PE, LEED-AP
Principal and Senior Consultant
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Mr. Zapka:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN)
Kapa`a Light Industrial Park
Kailua, Island of Oahu, Hawaii

The Department of Health, Clean Water Branch (CWB), has reviewed the subject documents of the EISPN and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at
http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale.

   b. Hydrotesting water.

   c. Construction dewatering effluent.

   d. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Section 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. Please call the Army Corps of Engineers at (808) 438-9258 to see if this subject project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

5. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

MT:ml

c: DOH - EPO # I-3278 [via email only]

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O.BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD/SDWB

August 11, 2010

Dr. Manfred Zapka
Sustainable Design & Consulting, LLC
P.O. Box 283267
Honolulu, HI 96828

Dear Dr. Zapka:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)
KAPAA LIGHT INDUSTRIAL PARK
KAILUA, OAHU, HAWAII
TMK: 4-2-15: PORTION OF 001, 006, AND 008

Thank you for the opportunity to review the subject project's Final Environmental Assessment (FEA), serving as the content for the EISPN. The Safe Drinking Water Branch has reviewed the FEA and has the following comments to offer:

1. Section 3, Assesement of Impacts on Infrastructure, subsection 3.4.2, Water Supply, (page 3-37), states that:

   > " As discussed in the Section Two, the proposed site is served by a 36-inch water main along the Kapa`a Quarry Road. Communications with the Board of Water Supply indicate that the existing infrastructure can accommodate the projected daily water demands with adequate pressures for firefighting emergencies. ..."

   We have no objections if the project obtains its drinking water from the Honolulu Board of Water Supply who operates the regulated public water system in this area.

2. The FEA indicates that the project will have a dual water system. The drinking water and nonpotable, irrigation water systems must be carefully designed and operated to prevent cross-connections and backflow conditions. We believe that the Honolulu Board of Water Supply will require reduced pressure principle backflow prevention

devices to be installed immediately after each water meter to protect their drinking water distribution system.

The two systems must be clearly labeled and physically separated by air gaps or reduced pressure principle backflow preventers to avoid contaminating the potable water supply. In addition, all nonpotable spigots and irrigated areas should be clearly labeled with warning signs to prevent the inadvertent consumption of nonpotable water.

We would strongly encourage the project owners to develop a water system management plan detailing the quality of the nonpotable water, who will be responsible for and how the drinking water and nonpotable water systems will be operated and actively monitored to maintain the separation and prevent cross connections between the two systems.

If you have any questions, please call me at 586-4258.

Sincerely,

STUART YAMADA, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

SY:cb

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

August 16, 2010

TO: Dr. Manfred Zapka, PhD, PE, LEED-AP
Sustainable Design & Consulting, LLC

FROM: Russell S. Takata, Program Manager
Indoor and Radiological Health Branch

**SUBJECT: Environmental Impact Statement Preparation Notice (EISPN)
Kapa'a Light Industrial Park in Kailua, Oahu, Hawaii
Request for comments on the content of the EISPN**

Our comments should be printed as follows:

"Project activities shall comply with the Administrative Rules of the Department of Health:

- Chapter 11-46 Community Noise Control.

Should there be any questions, please contact me at 586-4701.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2010-TA-0407

AUG 20 2010

Dr. Manfred Zapka
Marc M. Siah and Associates, Incorporated
820 South Beretania Street, Suite 201
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice for Kapaa Light Industrial Park Kailua, Oahu

Dear Dr. Zapka:

We are in receipt of your July 20, 2010, letter in which you requested comments on your Environmental Impact Statement Preparation Notice for Kapaa Light Industrial Park development located in Kailua, Oahu. These comments are provided in accordance with the Endangered Species Act of 1973 (16 U.S.C 1531 *et seq.*: 87 Stat. 884), as amended (ESA); and other authorities mandating Federal oversight of environmental resources including the Migratory Bird Treaty Act (16 U.S.C. 703 *et seq.*) as amended (MBTA). We provided comments on the draft Environmental Assessment in February 2009 (Service File 2009-TA-0094). You incorporated the Final Environmental Assessment into your Environmental Impact Statement Preparation Notice.

The proposed project entails expansion of the existing commercial and light industrial warehouse park on three contiguous land parcels that are located in the Kapaa valley, on the windward side of Oahu. The three parcels are owned by Kapaa III, LLC; are within the following Tax Map Keys: (1) 4-2-015:001, portion of TMK (1) 4-2-015:008, and TMK (1) 4-2-015:006; and total 78 acres. The Kapaa III, LLC property borders Kawainui Marsh and the Kapaa stream which is habitat for the federally endangered Hawaiian stilt *(Himantopus mexicanus knudseni)*, Hawaiian moorhen *(Gallinula chloropus sandvicensis)*, Hawaiian coot *(Fulica alai)* and Hawaiian duck *(Anas wyvilliana)* as well as populations of migratory waterfowl and shorebirds protected under the MBTA.

The developers have entered into a contract with the U.S. Department of Agriculture, National Resources Conservation Service (NRCS) to develop a 15-acre wildlife habitat and wetland restoration project located within the project site. The wildlife habitat restoration project will be developed in accordance with the design standards and recommendations of the NRCS. We recommend you also incorporate the following measures into the Environmental Impact Statement to minimize potential adverse project impacts to waterbirds:

- *Ensure Waterbirds Attracted to the Restored Wetland are Not Exposed to Predators:* In the design of the 15-acre wildlife habitat and wetland restoration site, you have incorporated a 6,000-linear-foot (ft) fence surrounding the area. The fence, when installed, is designed to prevent non-native predators, such as feral cats, from entering the site. Your plans should also include measures to remove predators from the site once the fence is built (i.e., non-native predators may still remain once the fence is constructed). Measures to suppress rats and mongoose, which are know predators of the eggs of federally listed waterbird species, should also be incorporated into project plans.

- *Minimize Waterbird Attraction to Detention Ponds:* As previously addressed in our comments to the draft Environmental Assessment, we continue to be concerned that the proposed detention ponds, although designed to be "dry" during dry weather periods, still have the potential to attract breeding waterbirds. We suggest further coordination with us to develop methods to make these detention ponds less desirable habitat for waterbirds.

- *Long-Term Management to Ensure Wetland does not become an Attractive Nuisance:* Appendix G of the final Environmental Assessment states that the minimum duration of the conservation effort under the conservation plan is nine years (Wetland & Wildlife Habitat Management, NCRS Core 644). Without continued management, the wetland area may become an attractive nuisance to waterbirds (i.e., it may attract waterbirds to an area where they will be exposed to mortality or reduced reproductive success). The Environmental Impact Statement should include a long-term plan to manage wildlife habitat and wetland restoration site, which should include additional details on field procedures, personnel responsible for implementation, predator control activities, and long-term monitoring actions.

- *Address Project Impacts to Hydrology:* This project may also impact the hydrology of the area. In order to gain a better understanding of the current hydrological system at the wetlands restoration site, we recommend that a complete hydrology study be incorporated into the Environmental Impact Statement.

We recommend you coordinate further with our office as you work to develop the avoidance and minimization measures summarized above. As the lead Federal agency for the development of the 15-acre wildlife habitat and wetland restoration project, NRCS should consult with us pursuant to section 7(a)(2) of the ESA.

If aspects of the project outside of the 15-acre site, such as the detention pools, may adversely impact listed species, the developers should apply for an incidental take permit pursuant to section 10(a)(1)(B) of the ESA. A section 10 permit application must include a habitat conservation plan that identifies the effects of the action on listed species and their habitats, and defines measures to minimize and mitigate adverse effects.

We appreciate your efforts to conserve listed species. If you have questions about our comments, please contact Michelle Bogardus or Aaron Nadig, Consultation and Habitat Conservation Planning Program (phone: 808-792-9400, fax: 808-792-9400).

Sincerely,

Gavilet A. Zablan

for Loyal Mehrhoff
Field Supervisor

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 24, 2010

Sustainable Design & Consulting LLC
Box 283267
Honolulu, Hawaii 96828

Attention: Mr. Manfred Zapka, PhD, PE, LEED-AP

Ladies and Gentlemen:

Subject: Environmental Impact Statement Preparation Notice for Kapa'a Light Industrial Park

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Commission on Water Resource Management, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene Unoki

for Morris M. Atta
Acting Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2010 AUG 16 P 2:28

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
SUMNER ERDMAN
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIIKE, M.D., J.D.

LENORE N. OHYE
ACTING DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 16, 2010

REF: Kapaa Light Industrial Park EISPN

TO: Morris Atta, Administrator
Land Division

FROM: Lenore N. Ohye, Acting Deputy Director Lenore N. Ohye
Commission on Water Resource Management

SUBJECT: Environmental Impact Statement Preparation Notice for Kapaa Light Industrial Park, Oahu

FILE NO.: NA
TMK NO.: (1) 4-2-015:001(por.), 4-2-015:006(por.), 4-2-015:008(por.)

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☒ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/pp/index.htm.

☒ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

☐ 6. We recommend the use of alternative water sources, wherever practicable.

☒ 7. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/resources_permits.htm.

☐ 8. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water.

☐ 9. A Well Construction Permit(s) is (are) required any well construction work begins.

☐ 10. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☒ 11. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 12. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☒ 13. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 14. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 15. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 16. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER:

The project site is in the vicinity of Kapaa Stream (also known as Kawainui Stream). Any proposed alteration of the stream channel may require a stream channel alteration permit from the Commission and should be discussed in this document.

According to our records, there are two wells located within the project parcels. Well No. 2446-01 is located at TMK 4-2-015:001, and Well No. 2446-03 is located at TMK 4-2-015:008. These are very old wells, constructed in 1892 and 1944, respectively. Our records indicate that no pumps are installed in either well and that both are unused. These wells should be properly abandoned and sealed in accordance with the State Water Code and Hawaii Well Construction and Pump Installation Standards to prevent potential contamination or wastage of the underlying aquifer, identified as the Waimanalo Aquifer System Area. The document should discuss these wells and any future plans for use or abandonment. A pump installation permit and a water use permit would be required prior to any installation of pumps and use of the wells, and a well abandonment permit would be required prior to any sealing work.

If there are any questions, please contact Commission staff at 587-0216.

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

STP 8.0213

September 1, 2010

Mr. Manfred Zapka, PhD, PE, LEED-AP
Principal and Senior Consultant
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, Hawaii 96828

Dear Mr. Zapka:

Subject: Kapaa Light Industrial Park
Environmental Impact Statement Preparation Notice (EISPN)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project that includes constructing 35 new steel framed warehouse structures and associated improvements that will increase the square footage of the existing project from 250,000 square foot to 910,000 square foot with parking for 570 vehicles.

Given the project location, the State's highway facilities, Mokapu Saddle Road and Kalanianaole Highway, will be impacted. The Draft Environmental Impact Statement (DEIS) will need to address traffic and roadway impacts and identify mitigation measures.

The DOT Highways Division is concluding its review of the subject project. Upon completion of this review, DOT will provide additional comments as necessary.

DOT appreciates the opportunity to provide these interim comments. If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

EIS

October 12, 2010

Manfred Zapka, PhD, PE, LEED-AP
Sustainable Design & Consulting LLC
P.O. Box 283267
Honolulu, HI 96828

Dear Dr. Zapka:

Re: Kapa'a Light Industrial Park EISPN
Kailua, Oahu

Thank you for the opportunity to comment on the above-referenced project. We sincerely apologize for the delay in responding to your request for comments. Hawaiian Electric Company, Inc. (HECO) has no objections at this time.

Should HECO have existing facilities/easements on the subject properties, continued access for maintenance purposes will be needed. In addition, HECO reserves the opportunity to further comment on the protection of existing power lines and electric power facilities that may be affected by the project.

As the project develops and construction plans are finalized, please continue to keep us informed so that we may be better able to evaluate any effects on HECO's system facilities.

To ensure HECO's continuing input in this project, we suggest that you work directly with Mr. Rouen Liu of our Engineering Department (543-7245). Thank you again for the opportunity to comment on this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: Ms. Catherine P. Kealoha (OEQC)
R. Liu

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 2:

Market Study

<u>Appendix 2 is identical to Appendix 2 of DEIS</u>

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

Market Study of the

PROPOSED KAPAA LIGHT INDUSTRIAL PARK

Kailua, Oahu, Hawaii

THE HALLSTROM GROUP INC.
REAL ESTATE
CONSULTANTS
& APPRAISERS

August 31, 2009

Dr. Marc M. Siah, President
Marc M. Siah & Associates, Inc.
820 S. Beretania Street, Suite 201
Honolulu, Hawaii 96813

Market Study of the Proposed
Kapaa Light Industrial Park Expansion
Kailua, Oahu, Hawaii

Dear Dr. Siah:

At your request, we have completed a defined-scope analysis assessing the market demand and estimated absorption levels for the proposed Kapaa Light Industrial Park expansion to be located on 78 gross acres in Kapaa Valley on the windward side of Oahu, mauka of Kailua Town. Identified on State of Hawaii tax maps as First Division, Tax Map Key 4-2-15, Parcels 1, 6 and 8, the project could comprise up to a circa 660,000 square feet of additional gross floor space within some 35 metal-clad buildings on 50 net subdivided site acres adjacent to the existing initial phases of the park if built to maximum envisioned densities.

The results of our investigation, analyses and modeling efforts are presented in the attached summary report which includes current market data, economic and demographic projections, an overview of the evolution of the Koolauloa District (or Greater Kailua/Kaneohe) industrial real estate sector, and estimates of finished space demand for the proposed subject inventory during its build-out period. The report focuses on tabular presentation of market-based data, modeling and indicators with brief narrative describing the study and correlating our findings.

In completing this assignment, we have viewed the subject property, its environs, and competitive projects in the study area; interviewed knowledgeable brokers and other parties regarding current sales and market conditions; utilized published and on-line databases; reviewed governmental land use designations, entitlements and policies in the region; identified existing and proposed competitive developments and their attributes; and worked with team members to create realistic econometric models of the undertaking and its secondary impacts.

ARBITRATION
VALUATION AND
MARKET STUDIES

SUITE 1350
1003 BISHOP STREET
HONOLULU
HAWAII 96813-6442

(808) 526-0444
FAX (808) 533-0347
email@hallstromgroup.com
www.hallstromgroup.com

This summary report document, prepared for Marc M. Siah & Associates and Kapaa III LLC, is specifically intended to address market demand and absorption issues raised by the City & County of Honolulu Department of Planning and Permitting, and for inclusion into associated, timely land use entitlement petitions. Our findings do not constitute an appraisal of the property or any associated interests.

The assignment was performed in conformance with and subject to the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice. The function of our report is to provide real property information, real estate market data and informed professional opinions to be used for securing further entitlements needed to actualize the Kapaa Light Industrial Park, and to assist internal planning and decision-making by the development venture.

Based on our investigation and analysis, we have estimated the 660,000 square feet of gross industrial floor space of the proposed Kapaa Light Industrial Park should achieve full absorption within 16 to 18 years of offering.

Demand for the inventory will be via a combination of the evolution of the Windward industrial sector into an adequately supplied, sustainable trade area; continuing new business creation in a favorable economic region; relocation/expansion of existing companies into an under-serviced market; and the shortage of I-2 zoned land in the region. The need for additional development is evidenced by the rapid on-going absorption of floor space in Kapaa Valley over the past two decades.

Available vacant and proposed competitive supply is exceptionally limited, and will become increasingly scarce as existing light industrial spaces in Kailua and Kaneohe are being marketed more towards commercial-oriented businesses, I-2 parcels in Kailua Town are rezoned to other uses, and issues regarding non-conforming sites in Koolauloa are addressed.

We appreciate the opportunity to be of service in regards to this unique holding. Please contact us if further detail or explanation is required.

Sincerely,

THE HALLSTROM GROUP, INC.

Tom W. Holliday

Tom W. Holliday
Supervisor/Senior Analyst

/as

THE HALLSTROM GROUP INC.
REAL ESTATE
CONSULTANTS
& APPRAISERS

MARKET STUDY OF THE
PROPOSED KAPAA LIGHT INDUSTRIAL PARK

Located at

Kailua, Oahu, Hawaii

Prepared for

Marc M. Siah & Associates, Inc.

ARBITRATION
VALUATION AND
MARKET STUDIES

SUITE 1350
1003 BISHOP STREET
HONOLULU
HAWAII 96813-6442

(808) 526-0444
FAX (808) 533-0347
email@hallstromgroup.com
www.hallstromgroup.com

August 2009

ASSIGNMENT

The Kapaa Light Industrial Park will be sited on 78 gross acres in Kapaa Valley[1], which is located on the lower easterly flanks of the Koolau Mountains, on the windward side of Oahu, mauka of Kailua Town, approximately 9 miles east of Honolulu. The valley has long-been used for quarrying, land fill and industrial uses, and the proposed project will abut and be an expansion of the in-place development comprised of some 30 industrial/warehouse buildings containing 273,476 square feet of gross leasable floor space.

The proposed additions to the existing inventory, at maximum densities, would include up to 35 new "metal frame/siding on slab" industrial warehouse-type buildings housing up to 660,000 square feet of gross floor area. Approximately 247,000 square feet of the new product would be located on lands now zoned I-2 Intensive Industrial, which are partially improved with the existing warehouses; with the remaining space on two abutting parcels seeking entitlements.

The proposed development, its environs and characteristics are described in detail within the ***Draft Environmental Assessment for the Kapaa Light Industrial Park, Kailua, Hawaii*** prepared by Marc M. Siah and Associates, dated November 2008, which served as a basis for our study.

As part of the review process of the Draft EA undertaken by the City and County of Honolulu Department of Planning and Permitting they are requiring further analysis of market support for the development. These requests form the structure and function of our assignment, as stated in the DPP letter of March 3, 2009 regarding their review of the project:

> "Please prepare an industrial market study. We would be interested in whether or not this

1 The net subdivided area will be circa 50 acres after allowances for open space, setbacks and buffer area.

> windward area can absorb three (3) times more industrial floor spaces than currently exists in the area. Please discuss the anticipated increased demand for warehouse space and other types of industrial space in this region and also the location from which industries are likely to come."

"Sustainability" as it relates to the industrial sector of the Windward real estate market was also a focal point of our assessment. From a market-based planning perspective, an efficient sustainable market must provide sufficient competitive product to meet neighborhood needs. This serves to limit traffic impacts from commuting workers and business vehicles, and provide on-going opportunity to small businesses and startups in the region.

At present, the Koolauloa industrial sector does not demonstrate characteristics of long-term market sustainability.

PRESENTATION

In order to address the DPP issues, we have completed an eight-part study and reporting process:

1. Overview of the Oahu and Kailua/Windward industrial market sectors.

2. Development and absorption of the existing Kapaa Quarry industrial area.

3. Macro-economic quantification of demand for additional light industrial space in the Koolaupoko trade area.

4. Other industrial demand creation issues impacting the study trade area.

5. Identification of available existing and proposed light industrial supply in the competitive market sector.

6. Identification of most probable users for the proposed park inventory.

7. Assessment of the subject property and proposed project characteristics from a market perspective and its probable competitive standing therein.

8. Estimate of absorption of the proposed subject inventory.

Additionally, we have included a summary of Economic Impacts (employment, wages, business operations, etc.) and Public Benefits (primary taxes collected) for the project during build-out and upon operational stabilization.

The body of the report, focusing on tabular presentation with brief supporting and concluding narrative follows a summary of out salient indicators.

PRIMARY STUDY CONCLUSIONS

Based on our investigation and analysis, we have reached the following primary conclusions regarding the proposed Kapaa Light Industrial Park as of August 1, 2009:

1. Koolaupoko, which comprises the primary study region (or "Greater Kailua/Kaneohe" from a trade area perspective), is the poorest supplied industrial sector of any urban area on Oahu or in the state, despite it being one of the most populous and above-average income markets in the islands. The area currently contains only about 21 percent of the industrial space demand created by the resident population, or less than one-fourth the level of trade area supply found in Ewa, Central Oahu and Honolulu.

   Historically, the majority of demand created by Windward consumers and businesses was oriented towards other areas of the island; notably Honolulu. As a result, the effective trade area has been stunted in regards to proximate availability of "neighborhood/ local" and "subregional" industrial-type services. This is an unsustainable condition which increasingly adds expenses to area households and businesses, and is exacerbated due to the limited industrial-zoned land base.

In recent years, several factors have combined to stimulate business growth in the Greater Kailua/Kaneohe community:

- Recognition of the economic potentials associated with a stable 119,000 person moderate to upper-income primary trade area.

- On-going dislocation of industrial businesses serving Koolaupoko from their existing Windward and Central Honolulu locations.

- Dramatically increasing time and costs associated with servicing the Windward side from elsewhere on the island due to escalating traffic, gas, idle labor and operating expenses.

- The commute into Honolulu has worsened to the point small business owners living in Kailua/Kaneohe are looking to relocate operations closer to their residence and/or employees.

- It is a desirable, natural trade area for Honolulu or Central Oahu/Ewa businesses looking to expand.

- There has been a major increase in home/small business and self-employed persons in Koolaupoko, many of which have/will require industrial spaces.

While it is widely accepted the Windward Coast should not be the location for many intensive industrial uses, particularly those serving islandwide markets, it is under-supplied from a local and subregional perspective.

Neighborhood-oriented contractors, suppliers, repair shops, maintenance/landscaping, craftsmen/wood-working, and warehousing are all uses for which Koolaupoko has a demonstrable shortfall in available space.

2. As the economy recovers and into the long-term, more local/neighborhood-oriented businesses will seek a Windward location, generating increasing demand for additional industrial space in the Greater Kailua/Kaneohe trade area, even though the resident population will remain generally stable. Assuming sufficient lands are made available, the trade area will evolve into a standard suburban market which would capture up to 40-plus percent of the demand for industrial space users created by the local residents and businesses if competitive space were made available. Should Koolaupoko achieve growth to such a minimally sustainable level it would still capture only about half the per capita space demand of Oahu's other urban and suburban areas.

In addition to the demands created within a trade area expanding towards a viable market balance, other factors are contributing to the need for additional industrial space in the study area including:

- The rezoning of industrial lands in Kailua Town to more profitable mixed-uses.
- The dislocation of trade area service providers from the most proximate Central Honolulu industrial subdivisions.
- The relocation of current non-conforming industrial users within Koolaupoko.
- The conversion of spaces in existing industrial parks/subdivisions into commercial and other uses.

- The secondary demand created by the 14,000 residents and businesses in Koolauloa.

Our macro-economic demand models indicate the Koolaupoko region will readily support an additional 555,000 to 1.1 million gross square feet of industrial-type floor space over the coming 21-plus years (through 2030), or from 66 to 119 acres of vacant gross land area. The model mid-points are at 832,000 square feet of floor space and 92 acres of land.

An additional 166,000 square feet of demand will be created via dislocation and conversion, resulting in a total mid-point need for some 998,000 gross square feet of floor area by 2030, and about 96 acres of land.

Although this represents a doubling of the currently available industrial inventory in the region, it results in Koolaupoko still supporting only 34 to 42 percent of the industrial demand created by its residents and businesses; a level nominally sufficient to house most local and subregional industrial uses on a sustainable basis.

3. Koolaupoko contains some 82 total acres of industrial zoned lands containing a total of 991,618 square feet of finished floor space. The sector has remained relatively stable during the recent downturn, with a vacancy rate at the end of the first quarter of only 3.5 percent; favorably comparing with the overall rate for Oahu of 4.9 percent.

   The amount of available industrial space/land supply is extremely limited in Koolaupoko (excluding the subject property). As of the end of the first quarter, there was 35,115 square feet of vacant floor space, and the tax office shows only 3.09 acre of zoned vacant industrial lands. This represents one to two years of potential supply relative to demand. To provide for long-term trade area sustainability, additional industrial lands must be provided in Kailua/Kaneohe.

Further, the available supply of regional industrial lands in the district is being diminished by the on-going/planned transformation of existing industrial sites into higher return commercial and residential development. And, over time many established Windward industrial businesses located on non-conforming sites are being moved to alternative sites.

Further, there are environmental issues associated with historic industrial development types (particularly those in non-conforming locations), which will be addressed via the master plan's focus on energy efficiencies and environmental concerns.

It is anticipated that benefits arising from the adoption of LEED planning will become an increasing market factor in the industrial sector over the mid to long-term. The subject LEED-compliant master plan will well-position the project within this emerging market attribute.

4. Despite a recession meaningfully impacting virtually every sector of the state's real estate market, the demand for space at the existing Kapaa development has remained quite strong. A soon to be completed 20,000 square foot building is fully pre-leased, meaningful interest is emerging in the 19,600 square foot building to follow, and the project has an overall vacancy rate of only 4.2 percent.

   Since 2001, a total of 116,116 square feet has been added to the Kapaa Valley inventory, 110,000 square feet of which (or 95 percent) has been absorbed to date. The average absorption rate of new space in the project has been at circa 13,000 square feet per year. Adding in turnover replacement, the development has recently been leasing-up some 33,000 square feet annually.

   Ownership contends there is continuing strong interest by businesses seeking to locate in the valley due to its favorable location and limited alternatives. Six of the seven buildings constructed in this decade achieved full lease-up within six months of completion (or less). And, it is the speed of construction which is the limiting factor on absorption, not a lack of demand.

In addition to the strong support for finished space, offers to buy/lease acreage for base yard facilities are regularly submitted, with ownership stating that upwards of 15 acres of subject I-2 land could readily be absorbed by the market.

5. The subject site is well-located for the proposed light industrial use. Among the contributing factors are:

- It is adjacent to similar existing development and has been "prepared" for such uses by years of intensive quarrying and landfill in the valley.

- It is nearby the five major routes providing access into and through the Windward area; H-3, and Pali, Likelike, Kalanianaole and Kahekili Highways.

- It is centrally-located within its effective trade area.

- The master plan will embody "sustainable" building technologies, and be in full LEED compliance. This will result in increased energy efficiency and a far lesser environmental impact then historic industrial development. We envision this becoming a more focal market issue in coming decades.

- The characteristics of the site and master plan mitigate potential conflicts with other uses.

- The location has a well-established demand as evidenced by the successful leasing of more than 270,000 square feet of space over the last two decades (or nearly 30 percent of all Windward industrial space).

6. We have assessed the proposed development based on the forecast trends for the Greater Kailua/Kaneohe industrial sector and the probable standing of the Kapaa Light Industrial Park therein. Our absorption forecasts are based on the application of three methods, all of which show support for the project:

- Gross Analysis -- Even with the proposed subject inventory, the demand for space in Koolaupoko will exceed the supply during the projection period (through 2030).

- Residual Demand Analysis -- Even if all other available industrial lands are absorbed first, the residual demand will be sufficient to absorb the subject inventory in 14 to 19 years.

- Market Shares Analysis -- Based on its competitive characteristics relative to the scarce available alternatives, we estimate the subject product will capture a sufficient share of demand to achieve full absorption of the proposed warehouse floor space in circa 16 years.

We forecast it will require from 16 to 18 years for the proposed 660,000 square feet of floor space in the expansion area of the Kapaa Light Industrial park to reach full absorption. Faster absorption would be achieved if subject acreage were made available for base yard use.

7. The estimated market-level construction costs for the buildings in the subject development are expected to total some $52.8 million (excluding any infrastructure), with local contractors and suppliers garnering profits of some $7.4 million. Circa 176 worker-years in the trades will be created via construction, with wages totaling $12.5 million.

At build-out and stabilization, the tenant businesses are forecast to generate a minimum of $165 million annually in operating income, and employ from 660 to as many as 825 persons (in accordance with tenant business types) with potential wages totaling $29.7 million.

The project would produce an estimated $1.85 million annually in taxes to the City and County of Honolulu, and $8.8 million per year in primary taxes to the State of Hawaii. The project is anticipated to require nominal expenses in the form of public services.

OVERVIEW OF THE OAHU AND KAILUA/WINDWARD INDUSTRIAL MARKET SECTORS

There are some 35,588,597 square feet of industrial floor space on Oahu, developed on circa 3,017 acres of land. This constitutes approximately 61.6 percent of the total industrial floor space in the State of Hawaii.

There have been significant additions to the inventory over the past decade, totaling some 5.12 million square feet of floor space--virtually all in the Central Oahu and Ewa areas of the island. The expansion corresponded to significant economic growth and an increasing diversification of business activity in the islands.

As shown on Table 1, the "Per Capita Spatial Allowance for Each Resident" on Oahu of 39.32 square feet of industrial floor area per person. A similar ratio is found on Kauai (36.45 feet per resident), but those on the Big Island and Maui are much higher, specifically due to the large scale inclusion of commercial-type uses often found within zoned "light industrial" subdivisions.

Ratios between 28 and 50 square feet of industrial space per resident are the general range within major metropolitan areas in the United States in accordance with the level of trade activity, manufacturing and other economic and locational factors. Being an isolated market which serves as the economic hub of the entire state, it would be expected that Oahu's ratio would tend towards the upper end of the spectrum.

Although the island experienced a net absorption loss of some 245,274 square feet in the first quarter of 2009 (nearly a quarter of million more square feet were vacated versus being leased up), the overall vacancy rate of 4.9 percent remains generally low relative to similar-size mainland markets.

Initial figures from mid-year indicate there has been some additional vacancies as a result of the on-going recession, but movement towards stabilization has been emerging during the preparation of this report. A return to a positive economic environment is anticipated in 2010-11 by the State Department of Business Economic Development & Tourism (DBEDT) and by 2011 according to the UHERO Economic Information Service.

On an overall basis, Oahu's industrial inventory is reasonably adequate, and has typically maintained a favorable balance of supply and demand over the long term.

As with commercial uses, industrial floor space can also be delineated between a variety of neighborhood/local, (sub)regional, destination and location/functional specific types. For a given "trade area" to be considered sustainably-balanced it must provide sufficient inventory to service demands created by the residents and businesses of the economic community. Otherwise, a shortage condition emerges resulting in added costs to consumers.

Despite the apparent island-wide balance, the vast majority of industrial development is located along the heavily urbanized southerly coastline of the island from Kalaeloa (Barber's Point) to Kakaako, and in Central Oahu.

As displayed on Table 2, these trade areas have a per capita industrial space allowance at or near the island-wide average of 39 feet per person. However, the Koolaupoko District (or "Greater Kailua/Kaneohe") is significantly under-supplied at only 8.3 square feet of floor space per resident; just 21 percent of the island-wide average

While locating many industrial use types in Koolaupoko would not be practical, such as those airport or harbor-related, major manufacturers and island-wide distributors, or desirable from a community perspective, the substantive suburban trade area is statistically underserviced from a comparative perspective.

Greater Kailua/Kaneohe is distinctly defined by a major geographic barrier (the Koolau Range), is relatively removed (10 or more miles) from the nearest alternative industrial inventory, and is one of the largest trade areas in the state with a primary resident population greater than 100,000, and above-average household incomes and property values. Further, it serves as the operative base for some industrial demands created in the abutting rural Koolauloa District.

Analysis of the statewide industrial sectors and indicators taken from studies by the Urban Land Institute and other sources demonstrate that from about one-third to nearly half of industrial demand is oriented towards "neighborhood/local" or subregional general uses within a defined trade area.

These business types, essential in meeting the daily needs of consumers and companies in the trade area, include: storage and warehousing; showrooms; offices and staging areas for contractors, maintenance/landscaping operations, and other tradesmen and businesses; product suppliers to other local companies and agricultural uses; auto-related services and products; and, spaces for local residents to conduct their small business activities (such as craftsmen and custom production/manufacturing).

The remaining one-half to two-thirds of industrial demand created by the population and businesses of a suburban trade area is oriented towards major, destination, regional (or "super-regional") facilities servicing numerous trade areas or within more intensive urban environments.

A summary of the Koolaupoko or Greater Kailua/Kaneohe industrial space sector comprising the primary study area is shown on Table 3. As with the island-wide data the statistics are through the first quarter of 2009.

Indicative of the strength of demand for light industrial floor space in the region is the 3.5 percent vacancy rate at the time of the survey. This is meaningfully lower (by 29 percent) than the island-wide vacancy rate of 4.9 percent for the same period. Additionally, Koolaupoko's net loss of space absorption of 5,314 square feet represents only 0.54 percent of the total floor space inventory, notably below the 0.69 percent net loss for the entire island.

Similar to the overall Oahu market, initial second quarter statistics indicate an increase in the vacancy rate for Greater Kailua/Kaneohe industrial properties; but at a much lesser rate than for the island as a whole. We note the differing treatment of commercial spaces in some industrial-zoned buildings, which are experiencing higher vacancy levels than standard industrial structures, creates a disparity between the two primary surveys companies (CB Richard Ellis and Colliers Hawaii).

DEVELOPMENT AND ABSORPTION OF THE EXISTING KAPAA QUARRY INDUSTRIAL AREA

Intensive industrial uses in Kapaa Valley began with quarrying operations in the 1940s that continued into the 1990s. During the same period, portions of the valley have also been used for landfill. A result of these activities was to create a relatively level plateau of several hundred acres; vacant with the exception of several structures remaining from quarry plant operations.

Commencing in the late 1980s, a series of "Quonset-hut" type buildings were added on the property, providing competitively priced storage, work and staging space for Windward industrial businesses which did not require the characteristics or amenities associated with the higher-priced industrial subdivisions located in the center of Kailua and Kaneohe.

When the current ownership purchased the fee interest in the land in 2000, they significantly upgraded the types of structures built, moving towards standard "metal frame/siding/roof on concrete slab" industrial warehouse construction.

A summary of the existing development and use of the Kapaa Quarry industrial area is contained on Table 4.

By 2000, there was an estimated 157,360 square feet of gross floor space within 23 of the older-type buildings. During the 12-plus year emplacement and lease-up period for these structures an average of some 13,113 gross square feet of floor space per year was absorbed.

From 2001 to the present seven of the newer warehouse buildings were added, totaling 116,116 gross square feet of floor area. This total includes Building 30, containing 20,000 square feet which is nearing completion and lease-up as of the report date.

Table 5 displays the construction of Kapaa Quarry floor space and its absorption on an annualized basis.

During this decade, the average absorption rate for new space in the industrial area was 12,902 square feet per year. The under-construction building is fully pre-leased; a notable occurrence given the recessionary status of the economy and widespread vacation of space elsewhere on Oahu and statewide.

Preparations are underway to construct another 19,600 square foot building on the existing I-2 zoned acreage in 2010. Management reports strong interest and expects to have the space fully leased-up by or shortly after completion.

Including the recent turnover rate in the development of about 20,000 square feet per year, the subject industrial area is effectively absorbing about 33,000 square feet of floor space annually.

At present, the overall vacancy rate in the development is about 4.2 percent, marginally higher than the regional average, with the lower cost older buildings (many with long-time tenants) showing slightly lower vacancies than the newer structures.

Typically, the space in the project is about 98 percent occupied; or effectively full for a development having so many structures and individual tenants from a market perspective.

Approximately 60 to 70 percent of the tenants at Kapaa are relocations of newer and existing small businesses; from their home/garage or other non-conforming locations, from more expensive industrial Kailua/Kaneohe developments, or by windward resident businesspersons who want their operations to be closer to their homes.

Most of the other tenants are expanding Oahu businesses seeking a windward location to exploit the opportunities within Koolaupoko, and to avoid the difficulties and costs of servicing area customers from offices in Honolulu, Central Oahu or Ewa.

New business creation also contributes to tenancy levels.

Most space leases run for five year terms.

In addition to the 273,476 square feet of existing and under-construction floor space, the existing development also houses 8 land tenants utilizing about 36 gross site acres.

Ownership reports interest in floor space and (particularly) base yard area from prospective tenants "almost every day", with base yard acreage being exceptionally scarce throughout Windward Oahu. Among these, a major utility has recently approached ownership in an effort to obtain up to 10 acres for a base yard facility including 40,000 square feet of office/warehouse space.

The primary factors cited by tenants in electing to locate in the Kapaa industrial area are:

- Scarcity of alternative Windward industrial-zoned locations.

- Competitive pricing for space relative to other Kailua/Kaneohe developments.

- Ease of access to all the major thoroughfares of Windward Oahu.

- Relatively high quality of the newer warehouses.

MACRO-ECONOMIC QUANTIFICATION OF DEMAND FOR ADDITIONAL LIGHT INDUSTRIAL SPACE IN KOOLAUPOKO

As discussed foregoing, the industrial sector of Greater Kailua/Kaneohe is not fueled by major manufacturers, transportation hubs or companies with an island-wide customer base, but by "neighborhood/local" and subregional businesses serving the daily needs of the Windward community and in providing space for small businesses owned/operated by area residents.

Within this context, the demand for industrial space in the study trade area is therefore (as with retail space) primarily a function of the population being serviced by the constituent businesses and the adequacy of the available inventory of space to meet the expressed needs.

This macro-economic quantification of demand for a given trade area is fundamentally a three step process:

1. Estimate the trade area resident population base during the projection period.

2. Identify the per capita spatial demands required to provide adequate levels of floor area for "neighborhood"-type industrial businesses (the capture rate of overall industrial demand).

3. Construct an econometric model combining the factors to forecast gross floor and land area needed to adequately service the trade area over the projection time-frame.

For modeling purposes, we have utilized a 21-plus year time frame stretching from mid-2009 through the year 2030.

Estimate of Trade Area Population

Owing to the scarcity of zoned, available residential sites, and the expressed desire to limit urban sprawl in Windward Oahu, the estimated resident population of the Koolaupoko (primary trade area) and Koolauloa (secondary trade area) Districts is not anticipated to meaningfully increase over the coming two decades.

Conversely, growth projections made by the City & County of Honolulu Department of Planning and Permitting (DPP) forecast a slight decrease in the Koolaupoko resident population by 2030 due to declining household sizes coupled with relatively few housing additions. And, only minor gains in the Koolauloa population.

The DPP forecasts are shown at the top of Table 6 as 'Scenario One: Development Plan Forecasts, Unadjusted". They have forecast the current population of circa 119,000 will drop to 116,666 by 2030.

Given the type of residential inventory in Greater Kailua/Kaneohe (relatively larger homes in comparison to most newer product on the island) which we forecast will continue to attract similar types of purchasing families into the future, and the number of multi-generational households in the region, we believe the DPP figures depicting a decline of two percent in the District population over the next twenty years are somewhat conservative.

As an alternative to this "minimum" DPP perspective we have made some nominal revisions to their estimates, shown across the bottom of the table as "Scenario Two: Development Plan Forecasts, Adjusted".

Under this "maximum" perspective it is assumed household sizes remain generally stable for the district instead of declining, and that uncertified ("illegal") Transient Vacation Units are converted to resident population use (calculated on Table 7). The impact is not notably substantive, resulting in a total resident population for Koolaupoko of 125,000 in 2030; less than 9,000 persons and about seven percent more than the DPP projections.

Also shown on the Table are the similar scenario forecasts for the Koolauloa District, which will provide secondary industrial space demand and business opportunities for companies located in Greater Kailua/Kaneohe which service the larger Windward Coast trade area.

Identify Per Capita Spatial Demands

The average industrial floor area spatial allowance on Oahu is presently at about 39 gross square feet per person. This level is commensurate with the size and characteristics of the island's economy relative to other locales, and has resulted in a generally sustainable balance between inventory supply and market demand.

The total industrial floor space available in Koolaupoko is at just over eight square feet per resident, or only 21.2 percent of the island-wide average. This is the lowest level, by far, for any similar-sized trade area in the state; and with 119,000 persons in the District it is one of the most populous defined trade areas in the state.

Even much smaller, but comparably "isolated" trade areas such as Waimea on the Big Island (14.1 square foot of industrial space per resident) and Lahaina (23.4 square feet), have substantially larger levels of industrial inventory on a per capita basis.

Acknowledging that most major industrial facilities should be oriented towards the Ewa-Honolulu corridor, still results in Koolaupoko being meaningfully under-supplied for meeting the broad-spectrum of demand created by neighborhood/local and subregional industrial users. These are economically required to adequately service such a significant trade area that is more than ten miles and often upwards of thirty minutes driving time from other industrial areas (and worsening).

Generally neighborhood/local and subregional type industrial uses comprise between a third and half of the total demand for industrial inventory. Thus, Koolaupoko is under-served, and could support from 50 to more than 100 percent more floor space beyond present levels from a macro-economic perspective.

We estimate that a conservative to moderately appropriate range for the community-based needs of the Greater Kailua/Kaneohe trade area would be at 34 to 42 percent of the total demand created by the area residents. This would result in a per capita floor space allowance of 13.3 to 16.4 square feet per person; still at the bottom end of the range among urban trade areas statewide.

Our projections call for a long-term evolutionary period (extending to 2030) for Koolaupoko to reach even these comparatively low levels of sustainable industrial inventory for a suburban trade area.

Application of the Model

The population, per capita spatial demand figures, and effective regional capture rate were combined to estimate Koolaupoko demand for industrial space through 2030 as shown on Table 8.

The Scenario One "minimum" projections, which utilize the DPP Koolaupoko population forecasts, assume there is no further growth in the Oahu per capita industrial space figure and that the regional capture rate will move from its current level of about 21.5 percent of total regionally created demand to 34 percent of the island-wide average by the end of the projection time frame.

Under this alternative, the total demand for industrial floor space in the primary trade area will be at 1,546,991 square feet by 2030, an increase of 555,373 gross square feet and 56 percent from current levels. This includes an estimated latent (unmet) demand for nearly 6,200 square feet of floor space.

The Scenario Two "maximum" projections utilize the adjusted DPP Koolaupoko population estimates, assume nominal growth in the Oahu per capita industrial space demand figure (to 40 square feet per person) and a regional capture rate of 42 percent. This alternative indicates the total floor space demand in the primary trade area will be at 2,100,000 square feet in 21 years, an increase of 1,108,382 square feet and 112 percent above the presently available inventory.

A combined mid-point between the two scenarios is shown at the bottom of the table. Mid-point figures generally serve as the basis of analysis throughout the remainder of the report.

The estimated demand is further delineated on Table 9, broken into periodic additions required from gross floor area (in square feet) and gross site area (in acres) perspectives.

The model indicates there is a latent undersupply at present of some 6,197 square feet, even with the currently low regional capture rate. This figure is conservative and reflects the near-term business creation and operational disruptions associated with the on-going recession.

Apart from secondary factors which will additionally will contribute to industrial demand in the Greater Kailua/Kaneohe trade area, discussed following, our macro-economic analysis indicates the mid-point demand for additional industrial space will be at 831,878 square feet of floor space and 92 acres of gross site area between now and 2030.

OTHER INDUSTRIAL DEMAND CREATION ISSUES IMPACTING THE STUDY TRADE AREA

Beyond the demand for new industrial space in the study trade area generated by its evolution into a reasonably-serviced and sustainable suburban sector, there are several secondary sources of demand which also must be met by the market.

Cumulatively, we estimate they will contribute about another 20 percent to the demand quantified via the macro-economic model.

Dislocation of Existing Users

As part of its Kailua Village master plan, Kaneohe Ranch has rezoned 21 "I-2 (Intensive Industrial District)" classified parcels near the town core (Hekili Street and Hamakua Drive) to other designations. The planning goal was to bring some of the in-place commercial-oriented tenants into conformance with the underlying zoning and to otherwise put these properties to higher, better and more profitable uses than available via their existing industrial uses/zoning.

Six of the properties were re-zoned to "IMX-1 (Industrial and Commercial Mixed-Use)" with a major change of focus away from industrial towards the commercial alternative. The other 15 were re-zoned to "B-2 (Community Business District)", which preclude a wide-spectrum of standard neighborhood/local industrial use types.

Only a single I-2 parcel remains in the subdivision.

While most of this land is not improved with true industrial uses, it is estimated the long-term impact of this undertaking will be to remove some 15,000 square feet of industrial space from the trade area inventory during the study period.

A major source of dislocation of industrial users is taking place in central Honolulu, where extensive proposed redevelopments are being pursued to transform intensive industrial areas into residential, commercial, business and mixed-use project.

Particularly impacted will be the Kakaako industrial area, one of the closest sources of industrial lands to the Koolaupoko trade area (although still more than 10 miles removed), and a location from which many industrial businesses used as a base to service their Windward customers and accounts.

Significant industrial floor space and acreage, at a similar distance from the study trade area, will also be lost through redevelopment in the Kapalama Military Reserve and as short-term tenants are dislocated from the Airport and Mapunapuna industrial subdivisions.

A study completed by Colliers Monroe Friedlander in December 2005[2] estimated a total of nearly 480,000 square feet of industrial floor space will be "lost" due to these areas of transitioning use by 2019, with the potential for additional amounts in the following decades.

This estimate was made prior to the recent announcement of Kamehameha School's intention to redevelop 29 acres in Kakaako away from industrial uses. A minimum of 300,000 square feet of industrial floor space will be lost due to the Kaiaulu o Kakaako project, resulting in a total of at least 780,000 square feet lost in Honolulu.

While much of this dislocation is anticipated to be re-directed as demand towards Ewa and Central Oahu industrial subdivisions, such locations are not appropriate for businesses with a strong Greater Kailua/Kaneohe patronage component. Further, dislocated company owners who reside in Koolaupoko will be hesitant to move operations to these relatively far-removed (and traffic-plagued) sites.

A minor portion of this demand would inevitably be focused towards the study trade area if sufficient, competitive industrial floor space and zoned lands were made available. We conservatively estimate this secondary market component could contribute some 95,000 square feet of additional floor space demand to base Greater Kailua/Kaneohe levels (or about 12 percent of the total near to mid-term dislocation) during the study period. And substantially moreso if the pace of dislocation escalates.

The final aspect of potential dislocation demand will be internal to Koolaupoko. At present, there are numerous non-conforming industrial-type uses spread throughout the District, often in residential-zoned subdivisions (businesses being operated out of the owner's home) with some major non-conformance areas in Waimanalo.

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2 "Campbell/Kapolei Industrial Market Transient Demand Study", Hamasu and Macapanpan, December 20, 2005.

Over time many of these businesses will have to relocate to conforming industrial lands, with Kapaa providing an excellent alternative.

It is difficult to quantify a precise amount of floor space this secondary demand component will require over the coming two decades. However, a meaningful portion of the 270,000 square feet of space built in the Kapaa over the past two decades has been absorbed by this type of business; an operation moving from a home/garage or non-conforming location due to the need to expand, have more/higher quality space, or due to community and governmental pressures.

We have made a conservative allowance of 25,000 square feet of demand in the study trade area will come from the re-location of non-conforming users elsewhere in the District.

The total estimated secondary industrial floor space demand in Greater Kailua/Kaneohe created by dislocation/relocation impacts during the projection period (to 2030) is 125,000 square feet; but could readily be twice this amount.

Conversion of Industrial Space to Commercial Uses

Beyond the broad-scale conversion of Kaneohe Ranch industrial lands in Kailua Town to other uses, incremental conversion of existing industrial spaces to commercial tenancy is on-going in the built-out industrial subdivisions of Kailua and Kaneohe.

This trend, common throughout the state, is accelerated when available commercial space/lands within a trade area are fully absorbed and/or commercial rents and prices reach high levels. Both of these conditions exist in the Koolaupoko industrial sector.

Based on our review of the industrial subdivisions in Kaneohe and Kailua (such that remain), and surveys completed by major Oahu realty groups, we estimate that some 20 percent, or nearly 200,000 square feet of existing floor space built on industrial-zoned lands is being used for somewhat to full commercial-oriented business operations; a figure which has grown by nearly 25 percent during this decade.

Given the long-established status of most of the remaining "true" industrial users in these subdivisions, this trend is expected to slow, but not cease, during our projection period.

We have made an allowance that 20,000 square feet industrial floor space will be further lost due to conversion of existing space from industrial to commercial tenant businesses.

The current Koolaupoko Sustainable Communities Plan specifically calls for this conversion of industrial lands in the centers of Kailua and Kaneohe stating "Light industrial zones should be converted to commercial-industrial mixed use to reflect actual use patterns and promote storefront uses along the sidewalks." (page 3-37).

Thus, the actual impact of continuing conversion from industrial to commercial and quasi-commercial uses would be allowed to be much greater, increasing the pressure for additional industrial lands in the area (such as the proposed subject).

Secondary Demand from Koolauloa District

The industrial businesses in the study trade area are the closest source of most industrial services and supplies to the adjoining, rural and more isolated windward portions of the Koolauloa District. There are a few (often non-conforming) industrial users in the area, and many consumers may elect to use providers located in Central Oahu or elsewhere on the island, but there is no doubt that a portion of demand created by Koolauloa residents and businesses is directed into the study trade area.

While there are plans to meaningfully increase industrial supply in Koolauloa as part of the proposed HRI Laie master planning process, some additional future demands will still leak into Koolaupoko as a result of the evolving trade area and the minor projected increases in the upper-Windward resident population base.

We have made an allowance for this secondary demand component of 21,000 total gross square feet of industrial uses within the study trade area over the next 21 years.

This equates to about 1.25 square feet of space per person in Koolauloa (or three percent of total per capita demand).

Correlation of Secondary Demand Components

The secondary demand components are summarized in regards to both finished floor space and acreage requirements during the projection period and incorporated along with our macro-economic demand mid-point indicators on Table 10.

The estimated total primary and secondary industrial space demand components within the Greater Kailua/Kaneohe trade area for the period 2009 through 2030 is 997,878 square feet of floor space or 93.4 gross acres of zoned lands.

We note our projections do not include demand for open base yard areas, which could readily contribute another 20 to 40 acres to the total.

AVAILABLE EXISTING AND PROPOSED INDUSTRIAL SPACE SUPPLY

According to City and County Real Property Tax records (as accessed via hawaiiinformationservice.com), there are only 3.09 acres of vacant, available industrial-classified sites in the Koolaupoko District apart from the zoned portions of the subject property.

This represents less than four percent of the total amount of zoned lands needed to service the Greater Kailua/Kaneohe trade area through 2030.

There are some vacant industrial-designated lands within the Kaneohe Marine Air Station, but these are not available for general market use.

We are not aware of any significant new additions to the Koolaupoko industrial land inventory proposed at this time.

Further, the current Koolaupoko Sustainable Communities Plan discourages the development of any further industrial subdivisions in the District and speaks only to expansion of industrial uses in the Kapaa Quarry area (the subject property) "if sufficient demand can be demonstrated".

MOST PROBABLE USERS OF PROPOSED KAPAA LIGHT INDUSTRIAL PARK

New tenants of the proposed subject project are anticipated to be, for the most part, of the same general type and mix as currently exists in the buildings developed to date, including:

- Storage and small to moderate-sized warehousing.
- Offices, storage and staging areas for a wide variety of contractors, maintenance and landscaping companies, and similar businesses.
- Small to moderate-sized product suppliers to other companies, agricultural operations, and the general public within the trade area (often specialty products such as exotic woods, masonry/stone, and animal/grange supply).
- Craftsmen and custom design, production and assembly operations such as cabinet makers, solar water/power units, woodworkers, and interior design products.
- Equipment rental and repair.
- Automotive supply, servicing and customizing (although any engine repair or other type work which could potentially have unfavorable environmental consequences would be discouraged/not allowed).
- Land tenants.

In general, these are businesses which do not require a large on-site public patronage.

Additionally, the impacts of dislocation and increasing traffic congestion and traveling costs will attract selected moderate to larger businesses currently servicing the Windward side from Honolulu which will seek to open branch locations within the study trade area.

ASSESSMENT OF PROBABLE MARKET STANDING OF THE PROPOSED SUBJECT DEVELOPMENT

The proposed Kapaa Light Industrial Park will achieve a favorable market standing in the Greater Kailua/Kaneohe trade area for numerous reasons, focal among them:

- It already enjoys a reputation as a primary industrial location in Koolaupoko, with the existing and under-construction buildings comprising nearly 30 percent of the regional in-place industrial inventory, and a position as one of the largest concentrations of space in the District. The demonstrated ability to absorb some 273,000 square feet of floor space over the past two decades and the satisfaction of the tenant base all speak to a high level of proven, existing market acceptance. Unlike a fully new development, it will not have to endure through a ramp-up period of market exposure.

- Alternative locations in the trade area are exceptionally scarce and expensive. There are not many choices for Windward industrial businesses to locate outside of Kapaa. This inherently results in a near-total "capture" of the demand for additional space in the competitive market sector. Even apart from its many positive attributes, almost by default, the proposed development becomes the premiere industrial location in Greater Kailua/Kaneohe from a market perspective.

- The general access characteristics of the property relative to the trade area being serviced are good; superior to most other industrial developments on Oahu. It is at the near-loci of the central trade area it services (Kahaluu to Waimanalo), minimizing drive times for out-going service providers and in-coming patrons. The five major thoroughfares of the Windward side basically coalesce nearby Kapaa Valley, and all within a few minutes drive from the subject site. H-3, Pali Highway and Likelike Highway lead across the Koolau Range into the urban core of Greater Honolulu; Kalanianaole Highway leads southerly along the Windward Coast; and, Kahekili Highway to the northerly Windward communities.

- Owing to its somewhat isolated nature relative to other urban types and long-established industrial uses, the potential for conflicts with nearby developments (a market concern for any industrial project) is mitigated. Additionally, this characteristic will keep intense/storefront commercial tenants from locating in the Park, displacing industrial users as seen elsewhere throughout the trade area (and State) and driving up prices via their ability to pay more in rents and for property.

- In many ways, the subject property is somewhat of a "blank slate." It is well-suited for industrial uses as a result of the decades of quarrying and landfill which have created the in-filled, virtually featureless, artificial plateau upon which the existing and proposed industrial buildings site. The environmentally-sensitive and LEED-compliant master plan will insure that the proposed Park operations will have minimum impact on the lower elevation features in the Valley.

- The space lease and ground rents at Kapaa have an established standing as being very competitive, and expanded industrial development of the site has the potential to provide favorable economic returns within the context of its physical attributes and historic use.

ESTIMATE OF ABSORPTION OF THE PROPOSED SUBJECT INVENTORY

Based on our foregoing analysis, we have estimated the probable absorption velocity for the proposed subject inventory using the three methodologies described following.

We note our focus has been strongly-oriented on the demand for the subject "warehouse" floor space and underlying land area as a function of the site being built-out as envisioned in the master plan. While ownership's primary goal is to pursue this total build-out option, if it elects to use portions of the site for base yards (for which there is a significant market demand), the speed of absorption would increase meaningfully from the indicated conclusions.

Gross Demand/Supply Analysis -- This straight-forward technique assumes that if there is insufficient supply to meet projected market demand levels during the projection period (2009 to 2030), the proposed subject inventory will be absorbed in a reasonable manner, regardless of competitive qualities, as there are no other alternatives available.

Over the next two decades, if the Kapaa Light Industrial Park is not built as proposed, there will be a shortfall of from 500,000 to 1,000,000-plus gross square feet of industrial floor space in the study trade area and from 63 to 115 gross site acres of land.

This undersupply condition will ensure there is sufficient unmet demand to absorb the project within the projection timeframe.

The Residual Method -- In this technique, the available non-subject existing and proposed industrial floor space/acreage supply is placed on a time-line depicting the absorption of all competing product. To the extent this supply falls short of the forecast mid-point demand for product in the trade area, or exceeds the projected total, a respective undersupply or oversupply situation will exist.

Having thus accounted for the market absorption of all potentially competitive regional industrial inventory, and acknowledging the unlikelihood of additional major subdivisions being proposed and approved during the projection period, it can be asserted the subject development will capture virtually all of any remaining residual demand. This approach is conservative as it assumes the subject will capture only what is left over after all other inventory fully actualizes their share of demand.

Given the attributes of the Kapaa holding and master plan, and successful absorption experience to date, we believe it will be a regional leader, not a follower, as is implicit in this method.

Table 11 displays the application of this technique to the study trade area and the subject.

The top half of the table depicts the approach in regards to floor space absorption, with the existing vacant floor space and potential space on vacant industrial-zoned sites shown as being absorbed in the near to mid-term as the economy recovers.

After allowance for this (notably limited) competitive supply to be fully absorbed, there remains sufficient unmet residual demand for the entire proposed subject floor area to be fully absorbed within a 14 to 19 year period during the expected construction period.

The analysis from a land area (acreage) perspective is shown at the bottom of the table and provides similar results.

The Market Shares Method -- This approach accounts for the probable competitiveness of the subject inventory regardless of the total level of product otherwise offered on the market. It is an estimate of how much of the total forecast demand for industrial floor space/acreage in the Greater Kailua/Kaneohe trade area the subject could expect to capture on an annual basis in light of its locational, pricing and "amenity" characteristics.

Moderate in application, this technique tests "pure" competitiveness and is considered the classic absorption projection methodology, but does require judgment in the selection of capture rate factors.

Table 12 displays the application of this technique from a gross floor space (in square feet) perspective.

As the subject enjoys a favorable location and well-established market standing, it would be expected to achieve a high capture rate even were there meaningful competitive industrial spaces/lands available. As there is exceptionally limited competing supply, the subject project will achieve a near total capture rate of expressed demand.

During the first several years of offering, the capture rate is nominally lower in consideration of the scarce competing product. Thereafter, we have assumed a 90 percent capture rate, which is very high but may be somewhat conservative in light of market conditions.

This approach, using mid-point demand estimates, indicates the proposed subject floor space inventory will require about 16 years to achieve full absorption.

SUMMARY ECONOMIC IMPACTS ANALYSIS

The primary economic impacts and governmental tax receipts associated with the Kapaa Light Industrial Park are summarized on Table 13. All values are expressed in constant, uninflated 2009 dollars and assuming currently prevailing costs, wages and other factors.

- The project will generate some $52.8 million in new capital investment during its nearly two decades of construction, exclusive of infrastructure costs, based on vertical "all-in" construction expenses of $80 per square foot for the warehouse buildings.

- The anticipated contractor and supplier profits flowing to local business who provide the materials and labor for the undertaking are estimated at $5,280,000 and $2,112,000, respectively, during the build-out.

- A total of 176 worker-years will be required to build the Park, based on an average of one worker-year for every $300,000 of construction costs. The total wages paid to these workers will be some $12.5 million assuming prevailing wages are paid.

- On a stabilized basis, after build-out and full lease-up, the businesses populating the proposed new areas of the Park will employ an estimated 660 to 825 full-time equivalent workers (assuming one FTE worker for every 800 to 1,000 square feet of gross floor area. The annual wages earned by these workers will total up to $29.7 million.[3]

- After stabilization is reached, the operating business are forecast to generate $165 million in gross annual receipts, based on average sales of $250 per year per gross square foot of floor area.

- The City and County of Honolulu will receive an estimated $1.85 million in primary annual receipts from the proposed Park areas. This includes $1,023,000 in real property taxes (assuming an average assessed value of $125 square feet of finished floor space and a tax rate of $12.04 per $1,000), and $825,000 for its "transportation fund" portion of the State General Excise Tax (GET) collections.

- The State of Hawaii will receive some $8.8 million per year on a stabilized basis, consisting of $6,864,000 in GET on the Park's gross operating revenues and nearly $2

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[3] Actual worker count will be dependent upon the final mix of tenant businesses and amount of land area dedicated to base yard use (if any).

million in annual income tax revenues on operating business profits and employee wages.

Beyond these standard economic impacts and public benefits considerations, there is another significant but atypical issue which could have a major negative impact on the economic standing and sustainability of the Windward communities over the long-term. There are significant direct costs associated with a planning decision to not provide sufficient lands for neighborhood/local and subregional industrial land users in Koolaupoko.

If Greater Kailua/Kaneohe is not provided with enough industrial land inventory to support the on-going (and necessary) evolution of the Koolaupoko trade area, businesses will be forced to service the region from staging locations in the Ewa-Honolulu corridor, with more and more companies being further ewa over time via dislocation.

The costs of such long-distance servicing are high, have escalated rapidly in recent years, and will continue to inflate meaningfully into the future. Increasing fuel prices, vehicle ownership and operating expenses, and time/labor costs associated with a degrading traffic environment will result in Windward customers having to pay artificially higher costs for industrial-related services and products which must be "shipped" to a comparatively isolated location relative to the urbanized corridor of Oahu.

The economic impact resulting from a "no more industrial lands" perspective is effectively a tax/tariff on products and services for Windward residents and businesses.

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ADDENDA

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TABLE 1

SUMMARY OF EXISTING INDUSTRIAL SPACE DEVELOPMENT IN HAWAII AND AMOUNT PER CAPITA
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
As of End of First Quarter 2009, Major Islands Only

County	C& C of Honolulu	Maui		Kauai	Hawaii		State Totals
Total Estimated Industrial GLA (Square Feet)	**35,588,597**	**10,520,066**	(1)	**2,321,229**	**9,350,499**	(1)	**57,780,391**
Estimated Resident Population (Year-End 2008)	905,034	143,691		63,689	175,784		1,288,198
Per Capita Spatial Allowance for Each Resident (Square Feet per Person)	**39.32**	**73.21**		**36.45**	**53.19**		**44.85**
General Market Operating Overview							**State Averages**
Vacancy Rate	4.9%	0.6%		0.3%	0.4%		3.3%
Weighted Avg. Monthly Base per Square Foot Rents							
Net	$1.21	$0.98		$1.00	$0.95		$1.20
Gross	$1.55	$1.24		$1.59	$1.20		$1.49
Average Monthly per Square Foot Operating Expenses	$0.33	$0.26		$0.29	$0.25		$0.31
Space Absorbed in 2009 (through 1st Qtr)	(245,274)	37,224		2,162	13,280		(192,608)

(1) Maui and Big Island ratios artificially inflated due to large-scale inclusion of commercial and quasi-commercial uses within light industrial parks. In most modern parks on Maui and in West Hawaii commercial uses account for between 45% and 55% of total developed space.

Source: CB Richard Ellis, State DBEDT and The Hallstrom Group, Inc.

TABLE 2

COMPARISON OF EXISTING INDUSTRIAL SPACE DEVELOPMENT PER CAPITA ON OAHU BY TRADE AREA
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
As of End of First Quarter 2009

Trade Area	Honolulu	Ewa/Waianae	Central Oahu	Koolaupoko
Total Estimated Industrial GLA (Square Feet)	**18,458,004**	**5,741,041**	**5,971,148**	991,618
Estimated Resident Population (Year-End 2008)	488,000	141,000	162,500	119,000
Per Capita Spatial Allowance for Each Resident (Square Feet per Person)	**37.82**	**40.72**	**36.75**	**8.33**
Per Capita Allowance Islandwide	39.32	39.32	39.32	39.32
Ratio of Region Per Capita Development to Island Average	**96.19%**	**103.54%**	**93.45%**	**21.19%**

Source: CB Richard Ellis, State DBEDT and The Hallstrom Group, Inc.

TABLE 3

SUMMARY OF EXISTING INDUSTRIAL SPACE DEVELOPMENT IN THE KOOLAUPOKO/GREATER KAILUA-KANEOHE STUDY AREA
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
As of First Quarter 2009

	Koolaupoko District/ Greater Kailua-Kaneohe
Total Estimated Industrial GLA (Square Feet)	991,618
Estimated Resident Population (Year-End 2008)	119,000
Per Capita Spatial Allowance for Each Resident (Square Feet per Person)	8.33
Per Capita Allowance Islandwide	39.32
Ratio of Koolaupoko Per Capita Allowance to Island Average	21.19%
General Market Operating Overview	
Vacancy Rate	3.54%
Weighted Avg. Monthly Base per Square Foot Rents	
Net	$0.97
Gross	$1.17
Average Monthly per Square Foot Operating Expenses	$0.20
Space Absorbed in 2009 (through 1st Qtr)	(5,314)

Source: CB Richard Ellis, Colliers Hawaii, State DBEDT and The Hallstrom Group, Inc.

TABLE 4

CURRENT KAPAA QUARRY INDUSTRIAL AREA SUMMARY
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

1. Gross Floor Area	
Pre-2000 Constructions (Quonset Huts and Mesh Bldg).	157,360
2001 to Current Constructions (Metal Warehouse on Slab)	116,116
Total Leasable Floor Space	**273,476**
2. Estimated Historic Annual Absorption	
Original Leases Circa 1988 through 2000 Square Feet Per Year	13,113
Original Leases 2001 to 2009 Square Feet Per Year	12,902
Tenant Turnover Space per Year (Recent Average)	20,000
Annual Average Total Original and Turnover Space Leased	**33,023**
3. Vacancy Rate	
In Pre-2000 Buildings (Square Feet Vacant)	5,554
Percent of Total Available	3.5%
In 2001 to Current Buildings (Square Feet Vacant)	6,000
Percent of Total Available	5.2%
Overall Vacancy Rate (Weighted Average)	**4.2%**
4. Base Yard/Land Tenants	
Number of Base Yard/Land Tenants	8
Land Area in Acres	36+/-
5. Next Scheduled Addition (Leasable Area in Sq. Ft.)	
Building #45 (Completion in 2010)	19,600

Source: Kapaa III LLC, and The Hallstrom Group, Inc.

TABLE 5

SUMMARY OF HISTORIC KAPAA QUARRY FLOOR SPACE ABSORPTION
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

Year		In Gross Leasable Square Feet: In-Place Floor Area at Beginning of Year	Floor Area Added During Year	In-Place Floor Area at End of Year	Absorption Period Required
Pre-2000				157,360	Older Leases
2001		157,360	6,000	163,360	Within 6 Mos.
2002		163,360	6,000	169,360	Within 6 Mos.
2003		169,360	0	169,360	
2004		169,360	15,600	184,960	Within 6 Mos.
2005		184,960	16,000	200,960	Within 6 Mos.
2006		200,960	33,316	234,276	Within 6 Mos.
2007		234,276	19,200	253,476	Within 6 Mos.
2008		253,476	0	253,476	
2009	(1)	253,476	20,000	$\boxed{273,476}$	Fully Pre-Leased

(1) Building to be completed in Fall 2009.

Source: Kapaa III, LLC and The Hallstrom Group, Inc.

TABLE 6

HISTORIC AND PROJECTED RESIDENT POPULATION
FOR PRIMARY AND SECONDARY STUDY AREAS 1990 TO 2030
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

	Historic Figures			Projected Figures				
Year	**1990**	**2000**	**2008** Year-End Est.	**2010**	**2015**	**2020**	**2025**	**2030**
Scenario One: Development Plan Forecasts, Unadjusted (1)								
Koolaupoko District (Primary)	117,694	117,994	119,000	119,852		119,569		116,666
% Annual Average Change		0.03%	0.11%	0.36%		-0.02%		-0.24%
Koolauloa District (Secondary)	14,263	14,546	14,800	15,013		15,824		16,515
% Annual Average Change		0.20%	0.22%	0.72%		0.54%		0.44%
Total Windward Population	131,957	132,540	133,800	134,865		135,393		133,181
% Annual Average Change		0.04%	0.12%	0.40%		0.04%		-0.16%
% of Oahu Total	15.8%	15.1%	14.8%	14.2%		13.1%		11.9%
Scenario Two: Development Plan Forecasts, Adjusted (2)								
Koolaupoko District (Primary)	117,694	117,994	119,000	119,300	121,000	122,500	124,000	125,000
% Annual Average Change		0.03%	0.11%	0.05%	0.28%	0.25%	0.24%	0.16%
Koolauloa District (Secondary)	14,263	14,546	14,800	15,000	15,500	16,000	16,500	17,000
% Annual Average Change		0.20%	0.22%	0.27%	0.67%	0.65%	0.63%	0.61%
Total Windward Population	131,957	132,540	133,800	134,300	136,500	138,500	140,500	142,000
% Annual Average Change		0.04%	0.12%	0.07%	0.33%	0.29%	0.29%	0.21%
% of Projected Oahu Total	15.8%	15.1%	14.8%	14.1%	13.7%	13.4%	13.1%	12.7%

(1) As taken from "Growth Projections by DP Area (2000 -2030)", Department of Planning and Permitting.
(2) Adjusted to stabilized household size and for return of uncertified TVU units into residential use.

Source: C&C of Honolulu DPP, and The Hallstrom Group, Inc.

TABLE 7

ESTIMATED RESIDENT POPULATION IMPACT OF TRANSIENT VACATION UNITS IN WINDWARD OAHU
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

Primary Study Area	
Koolaupoko District	
Estimated Transient Vacation Units (1)	561
Percent of Regional Housing Inventory	1.52%
Less Those Having Non-Conforming Use Certificates (2)	78
Total Estimated "Illegal" TVUs	483
Average Number of Bedrooms in TVUs (3)	2.6
Average Household Size	3.5
Total Resident Population Displaced by TVUs	**1,691**
Secondary Study Area	
Koolauloa District	
Estimated Transient Vacation Units (1)	106
Percent of Regional Housing Inventory	2.36%
Less Those Having Non-Conforming Use Certificates (2)	13
Total Estimated "Illegal" TVUs	93
Average Number of Bedrooms in TVUs (3)	2.6
Average Household Size	3.5
Total Resident Population Displaced by TVUs	***326***
ESTIMATED TOTAL DISPLACED WINDWARD POPULATION	**2,016**

(1) From "Vacation Rentals in Hawaii", The Kauaian Institute, October 2005.
Others have estimated there are/were more than 1,000 TVUs in Windward Oahu.
(2) From "Nonconforming Use Certificates by TMK", City & County of Honolulu,
Department of Planning and Permitting-Code Compliance Branch, November 2008.
(3) Extrapolated from data presented in "Vacation Rentals in Hawaii".

Sources: As Cited and The Hallstrom Group, Inc.

TABLE 8

QUANTIFICATION OF INDUSTRIAL FLOOR SPACE DEMAND
IN THE GREATER KAILUA STUDY AREA FROM 2009 TO 2030 (1)
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

Scenario One: Minimum Population Estimates and Growth Rate

Year	Patronage Population Annual Growth Rate	Patronage Population Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (2)	=	Net Regional Demand in Square Feet
2009		119,000		39.00		4,641,000		21.5%		997,815
2010	0.71%	119,852		39.00		4,674,228		22.0%		1,028,330
2015	-0.03%	119,700		39.00		4,668,300		25.0%		1,167,075
2020	-0.02%	119,569		39.00		4,663,191		28.0%		1,305,693
2025	-0.27%	118,000		39.00		4,602,000		31.0%		1,426,620
2030	-0.23%	116,666		39.00		4,549,974		34.0%		1,546,991

Scenario Two: Adjusted Population Estimates & Maximum Growth Rates

Year	Patronage Population Annual Growth Rate	Patronage Population Forecast Total	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate (2)	=	Net Regional Demand in Square Feet
2009		119,000		39.00		4,641,000		21.5%		997,815
2010	0.25%	119,300		39.00		4,652,700		22.0%		1,023,594
2015	0.28%	121,000		39.25		4,749,250		27.0%		1,282,298
2020	0.24%	122,500		39.50		4,838,750		32.0%		1,548,400
2025	0.24%	124,000		39.75		4,929,000		37.0%		1,823,730
2030	0.16%	125,000		40.00		5,000,000		42.0%		2,100,000

Indicated Projection Mid-Point

Year	Patronage Population Annual Growth Rate	Patronage Population Forecast Population	X	Per Capita Demand in Square Feet	=	Total Resident Demand in Square Feet	X	Regional Capture Rate	=	Net Regional Demand in Square Feet
2009		119,000		39.00		4,641,000		21.5%		997,815
2010	0.48%	119,576		39.00		4,663,464		22.0%		1,025,962
2015	0.13%	120,350		39.13		4,708,694		26.0%		1,224,260
2020	0.11%	121,035		39.25		4,750,604		30.0%		1,425,181
2025	-0.01%	121,000		39.38		4,764,375		34.0%		1,619,888
2030	-0.03%	120,833		39.50		4,772,904		38.0%		1,813,703

Figures Do not Include the Current Unmet Shortfall in Space Estimated at 6,197 Square Feet (See Table 9).

(1) Per capita demand includes space for industrial uses only.
(2) The Regional Capture Rate is the portion of the entire demand spectrum created by regional residents which will be focused towards ("captured") by industrial projects in Kailua/Kaneohe. This includes construction trade shops, suppliers for regional users, base yards, limited warehousing, repair shops, other storage, and marginal light manufacturing. Significant portions of demand are presently directed towards development in Honolulu and Ewa.

Source: The Hallstrom Group, Inc.

TABLE 9

ESTIMATED TOTAL ADDITIONAL INDUSTRIAL FLOOR SPACE AND ACREAGE DEMAND
FOR THE GREATER KAILUA STUDY AREA 2009 TO 2030
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii

Scenario One: Minimum

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
2009	997,815	0.24	95
2010	1,028,330	0.24	98
2015	1,167,075	0.24	112
2020	1,305,693	0.24	125
2025	1,426,620	0.24	136
2030	1,546,991	0.24	148

Scenario Two: Adjusted

Year	Forecast Floor Space Demand (in Sq. Ft.)	Divided by FAR Allowance (1)	Resulting Land Area Demand (in Acres)
2009	997,815	0.24	95
2010	1,023,594	0.24	98
2015	1,282,298	0.24	123
2020	1,548,400	0.24	148
2025	1,823,730	0.24	174
2030	2,100,000	0.24	201

FINISHED FLOOR SPACE ANALYSIS (in Square Feet)

Total Existing Demand		997,815
Estimated Existing Industrial Space (Sq. Ft.):		991,618
Current Undersupply or (Oversupply):		**6,197**
Periodic Additions Required (Sq. Ft.):	**Scenario 1**	**Scenario 2**
Latent/Existing Demand	6,197	6,197
2009 to 2010	30,515	25,779
2011 to 2015	138,745	258,704
2015 to 2020	138,618	266,103
2021 to 2025	120,927	275,330
2026 to 2030	120,371	276,270
Cumulative Additional Space Required:	555,373	**1,108,382**
Increase as a Percent of Existing Floor Space	**55.66%**	**111.08%**
Estimated Mid-Point Additional Space Required (2):		**831,878**

DEVELOPABLE LAND AREA ANALYSIS (in Acres)

Total Existing Demand		95
Estimated Existing Commercial Development Sites (in Acres.):		82
Current Undersupply or (Oversupply):		**13**
Periodic Additions Required (Sq. Ft.):	**Scenario 1**	**Scenario 2**
Latent/Existing Demand	13	13
2009 to 2010	3	2
2011 to 2015	13	25
2015 to 2020	13	25
2021 to 2025	12	26
2026 to 2030	12	26
Cumulative Additional Acreage Required	**66**	**119**
Increase as a Percent of Existing Acreage:	**69.12%**	**124.55%**
Estimated Mid-Point Additional Space Required (2):		**92**

(1) Assuming average finished "Floor Area Ratio" of .28 for finished industrial development sites, with a net to gross efficiency on bulk sites of 85%.
(2) Includes existing latent demand in totals.

Source: CB Richard Ellis and The Hallstrom Group, Inc.

TABLE 10

SUMMARY OF DEMAND COMPONENTS FOR FINISHED INDUSTRIAL FLOOR SPACE IN KOOLAUPOKO
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
Excludes Demand for Base Yard Spaces

Period	2009-2010 (1)	2011-2015	2016-2020	2021-2025	2026-2030	Totals 2009-2030
1. Gross Leasable Floor Area Analysis (All Figures in Square Feet Finished Floor Space)						
Demand Component						
Natural Trade Area Evolution (Using Mid-Point Figures)	34,344	198,724	202,360	198,128	198,321	831,878
Dislocation of Existing Industrial Uses	5,000	50,000	50,000	20,000		125,000
Conversion of Industrial Spaces to Commercial Uses		5,000	5,000	5,000	5,000	20,000
Secondary Demand from Koolauloa District (Allowance)	1,000	5,000	5,000	5,000	5,000	21,000
TOTAL ESTIMATED PERIODIC KOOLAUPOKO DEMAND	**40,344**	**258,724**	**262,360**	**228,128**	**208,321**	**997,878**
2. Gross Developable Site Area Analysis (All Figures in Gross Site Acres)						
Demand Component						
Natural Trade Area Evolution (Using Mid-Point Figures)	3.3	19.0	19.4	19.0	19.0	79.6
Dislocation of Existing Industrial Uses	0.5	4.8	4.8	1.9	0.0	12.0
Conversion of Industrial Spaces to Commercial Uses	0.0	0.5	0.5	0.5	0.5	1.9
Secondary Demand from Koolauloa District	0.1	0.5	0.5	0.5	0.5	2.0
TOTAL ESTIMATED PERIODIC KOOLAUPOKO DEMAND	**3.8**	**24.3**	**24.6**	**21.3**	**19.4**	**95.5**

(1) All latent demand shown in 2009-2010, will likely require several more years to be expressed and absorbed.

Source: The Hallstrom Group, Inc.

TABLE 11

PROJECTION OF POTENTIAL SUBJECT ABSORPTION USING THE RESIDUAL METHOD BASED ON TOTAL DEMAND FOR INDUSTRIAL SPACE AND LAND IN THE KOOLAUPOKO STUDY AREA
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu Hawaii
Based on Mid-Point Demand Estimates

Product Type	TOTAL SUPPLY	Lease/Sales Period 2009-2010	2011-2015	2016-2020	2021-2025	2026-2030	Total
Gross Square Feet of Finished Floor Space							
Currently Vacant Space	35,115	15,000	15,115				30,115
Market Share Percentage of Total Demand		37%	6%				3%
Potential Space on Vacant Industrial Lands (1)	37,716		12,000	12,000	13,716		37,716
Market Share Percentage of Total Demand			5%	5%	6%		4%
Regional Floor Space Demand (mid-point)	**997,878**	**40,344**	**258,724**	**262,360**	**228,128**	**208,321**	**997,878**
Shortage or (Excess) Supply	**925,047**	**25,344**	**231,609**	**250,360**	**214,412**	**208,321**	**930,047**
Potential Residual Subject Floor Space Demand							
at 95% Capture Rate	878,794	24,077	220,029	237,842	203,692	197,905	883,544
at 85% Capture Rate	786,290	21,542	196,868	212,806	182,250	177,072	790,540
Gross Acreage of Industrial Sites							
Currently Vacant, Zoned Industrial Lands	3.1		1.0	1.0	1.1		3.1
Market Share Percentage of Total Demand			4%	4%	5%		3%
Regional Industrial Land Demand (mid-point)	**93.4**	**3.8**	**24.3**	**24.6**	**21.3**	**19.4**	**93.4**
Shortage or (Excess) Supply	**90.4**	**3.8**	**23.3**	**23.6**	**20.2**	**19.4**	**90.3**
Potential Residual Subject Land Area Demand							
at 95% Capture Rate	85.8	3.6	22.1	22.4	19.2	18.5	85.8
at 85% Capture Rate	76.8	3.2	19.8	20.1	17.2	16.5	76.8

(1) According to property tax records, there are 3.09 acres (124,701 square feet) of vacant industrial-classified sites in Koolaupoko apart from the subject.
Assuming a net "Floor Area Ratio" of .28 for the available finished sites, the total finished GLA would be some 37,716 square feet.

Source: Hawaii Information Service & The Hallstrom Group, Inc.

TABLE 12

SUMMARY OF POTENTIAL SUBJECT PROJECTED DEMAND LEVELS
FOR INDUSTRIAL FLOOR SPACE USING THE MARKET SHARES METHOD
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
Based on Gross Leasable Floor Area Required

Using Mid-Point Demand Assumptions

Sales Year	Total Koolaupoko Trade Area Industrial Demand (in Gross Acres)	Effective Subject Share	Indicated Total Subject Absorption (in Gross Acres)
1	20,172	85.00%	17,146
2	20,172	85.00%	17,146
3	51,745	90.00%	46,570
4	51,745	90.00%	46,570
5	51,745	90.00%	46,570
6	51,745	90.00%	46,570
7	51,745	90.00%	46,570
8	52,472	90.00%	47,225
9	52,472	90.00%	47,225
10	52,472	90.00%	47,225
11	52,472	90.00%	47,225
12	52,472	90.00%	47,225
13	45,626	90.00%	41,063
14	45,626	90.00%	41,063
15	45,626	90.00%	41,063
16	45,626	75.00%	34,219
Totals	**743,931**	**88.81%**	**660,677**

Source: The Hallstrom Group, Inc.

TABLE 13

SUMMARY OF MAJOR ECONOMIC IMPACTS
AND PUBLIC BENEFITS
Market Study of the Proposed Kapaa Light Industrial Park
Kailua, Oahu, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Analysis Item	During Build-Out/Absorption Period	Stabilized Annually Thereafter
Direct Capital Investment	$52,800,000	
Local Contractor's Profits	$5,280,000	
Local Supplier's Profits	$2,112,000	
Construction Worker-Years of Jobs	176	
Construction Worker Wages	$12,496,000	
Tenant Full-Time-Equivalent Employment		600 to 825
Employee Wages		Up to $29,700,000
Total Operating Gross Receipts		$165,000,000
City & County of Honolulu Gross Tax Receipts (1)		$1,848,000
State of Hawaii Gross Primary Tax Receipts		$8,797,800

(1) Real property taxes and portion of GET for transportation fund.
(2) State income tax and Gross Excise Tax.

Source: The Hallstrom Group, Inc.

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 3:

Survey of Existing Businesses at the Project Site

Appendix 3 is identical to Appendix 3 of DEIS

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

Table of Contents:

Questions asked in questionnaire

One short, one-page questionnaire was distributed to each company and collected within three working days. The following information was requested from companies and was used for the data analysis:

1. Name of company
2. Type of company:
3. Total number of full time employees
4. Number of full time employees from Kailua
5. Number of full employees from Kaneohe

Summary of Results from the survey

Survey carried out September 2010:

Number of companies which returned questionnaire	40	
Total number of companies in existing warehouse development	44	
Percentage of total companies that returned the questionnaire	90%	
Total number of employees in companies that returned questionnaire	251	
Normalized total number of employees in all companies	279	
Percentage of all employees from Kailua	39%	
Percentage of all employees from Kaneohe	18%	
Percentage of all employees from outside Kailua & Kaneohe	43%	
sum	100%	
Percentage of all employees from Kailua and Kaneohe	**57%**	
Total industrial space of existing warehouses	283,000	squart feet
Per employee allowance of warehouse space	1,015	sqft per employee

Figure 1 Frequency distribution of residence of total full time equivalent employees

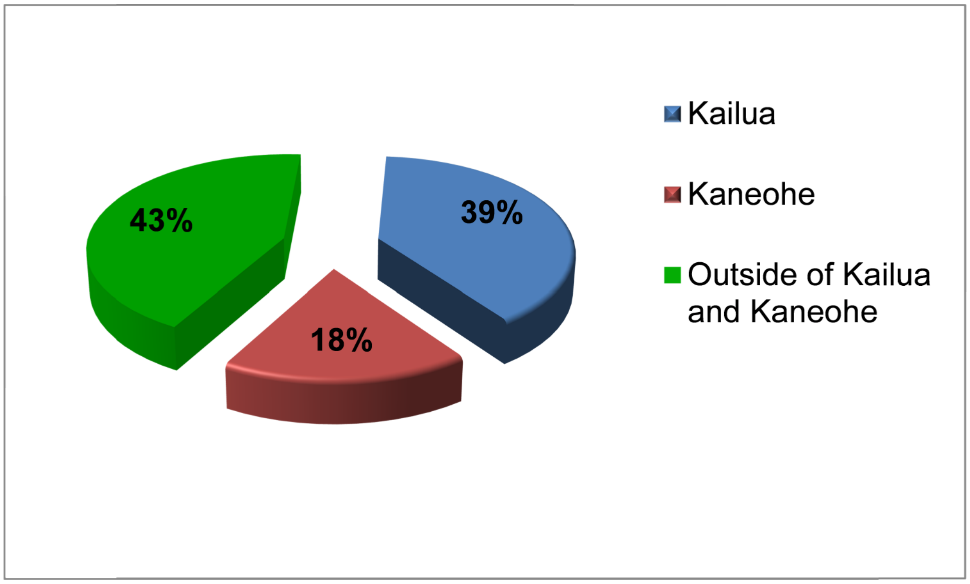

Figure 1 indicates the residence of employees of companies in the existing warehouse development at the proposed site. The figure indicates that 39 and 18 percent of all employees reside in Kailua and Kaneohe, respectively. The percentage of employees, who live in Kailua or Kaneohe represents 57 percent of the entire workforce of companies at the existing warehouse development.

Figure 2 Frequency distribution of size of companies within existing industrial development

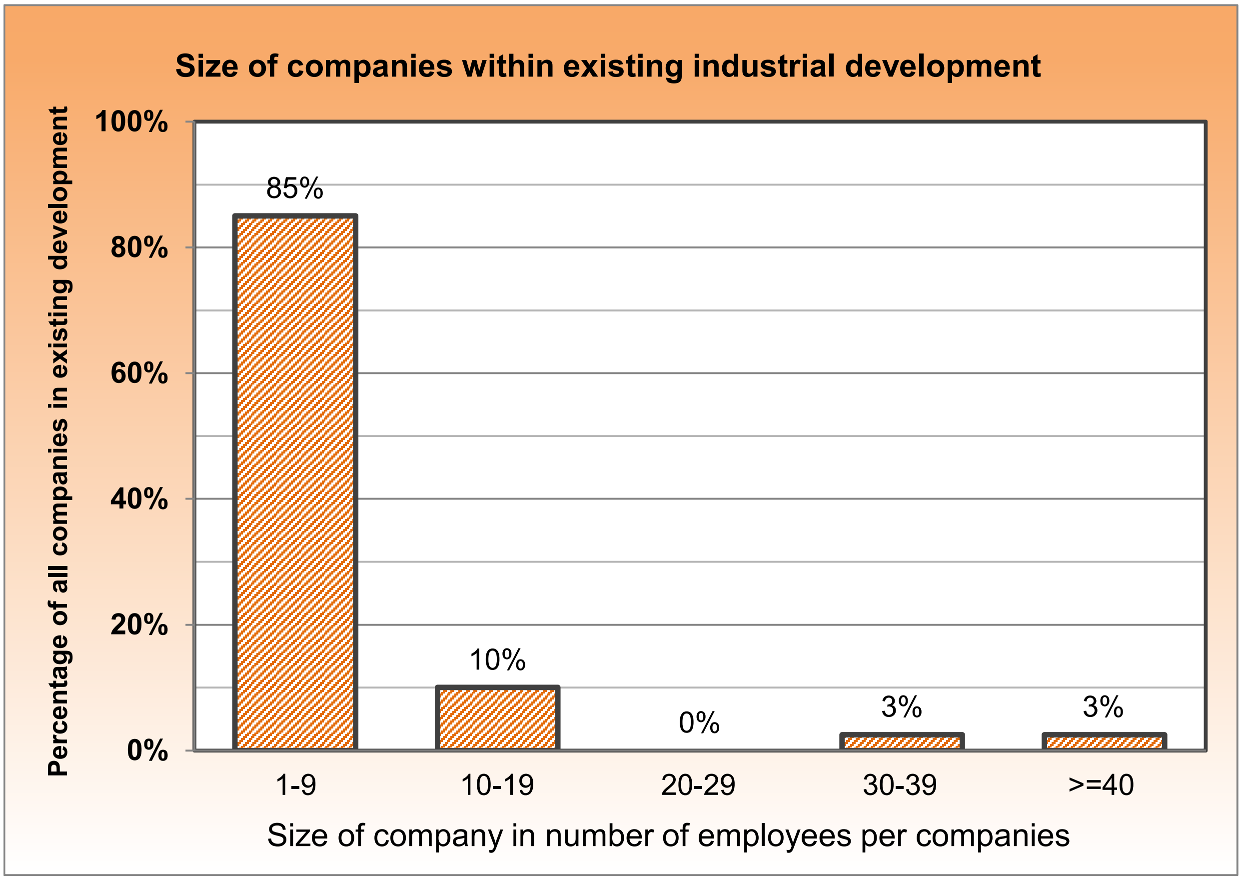

Figure 2 indicates the distribution of all employees as a function of size of company. The figure suggests that 85 percent of all companies are working in companies with 1 to 9 employees.

Figure 3 Distribution of FTE employees from Kailua & Kaneohe as function of size of company

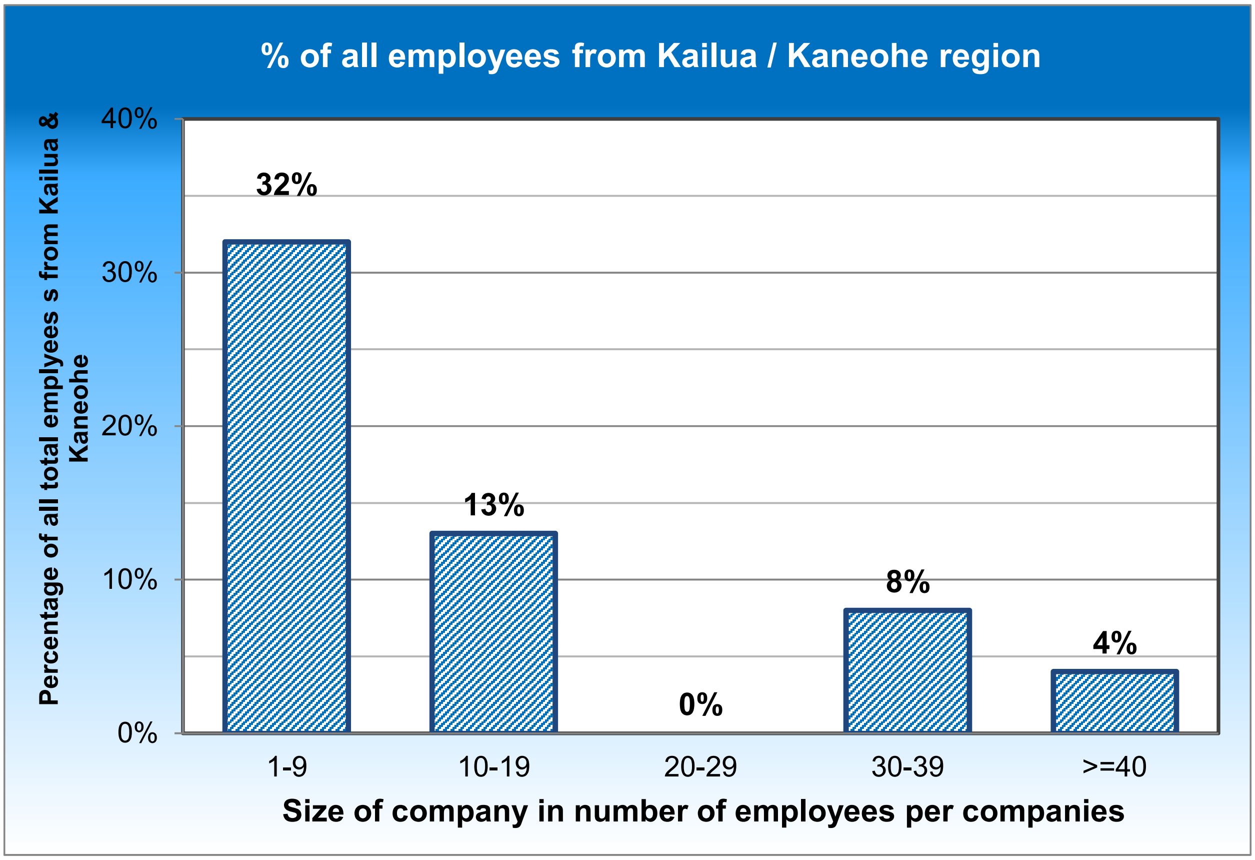

Figure 3 indicates the distribution of the 57 percent of total employees who are from Kailua & Kaneohe, as a function of size of company. The figure indicates that 32 percent of all employees come from Kailua and Kaneohe and are working in small companies with 1 to 9 employees.

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Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 4:

Sustainable Design Approach

Appendix 4 is identical to Appendix 4 of DEIS

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

APPENDIX 4

Draft Environmental Impact Statement

for the proposed

Kapa’a Light Industrial Park

Sustainable Design Approach

Concept Design for the Proposed

Kapa’a Light Industrial Park

in the Lower Portion of the Development of the Project Site

within TMK 4-2-15:006 (portion of)

Definition of LEED Credits to be Attempted and Description of

Design Measures to Attain LEED Silver Certification Upon

Completion of the Development

Prepared for

Kapaa I, LLC

Prepared by

Sustainable Design & Consulting LLC
www.sustain-HI.com

November 2010

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1. Introduction

The Kapa'a Light Industrial Park will be developed on former landfill area that is within the land parcels TMK 4-2-15:001 (portion of), 006 and 008. The intended land use is industrial warehouses, which requires that the land is properly zoned for this use. While the parcel TMK 4-2-15:008 is already zoned I-2 (Intensive Industrial), the other two parcels TMK 4-2-15:001 (portion of) and 006 have to be rezoned to I-1 Light industrial from the present P-2 General preservation land in order to build warehouse or base yards.

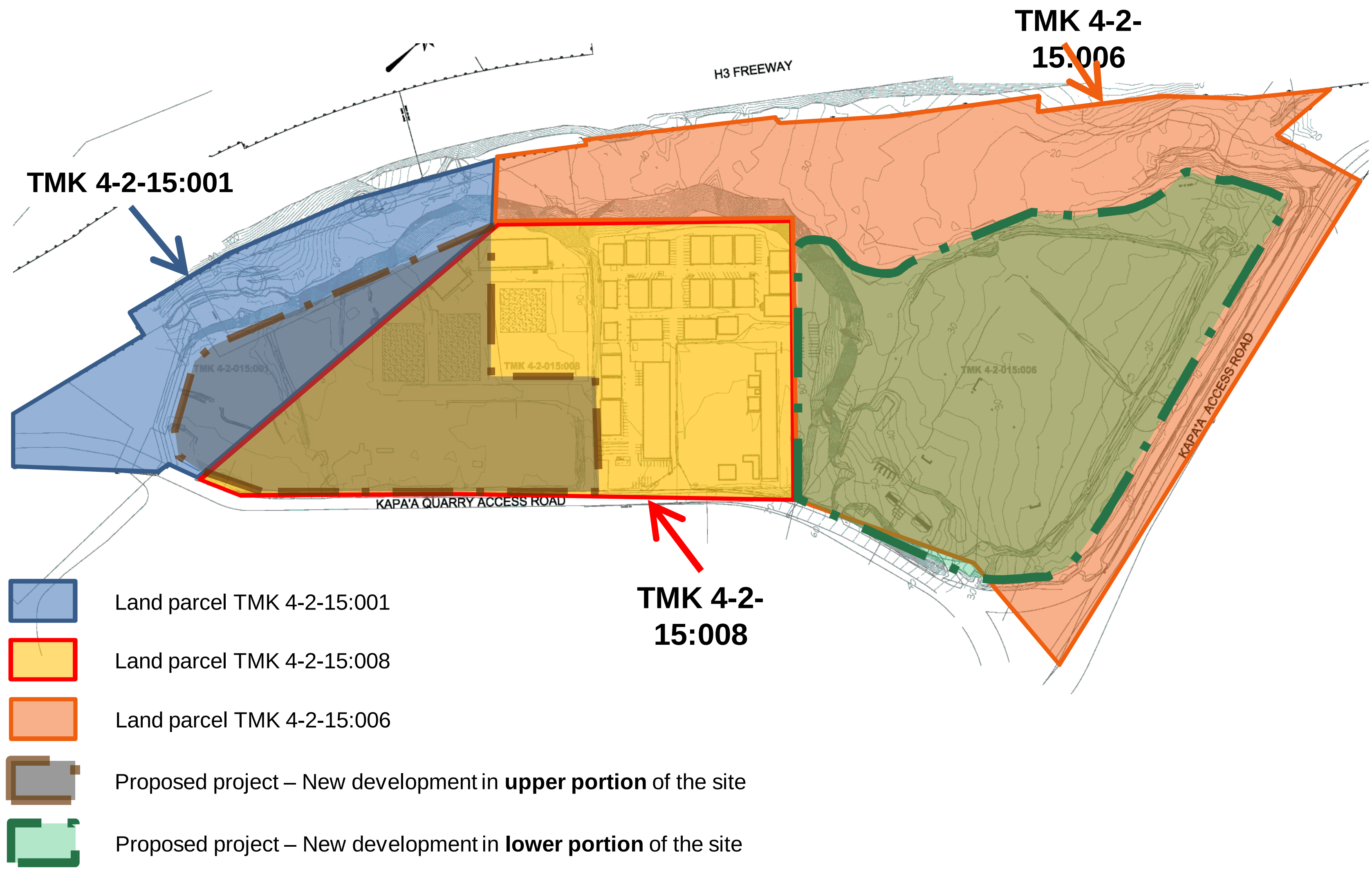
The three parcels are contiguous land parcels, whereby parcels TMK 4-2-15:001 (portion of) and 008 are adjacent and on one plateaued portion of the site and parcel TMK 4-2-15:006 is on another plateau which is at a lower elevation. Thus, the proposed site is separated into two portions, the upper portion and the lower portion.

Figure SDA 1.1 shows an aerial photography of the proposed site. The boundaries of the land parcels are indicated. The central part of the proposed site, parcel TMK 4-2-15:008 has presently a number of warehouses, while the adjoining parcel TMK 4-2-15:001 (portion of) to the west does not have any permanent buildings or structures. This parcel is graded but has no pavement; only some dirt roads.

Figure SDA 1.1 shows the parcel TMK 4-2-15:006 to the east of the existing warehouse development. The parcel 4-2-15:006 includes a larger portion of the Kapa'a Stream corridor and an area that was formed from landfill that dates back several decades. Only the land fill area will represent of lower portion of the proposed site and no open space will be used for the development footprint of the project. The land within parcel 4-2-15:006, which will be used for the warehouse development is currently used for different activities ranging from green waste processing to storage of inert building material.

In planning the light industrial park the lower portion of the site, parcel TMK 4-2-15:006 has to be considered of having a larger potential for impact on the surrounding land and especially the adjacent wetland. Figure SDA 1.2 shows that a significant portion of the parcel 006 is within the Special Management Area (SMA) district. The site is in close proximity to important wetland, especially the Kawainui Marsh. Consequently, the planned light industrial park will have to be developed in such a way to avoid significant impacts to the environment and to the community.

Green building technologies can effectively mitigate many potential impacts to the environment and the community. Electing a recognized green building certification program and subjecting the design and construction to an thorough audit by a third party to verify that the selected development approach conforms to effective and proven green building and development practices is a strong commitment to implement the environmentally friendly design for the light industrial park.



Sustainable Design & Consulting LLC
www.sustain-HI.com

Kapa'a Light Industrial Park
Draft Environmental Impact Statement
Sustainable Design Approach - Lower Portion of Site

Figure SDA 1.1 Land Parcels on which the Proposed KLIP will be developed

In accordance to these goals the developer of the Kapa'a Light Industrial Park has decided to develop the lower portion of the proposed site in accordance to the LEED Green Building Rating System for Core and Shell, Version 3.0. Upon completion of construction the warehouse development will apply for **LEED Silver** certification, which signifies an advanced level of commitment to green building technology implementation.

Figure SDA 1.2 shows the project boundary of the proposed site for which LEED Silver certification is sought.

The LEED Green Building Core and Shell Rating system applies to new constructions or major renovations where the owner occupies less than 50% of the space, which is the case for the proposed Kapa'a Light Industrial Park, where warehouses will be built on a graded and landscaped site. Tenants will occupy warehouse space and are will be responsible to build and maintain the commercial interior. The core and shell spaces encompass the building envelope of the warehouses and the development of all areas around the buildings and providing all utility services.

In reaching the LEED Silver certification goal the project has to qualify for at least 51 credit points out of a total of 100 credit from five credit categories plus 10 possible bonus points for innovative designs, exemplary performance and fulfillment of regional priorities.

Credits carry different weight have different numbers of possible points maximum associated with them . In addition for selected credits, the degree of credit compliance results in different number of credit points awarded. The LEED project team can adjust the project approach in such a way as to select how many points will be attempted from the different credit categories and bonus points. The ability to select which credits are attempted provides the project team with the opportunity to consider locally important factors. In the case of the proposed industrial development the project team has selected to focus on those credits, which would result in effective mitigation of impacts on the wetland area.

Section Two of this design document presents the selected design approach to fulfill the requirement of the LEED Silver certification goal.

Section Three of this design document shows a more detailed design description of several key credits that will be attempted.

Section Four of this design document summaries the proposed certification approach and discusses how and to which extent the different credit categories contribute to overall points of the project and offer effective impact mitigation for the adjacent environment and the community living in the Koolaupoko region.

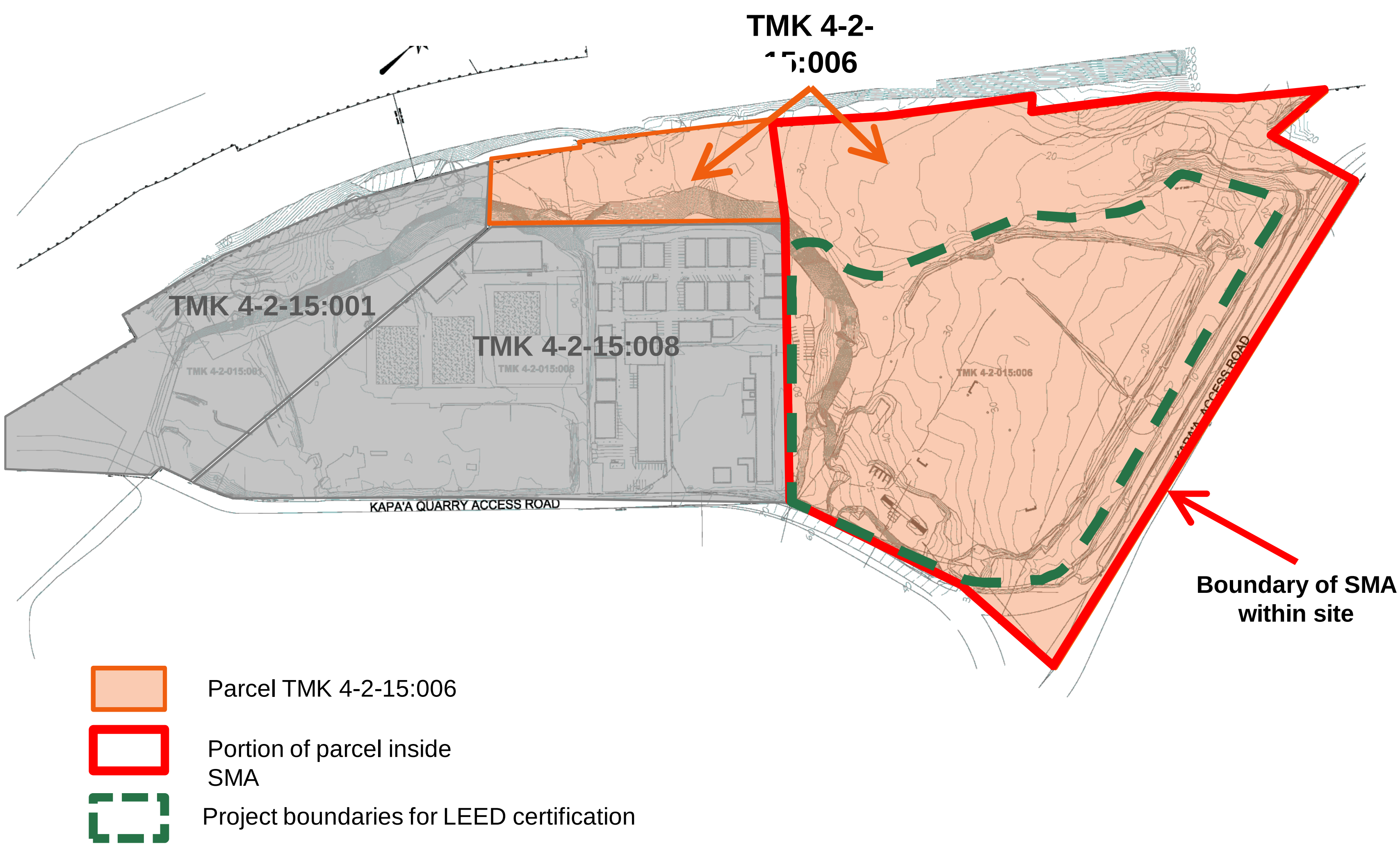


Figure SDA 1.2 Project boundary for LEED certification

2. List of the LEED Credits for LEED Silver Certification

The list below summarizes the credits that will be attempted by the project team to achieve LEED certification upon completion of the proposed project. Credits have different point values. The sum of credit points attempted in the design and achieved upon project completion determines the level of LEED certification. The project goal is to achieve LEED Silver certification.

The list below shows only those credits that will be attempted by implementing appropriate measures and technologies. The list also shows several important credits (high credit points) and measures that would mitigate important impacts for the proposed project are important and that might be attempted if the project team decides to include these credit in the overall LEED strategy of the proposed project. .

Furthermore the list below also shows prerequisites that must be met and for which no points are awarded. By and large the credit prerequisites for this project are not only met by generally exceeded, in order to implement an effective impact mitigation for the proposed project.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
SS Sustainable Sites:	
SS Prerequisite 1: Construction activity pollution prevention: This is a prerequisite, therefore design measures have to be implemented and no credit points are awarded.	
Intent of credit: Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation;	The project will conform to the erosion and sedimentation requirements of the 2003 EPA Construction General permit or applicable local standards and codes, whatever is more stringent. The project will specifically implement Best Management Practices (BMP) to avoid or significantly mitigate impacts from soil erosion, loss of topsoil, or impacts from airborne dust and particular matters. Section 3.1 presents a more detailed description of the type of control measures for storm water runoff from the construction site

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
SS Credit 1: Site Selection : The proposed design approach satisfies all but one requirement for this credit; with the present site layout this credit will not be attempted	
Intent of credit: Reduce the environmental impact from the location of building on a site.	The project satisfies most of the requirements of this credit. There is one building and one loading dock within the site layout which are closer than the required 100 feet setback from the wetland delineation. The portion of the proposed site that is closest to the wetland area in the Kapa'a Stream corridor is reserved for a vegetative buffer zone around the site areas which contain buildings, roads, parking areas and other hardscape areas. In case of changes to the proposed park layout this credit point might be achieved. Section 3.2 discusses the reason why the credit is not attempted at this time; but might be attempted if there is a change in the proposed layout of the industrial park
SS Credit 3: Brownfield Redevelopment: The proposed design approach satisfies the core intent of the credit but does not follow all requirements; this credit will not be attempted	
Intent of credit is to rehabilitate damaged sites where development is complicated by environmental contamination and reduce pressure on undeveloped land	The proposed site has not officially been defined as a Brownfield, and therefore the credit cannot be counted at this point in time. However, the proposed project site satisfies the intent of the credit to reduce pressure on undeveloped land. The development on this former landfill is likely more cost intensive than developing on undeveloped land.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
SS Credit 4.1: Alternative Transportation - Public Transportation Access: This credit is important but cannot be satisfied without the creation of at least one public bus line; if a public bus line is implemented to serve the project area during the development of the project in addition to the planned private shuttle the credit will be attempted	
Intent of credit is to reduce pollution and land development impacts from automobile use.	At the present there is no public transportation that serves the Kapa'a Valley or the west side of the Kawainui Marsh. The project team understands that there are no immediate plans to implement public transportation to this area. The developer strongly support alternative transportation and plans to start a private shuttle service if there is a sufficient demand from the businesses leasing the industrial space. While private shuttle would be one out of two required bus services, this credit point cannot be achieved, but might be achieved sometime in the future. This credit point would significant help the project team to reach a higher certification level.
SS Credit 4.2: Alternative Transportation: Bicycle Storage & Changing Rooms: this credit will be attempted	
Intent of credit is to reduce pollution and land development impacts from automobile use.	Bicycle storage and changing rooms will be made available to the users (employees and visitors) of the proposed industrial park. These measures will encourage the use of bicycles as a means for commutes or visits to the industrial park. It has been pointed out that riding a bicycle on the current quarry road might be not safe, due to the absence of a paved shoulder. The project team anticipates that in the near future conditions for safer bicycle riding will improve along the quarry road, e.g. through the planned Kawainui Marsh perimeter trail (a combined walkway / bikeway). This perimeter trail would provide secure riding and walking along the quarry road from Mokapu Blvd. and Kalanianaole Highway to the proposed project site.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
SS Credit 5.1: Site Development - Protect or Restore Habitat: this credit will be attempted	
Intent of credit is to conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.	The minimum of area (either 50% of site (excluding building footprint) or 20% of entire site) will be restored with either native or adapted plant species. A significant portion of the restored land will be contained in the vegetative buffer zones that will surround the proposed industrial park. Section 3.3 presents a more detailed description of the design approach for this project measure
SS Credit 5.2: Site Development - Maximize open space: this credit will be attempted	
Intent of credit is to promote biodiversity by providing a high ratio of open space to development footprint.	Vegetated open space will be provided that exceeds the county zoning requirement by more than 25%. The vegetated open space comprises the area that is outside the development foot print (e.g. hardscape, buildings, roads, and parking areas) thus vegetated areas adjacent and between the buildings as well as open space at the perimeter of the site.
SS Credit 6.1: Stormwater Design: Quantity Control: this credit will be attempted (the basic requirements for the stormwater design will significantly exceed the basic requirements so that exemplary performance credit will be attempted)	
Intent of credit is to limit disruption of the natural hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff and eliminating contaminants.	The project will implement a stormwater management plan that protects the receiving stream channels from excessive erosion and includes stream protection and quantity control strategies. All stormwater will be treated to remove at least 80% of all pollutants before being discharged into the receiving waters in a controlled manner. An extended detention pond will contain stormwater peak flows and will release the stormwater with a low flow rate over a time period that is between 24 and 48 hours. The rainwater will be collected from a portion of the roof areas and selected

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
	sections of the internal roadway. The collected rainwater will be harvested in underground cisterns for use in irrigation and certain graywater applications; thus parts of impervious roof surfaces and roadway sections will be transformed to pervious surfaces since the collected rainwater will ultimately either infiltrate into the ground or evaporated by the vegetation. Section 3.4. presents a more detailed description of the design approach for the stormwater system related to quantity control
SS Credit 6.2: Storm water Design - Quality Control: this credit will be attempted (the basic requirements for the stormwater design will be significantly exceeded by the selected project approach; therefore an exemplary performance credit will be attempted)	
Intent of credit is to limit disruption and pollution of natural water flows by managing stormwater runoff.	The proposed stormwater management plan will comprise several interlinked treatment steps. It is the goal to treat 100% of all stormwater that is collected from impervious surfaces and conveyed to the treatment facilities. The main treatment component of the proposed system is the extended detention pond, where stormwater will undergo natural treatment functions and stormwater catchment units. The stormwater catchment units are placed upstream of the detention ponds and remove all the floatables as well as a significant portion of the suspended solids and nutrients from the stormwater runoff. The combined efficiency of the catchment units and extended detention ponds are estimated to be around 90%, which is significantly higher than the 80% efficiency in TSS removal required under this credit. Section 3.5. presents a more detailed description of the design approach for the stormwater system related to quality control

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
SS Credit 7.1: Heat Island Effect - Non-Roof: this credit will be attempted	
Intent of credit is to reduce heat islands to minimize impacts on microclimates and human and wildlife habitats.	The site hardscapes (including roads, sidewalks and parking lots) will be configured to achieve the following heat island mitigation: shade will be provided by trees, structures covered by polar panels and structures that have >29 SRI, hardscape material with >29 SRI will used as well as open grid pavement. Section 3.6. presents a more detailed description of the design approach of non-roof heat island avoidance
SS Credit 8: Light Pollution Reduction: this credit will be attempted	
Intent of credit is to minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve night time visibility and reduce impacts from lighting on nocturnal environments	Both interior and exterior lighting have to be considered for effective mitigation of light pollution. Interior lights should not be penetrating to the outside unabated and within the limits given under this credit. Exterior lighting should be limited to the extent required by safety and comfort. The exterior lighting for the project is regulated by requirements of the LZ1 (=Dark) light zones of IESNA RP-33. LZ1 far exceeds the requirements for urban regions; yet LZ1 is more appropriate given the close proximity to the Kawainui Marsh. Section 3.7.presents a descriptions measures for the interior and external lighting systems to reduce light pollution
SS Credit 9: Tenant Design and Construction Guidelines: this credit will be attempted	
Intent of credit is to educate tenants about implementing sustainable design and construction features in the tenant build-out.	Create and disseminate to all tenants a document that provides tenants with important design and construction guidelines. The documents will enable tenants to coordinate their design and construction efforts with the LEED certified core and shell building

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
	system. The document will address all important credit categories of the LEED for Commercial Interiors certification process. Section 3.8 discusses the tenants guidelines to incorporate sustainable building strategies
WE - Water Efficiency **WE Prerequisite 1: Water Use Reduction**: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems	The water consumption in the buildings will be reduced by at least 20% below the water use baseline defined in the prerequisite.
WE Credit 1: Water Efficient Landscaping: this credit will be attempted	
Intent of credit is to limit or eliminate the use of potable water or other natural water resources for landscape irrigation.	The proposed selection of special native or adapted plant species will reduce the need for irrigation. The project will use only captured rainwater and recycled greywater for irrigation. The rainwater from the extensive roofs will be captured, filtered and conveyed to cisterns from where it will be pumped to locations requiring irrigation or to buildings for selected greywater applications (e.g. wastewater conveyance) Section 3.9 presents a more detailed description of the design approach water efficient irrigation

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
WE Credit 2: Innovative Wastewater Technologies: this credit will be attempted (the proposed project approach will significantly exceed the basic requirements for the innovative wastewater systems design; therefore an exemplary performance credit will be attempted)	
<u>Intent of credit</u> is to reduce wastewater generation and potable water demand while increasing the local aquifer recharge	The requirements of this credit will be satisfied through both of the alternative credit options: (1) by reducing the amount of potable water used for sewage conveyance by at least 50%. Water conserving fixtures (water closet, urinals) and non-potable water (e.g. captured rainwater and recycled greywater) will be used. It is project goal to only use non-potable water for sewage conveyance (2) by using advanced wastewater treatment systems onsite combined with infiltration on the site. <u>Section 3.10 provides a discussion of the proposed system design of the onsite wastewater system</u>
WE Credit 3: Water Use Reduction 40% Reduction: this credit will be attempted	
<u>Intent of credit</u> is to further increase water efficiency within the buildings to reduce the burden on municipal water supply and wastewater systems	The project will only use water conserving water fixtures (e.g. water closet, urinals, shower heads) and will replace potable water for applicable water with either captured rainwater or recycled graywater for certain applications to the allowable (e.g. local codes) extent possible. This includes the use of highly efficient water fixtures (e.g. Water Sense fixtures). <u>Section 3.11 discusses some strategies for achieving a 40% reduction in water use in the buildings</u>

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
EA - Energy & Atmosphere	
EA Prerequisite 1: Fundamental commissioning of building energy systems: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to verify that the project's electricity are installed and perform well according to the requirements, basis of design and construction documents.	Fundamental commissioning will be carried out by a commissioning authority according to the requirements of this prerequisite
EA Prerequisite 2: Minimum energy performance: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to establish the minimum level of energy efficiency for the proposed building and systems to reduce impacts of avoidable energy use.	Demonstrate a 10% improvement in the proposed building energy use performance compare to a building baseline energy performance. As an alternative to the demonstrated 10% improvement in the building performance (which include a comprehensive energy modeling) the prerequisite can satisfied by the option of following prescriptive measures of the ASHRAE Advanced Energy Design Guide for warehouses.
EA Prerequisite 3: Fundamental refrigerant management: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to reduce stratospheric ozone depletion.	Chlorofluorocarbon (CFC)- based refrigerants will not be used in the proposed industrial park

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
EA Credit 1: Optimize Energy Performance: this credit will be attempted	
Intent of credit is to achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.	The project will attempt to reduce the energy consumption of the proposed development by at least 30% below the baseline energy consumption standard. The reduction in energy consumption for the required building systems will be achieved by using only energy saving lighting and controls, using natural lighting to the extent possible, and using only energy efficient appliances and HVAC systems. Section 3.12 presents the measures that will be implemented to achieve the targeted energy savings
EA Credit 2: On-Site Renewable Energy: this credit will be attempted	
Intent of credit is to encourage increasing levels of on-site renewable energy self-supply to reduce the environment and economic impact associated with fossil fuel energy	The project will install on-site renewable energy devices to generate at least 1% of the total annual energy consumption of the project. On-site renewable energy technology will include mainly Photovoltaic (PV) systems and solar thermal systems. Wind energy systems will not be used due to the danger of bird-strikes. The PV and/or solar thermal systems will be installed on the roofs of buildings or on structures that provide shade for parking areas. Section 3.13. presents a description of the proposed design approach to integrate onsite renewable energy into the project
EA Credit 5.1: Measurement & Verification – Base-building: this credit will be attempted	
Intent of credit is to provide ongoing accountability of building energy	A measurement and verification plan will be implemented that is consistent with the credit

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
consumption over time	requirements. Appropriate meters will be installed to measure energy consumption of the base core and shell building.
EA Credit 5.2: Measurement & Verification - Tenant Sub-metering: this credit will be attempted	
Intent of credit is to provide ongoing accountability of building energy consumption over time	A measurement and verification plan will be implemented that is consistent with the credit requirements. Appropriate meters will be installed to measure energy consumption of the tenant spaces. Meters and controls include centrally monitored electronic metering systems for the individual buildings that allows for tenant sub-metering.
MR - Materials & Resources	
MR Prerequisite 1: Storage and Collection of Recyclables: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to facilitate the reduction of waste generated by building occupants.	Convenient areas to recycle paper, metals, glass, card boards\ and plastics will be made available within the park. The objective is to encourage recycling and make the use of the recycling facilities easy and accessible. The park management will establish the locations and outfitting on the recyclable collection sites and will enter into contract with a licensed recycle operator.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
MR Credit 2: Construction Waste Management: this credit will be attempted	
Intent of credit is to divert construction and demolition debris from disposal in landfills. Redirect recyclable resources so they can be reused.	A construction waste management plan will be developed to ensure that recyclable material can be reused on site. A significant portion of the recyclable material will be concrete pavement and other structures which will be crushed for reuse as base for the internal roads or permeable road cover.
MR Credit 4: Recycled Content: this credit will be attempted	
Intent of credit is to increase demand for building products that incorporate recycled content materials.	The project will use recycled material to the extent possible. Where possible concrete structures and pavement will use fly ash instead of cement; steel structures have an inherently high proportion of pre-consumer recycled content and the extensive use of steel in the development will therefore result in a high recycled content for the overall project.
MR Credit 5: Regional Materials: 10% Extracted, Processed & Manufactured Regionally: this credit will be attempted	
Intent of credit is to increase demand for building materials and products that are extracted and manufactured within the region; supporting the use of indigenous resources and reducing environmental impacts resulting from transportation	The project will utilize building materials and products that are extracted and manufactured within the region. The building material that is permanently installed on site (e.g. mechanical, electrical and plumbing components are NOT included in the list of allowable material for this credit). The project team believes that 10% of regional products can be achieved in the design and construction.
IEQ - Indoor Environmental Quality	

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
IEQ Prerequisite 1: Minimum indoor air quality performance: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to establish minimum indoor air quality performance to contribute to comfort and well-being of the occupants	The project team will decide on the scope of either mechanical or natural ventilation of the core and shell portion of the project. Most of the space in the warehouses will have natural ventilation and only smaller portions will have mechanical ventilation and cooling. The project team will satisfy the requirements of this prerequisite and safeguard minimum ventilation rates and avoidance of internal pollutants
IEQ Prerequisite 2: Environmental Tobacco smoke (ETS) Control: This is a prerequisite; therefore design measures have to be implemented and are not optional: no credit points are awarded.	
Intent of prerequisite is to prevent or minimize exposure of building occupants, indoors surfaces and ventilation systems to ETS	Smoking in the building is regulated under state law and the project will incorporate these laws in the design. Smoking will be prohibited in the buildings and within the designated setback from buildings openings and ventilation intakes.
IEQ Credit 3: Construction IAQ Management Plan: During Construction : this credit will be attempted	
Intent of credit is to reduce IAQ problems resulting from construction	The project will require contractors to abide by the regulation for the core and shell as well as for the tenant spaces.
IEQ Credit 4.1: Low-Emitting Materials:-Adhesives & Sealants: this credit will be attempted	
Intent of credit is to reduce the quantities of indoor air contaminates that are irritating or harmful to the occupants	The project team will specify the type of low VOC sealants and adhesives that can be used in the project to satisfy the credit.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
IEQ Credit 4.2: Low-Emitting Materials-Paints & Coatings: this credit will be attempted	
Intent of credit is to reduce the quantities of indoor air contaminates that are irritating or harmful to the occupants	The project team will specify the type of low VOC Paints & Coatings that can be used in the project to satisfy the credit.
IEQ Credit 8.1: Daylight & Views: Daylight: this credit will be attempted	
Intent of credit is to provide occupants with connection to the outdoors through introduction of daylight.	The project will utilize as much day lighting as possible in order to lower the electricity demand in the warehouses. The 75% threshold will be achieved. The project team will utilize a combination of windows and skylights (e.g. light domes) to achieve sufficient day lighting. As was pointed out, the installation of a significant number of skylights, e.g. (5% to 7% of the total roof area) needs to satisfy the requirements of light pollution reduction. The selected skylights would have to be equipped with a suitable measure to result in allowable lighting conditions between 11:00 pm and 5:00 am.

ID - Innovation & Design:

ID1 credit 1.1: Educational program – display about the bordering Kawainui Marsh; this ID credit will be attempted

	The project team will develop an education program to educate about certain issues that affect the Kawainui Marsh. The educational program will be designed in cooperation with local environmental advocacy groups and/or local schools. The centerpiece of the education program will be a display that will be erected at an accessible location on the property of the developer and adjacent to the proposed site in such a way that it will not negatively affect the traffic. In addition, the

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
	content of the display will be made accessible through the web-site presentation of the proposed warehouse development or other web-sites that inform about the marsh. The web-site will, among other issues, inform about environmentally friendly and energy efficient industrial developments. The developer will seek the cooperation of the future tenants in the warehouse development to contribute to the educational program.
ID1 credit 1.2: Use energy saving electric vehicles for maintenance vehicles in the proposed light industrial park: this ID credit will be attempted	
	The project will primarily use small electric utility vehicles for all maintenance functions within the proposed park that can be carried out with smaller vehicles. A part of the electric energy for the vehicles will be obtained by onsite renewable energy or other renewable resources, for example renewable energy certificates. The electric maintenance vehicles do not discharge any harmful substances and are quite in operation.
ID1 credit 1.3: Developing contractually binding performance criteria for the tenants: this ID credit will be attempted	
	The developer will develop contractual agreements what basic procedures the tenants have to follow when building out their leased industrial space. Areas that will be covered will comprise such LEED credits that also serve as impact mitigation measures for the proposed industrial park. One important impact mitigation is the reduction of light pollution. The developer will use binding contractual terms to enforce strict light pollution mitigation by the selection and operation of the external and internal lighting.

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
	Other impacts mitigation that will be regulated are measure to reduce noise pollution and air pollution as well as implement preferred parking and abide by requirements to conserve water and avoid disposing of substances in the onsite wastewater system that could degrade the performance of the advanced septic system.
ID1 credit 1.4: Exemplary Performance for stormwater system design: this ID credit will be attempted	
Intent of this exemplary performance credit is to minimize to the extent possible detrimental effect of storm water to the receiving waters (refer to SS6)	The proposed storm water system will be designed and operated in accordance with the highest standards in storm water volume and quality control. One hundred percent (100%) of the runoff will be treated in two stages to remove all floatables and in excess of 90% of all soluble contaminates, sediments and particular nutrients. The storm water will be contained in an extended detention pond and released to avoid stream bed erosion. Storm water will be captured and the used for irrigation of greywater applications. <u>Section 3.4 and 3.5 show the proposed design approach of the comprehensive storm water treatment</u>
ID1 credit 1.5: Exemplary Performance in innovative wastewater technologies: this ID credit will be attempted	
Intent of this exemplary performance credit is to reduce the amount of wastewater generated, conserve potable water and increase efficiency of wastewater treatment.	The proposed wastewater treatment system greatly exceeds the requirements of credit WE 2. The system will use no potable water for sewage conveyance and will treat 100% of the wastewater to advanced wastewater treatment standards. <u>Section 3.1 presents a description of the proposed design approach for the onsite wastewater treatment</u>

List of credits / prerequisites that will be implemented to achieve LEED certification goal

Type of Credit / Prerequisite	Description of design measure to meet credit
ID1 – LEED-AP:	The project team will include at least one LEED-AP as a principle team member.
Regional Priorities:	
RP credit 1: SSc6 - Storm water Design: Quantity & Quality Control; Bonus point will be attempted	The project will qualify by achieving exemplary performance in stormwater design.
RP credit 2: WEc2 (25%) - WE Credit 2: Innovative Wastewater Technologies: Bonus point will be attempted	The project will qualify by achieving exemplary performance in innovative wastewater design.
RP credit 3: MR5 - Regional materials; Bonus point will be attempted	The project will qualify by achieving the threshold in regional materials.
RP credit 3: EAc1 (30%) - Optimize energy performance: Bonus point will be attempted	The project will qualify by achieving 30% energy savings

3. Description of Key Measures for Sustainable Design Approach

This section provides more detailed descriptions of some of the key measures for the sustainable design approach. The list of credit attempted by the project team in section 2 references the key measures.

3.1. Construction Activity Pollution Prevention (SS Prerequisite 1)

The prerequisite requires an effective approach to avoid or minimize the loss of topsoil, which is regarded as one of the most significant consequence of erosion. Runoff from developed sites result in a variety of water quality issues, since pollutants, sediments and excess nutrient contained in the runoff impact aquatic habitat in the receiving waters. During construction measures have to be planned and executed to respond to rain and other erosion-causing events to avoid or minimize impacts.

The following common measures are to be adopted which should not only be met but exceeded:

Stabilization measures:

Stabilization control measures:

Temporary seeding	-	Plant fast growing grasses for temporary soil stabilization
Permanent seeding	-	Plant grass, trees and shrubs for permanent stabilization. Use preferably native or adapted plant species.
Mulching	-	Place hay, grass, woodchips, straw or gravel on the soil
	-	

Structural control measures:

Earth dikes	-	Construct earth dikes and mounds of stabilized soil to divert surface runoff from disturbed soil areas or guide runoff towards sediment basin and traps
Silt fence	-	Install fabrics held by posts to remove sediments from the runoff
Sediment trap	-	Install a sediment trap by excavating a pond or create an earthen embankment to allow sediments to settling of sediment from the stormwater runoff
Sediment basin	-	Allow for settling of sediments from the runoff before release into receiving waters

Vehicle tracking	-	Construct an area for vehicles access where soil is removed and replaced with free draining gravel so that soil displacement is minimized

Figures SDA 3.1 through SDA 3.4 show four different phases of the site development. The following paragraphs discuss measures against soil erosion and contaminated runoff.

Figure SDA 3.1 shows the first phase of site development. As a first step of the comprehensive erosion and sedimentation control plan earthen dikes or vegetative buffer zones will be installed around the project site before grading of the interior site commences. All the runoff from the site will be treated to remove as much sediments before the runoff volumes can enter the receiving waters. A range of stabilization and stormwater BMPs (Best Management Practices) will ensure that the construction related impacts on the receiving waters will be minimized. After major grading a temporary vegetation cover will be established to avoid water and wind induced erosion.

Figures SDA 3.2 shows the second phase of the site development when major roadways are constructed and the drainage system will be installed on the site. The buffer zones at the site perimeter are surrounding the interior areas with visual impact mitigation and earth dams to avoid any uncontrolled runoff. During this phase of the construction the rainwater / stormwater catchment from the roadway surfaces are installed to provide irrigation water for the growing habitat restoration areas and buffer zones at the perimeter of the site.

Figure SDA 3.3 shows the third phase of the development of the site. The warehouse structures are first built in the southern portion of the site. As warehouse construction continues more warehouses are built and added to fill the site progressively from the south towards the north of the project site. During this phase of the project the vegetation in the buffer zones is already well developed and cab offer visual impact mitigation as well as mitigation of air quality and noise impacts. The first Type A and B onsite wastewater systems are installed to serve warehouses. The effluent of the Type B wastewater systems at the perimeter of the site are discharged in leach fields or in irrigation at the southern perimeter buffer zones.

Figure SDA 3.4 shows the final phase of the development when all warehouses are constructed. The time period during which the warehouses are constructed will range from approximately five to ten years, depending on the rate at which demand for new industrial warehouse space evolves in the Koolaupoko region.

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Figure SDA 3.1 Development of Site - 1st Phase - Grading and bufferzones

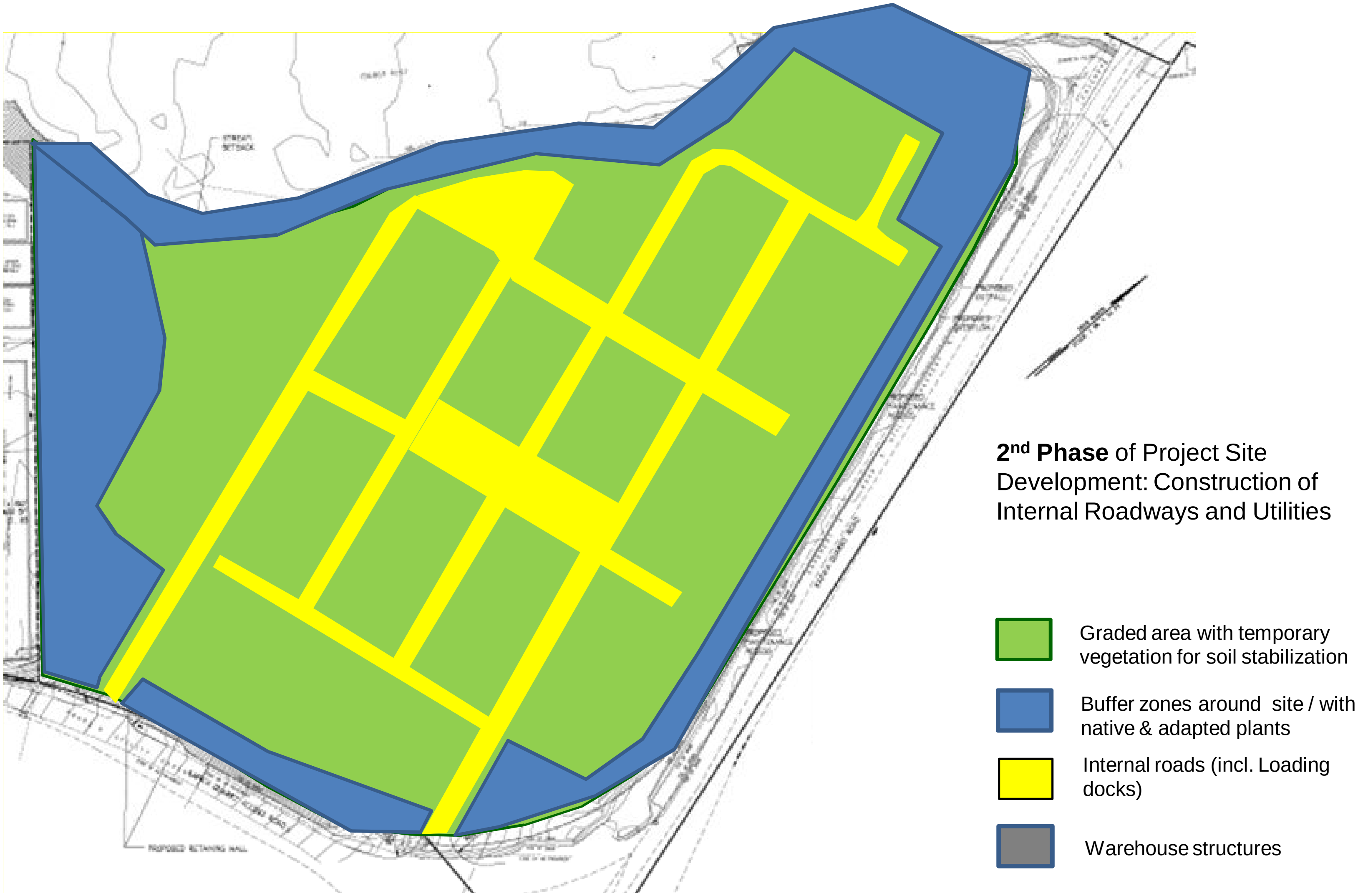

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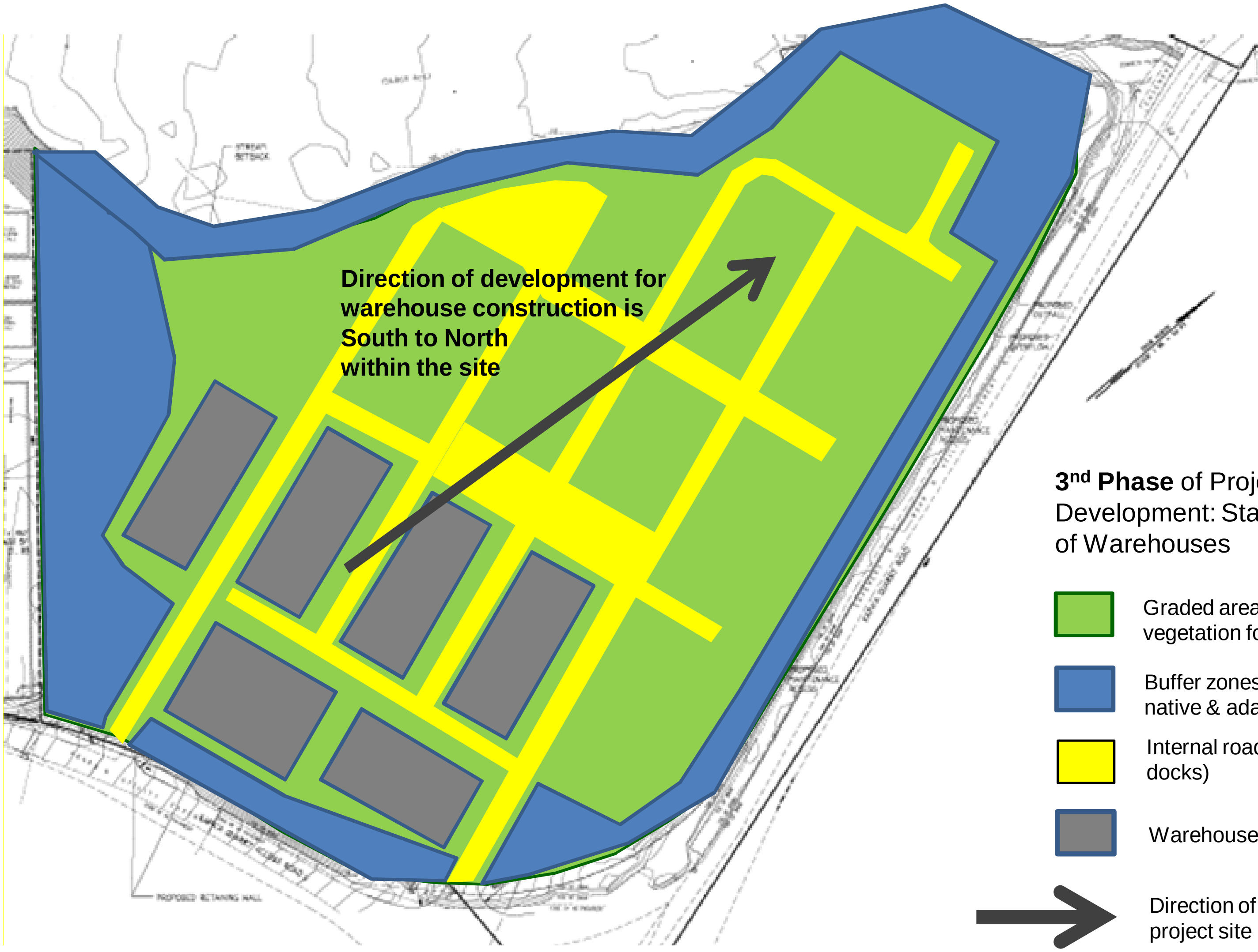
Figure SDA 3.2 Development of site - 2nd Phase - Construction of internal roadways and utilities



3nd Phase of Project Site Development: Start Construction of Warehouses

- Graded area with temporary vegetation for soil stabilization
- Buffer zones around site / with native & adapted plants
- Internal roads (incl. Loading docks)
- Warehouse structures
- Direction of development within project site

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Figure SDA 3.3 Development of site – 3rd Phase - Start construction of warehouses in southern part of site

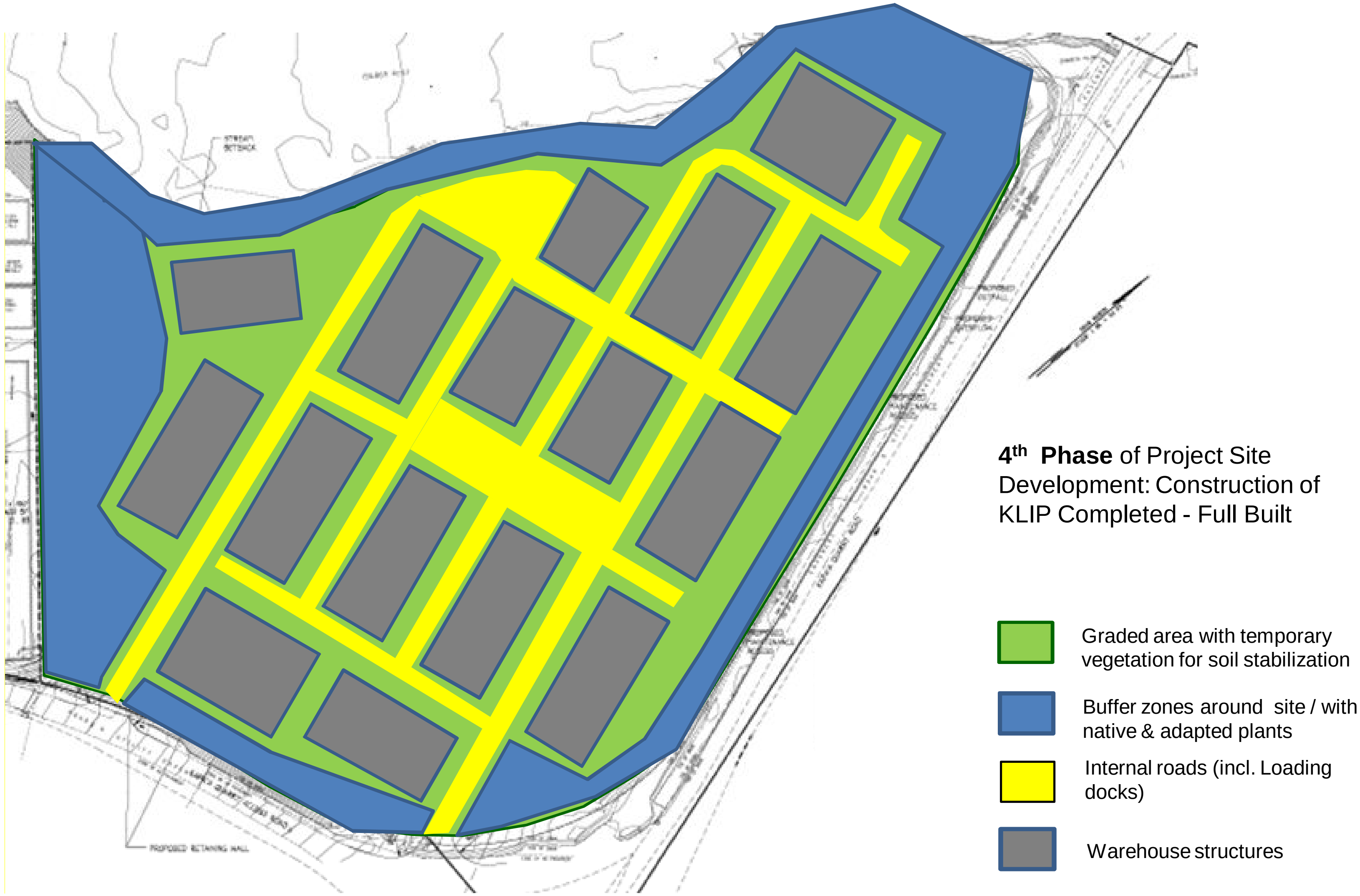

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Figure SDA 3.4 Development of site – 4th Phase - Construction of KLIP completed - full built

3.2 Site Selection (SS Credit 1)

The proposed layout of the lower portion of the proposed site, for which LEED certification is sought, is depicted on Figure SDA 3.5. The figure shows the location and extent of buildings, internal roads, hardscape and parking areas on the proposed site in relationship to wetland area that are adjacent to the site. Since the site is previously developed (e.g. was graded) the credit requires that of buildings, internal roads, hardscape and parking areas meet the following criteria:

1. The site should not be prime farmland as defined by the U.S. Department of Agriculture. - <u>The proposed site is a land fill area and is not farmland.</u>
2. The site should not be identified as a habitat for any species on federal or state threatened and endangered lists. – <u>The proposed site is not identified as such a habitat.</u>
3. The site should not be a former public parkland – <u>The site is and was not public parkland; the site is a landfill area.</u>
4. The site should not be within 100 feet of designated wetland – The current site layout shows some hardscape areas and buildings within the 100 feet setback requirement and therefore the credit cannot be taken.

Requirements 1 through 3 are met, while requirement 4 is NOT met; thus the credit cannot be attempted with the existing layout of the proposed site plan. However, a main objective of sustainable site development is met as the propose site is not a green field but is a former landfill area, therefore avoiding that precious greenfield and undeveloped land will be converted.

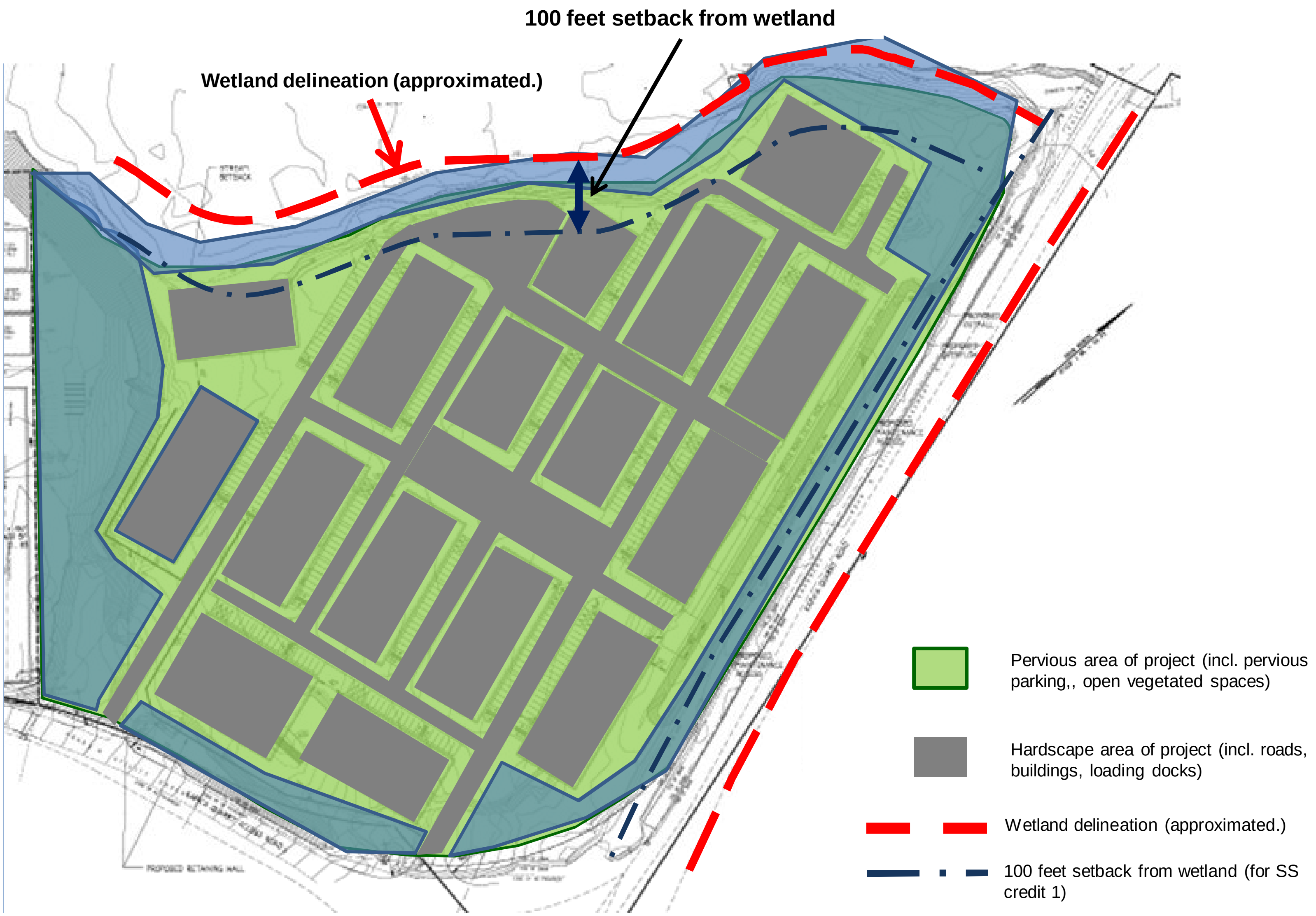

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Figure SDA 3.5 Sustainable Sites – Distance of hardscape to adjacent wetland

3.3 Site Development - Protect or Restore Habitat (SS Credit 5.1)

The project site will be surrounded by vegetative buffer zones which will provide mitigation for visual impacts, soil erosion, air quality impacts and noise impacts. The buffer zones are located at all four sides of the site perimeter as illustrated in Figure SDA-3.6. Figure SDA 3-7 illustrates the configuration of these four different buffer zones by means of four typical cross sections of the buffer zones.

<u>Buffer Zone 1 – illustrated by Cross-Section A1:</u> This buffer zone is located at the western perimeter of the project site and it represents a sloped area between lower and upper portion of the site which is currently vegetated. This area, has a size of 2.1 acres, a length of 600 and an average width of 150 feet. This area will be restored with native and adapted plants as well as with suitable trees that serve well as wind breaks / visual barrier. The trees and shrubs will provide an effective vegetative cover for visual and noise impact mitigation originating from the warehouses within the upper portion of the entire warehouse park development. (The typical cross section is shown on Figure SDA 3.7 – section A1 – A1).

<u>Buffer Zone 2 – illustrated by Cross-Section A2:</u> This buffer zone is located at the northern perimeter of the project site. The buffer zone will separate the Kapa'a Stream valley from the development. This area, which has a size of 2.5 acres, a length of 1,200 and an average width of 100 linear feet is the vegetative buffer zone between the proposed site and adjacent wetland areas in the Kapa'a Stream corridor. The vegetative buffer will have native and adaptive plants, including tall trees and shrubs. The buffer zone will contain a small earthen mound and a stabilized slope. The main function of the vegetative buffer is to separate the developed site from the adjacent wetland area and provide visual and noise mitigation. (The typical cross section is shown on Figure SDA 3.7 – section A2 – A2).

<u>Buffer Zone 3 – illustrated by Cross-Section A3:</u> This buffer zone is located at the eastern perimeter of the project site. This area, which has a size of 2.5 acres and a length of 1,200 linear feet, is a vegetative buffer zone between the proposed site and the adjacent quarry road as well as Kawainui Marsh. The vegetative buffer has a varying width between 80 and 120 feet, with an average width of about 100 feet and will have native and adaptive plants, including tall trees and thicker shrubs. The main function is to separate the developed site from the adjacent Kawainui Marsh and provide visual and noise mitigation. (The typical cross section is shown on Figure SDA 3.7 – section A3 – A3).

<u>Buffer Zone 4 – illustrated by Cross-Section A4:</u> This area is a vegetative buffer zone along the southern boundary of the site. The buffer zone is between 30 and 50 feet wide, with an average width of 40 feet. This buffer zone separates the developed site from the Kapa'a Quarry Access Road. The vegetative buffer zone has an area of about 0.4 acres and a length of 400 linear feet. (The typical cross section is shown on Figure SDA 3.7 – section A4 – A4).

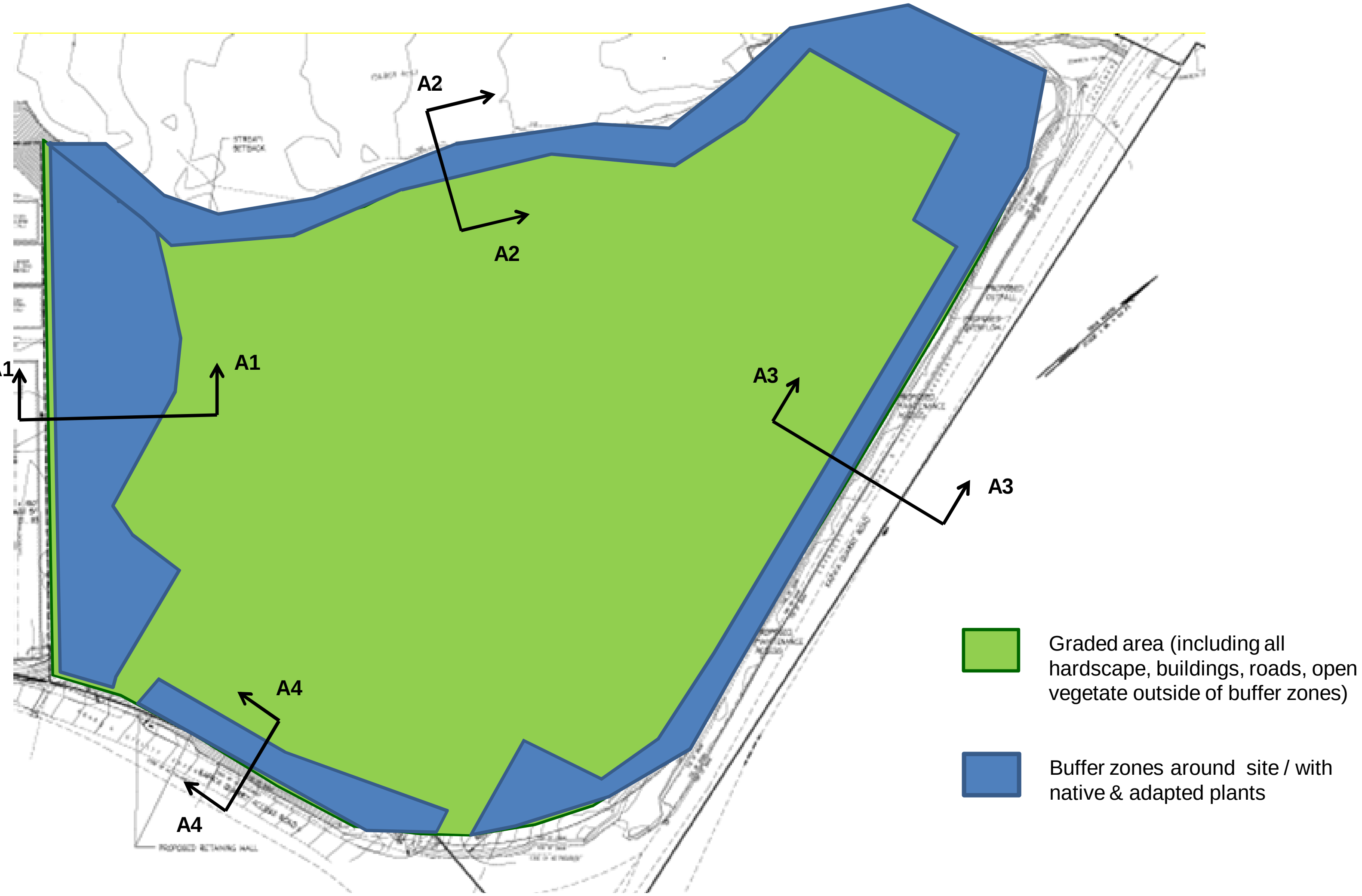

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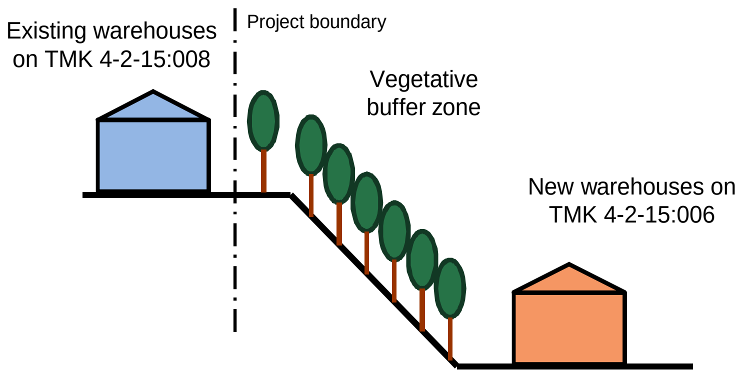
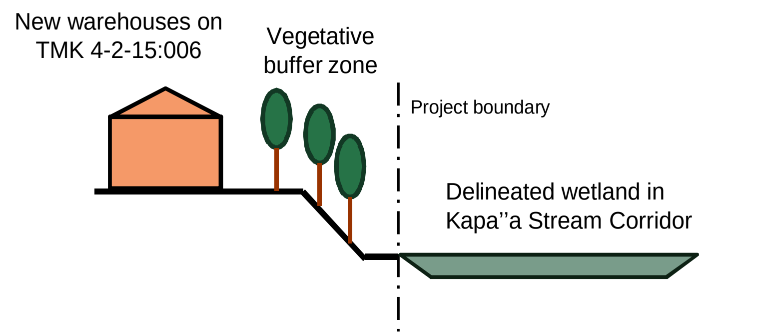
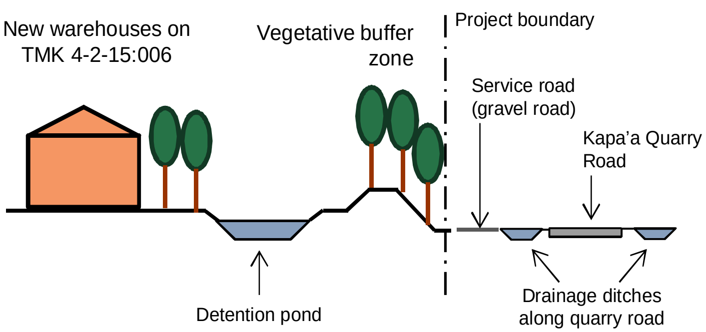
Figure SDA 3.6 Vegetative buffer zones at site perimeter - location and type of buffer zones



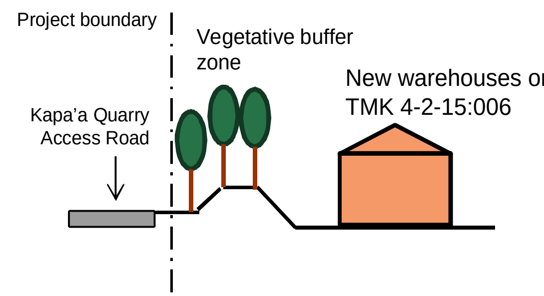
Section A1 – A1



Section A2 – A2



Section A3 – A3



Section A4 – A4

Figure SDA 3.7 Vegetative buffer zones at site perimeter - typical cross sections

3.4 Stormwater Design - Quantity Control (SS Credit 6.1)

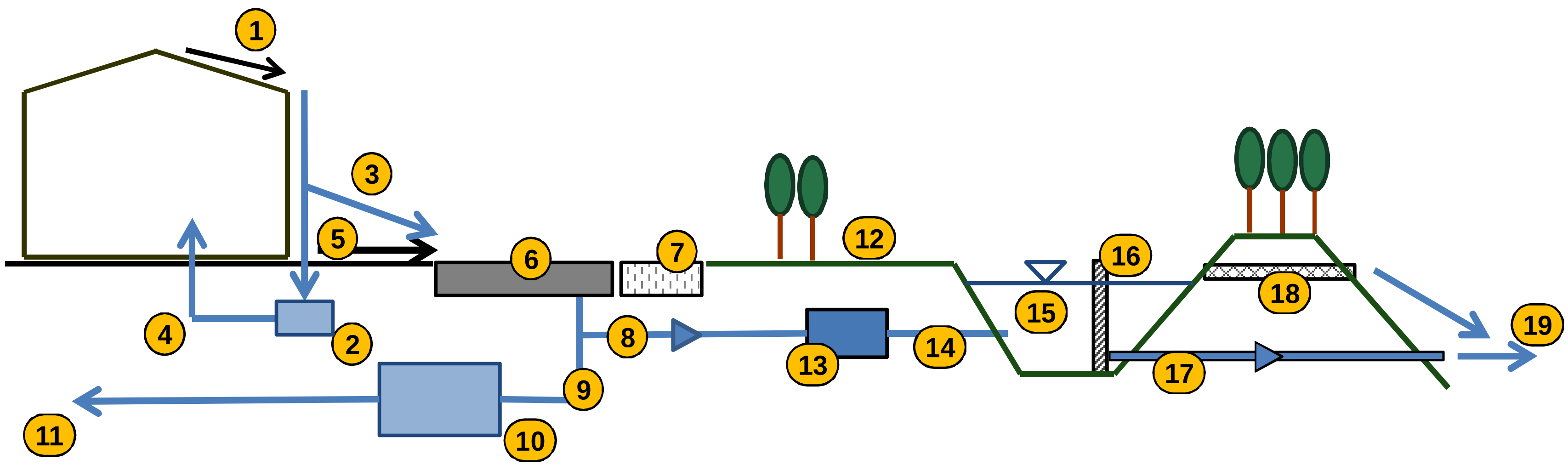
The proposed stormwater system offers a comprehensive treatment of the runoff from the proposed site. Figure SDA 3.8 shows the flow diagram of the stormwater system as it relates to the flood control function; e.g. the flow diagram illustrates stormwater management system components that control the quantity of stormwater runoff from the proposed site. The systems components are labeled from (1) through (19) and are discussed below:

Rainwater runoff from the roofs (1) is collected and conveyed to an underground tank (2). When the tank is filled to capacity the overflow (3) is directed to the stormwater conveyance system. The harvested rainwater is lifted by a pump and supplied to the buildings for use in the sewage conveyance (4). The irrigation system is a subsurface distribution system which can either use harvested rainwater of treated and recycled wastewater from the buildings.

Runoff from impervious surfaces around the warehouses (5) is conveyed to drain inlets in the roadways. Runoff from the impervious pavement of internal roadways is collected and enters the buried stromwater conveyance systems through catchment inlets (6) where all floatables, some sediments and optionally grease or oil is removed from the stormwater. Rainwater falling on open-grid parking areas (areas with perviousness > 50%) (7) and on open vegetated areas (12) percolates into the ground and no runoff is typically generated from these areas.

Runoff enters the stormwater conveyance system and is either flowing towards underground stormwater cisterns (9) and (10) or, when the stormwater cisterns are filled to capacity, flows towards the two-staged stormwater treatment (8) system downstream. On its way to the detention pond (15) the runoff flows through a nutrient / sediment trap (13) upstream where a significant quantity of sediments and suspended nutrients are removed from the runoff as well as all floatables. Stormwater runoff then flows through the outfall (14) to the detention pond, where the runoff is retained for a time between 24 and 48 hours. The runoff is then released at a low discharge rate through an appropriate discharge device (16) (e.g. perforated stand pipe or baffle system) and released to the receiving water. The discharge of outfall pipe (17) is configured to avoid scouring and erosion in the stream bed, when the water in the detention pond is released. In case of exceptionally severe storm events that surpass the design capacity of the detention pond and discharge system, an armored spillway (18) is installed that can safely convey peak discharges and avoid scouring of the embankments of the detention pond.

All stormwater runoff from the proposed site is collected and conveyed to the detention pond for comprehensive flood control. After being held in the detention pond for the prescribed 24 to 48 hours the runoff is then discharged to the receiving waters in a controlled flow. The detention ponds and time lagged release of captures stormwater shaves off detrimental peak discharges of runoff and thus avoids erosion of the streambed of the receiving water.



1. Runoff from rooftops or warehouses / structures
2. Underground rainwater storage (for use in buildings only)
3. Overflow of collected rainwater to roadway drainage system
4. Rainwater applications (irrigation, sewage conveyance, etc)
5. Runoff from impervious hardscape (other than roadways
6. Impervious roadways
7. Pervious traffic surfaces (parking, others)
8. Stormwater conveyance
9. Collected rainwater (from roofs) and stormwater runoff flow to underground rainwater cavern
10. Underground rainwater / stormwater cavern
11. Rainwater / stormwater applications for irrigation
12. Pervious vegetated open space
13. Sediment, debris catchment
14. Outfall to detention pond
15. Extended detention pond
16. Controlled stormwater release structure
17. Outfall of detention pond
18. Spillway for controlled overflow
19. Release of stormwater runoff to receiving waters

Figure SDA 3.8 Flow diagram of the stormwater System – quantity control

3.5 Storm water Design - Quality Control (SS Credit 6.2)

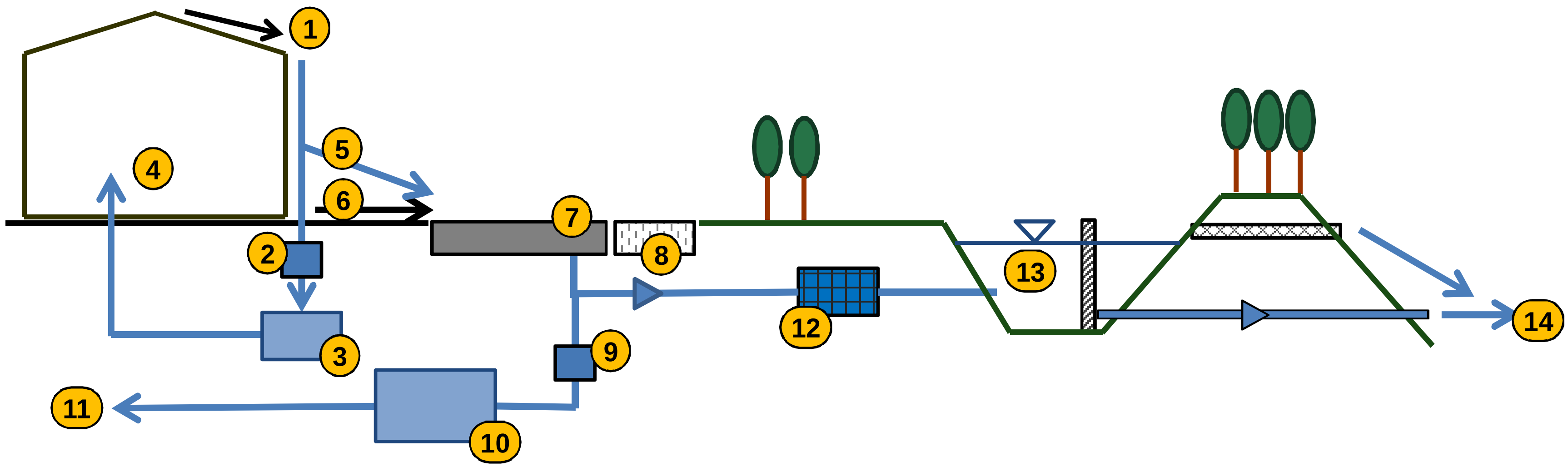
All stormwater runoff from the site are treated before it is released to the receiving waters, in order to avoid negative impacts on the water quality.

Figure SDA 3.9 shows a flow diagram for the stormwater quality control. Figure SDA 3-9 depicts the process steps of the stormwater quality control. Rainwater from the roofs (1) is collected and flows through filters (2) to underground tanks (3) where it is harvested for use in buildings (4) (e.g. toilet flushing or certain custodian uses). If the capacity of the rainwater harvesting storage tanks is surpassed, the rainwater overflows (5) and flows to the drain inlets (7) of the site stormwater drainage system. Debris catchment units (7) remove floatables, larger debris and as well as portions of sediments loads from the stormwater runoff before it enters the stormwater conveyance system . Runoff from impervious surfaces around the warehouses (6) discharges to the drainage systems inlets. Pervious traffic surfaces (8) allow infiltration of rainwater to the ground.

The stormwater runoff which enters the drainage inlets (7) flows into the underground stormwater cisterns or, when the stormwater storage cisterns (10) are filled to capacity, stormwater flows towards the stormwater treatment system, comprised of two treatment steps. The stormwater that is captured in the underground cisterns is used for irrigation (11). The treatment of the runoff is a two-step process consisting of several debris and sediment catchment units (12) (for multiple outlets into the detention pond) followed by an extended detention pond (13). First stormwater runoff passes through the debris and sediment catchment unit where all floatables and a significant portion of the sediments and other suspended solids are removed. In addition to sediments and suspended solids the catchment unit has an integrated oil-grease separator. After passing through the catchment unit the runoff enters the extended detention pond where natural treatment processes remove a portion of TSS, nutrients and sediments.

Stormwater is retained in the detention ponds for a period between 24 and 48 hours, after which it is released to the receiving waters (14).

A measure of the effectiveness of pollutant removal is the amount of total suspended solids (TSS) removed from the runoff. For the type of catchment unit that would be used for the proposed stormwater system an average TSS removal rate of 76% can be assumed. Thus 24% of the initial TSS load in the stormwater would pass to the detention pond, where the second step in the stormwater treatment occurs. An average TSS removal rate for an extended detention pond can be assumed as 60%. Thus the detention pond would remove about 15% of the initial TSS load. Adding the removal rates of the catchment unit and the extended detention pond would result in a TSS removal rate of approximately 90%, which significantly exceeds the 80% removal rate required for the credit.



1. Runoff from rooftops
2. Filter / pretreatment of collected rainwater
3. Underground rainwater storage (for use in bldgs. Sewage conveyance)
4. Rainwater applications in buildings (sewage conveyance others)
5. Overflow of collected rainwater to roadway drainage system
6. Runoff from impervious hardscape (other than roadways)
7. Inlets with debris catchment (with grease/oil trap)
8. Infiltration from pervious traffic surfaces (filter function of gravel bed and open-grid)
9. Filter for collected rainwater (from roof areas) and stormwater runoff from roads upstream of caverns (gravel filter)
10. Underground rainwater / stormwater cavern
11. To irrigation of open and vegetated areas (e.g. buffer zones)
12. Sediment / nutrient / debris catchment and grease / oil trap)
13. Extended detention pond with 24 – 48 hours residence time
14. Controlled release to receiving water with armored outfall to avoid scouring of stream bed

Figure SDA 3.9 Flow diagram of the stormwater System – quality control

3.6 Heat Island Effect - Non-Roof SS Credit 7.1

The hardscape area within the proposed development comprises of roadways, parking spaces and sidewalks. A combination of the following measures is used for at least 50% of all hardscape areas:

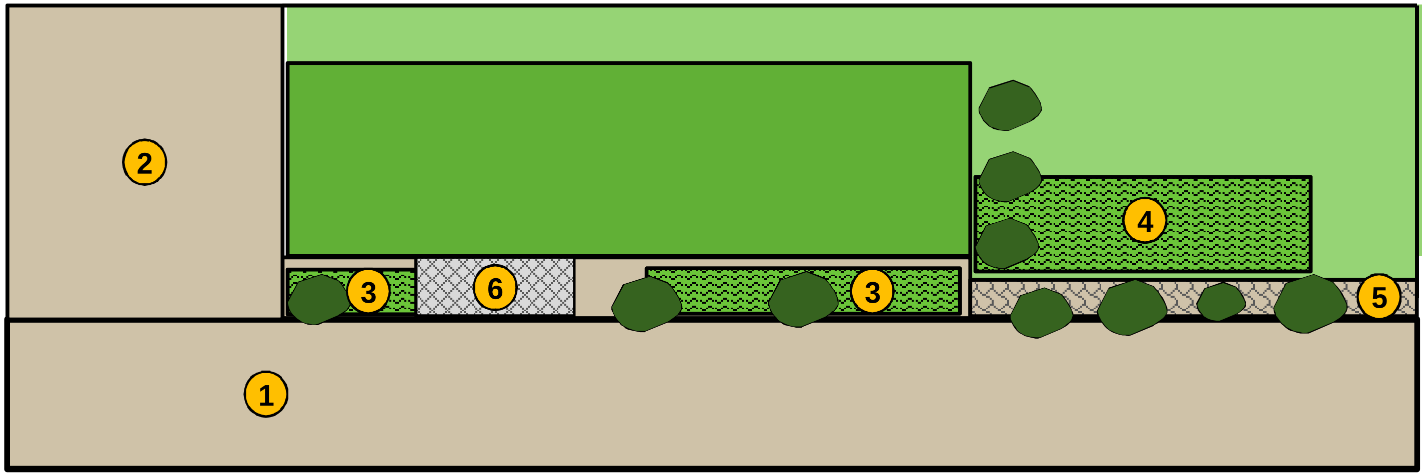
- Trees will be planted throughout the development to provide shade. In order to qualify the tree canopy has to provide the anticipated extent of shade within five years of landscape installation. The trees, which are planted throughout the park and around the buildings, also serve in the function of visual impact mitigation
- Some of the parking spaces will be covered with structures that have either a solar reflectance index at least 29 or are covered with solar panels that produce energy to offset non-renewable energy resources.
- Use of hardscape material with an SRI of at least 29. The use of light colored cement pavement can provide an SRI of at least 29 in the weathered condition.
- Use open grid pavement for off road parking spaces and emergency access roadways.

Figure SDA 3.10 illustrates the measures that will be used to achieve effective non-roof heat island mitigation.

It should be pointed out that the SS credit 7.2, Heat Island Effect – Roof, is not attempted. The requirement of SS credit 7.2 calls for an SRI of at least 78 for the planned low slope roofs. A high SRI of 78 would require light colored roofing material which would very likely result in a high visual impact of the large roof areas in the development.

3.7 Light Pollution Reduction (SS Credit 8)

Light pollution mitigation is an important measure since the proposed development will be built close to the Kawainui Marsh, which is an important habitat for endangered species, especially endangered water birds, which dwell in the extensive wetland areas of the marsh. Light pollution can negatively affect the habitat of birds in various ways, including deterioration of navigation for birds that are active at night and the destruction of important food source (e.g. insects that are attracted towards the light and are no longer available as food source).



Impervious pavement (SRI > 29) for heavy loadbearing	Warehouse roof area
Open grid pavement (impervious area < 50%, vegetation in open cells) for parking or other uses of cars, light trucks, NO trucks	
Open vegetated spaces around warehouses Pervious sidewalks / shoulders (gravel beds)	
Structures (SRI > 29) to provide shade for parking	
Tress to provide shade within 5 years of landscaping	

X Functions of areas:

1. Roadways within development
2. Truck parking or loading
3. Regular parking spaces
4. Auxiliary areas suitable for cars and light trucks
5. Sidewalks or shoulders
6. Shaded parking stalls (preferred parking)

Figure SDA 3.10 Heat island reduction – non-roof

The project measures to reduce light pollution will include controls of exterior and interior lights.

Measures to control interior lights:

The measure to reduce light pollution from interior light fixture that have a direct line of sight to building openings includes a combination of reducing the input power off all non-emergency internal luminaries or shielding all openings in building envelope. A required reduction by at least 50% of light power for internal luminaries must be by automatic control between 11:00 pm and 5:00 am. The shielding of all internal luminaries must occur by automatic controls between 11:00 pm and 5:00 am and must result in a resultant transmittance of less than 10%.

The warehouses would preferably have translucent skylights to provide daylighting and thus reduce energy demand for lighting. The skylights would cover approximate 5% - 7% of the roof area. Possible light pollution through installed skylights to provide daylight can be a challenge. The type of translucent skylights planned for the warehouses offers light-diffusion characteristics that will reduce light transmittance to less than 10% without the need for additional shielding. Lights within the warehouses will be fully shielded to avoid direct line of sight of light beams hitting the skylights, thus helping to keep light transmittance under the allowable 10% rate.

Measures to control exterior lights:

Since the proposed site is adjacent to important wetland areas the project team has selected the Illuminating Engineering Society of North America (IESNA) P-33 Light Zone L1-Dark. The Light Zone L1, which far exceeds the typical requirements for light industrial districts, since the Zone L1 is designated for developments within national parks, state parks forest land or rural areas. The proposed site is within the State of Hawaii Urban land use district.

Some of the main design and product characteristics for the external luminaries comprises as follows:

- Use minimum amount of light necessary as required by comfort and safety.
- Use automatic control to minimize or turn lights off during a certain time (e.g. between 11:00 pm and 5:00 am)
- Identify and address all light trespassing problems
- Use light sources more uniformly; e.g. use rather two luminaries with lower light output than one with high light output.
- Use only fully or semi-shielded luminaries and select those luminaries that produce the least light trespassing and glare.

The design and operational measures to reduce light pollution will be made mandatory for all tenants and users in the industrial park.

3.8 Tenant Design and Construction Guidelines (SS Credit 9)

Since the Core and Shell LEED certification only addresses the core building spaces it is important that tenants design and construct their built-out in coordination with the goals and vision of the sustainability approach of the proposed project. Tenants are encouraged to achieve LEED for commercial interior certification for their respective spaces and therefore their design and construction should fit into the sustainable design and construction approach of the overall.

The project team will produce a document for the tenants, which will address design and construction guidelines for the tenant build-out spaces. The following project specific areas are planned to be addressed in the guidelines:

<u>Water use reduction:</u> The goal is to conserve precious potable water resources in the buildings and to reduce the volume of wastewater produced.

<u>Optimization of energy performance:</u> These project goals aim to reduce energy demand by lighting and HVAC.

<u>Energy use and metering:</u> Communicate the goals of reducing energy use and provide means to meter energy use in the buildings.

<u>Measurement and Verification:</u> Implement a system to measure entire building and tenant spaces and verify that energy savings goals are met.

<u>Ventilation:</u> Provide guidelines to use mechanical and natural ventilation systems; communicate the need to select and manage environmentally friendly refrigerants.

<u>Construction indoor air quality:</u> Guidelines to protect indoor air quality during construction.

<u>Daylighting:</u> The warehouses will have skylights in all areas to augment lighting. Additional daylighting should conform to the sustainability goals.

<u>Commissioning:</u> At a minimum the electric equipment needs to be commissioned.

<u>Elimination or control of environmental tobacco smoke (ETS)</u>: All spaces should either be ETS free or otherwise protect all tenants from ETS exposure.

While the guidelines are typically not binding specific design and constriction measures will be made contractually biding for all tenants. Certain LEED credit are linked to specific impact mitigation measures, such as:

Alternative transportation measure: Adhering to preferred parking arrangements for low emitting and fuel efficient cars and for car pools.

Water reduction: The use of harvested rainwater and graywater for certain indoor and outdoor applications and the use of water saving fixtures. , as well as utilizing separate water systems for potable and graywater.

Wastewater treatment: Using graywater and harvested rainwater for sewage conveyance. Using water saving toilets and waterless urinals.

Refrigerant management: Using only those CFC-free refrigerants

Light Reduction: Install and use interior lights in accordance to comprehensive light pollution reduction

Optimize energy performance: Using energy responsively and use only energy efficient appliances.

Low emitting materials: use only environmentally friendly paints, sealants and adhesives.

3.9 Water Efficient Landscaping (WE Credit 1)

The water efficient landscaping will use only non-potable water for irrigation.

The project will use captured rainwater and recycled graywater and wastewater for irrigation. Rainwater will be collected from certain sections of the internal roadways as well as roofs of the warehouses and stored in underground cisterns (e.g. large storage tanks). The capacity of the underground rainwater harvesting cisterns depends on the specific needs for irrigation, which dependent on a range of factors typically described in a landscaping factor. The main determinates of the landscaping factor are the rate of evapotranspiration (e.g. which is a function of the type of plant species, the density of plant cover and characteristics of shading by trees and shrubs as well as the specific micro environment) and the irrigation effectiveness. The final landscaping design will determine the needed volume of harvested rainwater. In addition recycled graywater and wastewater, which is treated to advanced standards by means of advanced septic systems incorporating recirculating sand filters and denitrification, will also be used for irrigation as needed. The type of irrigation selected will be determined by a high irrigation effectiveness and the local code requirements for irrigating with recycled wastewater.

The following lists several design principles for water efficient irrigation:

<u>Site selection:</u> Utilize shadows through the site and plant trees to increase shade canopy and reduce heat island effect, plan water use zones that have varying requirements for irrigation and select tank volumes of rainwater harvesting system

<u>Do not use turf grass:</u> Turf grass should not be used within the development since it requires significant irrigation.

<u>Use plants according to soil:</u> The selection of the plants will depend on the type of soil in the development. Since the proposed site is a former landfill area the top soil might have to be augmented to support the plants types that are preferred.

<u>Selection of plants:</u> Plants material should be selected that will easily adapt to the site. A diverse selection of native or adaptive plants is preferred over monocultures. Plants materials should use little or no fertilizers

<u>Efficient watering practices:</u> Drip, micromist and subsurface irrigation systems have a better efficiency than sprinkler. Watering schedules and durations need to be adjusted on a monthly basis and adjusted to actual weather conditions.

Figures SDA 3.8 and SDA 3.9 show the proposed schemes of rainwater harvesting for irrigation as well as for use in the buildings. In the final build-out of the proposed industrial park the rainwater collected from certain sections of the roads, some or all roofs of the warehouses and the reused wastewater from the buildings are main sources for irrigation water. Since the park is developed over a period of several years a combination of rainwater collection and wastewater recycling schemes are required to provide operational flexibility for supplying sufficient irrigation water quantities.

Detail (1) in Figure SDA 3.8 shows the approach of collecting rainwater for non-potable water uses inside the buildings using rainwater tanks dedicated to the particular building. The rainwater for use in the buildings is collected from the roofs and flows into a below-ground or above-ground storage tank. Before use inside the buildings the collected rainwater is filtered. The rainwater use inside the buildings is limited to sewage conveyance and certain janitorial uses. For the use of collected rainwater inside the buildings an initial estimate suggests that around 230 gpd of harvested rainwater are used for flushing the toilets and for selected janitorial use in a typical warehouse (e.g. size about 24,000 sq ft). A tank with a capacity of about 3,000 to 4,000 gallons would have sufficient reserves to supply harvested rainwater also during the dry season.

Significant volumes of harvested rainwater and stormwater for irrigation are required for irrigation and the collection of rainwater and stormwater requires larger areas and a larger storage volume. A cost-effective means to store larger volumes of rainwater and stormwater are underground cavern. Innovative designs are available to construct such cavern with modular internal support so that the top of the caverns can be used for parking or auxiliary traffic areas for cars and light trucks. The collection of the irrigation water would use sections of the internal roadways and the large roof areas of the building.

During the development of the industrial park, when warehouses are added over time the roadways can be used as a cost effective source for irrigation water. The collection system from the roadways could use gravel beds in the shoulder of the roads with smaller rock sizes to function as a coarse filter for the runoff from the streets. During lighter storm events runoff from the roads flows through an open channel with sloped bottom towards the gravel bed from where it flows towards the underground rainwater harvesting storage. During intense storm events runoff fills the gravel bed and then the open channel carries the runoff to the detention pond. Similarly, when the rainwater harvesting storage is filled stormwater flows is automatically redirected towards the detention ponds.

Figure SDA 3-11 shows a typical layout of the project site with the likely locations of rainwater / stormwater cisterns to supply irrigation water. Since practically all irrigation needs are located at the perimeter of the site the cisterns are located accordingly. Once all warehouses are built, the roofs would also be used to supply the irrigation water for the then expanded landscaped area and for irrigation needs for vegetation around the warehouses.

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Figure SDA 3.11 Possible locations of underground rainwater and stormwater caverns for irrigation water

3.10 Innovative Wastewater Technologies (WE Credit 2)

The proposed site is not connected to the municipal sewage system and therefore all wastewater has to be treated onsite. The proximity to the wetland areas and the Kawainui Marsh requires a comprehensive approach to mitigate, to the extent possible, any possible impacts from the wastewater that is produced on the proposed site.

In accordance with the increased need to avoid any significant impact of the released wastewater to the environmental and in particular to the adjacent wetland area, the design team proposes a comprehensive wastewater treatment design approach. This advanced wastewater treatment approach will go beyond the treatment efficiency of conventional septic systems.

The wastewater from the proposed development will basically resemble domestic wastewater, with the exception that the volume of wastewater will be smaller and that less organic waste will be from food preparation, dishwashing and garbage disposal. The wastewater treatment system will be designed to remove a significant amount of the biological oxygen demand (BOD), suspended solids matter (TSS), pathogens as well as nutrient agents such as nitrogen and phosphorus.

The proposed onsite wastewater treatment approach will employ a combination of conventional and alternative septic systems for the onsite wastewater treatment system. Figure SDA 3.12 shows the two approaches involving septic systems:

Type (A) in Figure SDA 3.12 shows the conventional process of septic systems where a septic tank represents the initial treatment step and a subsurface wastewater infiltration system (SWIS), e.g. leach field, is the second treatment step.

The <u>septic tank</u> is used to treat raw wastewater before it is discharged to a subsurface infiltration system. The tank provides primary treatment by creating quiescent conditions inside a process vessel, which is typically buried. The main primary treatment process is settling of particles of sewage to the bottom or collection of floatables in a surface scum layer, thereby separating solids and water. In addition the septic tank stores and partially digests settled and floating organic solids in sludge and scum layers. This can reduce the sludge and scum volumes by as much as 40 percent. Typical septic tank BOD removal efficiencies are typically between 30 to 50 percent.

<u>Subsurface wastewater infiltration systems (or leach fields)</u> are infiltrative surfaces which are located in permeable, unsaturated natural soil or imported fill material. The wastewater leaving the septic tank can infiltrate and percolate through the underlying soil to the ground water. As the wastewater infiltrates and percolates through the different soil layers, it is treated through a variety of physical, chemical, and biochemical processes and reactions.

Type A: Conventional onsite septic system:

Septic Tank → **Subsurface wastewater infiltration system Leach field**

Septic Tank

Function:
BOD, TSS removal
Treatment steps:
Settlement unit; Sludge storage; anaerobic digester

Subsurface wastewater infiltration system Leach field

Function:
BOD, TSS, pathogen removal; infiltration
Treatment steps:
Aerobic digestion, filtering, adsorption, percolation

Type B: Alternative onsite septic system:

Septic Tank → **Aeration unit** → **Anaerobic unit - Denitriifcation** → **Subsurface wastewater infiltration system Leach field**

Septic Tank

Function:
BOD, TSS removal
Treatment steps:
Settlement unit; Sludge storage; anaerobic digester

Aeration unit

Function:
BOD, TSS, pathogen removal, nitrification
Treatment steps:
Aerobic biological processes

Anaerobic unit - Denitriifcation

Function:
Denitrification
Treatment steps:
Anaerobic conversion of nitrates to molecular . nitrogen

Subsurface wastewater infiltration system Leach field

Function:
BOD, TSS, pathogen removal; infiltration
Treatment steps:
Aerobic digestion, filtering, adsorption, percolation

Figure SDA 3.12 Onsite wastewater treatment system – treatment options

The overall effectiveness of the conventional septic system depends on a variety of factors, such as organic loading, residence time, soil type, geometry of the construction, etc.. In general conventional septic have been performing well in regard to removal of BOD, TSS and pathogens, if design, site conditions and operations are done properly. The conventional can system result in insufficient treatment performance if the system operates close to environmentally sensitive areas and the water table and if nutrient removal (e.g. removal of nitrogen) is important.

Type (B) in Figure SDA 3.12 shows alternative septic process where an aeration process and a denitrification step removes significantly larger amounts of BOD, TSS and nitrogen than the amounts achievable with conventional septic systems. In the alternative process an aeration unit is added downstream of the septic tank to provide oxygen for BOD removal and nitrification. An anaerobic process step is then added to provide for denitrification; as a process variation the anaerobic process step is effectively done by recirculating the effluent from the aerobic unit to the pump chamber downstream of the septic tank. The pump chamber is basically anaerobic and has sufficient organic load for the denitrifying bacteria.

The alternative septic process significantly increases the overall removal rate for BOD, TSS and nitrogen. Excess amounts of nitrogen in the effluent can deteriorate the water quality of receiving water or ground water, e.g. in form of eutrophication. Since the discharge of the alternative septic system has a significantly lower organic load than the effluent from conventional septic tanks, the performance of the leach field are less prone to failure due to excessive and non-uniform application of wastewater in the infiltration field. Failures of the leach field can result in possible contamination of the groundwater or receiving waters.

Figure SDA 3.13 shows a concept process / flow diagram of the proposed onsite wastewater treatment system. Two types of septic systems will be used. The warehouses in the center of the development will discharge the wastewater into septic tanks (Type A) which do not have individual leach fields attached to them, since there might be structures and impermeable pavement which could negatively affect the performance of the leach fields downstream of the septic tanks. The wastewater from these septic tanks flows to the Type B alternative septic systems, which are located at the perimeter of the site where vegetated and pervious areas are located that can accommodate leach fields. (Figure SDA 3.14 shows where in the warehouse development septic systems type A and B would be used). Depending on the hydraulic head available the effluent of the Type A septic tanks either flows by gravity to the Type B septic systems or has to be pumped in batches.

The Type B septic systems have added aeration (aerobic) and anaerobic process steps to increase the removal of BOD, TSS, pathogens as well as nitrogen. The effluent of the Type B systems is either used for subsurface irrigation of the landscaped area at the perimeter of the site or is discharged through regular leach fields. The lower BOD in the effluent avoids possible organic overload of the leach fields and results in effective hydraulic and treatment performance of the leach fields and infiltration.

The aeration process could be any of a host of processes currently on the market. The proposed configuration of the Type B treatment process includes a recirculating sand filter downstream of the septic tank. The generic design of the recirculating sand filter offers cost effective operation and an effluent that is very low in BOD, TSS and pathogens. In addition, sand filters can remove a significant amount of phosphorus, another detrimental nutrient in wastewater, due to adsorption processes in the upper layers of the filter. The pump chamber upstream of the sand filter collects the effluent of the septic tanks and lifts it to the top of the sand filter in timed doses. The sand filter is an aerobic process step which provides oxygen for BOD removal and nitrification. After passing through the filter the wastewater stream flow back to the pump chamber which is an anaerobic vessel where denitrification occurs. From here one part of the wastewater is recirculating to the top of the sand filter and the remainder is pumped to the leach field or irrigation systems. The total system has a very high removal rate (over 95%) of BOD, TSS and pathogens and a nitrogen removal rate in the order of 60-70%. Since the proposed industrial warehouse park will add leasable space over a couple of years. The aeration and leach field might be installed in modules to the design conditions of the expanding wastewater flow rates.

Figure SDA 3.13 shows the location of Type A and B septic systems. Type A septic systems are located in the center of the proposed warehouse development. These systems consist only of septic tanks and have no dedicated leach fields. Type B septic systems are located at the perimeter of the proposed warehouse development. Each of these systems consists of a septic tank and an added aeration process step and anaerobic denitrification which have the capacity of accommodating the Type a system flow that is connected to them. The quality of the effluent of the Type B septic systems is sufficient enough to be applied to the subsurface wastewater infiltration systems or irrigated landscapes at the perimeter of the proposed site.

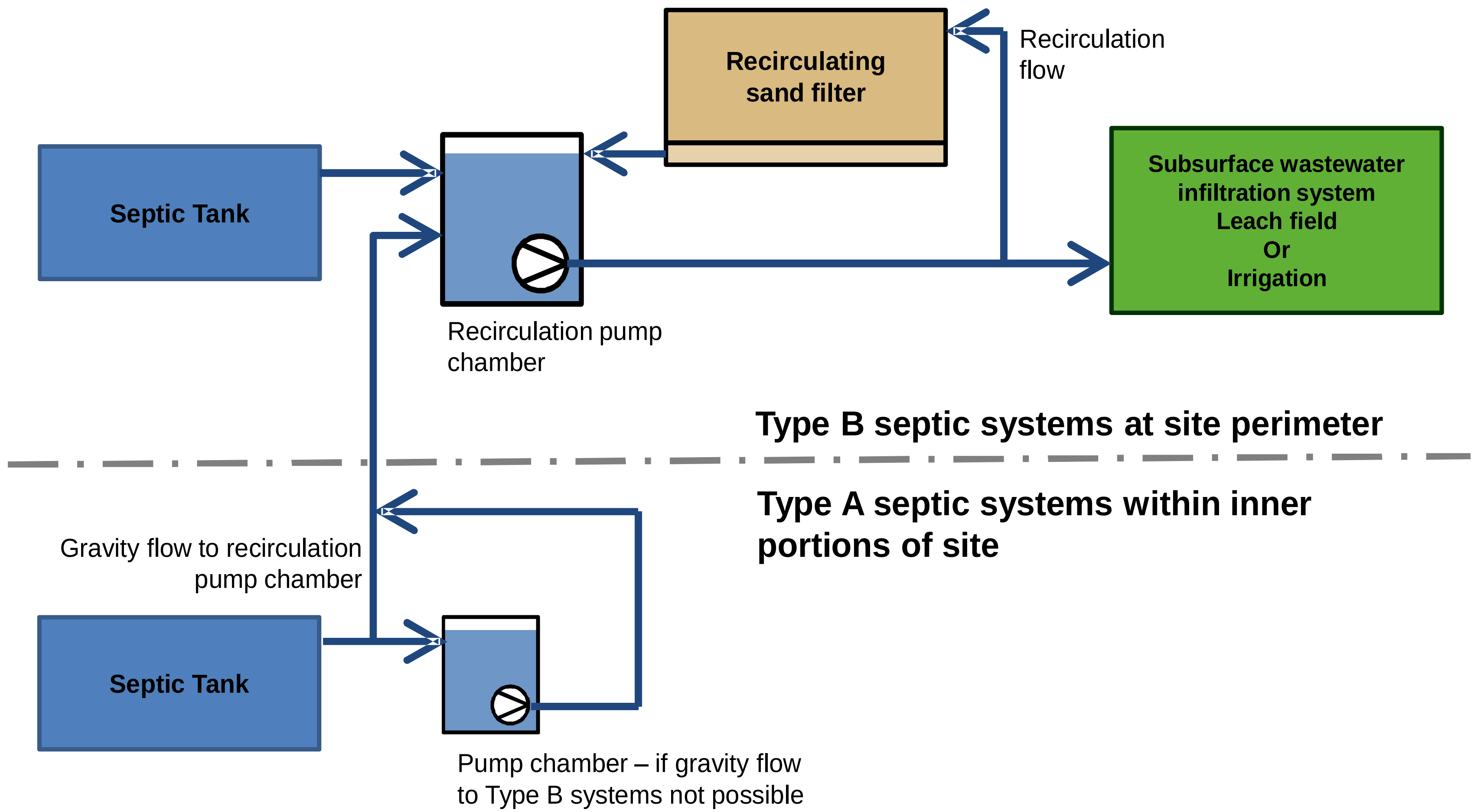

Figure SDA 3.13 Onsite wastewater treatment system – process flow diagram

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Figure SDA 3.14 Onsite wastewater treatment system – location of alternative treatment septic systems

3.11 Water Use Reduction 40% Reduction (WE credit 3)

The water use in the buildings will be reduced by 40% by using water conserving fixtures in the building. In order to satisfy this credit the following fixtures have to achieve in aggregate a 40% reduction relative to the current baseline:

Water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves. Irrigation water is NOT included in the water use reduction assessment.

The project will utilize only those fixtures which have a documented water savings. Such water fixtures would include fixtures certified under the WaterSense program that is administered under the US-EPA.

Examples of water saving fixtures are:

Type of fixture	Current baseline Gal per flush or cycle	Water saving fixture Gal per flush or cycle	Savings in %
Water closet	1.6	1.28	20%
Water closet (High-Eff. Toilet)	1.6	1.1	30%
Urinals (high-efficiency)	1.0	0.5	50%
Urinals (waterless)	1.0	0	99%
Lavatory faucet	2.2	1.5	32%
Kitchen sink	2.2	1.8	18%
Showers	2.5	1.5	40%

A sample calculation assuming a LEED default water usage frequency of the applicable fixtures by full time employees, part time employees and transients users of the building, e.g. visitors/customers, would result in a 42% water savings by using water savings fixtures listed above, such as high-efficiency toilets, waterless urinals, as well as low flow lavatory faucets, showers and kitchen sinks.

3.12 Optimize Energy Performance (EA Credit 1)

An overall energy savings relative to the baseline, as defined by ASHRAE 90.1-2007 will be determined by a whole building energy simulation ,as required by the credit. An overall energy cost savings of at least 30% compared to the baseline case should be achieved by using a host of energy savings measures.

The following energy saving measures as well as additional measures will be used to reduce energy cost for the warehouses by the amount required:

Goals / Areas of Improvement	Strategies
Reduce internal loads	
Equipment and Appliances:	• Use efficient equipment and appliances, e.g. computers, monitors, printer, copy machine, water cooler, refrigerator, dishwasher, only with ENERGY STAR certification. • Use controls to minimize usage and waste; disconnect excess equipment • Educate building staff; encourage energy efficiency
Lighting:	• Use appropriate lighting power density: between 0.65 and 0.9 W/sq ft; depending on the required tasks to be performed (e.g. warehouse space, shop, office) • Use energy efficient lighting: in warehouse space use high-performance T-8 lamps and ballasts in an appropriate fixture configuration (e.g. tandem 8 feet long luminaries); lights fully shaded that light source is not in direct line of sight to skylight to reduce light pollution; in office space use ambient and supplemental task lights • Maximize the benefits of day-lighting: use skylights and some vertical glazing for the warehouse area and windows for office and lobby areas. • Use skylights & north-facing clerestories to daylight interior zones: • 5%-7% of roof area of translucent skylights; VLT in accordance to credit SS-8 Light Pollution Reduction requirements; 0.2 -0.4 SHGC • Use separate controls for lighting in areas near windows: stepped dimming system half off and full off at appropriate day lighting levels; automatic dimming or switching of all luminaires in day lighted areas • Use automatic controls that turn lighting off during unoccupied periods • Manual switches for task lighting.

Goals / Areas of Improvement	Strategies
	• External lighting should be limited in accordance with SS credit 8 (reduction of light pollution); select pulse-start metal halide, fluorescent, induction, or CFL amalgam lamps with electronic ballasts.
Reduce heat gain in building:	
Through Windows:	• Minimize windows east and west, maximize north and south • Low solar heat gain coefficient (SHGC) glazing where sun penetrates the window • External shade to reduce solar heat gain & glare through window: external light shelves or horizontal overhangs above the windows block direct sun penetration
Through building envelope:	• Roofs and walls with sufficient insulation: recommended construction standing-seam roofs with insulation blanket over purlins; use aerated wall construction for good insulation properties • Roof with high surface reflectance & emittance to produce "cool roof"; Solar reflectance index (SRI) > 78 is recommended for roofing material • Shade building surfaces with deciduous or coniferous trees as appropriate; Use vegetation on S/E/W to control solar heat gain (and glare)
Efficient building systems:	
Efficient HVAC systems:	• Select efficient cooling equipment: use 11.3 EER or lower AC unit and heat pump; • Improve outdoor air ventilation: • Improve fan power and air distribution: use variable speed fans; insulate and seal air ducts; • Use natural ventilation: Operable windows with screens so that air conditioning is necessary needs are reduced or eliminated; design building layout for effective cross-ventilation
Efficient service water heating systems:	• Minimize distribution losses; insulate pipes, size correctly to peak demand, supply temp. Max. 120 F • Hot water for work sinks and in restrooms from "instant hot" fixtures, not from traditional water heaters.

Goals / Areas of Improvement	Strategies
	• Use solar water heaters or site recovered energy; size to provide most of indoor hot water usage with solar energy or waste heat
Commission all components of the energy systems to ensure equipment is installed according to design and functions energy efficiently.	

By implementing the measures above, which are based on the recommendations contained in the ASHRAE Advanced Energy Design Guide for Small Warehouses and Self-Storage Buildings, a minimum of 30% energy savings when compared to those same warehouses designed to the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-1999, should be achievable. Since the project team will attempt the full credit allocation of 12 points for a minimum of 30% energy savings, a comprehensive energy modeling has to be performed.

3.13 On-Site Renewable Energy (EA Credit 2)

The credit requires onsite renewable energy generation to off-set building energy costs of at least 1% of the buildings annual energy costs. The building energy costs are determined by the whole building energy simulation. The eligible types of onsite renewable energy generation under this credit include the following types that represent viable candidates for the proposed project site:

- Photovoltaic (PV) systems
- Wind energy systems
- Solar thermal systems
- Biofuel-based electrical systems

From the above list of applicable renewable energy forms, biofuel based system will not be considered for the project as well as wind energy systems, due to the proximity to the marsh and the danger of bird strikes by the wind energy systems.

The onsite renewable energy generation capacity for the proposed project will be a combination of PV systems and solar-thermal systems. As the demand for hot water in the building depends on the specific usage (e.g. is there a kitchen or shower in the warehouse?) the scope of solar water heating applications versus PV-capacity will be determined at a later stage.

The annual electricity demand for PV for this credit is assumed in the order of 13,000 to 14,000 kWh, which is about 1% of total consumption. Considering the situation where only PV systems are utilized to generate the amount of required onsite renewable energy, the installed capacity of the PV system would be in the order of 8 kW.

4. Summary and Conclusions

Section Two and Three presented the selected approach of project team to achieve the LEED Silver certification goal for the proposed industrial development. This section discusses how the different credit categories provide to the certification goal. It must be noted that industrial developments of the type of the proposed warehouse park have less opportunities to implement green building features than project for residential, office and intuitional buildings. In addition, the proposed site and its location render some of the credits outright un-achievable. Therefore the expected LEED Silver certification is a very ambitious goal set forth by the development of the proposed warehouse park and it expresses the commitment to build the proposed light industrial park in the most environmentally friendly way and to use resources in an utmost responsible manner. Figure SDA 4-1 delineates how the attempted credits are distributed among the following credit categories:

SS	-	Sustainable Sites	IEQ	-	Indoor Environmental Quality
WE	-	Water Efficiency	ID	-	Innovation in Design
EA	-	Energy & Atmosphere	RP	-	Regional priority
MR	-	Materials & Resources			

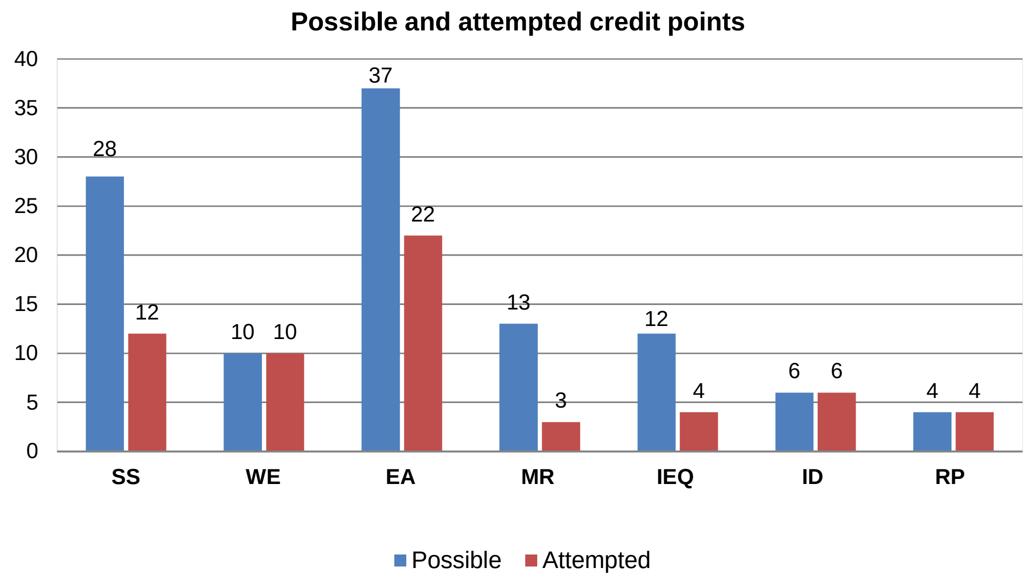

Figure SDA 4.1 Comparison between Possible and Attempted Credit Points per Category

Figure SDA 4-2 shows the percentage of available points within credit categories will be attempted:

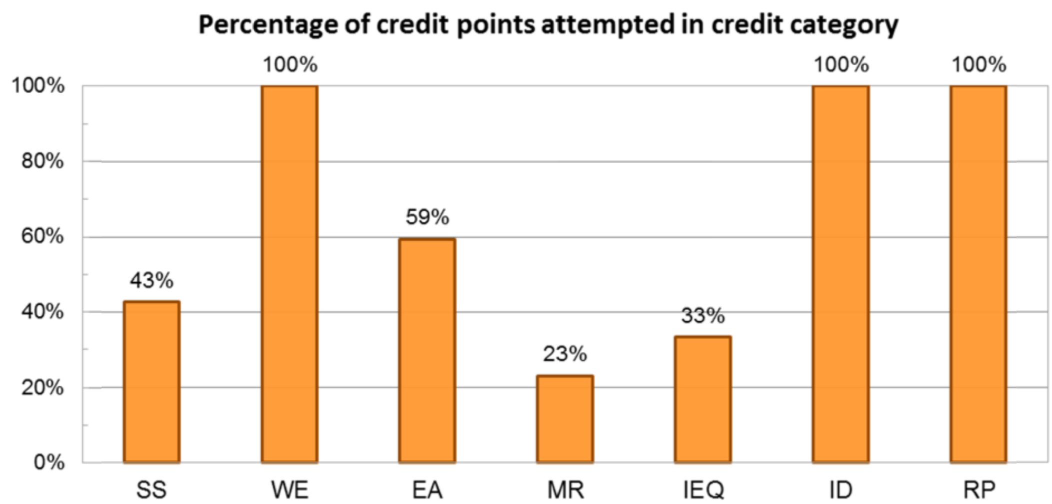

Figure SDA 4.2 Percentage of Attempted to Available Credit Points for Credit Category

Sections 4.1 through 4.7 discuss the objectives of attempting the credit points for the seven credit categories.

4.1. SS - Sustainable Sites

Although the proposed site is within the State of Hawaii "Urban" land use district and is not a greenfield development several of the SS credits which would result in high credit points do not apply. The proposed site is not directly connected to dense population centers and the required basic services do not exist at or close to the site. The proposed site has currently also no connection to public transportation and the plans of the developer to implement a private shuttle would not suffice for the alternative transportation credit without the public transportation option.

Although the proposed site will use a former landfill area and therefore satisfied the credit intent of brownfield developments, which reduce pressure undeveloped land, all credit requirements are not met for a brownfield development.

From the 28 available credit points of the Sustainable Site credit category the project team will attempt 12 credits. The attempted credits are addressing impacts and mitigation measures that are of significance to the environmentally sensitive land that surrounds the proposed site. The attempted credits are as follows:

- Incentivizing the use of alternative transportation by providing secure storage and changing / shower facilities for bicyclists and providing preferred parking for low emitting vehicles and carpools.
- Restoring habitat and maximizing open space within the site, by planting open space with native or adaptive plants to provide as much vegetative area within the development footprint as possible.
- Comprehensive stormwater treatment to control the quality and quantity of the stormwater runoff from the developed site, by providing pervious parking areas, harvesting stormwater from roofs and roadways for irrigation, removing pollutants from 100 % of the runoff through a multistage treatment system and providing flood control by means of an extended detention pond. The proposed design for a comprehensive stormwater treatment system far exceeds the basic credit requirements and **an exemplary performance will be attempted for the stormwater credit.**
- Reducing Light Pollution by controlling internal and external light sources during the night.
- Providing guidelines to the tenants to build-out spaces along the green building approach that was used for the Core & Shell certification. In going beyond a non-binding guideline status the developer will make the compliance of certain green building measures contractually mandatory, such as strict compliance with the reduction of light pollution measures. **For the contractually binding measures the project team will attempt an exemplary performance credit.**

4.2. WE - Water Efficiency

The close proximity of the proposed site to important wetland areas requires special consideration for all water related effect on the environment. Water relevant issues include stormwater runoff, water use for irrigation, water use in the buildings and wastewater treatment and disposal. While the stormwater control is treated under the Sustainable Site credit category all the remaining water related credit are grouped under the Water Efficiency credit category.

Figure SDA 4-1 and SDA 4-2 indicate that the project team will attempt all credit points that are available under the Water Efficiency category. In addition, an exemplary performance credit point will be attempted. The attempted credits under the category Water Efficiency are:

Water efficient landscaping, where harvested rainwater and recycled wastewater will be used for irrigation instead of potable water. Landscaping will preferably use native and adaptive plants that have lower needs for irriga**tion, pesticides and fertilizers then introduced plants. Innovative wastewater technologies** will include advanced onsite treatment systems that go far beyond the performance and effectiveness of conventional septic systems. Since the wastewater is treated onsite, due to the missing connection to the municipal sewer system, and the wastewater discharge occurs in close proximity to important wet-lands, advanced treatment steps are added to the septic systems on the site. Aerobic and anaerobic treatment process steps are added to remove more BOD and TSS loads and significantly reduce nutrients from the wastewater before it is infiltrated in irrigation or in leach fields. Since the proposed wastewater treatment system goes far beyond the basic credit requirements an exemplary performance point will be attempted for the innovative wastewater treatment systems.

Water use reduction measures will result in 40% water saving by installing only high performance water fixtures in the buildings.

4.3. EA - Energy & Atmosphere

The energy and atmosphere credit category implies mitigation of impacts that are relevant also to the island-wide environment and economy. The attempted credits involve efforts to save energy and impacts that result from the generation as well as verification that these measures are indeed implements. Hawaii has a very unique energy dependence on imported oil, since at the present about 90% of all its energy is made from oil. Efforts to save energy and generate energy from renewable energy sources will help the State of Hawaii in its declared effort to reduce the high oil dependence and substitute imported energy with indigenous energy forms.

Figure SDA 4-1 and SDA 4-2 indicates that 22 of 37 available credit points and 59% of the available points will be attempted, respectively. The attempted credits under the category Energy & Atmosphere are:

- Optimized energy performance by saving a minimum of 30% of the energy costs of a baseline building. The 30% energy savings is selected since it conforms to a realistically and cost efficient achievable energy saving goal when applying recommendation and guidelines set forth by ASHRAE.

- Onsite renewable energy will be produced to offset energy derived from imported fossil fuel, especially oil. The onsite renewable energy will be derived from solar thermal/waste heat recovery and PV energy systems.

- Measurement and verification will be done on the core and shell part of the buildings as well as in the tenant spaces. Continuous measurement and verification will support the park management and the tenants to monitor the success of energy savings and intervene if the saving goals are not met.

4.4. MR - Materials & Resources

The materials and resources credit category addresses island-wide concerns, since it combines efforts to divert as much construction waste from landfill and to conserve virgin material by reusing and recycling waste. In addition, the credit category advocates the use of locally extracted or manufactured materials in lieu of imported material.

Figure SDA 4-1 and SDA 4-2 indicates that 3 out of 13 available or 23% of the available credit point will be attempted. The attempted credits under the category Materials & Resources are:

- Construction waste management will be performed to reuse or recycle construction waste and therefore avoid disposal in landfills.
- Recycled materials will be used in the construction and products will be purchased that have a higher percentage of pre- and post-consumer recycled content.
- Regional extracted or manufactured material will be used to support indigenous resources and the economy of Hawaii.

4.5. IEQ - Indoor Environmental Quality

The Indoor environmental quality credit category addresses concerns about a health indoor environment for building occupants. IEQ impacts and their mitigation have only secondary significance to the exterior environment. In selecting what credits will be attempted the project endeavors to create synergy between increasing the indoor environmental conditions and to mitigate impacts to the exterior environment.

Figure SDA 4-1 and SDA 4-2 indicate that 4 out of 12 possible credits and 33% of the available credits will be attempted. The attempted credits under the category Indoor Environmental Quality are:

- A construction indoor air quality (IAQ) management plan will be developed and implemented that ensures that the buildings will not have an endemic indoor air quality problems that could be avoided if best management strategies are followed during construction. The construction IAQ management plan will also be provided to the tenants as part of the construction guidelines for the build out of the leasable space.
- Low VOC emitting paints and coatings as well as adhesives and sealants will be used in the core and shell part of building
- Ample day lighting will be provided as part of the improvement of indoor environmental quality, in synergy with the measures to reduce the energy demand of the warehouse.

4.6. ID - Innovation in Design

The Innovation in Design credit category includes measures to step outside the conventional design paradigm and implement mitigation measures in excess of the basic credit requirements or use innovative project initiative that create effective synergies that will make the project more "green".

Figure SDA 4-1 and SDA 4-2 shows that the project team is attempting 6 out of 6 available credits or 100% of the available credits under this category. The project team goes this route since the warehouse development will not be eligible for a range of credits and feels that this project calls for innovative and bold design to minimize impacts of the project to the environment and the community. The attempted credits under the category Innovation in Design are:

- An educational program will be implemented that will inform the public about features of the adjacent Kawainui Marsh as well as how green building technologies can avoid environmental impacts of industrial developments such as the proposed industrial park. The educational program will be a continuous public outreach initiative by the developer.

- The maintenance vehicles of the industrial park will use electric vehicles whenever the work tasks allow the use of smaller electric utility vehicles. The energy for the vehicles will come exclusively from renewable energy, either from onsite renewable energy or from offsite renewable energy sources.
- Since some of the LEED credit measures will be used also as important environmental impact mitigation measures that the developer has guaranteed to implement, certain measures that apply to core and shell will be part of the lease agreement and will be contractually binding. One important measure will be the need to reduce light pollution by controlling interior and exterior lights.
- Since water related impact mitigation measures are very important the basic requirements for storm water treatment and for the onsite wastewater treatment will far exceed the basic credit requirements. By doing so the project team will attempt two exemplary performance credits.
- The inclusion of at least one LEED-AP in the project team as a principle member will assure that the LEED certification will be facilitated and that the ambitious LEED Silver goals for the green industrial development will be met.

4.7. RP - Regional Priority

The credits of the regional priority category represent bonus point for the project to implement those credits that are most attractive to the regions. Figure SDA 4-1 and SDA 4-2 indicate that the project will quality for 4 out of 4 available credit points or 100% of the available credit points, respectively. This underlines the validity of the project team to select those credits that matter most for the region and Hawaii.

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Final Environmental Impact Statement

for the proposed

Kapa’a Light Industrial Park

Kailua, Hawaii

Appendix 5:

Traffic Impact Analysis Report

Appendix 5 is identical to Appendix 5 of DEIS

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

TRAFFIC IMPACT ANALYSIS REPORT FOR

KAPA’A LIGHT INDUSTRIAL PARK

IN KAILUA, OAHU, HAWAII

Prepared For

KAPA’A III, LLC
905 Kalanianaole Highway
Kailua, HI 96734

Phillip Rowell and Associates
47-273 ‘D’ Hui Iwa Street
Kaneohe, Hawai‘I 96744
Tel: 808-239-8206   Fax: 808-239-4175
Email: prowell@hawaiiantel.net

December 7, 2009

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1. INTRODUCTION

Phillip Rowell and Associates has been retained to prepare a Traffic Impact Analysis Report for the proposed Kapa'a Light Industrial Park. The purpose of this study is to identify the traffic impacts of the proposed project and to identify potential improvements to mitigate the projects traffic impacts.

This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

Project Location and Description

The following is a summary of the project:

1. The project is located along the north side of Kapa'a Quarry Access Road, which is located south of the H-3 freeway in the vicinity of Kalaheo High School in Kailua. Figure 1 indicates the approximate location on the Island of Oahu. Figure 2 is a vicinity map.

2. The project will consist of 663,000 of light industrial floor area to be developed in four phases between 2011 and 2026. Each phase is described in Chapter 4 of this report.

3. Access to and egress from the project will be provided via driveways along the north side of Kapa'a Quarry Access Road. A schematic drawing indicating the approximate locations of these driveways and the phase served by each driveway is presented as Figure 3.

Study Methodology

The following is a summary list of the tasks performed:

1. A field reconnaissance was performed to identify existing roadway cross-sections, intersection lane configurations, traffic control devices, and surrounding land uses.

2. Existing traffic volumes were obtained for the study intersections from traffic counts. These traffic counts counted the number of automobiles and trucks.

3. Existing levels-of-service of the study intersections were determined using the methodology described in the *2000 Highway Capacity Manual*.

4. Future background traffic volumes at the study intersections without traffic generated by the study project were estimated.

5. Peak hour traffic that the proposed project will generate was estimated using trip generation analysis procedures recommended by the Institute of Transportation Engineers.

6. Project generated traffic was assigned to the adjacent roadway network for each of the four development phases described previously.

7. A level-of-service analysis for future traffic conditions with traffic generated by the study project was performed.

8. The impacts of traffic generated by the proposed project at the study intersections was quantified and summarized.

9. Locations where project-generated-traffic significantly impacts traffic operating conditions were identified.

10. If required, improvements or modifications necessary to mitigate the traffic impacts of the project and to provide adequate access to and egress from the site were formulated.

11. A report documenting the conclusions of the analyses performed and recommendations was prepared.

Study Area

The study area for this study is consistent with the study area used in the preparation of traffic studies for other projects in the area and was reviewed with the Traffic Review Branch of the City and County of Honolulu Department of Planning and Permitting. These intersections are listed in Table 1.

Table 1 Study Intersections

Number	Intersection	Status	Jurisdiction
1	Kapa'a Quarry Road at Mokapu Boulevard	Existing	State
2	Kapa'a Quarry Road at Kalanianaole Highway	Existing	State
3	Kapa'a Quarry Road at Kapa'a Quarry Access Road	Existing	City & County

Order of Presentation

Chapter 2 describes existing traffic conditions, the level-of-service (LOS) concept and the results of the level-of-service analysis of existing conditions.

Chapter 3 describes the process used to estimate 2016 and 2026 background traffic volumes and the resulting background traffic projections. Background conditions are defined as future background traffic conditions without traffic generation by the study project.

Chapter 4 describes the methodology used to estimate the traffic characteristics of the proposed project, including 2016 and 2026 background plus project traffic projections.

Chapter 5 describes the traffic impacts of the proposed project, conclusions of the impact analysis and recommended mitigation measures.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service (LOS) concept and the results of the LOS analysis for existing conditions are also presented. The purpose of this analysis is to establish the base conditions for the determination of the impacts of the project, which are described in a subsequent chapter.

Existing Streets and Intersection Controls

The primary streets and roadways serving the project are Mokapu Boulevard, Kalanianaole Highway and Kapa'a Quarry Road. These streets and the lane configurations of the study intersections are shown as Figure 4. Also shown are the method of right-of-way control at the study intersections.

Existing Peak Hour Traffic Volumes

The existing peak hour traffic volumes were estimated from manual traffic counts at the study intersections. The total peak hour vehicular volumes are shown in Figures 5 and 6.

1. The traffic counts include buses, trucks, motorcycles, mopeds and heavy vehicles. Heavy vehicles are defined in the *Highway Capacity Manual* as vehicles with more than four tires and may be trucks or buses[1]. Therefore, any vehicle with more than four tires touching the pavement counted and factored into the capacity calculations. The peak hourly volumes of heavy vehicles are shown in Figure 7.

[1] Transportation Research Board, *Highway Capacity Manual*, 2000, Washington, D.C., page 16-4.

2. Bicycles and pedestrians were not counted.

3. All intersections were counted from 6:30 AM to 8:30 AM and from 3:30 PM to 5:30 PM on either a Tuesday or a Thursday.

4. The traffic volumes shown are the results of manual counts and may not agree with traffic counts obtained from other agencies. Traffic counts obtained from State and County agencies may be machine counts that a subject to some error as machine counts are based on the number axles crossing the traffic counter tubes that cross the roadway.

5. The traffic volumes of adjacent intersections may not match the volumes shown for an adjacent intersection because the peak hours of the adjacent intersections may not coincide and there are driveways between the intersections.

6. Pedestrian activity was negligible during the traffic counts.

Existing Peak Hour Traffic Into and Out of Industrial Park

Existing peak hour traffic into and out of the existing industrial park is summarized in Table 2. Also shown are the number of autos, medium size vehicles and large vehicles.

Table 2 Peak Hour Traffic Into and Out of Industrial Park

Time Period	AM Peak Hour				PM Peak Hour			
	In	Out	Total	%	In	Out	Total	%
Autos	111	41	152	69%	49	143	192	91%
Heavy Vehicles	26	41	67	31%	14	6	20	9%
Total	137	82	219	100%	63	149	212	100%

Notes:
(1) The sum of inbound plus outbound was used to identify the peak hour. The peak hour of the inbound trips may not coincide with the peak hour of the outbound trips.

Level-of-Service Concept

Signalized Intersections

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 3. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. ***Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.*** As the proposed project is within the State “urban” district, this standard is applicable.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 3 Level-of-Service Definitions for Signalized Intersections[1]

Level of Service	Interpretation	Volume-to-Capacity Ratio[2]	Stopped Delay (Seconds)
A	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<10.0
B			10.1 - 20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 4 summarizes the definitions for level-of-service and the corresponding delay.

Table 4 Level-of-Service Definitions for Unsignalized Intersections[1]

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Roadway Segments

The levels-of-service of the roadways links north of and south of Kapa'a Quarry Access Road were analyzed using the roadway segment methodology described in the *Highway Capacity Manual*. The level-of-service is defined by the percent of time that a vehicle will spend following another vehicle along the segment of highway being analyzed. The criteria for the level-of-service analysis is summarized in Table 5.

Table 5 Level-of-Service Criteria for Class II Two-Lane Highway[1]

Level-of-Service	Percent Time-Spent-Following
A	$\leq$ 40.0
B	> 40 to 55
C	> 55 to 70
D	> 70 to 85
E	> 85
F	See Note (3) Below

Notes:
(1) Source: Institute of Transportation Engineers, *Highway Capacity Manual*, 2000, page 20-4.
(2) This means that the primary function of the roadway is to serve adjacent development.
(3) Level-of-Service F applies whenever the flow rate exceeds the segment capacity.

Level-of-Service Analysis of Existing Conditions

The existing levels-of-service of the signalized study intersections are summarized in Table 6. The results shown in the table are the volume-to-capacity ratios, delays and levels-of-service of the overall intersections and each lane group. As shown all movements operate at Level-of-Service D, or better. Several movements have delays that result is Level-of-Service E or F. However, all the volume-to-capacity ratios are well below 0.90. As described in the *Highway Capacity Manual*, this implies that the long delays and levels-of-service are the result of the long traffic signal cycle length[2].

The results of the Level-of-Service analysis of the unsignalized study intersections are summarized in Table 7. The methodology for unsignalized intersections does not calculate the volume-to-capacity ratio. Only the delays are calculated. All movements operate at Level-of-Service A or B, which implies minimal delays and good operating conditions.

[2] Transportation Research Board, Highway Capacity Manual, 2000, Washington, D.C., page 16-35.

Table 6 Existing (2009) Levels-of-Service of Signalized Intersections

	AM Peak Hour			PM Peak Hour		
Intersection	V/C(1)	Delay(2)	LOS(3)	V/C	Delay	LOS
Kapa'a Quarry Road at Mokapu Boulevard	***0.58***	***18.2***	***B***	***0.67***	***25.5***	***C***
Eastbound Left	0.19	9.7	A	0.02	9.2	A
Eastbound Thru & Right	0.68	20.6	C	0.78	26.6	C
Westbound Left	0.37	12.0	B	0.36	24.0	C
Westbound Thru	0.56	15.1	B	0.35	12.9	B
Westbound Right	0.04	10.1	B	0.01	9.8	A
Northbound Left & Thru	0.38	33.8	C	0.55	60.8	E
Northbound Right	0.05	27.9	C	0.11	48.2	D
Southbound Left, Thru & Right	0.12	28.7	C	0.02	46.8	D
Kapa'a Quarry Road at Kalanianaole Highway	***0.78***	***17.0***	***B***	***0.78***	***15.6***	***B***
Eastbound Left	0.48	82.4	F	0.44	70.9	E
Eastbound Thru	0.42	3.8	A	0.82	9.5	A
Westbound Thru	0.84	17.9	B	0.60	13.8	B
Westbound Right	0.09	6.0	A	0.06	7.9	A
Southbound Left	0.44	67.8	E	0.52	69.4	E
Southbound Right	0.07	61.9	E	0.03	61.1	E

NOTES:
1. V/C denotes ratio of volume to capacity. V/C ratios are not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table 7 Existing Levels-of-Service of Unsignalized Intersections

	AM Peak Hour		PM Peak Hour	
Intersection and Movement	Delay 1	LOS 2	Delay	LOS
Kapa'a Quarry Road at Kapa'a Quarry Access Road North				
Eastbound Left	12.6	B	12.0	B
Kapa'a Quarry Road at Kapa'a Quarry Access Road South				
Eastbound Right	10.1	B	9.4	A
Kapa'a Quarry Access Road at Kapa'a Access Road South				
Northbound Left	8.3	A	8.3	A
Kapa'a Quarry Access Road at Existing Industrial Access				
Southbound Left	9.9	A	6.5	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

Segment Analysis for Existing Conditions

The results of the segment analysis are summarized in Table 8. The assumptions such as shoulder widths, lane widths, percent no passing zones and free flow speed used in the analysis assume worse-case conditions. The traffic characteristics were calculated from the results of the traffic counts at the intersection of Kapa'a Quarry Road at Kapa'a Quarry Access Road.

The conclusions of the segment analysis are:

1. Kapa'a Quarry Road north of Kapa'a Quarry Access Road operates at Level-of-Service C during the morning peak hour and Level-of-Service B during the afternoon peak hour.

2. Kapa'a Quarry Road south of Kapa'a Quarry Access Road operates at Level-of-Service B during both peak periods.

3. Kapa'a Quarry Access Road between Kapa'a Quarry Road and the entrance to the existing industrial park operates at Level-of-Service B during both peak periods.

Table 8 Results of Roadway Segment Level-of-Service Analysis - Existing Conditions

Road	Kapa'a Quarry Rd				Kapa'a Quarry Access Rd	
Location	North of Kapa'a Quarry Access Rd		South of Kapa'a Quarry Access Rd		West of Kapa'a Quarry Rd	
Time Period	AM	PM	AM	PM	AM	PM
Inputs and Assumptions						
Class	II		II		II	
Terrain	Level		Level		Level	
Shoulder Width (ft) (1)	0.0		0.0		0.0	
Lane Width (ft) (2)	11.0		11.0		11.0	
Segment Length (mi)	0.5		1.5		0.2	
Two Way Volume	460	405	360	360	235	220
Directional Split	65/35	63/37	60/40	53/47	62/38	68/32
Peak Hour Factor	0.90	0.97	0.90	0.97	0.90	0.97
% Trucks & Buses	14%	4%	8%	5%	29%	9%
% Recreational Vehicles	0%	0%	0%	0%	0%	0%
% No Passing Zone	100%	100%	100%	100%	100%	100%
Access Points	2		2		3	
Free Flow Speed (mph) (3)	25		25		25	
Results of Level-of-Service Analysis						
% Time Spent Following	58.2	53.1	52.0	51.8	44.5	43.1
Level-of-Service	C	B	B	B	B	B
Volume-to-Capacity Ratio	0.18	0.13	0.13	0.12	0.10	0.08

Notes:
(1) No shoulders were assumed as a worse-case condition.
(2) 11.0 foot lanes were assumed as a worse-case condition.
(3) 25 miles per hour is the minimum speed allowed for the segment analysis.

3. PROJECTED BACKGROUND TRAFFIC CONDITIONS

The purpose of this chapter is to discuss the assumptions and data used to estimate background traffic conditions. Background traffic conditions are defined as future traffic volumes without the proposed project.

Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This growth factor also considers traffic associated with minor, or small, projects for which no traffic data are available.

The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Design Year for Traffic Forecasts

The design, or horizon, year of a project is the future year for which background traffic conditions are estimated. A preliminary level-of-service analysis concluded that mitigation was required to accommodate 2026 background traffic projections and traffic generated by Phases A through D. A separate level-of-service analysis was therefore performed to determine if mitigation will be required before Phase D of the project is initiated. The analysis determined that no mitigation will be required to accommodate 2016 traffic projections and Phases A through C of the proposed project,

Background traffic projections were estimated for the design years of each phase: 2011, 2014, 2016 and 2026. However, as a level-of-service analysis was needed for 2016 and 2026 only, background traffic projections for these two design years are presented.

Background Traffic Growth

The background growth rates was estimated by comparing the traffic counts performed in 2009 to State of Hawaii Department of Transportation traffic count data for Mokapu Boulevard and Kalanianaole Highway in the vicinity of the study intersections. This analysis concluded that between 2005 and 2009, traffic volumes along Mokapu Boulevard increased 2% per year during the morning peak hour and 4% during the afternoon peak hour. Traffic along Kalanianaole Highway decreased 1% per during the morning peak hour and increased 1.2% per year during the afternoon peak hour. See Table 9. A growth rate 1% was used to estimate background growth rather than the negative growth rate calculated for morning traffic along Kalanianaole Highway was not used.

The average annual increase along Kapa'a Quarry Road was estimated to be 1.5% during the afternoon peak hour and 2.6% during the afternoon peak hour, which are the respective averages of the growth rates along Mokapu Boulevard and Kalanianaole Highway. Growth rates were not applied to traffic into and out of the quarry or the existing industrial park.

Table 9 Calculation of Background Growth Rate Along Mokapu Boulevard and Kalanianaole Highway[1]

	Mokapu Boulevard		Kalanianaole Highway	
Year	AM	PM	AM	PM
2005	2,014	1,967	3,241	3,521
2009	2,177	2,324	3,203	3,692
Calculated Growth Rate [2]	2.0%	4.0%	-1.0%	1.2%
Growth Rate [2] Used in Calculations	2.0%	4.0%	1.0%	1.2%

Notes:
1. Source: SDOT
2. Average annual growth rate per year.

The growth factors were calculated using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate
n = Growth period, in years

Related Projects

The second component in estimating background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are under construction or have been approved for construction and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements.

No related project were identified that should be used in addition to the background growth rates discussed above.

2016 and 2026 Background Traffic Projections

Background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates and then superimposing traffic generated by related projects. The resulting 2016 background peak hour traffic projections are shown in Figures 8 and 9 and the 2026 background traffic projections are shown on Figures 10 and 11.

Projections of 2016 and 2026 peak hour heavy vehicles volumes are shown on Figures 12 and 13, respectively. The heavy vehicles projections were estimated using the existing vehicle classifications for through traffic along Kapa'a Quarry Road. It was assumed that vehicle classifications into and out of the quarry and the existing industrial park would not change.

2016 and 2026 Background Levels-of - Service Without Project Traffic

The results of the level-of-service analysis for 2016 and 2026 background conditions are summarized in Tables 10 and 11. For the signalized intersections and 2016 traffic conditions, all movements and lane groups operate at acceptable levels-of-service and all volume-to-capacity ratios are less than 1.00 during both peak periods. For 2026 conditions, all movements are acceptable during the morning peak hour. During the afternoon peak hour, several movements have volume-to-capacity ratios greater than 1.0. The results imply that the signalized intersections will operate at acceptable levels-of-service through 2016 without mitigation. Mitigation will be required to provide acceptable levels-of-service for 2026 traffic conditions, which implies that mitigation is required.

All controlled movements at the unsignalized intersections will operate at Level-of-Service C, or better. This implies that no mitigation is required to accommodate 2016 or 2026 background traffic projections at acceptable levels-of-service.

Table 10 2016 and 2026 Levels-of-Service of Signalized Intersections Without Project Traffic

	2016 Background Without Project						2026 Background Without Project					
	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
Intersection	V/C(1)	Delay(2)	LOS(3)	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Kapa'a Quarry Road at Mokapu Boulevard	***0.62***	***26.7***	***C***	***0.85***	***33.3***	***C***	***0.75***	***21.1***	***C***	***1.31***	***126.3***	***F***
Eastbound Left	0.21	13.3	B	0.03	7.9	A	0.33	13.5	B	0.06	12.0	B
Eastbound Thru & Right	0.72	29.6	C	0.94	34.8	C	0.87	25.1	C	1.34	196.8	F
Westbound Left	0.43	21.1	C	0.79	79.7	E	0.63	31.2	C	1.23	328.0	F
Westbound Thru	0.56	18.7	B	0.46	14.9	B	0.69	14.2	B	0.74	15.4	B
Westbound Right	0.04	12.0	B	0.00	10.1	B	0.04	7.5	A	0.00	8.0	A
Northbound Left & Thru	0.43	63.4	E	0.08	57.8	E	0.50	39.1	D	0.80	236.3	F
Northbound Right	0.05	80.0	F	0.24	88.0	F	0.05	29.5	C	0.62	145.6	F
Southbound Left, Thru & Right	0.15	48.9	D	0.03	46.9	D	0.15	30.7	C	0.03	46.3	D
Kapa'a Quarry Road at Kalanianaole Highway	***0.86***	***23.1***	***C***	***0.87***	***18.6***	***B***	***0.94***	***27.4***	***C***	***0.99***	***35.8***	***D***
Eastbound Left	0.36	68.2	E	0.55	73.2	E	0.68	98.1	F	0.52	64.2	E
Eastbound Thru	0.45	3.8	A	0.90	13.5	B	0.50	4.2	A	1.03	37.6	D
Westbound Thru	0.95	29.8	C	0.66	15.5	B	0.99	34.9	C	0.82	25.6	C
Westbound Right	0.12	7.6	A	0.08	8.3	A	0.13	5.9	A	0.12	12.0	B
Southbound Left	0.50	52.0	D	0.67	66.3	E	0.58	70.2	E	0.79	69.3	E
Southbound Right	0.08	61.0	E	0.04	58.5	E	0.24	64.1	E	0.05	58.3	E

NOTES:
1. V/C denotes ratio of volume to capacity. V/C ratios are not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table 11 2016 and 2026 Levels-of-Service of Unsignalized Intersections without Project Traffic

	2016 Background Without Project				2026 Background Without Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection and Movement	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS	Delay	LOS
Kapa'a Quarry Road at Kapa'a Quarry Access Road North								
Eastbound Left	13.0	B	13.3	C	13.8	B	15.0	B
Kapa'a Quarry Road at Kapa'a Quarry Access Road South								
Eastbound Right	10.3	B	10.0	A	10.6	B	10.3	B
Kapa'a Quarry Access Road at Kapa'a Access Road South								
Northbound Left	10.0	B	10.0	A	10.3	B	0.96	A
Kapa'a Quarry Access Road at Existing Industrial Park								
Southbound Left	0.8	A	9.9	A	9.8	A	9.9	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

2016 and 2026 Segment Levels-of - Service Without Project Traffic

The results of the segment analysis are summarized in Table 12. The assumptions such as shoulder widths, lane widths, percent no passing zones and free flow speed used in the analysis assume worse-case conditions. The traffic characteristics were calculated from the results of the traffic projection calculations.

The conclusion of the segment analysis is that all segments analyzed will operate at Level-of-Service B, or better.

Table 12 Results of Roadway Segment Level-of-Service Analysis - Background Conditions

	2016 Background Without Project						2026 Background Without Project					
Road	Kapa'a Quarry Rd				Kapa'a Quarry Access Rd		Kapa'a Quarry Rd				Kapa'a Quarry Access Rd	
Location	North of Kapa'a Quarry Access Rd		South of Kapa'a Quarry Access Rd		West of Kapa'a Quarry Rd		North of Kapa'a Quarry Access Rd		South of Kapa'a Quarry Access Rd		West of Kapa'a Quarry Rd	
Time Period	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Inputs and Assumptions												
Class	II		II		II		II		II		II	
Terrain	Level		Level		Level		Level		Level		Level	
Shoulder Width (ft) (1)	0.0		0.0		0.0		0.0		0.0		0.0	
Lane Width (ft) (2)	11.0		11.0		11.0		11.0		11.0		11.0	
Segment Length (mi)	0.5		1.5		0.2		0.5		1.5		0.2	
Two Way Volume	490	460	390	415	235	220	545	555	445	505	235	220
Directional Split	64/36	62/38	60/40	53/47	62/38	68/32	64/36	61/39	61/39	54/46	62/38	68/32
Peak Hour Factor	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97
% Trucks & Buses	14%	10%	8%	5%	29%	22%	13%	4%	7%	4%	29%	22%
% Recreational Vehicles	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% No Passing Zone	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Access Points	2		2		3		2		2		3	
Free Flow Speed (mph) (3)	25		25		25		25		25		25	
Results of Level-of-Service Analysis												
% Time Spent Following	59.7	56.1	53.8	55.0	44.5	43.2	62.0	60.5	57.0	58.7	44.5	43.2
Level-of-Service	C	C	B	B	B	B	C	C	C	C	B	B
Volume-to-Capacity Ratio	0.19	0.16	0.14	0.14	0.10	0.08	0.19	0.18	0.16	0.17	0.10	0.08

Notes:
(1) No shoulders were assumed as a worse-case condition.
(2) 11.0 foot lanes were assumed as a worse-case condition.
(3) 25 miles per hour is the minimum speed allowed for the segment analysis.

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. This chapter presents the generation, distribution and assignment of project generated traffic and the background plus project traffic projections. The results of the level-of-service analysis of background plus project conditions is presented in the following chapter.

Methodology

Generally, the process involves the determination of weekday peak-hour trips that would be generated by the proposed project, distribution and assignment of these trips on the approach and departure routes, and finally, determination of the levels-of-service at affected intersections and driveways subsequent to implementation of the project.

The proposed project will be developed in four phases (Phases A through D). The square footage in each of the phases and the anticipated year of completion of each phase is summarized in Table 13.

Table 13 Proposed Development Plan By Phase

Phase	Square Footage	Completion Year
A	80,000	2011
B	147,000	2014
C	81,000	2016
D	355,000	2026
Total	663,000	

Trip Generation of Proposed Development

It was assumed that the proposed development would have trip generation characteristics comparable to the existing industrial park. Trip generation rates based of the gross floor areas and the directional distribution of peak hour traffic was calculated from the traffic counts. These calculations as summarized in Table 14. As a comparison, the morning and afternoon peak hour generation rates for light industrial uses provided in *Trip Generation* are 0.92 and 0.98, respectively[3]. Therefore, the trip generation rates calculated for the existing industrial park are lower that the Institute of Transportation Engineers rates.

The trip generation calculations are summarized in Table 15.

Table 14 Trip Generation Rates Calculations

	AM Peak Hour			PM Peak Hour		
	Total In	Total Out	Total	Total In	Total Out	Total
Autos	111	41	152	49	143	192
Heavy Vehicles	26	41	67	14	6	20
Total Trips	137	82	219	63	149	212
Trips per TGSF(2)	0.54	0.32	0.87	0.25	0.59	0.84
Percent	63%	37%	100%	30%	70%	100%

Notes:
(1) The sum of inbound plus outbound was used to identify the peak hour. The peak hour of the inbound trips may not coincide with the peak hour of the outbound trips.
(2) Trip generation calculations are based on 253,000 gross square feet.

Table 15 Summary of Trip Generation Analysis

Time Period	Direction	Trips per TGSF or Percent	Phase A	Phase B	Phase C	Phase D	Total Project Trips
			80,000	147,000	81,000	355,000	
			Trips	Trips	Trips	Trips	
AM Peak Hour	Total	0.87	70	130	70	300	570
	In	63%	45	80	45	190	360
	Out	37%	25	50	25	110	210
PM Peak Hour	Total	0.84	65	125	65	290	545
	In	30%	20	35	20	85	160
	Out	70%	45	90	45	205	385

Notes:
(1) All numbers of trips are rounded to nearest five (5).

3 Institute of Transportation Engineers, Trip Generation 7th Edition, 2003, Washington, D.C. pages 100 - 101

Trip Distribution and Assignments

The project-related trips were distributed based on the existing approach and departure routes as determined from the traffic counts. This assumes that the approach and departure patterns will be comparable to the existing traffic to and from the industrial park. The trip distributions are shown on Figure 14.

The peak hour trip assignments of the total vehicles generated by Phases A, B and C are shown as Figures 15 thru 16. Peak hour trip assignments of the total vehicle trips generated by Phases A, B, C and D are shown as Figures 17 and 18.

The peak hour trip assignments of the heavy vehicles generated by Phases A, B and C are shown as Figure 19. Peak hour trip assignments of the heavy vehicle trips generated by Phases A, B, C and D are shown as Figure 20.

Future Background Plus Project Projections

Background plus project traffic conditions is defined as future background traffic conditions plus project related traffic. The incremental difference between background and background plus project is the traffic impact of the project under study. Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background peak hour traffic volumes presented in Chapter 3. The 2016 background plus the project traffic projections are shown on Figures 21 and 22. 2026 background plus project traffic projections are shown on Figures 23 and 24. 2016 and 2026 background plus project heavy vehicle projections are shown as Figure 25 and 25, respectively.

5. TRAFFIC IMPACT ANALYSIS

The purpose of this chapter is to summarize the results of the level-of-service analysis, which identifies the project-related impacts. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed.

The impact of the project was assessed by analyzing the changes in levels-of-service at the study intersections. Mitigation measures are described in the following chapter.

The results of the level-of-service analysis for the driveways along Kapa'a Quarry Access Road are discussed separately from the study intersections.

Methodology for Level-of-Service Analysis

1. Synchro 6 was used to perform the level-of-service analysis.

2. We have used the Institute of Transportation Engineers standard that a Level-of-Service D is the minimum acceptable level-of-service and that the criteria is applicable to the overall intersection rather than each controlled lane group. Side street approaches and minor movements can operate a Level-of-Service E or F for short periods. If project generated traffic causes the level-of-service of the overall intersection to drop below Level-of-Service D, then mitigation should be provided to improve the level-of-service to Level-of-Service C or better. If the Level-of-Service is E or F without project generated traffic and project generated traffic causes the delay to increase, then mitigation should be provided to improve the delay to be equal to or less than the delay for background without project conditions.

3. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.

Results of the Level-of-Service Analysis

The level-of-service analysis for the study intersections was performed for 2016 and 2026 background plus project conditions. The level-of-service analysis was performed using the existing lane configurations and traffic signals timing for the existing study intersections.

The results of the level-of-service analysis of the signalized intersections are summarized in Table 16. And the results for the unsignalized intersections is summarized in Table 17.

Table 16 2016 and 2026 Levels-of-Service of Signalized Intersections With Project Traffic

	2016 Background Plus Project						2026 Background Plus Project					
	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
Intersection	V/C(1)	Delay(2)	LOS(3)	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Kapa'a Quarry Road at Mokapu Boulevard	***0.70***	***29.2***	***C***	***0.94***	***39.5***	***D***	***0.96***	***31.1***	***C***	***1.44***	***149.4***	***F***
Eastbound Left	0.23	14.9	B	0.03	7.9	A	0.33	13.5	B	0.06	12.0	B
Eastbound Thru & Right	0.78	32.6	D	0.95	36.7	D	0.98	37.8	D	1.37	196.8	F
Westbound Left	0.55	36.6	D	0.89	97.8	F	0.91	60.9	E	1.48	328.0	F
Westbound Thru	0.54	16.2	B	0.46	14.9	B	0.69	14.2	B	0.74	15.4	B
Westbound Right	0.04	10.5	B	0.00	10.1	B	0.04	7.5	A	0.00	8.0	A
Northbound Left & Thru	0.61	69.5	E	0.92	103.7	F	0.89	69.2	E	1.33	236.3	F
Northbound Right	0.07	75.9	E	0.48	72.6	E	0.10	30.1	C	1.10	145.6	F
Southbound Left, Thru & Right	0.15	49.0	D	0.04	47.0	D	0.17	31.2	C	0.03	46.3	D
Kapa'a Quarry Road at Kalanianaole Highway	***0.87***	***19.6***	***B***	***0.89***	***20.0***	***B***	***0.99***	***30.6***	***E***	***1.03***	***41.1***	***D***
Eastbound Left	0.71	99.3	F	0.66	80.2	F	1.09	182.8	F	0.71	73.9	E
Eastbound Thru	0.45	3.8	A	0.90	13.5	B	0.50	4.2	A	1.03	37.6	D
Westbound Thru	0.91	21.8	C	0.66	15.5	B	0.99	34.9	C	0.82	25.6	C
Westbound Right	0.15	6.3	A	0.09	8.4	A	0.21	6.5	A	0.15	12.3	B
Southbound Left	0.57	57.0	E	0.82	75.1	E	0.71	75.9	E	1.07	123.3	F
Southbound Right	0.15	56.0	E	0.05	46.6	D	0.41	69.5	E	0.07	57.4	E

NOTES:
1. V/C denotes ratio of volume to capacity. V/C ratios are not calculated for unsignalized intersections.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Table 17 2016 and 2026 Levels-of-Service of Unsignalized Intersections with Project Traffic

	2016 Background Plus Project				2026 Background Plus Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection and Movement	Delay 1	LOS 2	Delay	LOS	Delay	LOS	Delay	LOS
Kapa'a Quarry Road at Kapa'a Quarry Access Road North								
Eastbound Left	15.8	C	17.4	C	25.2	D	49.9	E
Kapa'a Quarry Road at Kapa'a Quarry Access Road South								
Eastbound Right	10.6	B	10.5	B	11.3	B	11.6	B
Kapa'a Quarry Access Road at Kapa'a Access Road South								
Northbound Left	12.9	B	12.4	B	22.3	C	15.8	c

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

The conclusions of the level-of-service analysis are:

2016 Traffic Conditions

1. The intersection of Mokapu Boulevard at Kapa'a Quarry Road will operate at Level-of-Service C during the morning peak hour and Level-of-Service D during the afternoon peak hour. All lane groups have volume-to-capacity ratios less than 1.0. No mitigation is required.

2. The intersection of Kalanianaole Highway at Kapa'a Quarry Road will operate at Level-of-Service B during the both peak hours. All lane groups have volume-to-capacity ratios less than 1.0. No mitigation is required.

3. All lane groups at the unsignalized intersections will operate at Level-of-Service C, or better.

2026 Traffic Conditions

1. During the morning peak hour, the intersection of Kapa'a Quarry Road at Mokapu Boulevard will operate at Level-of-Service C and all movements have volume-to-capacity ratios less than 1.00. During the afternoon peak hour, the intersection will operate at Level-of-Service F and the volume-to-capacity ratio is 1.44. This implies that mitigation will be required to accommodate 2026 background and project generated traffic.

2. The intersection of Kapa'a Quarry Road at Kalanianaole Highway will operate at Level-of-Service E during the morning and Level-of-Service D during afternoon peak hour. The volume-to-capacity ratios are 0.99 and 1.44 respectively. Mitigation is required. It should be noted that the problem movements are the eastbound and westbound through movements. The volume-to-capacity ratios of these movements are the same without and with project generated traffic. The proposed project adds no traffic to these movements. The reduced level-of-service is the result of increased background traffic as a result of background growth

3. During the afternoon peak hour, left turns at the intersection eastbound Kapa'a Quarry Access Road to northbound Kapa'a Quarry Road will operate at Level-of-Service E, which implies long delays and long queues. Mitigation should be implemented.

Project Driveways

The results of the Level-of-Service analysis of the project driveways are summarized in Table 18. It was assumed that all driveways will be unsignalized and that there will be no separate left or turn lanes into or out of the project, respectively. All movements will operate at Level-of-Service C, or better, without mitigation.

Table 18 2016 and 2026 Levels-of-Service of Project Driveways

	2016 Background Plus Project				2026 Background Plus Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection and Movement	Delay [1]	LOS [2]	Delay	LOS	Delay	LOS	Delay	LOS
Kapa'a Quarry Access Road at Existing Industrial Park and Phase A								
Eastbound Left & Thru	0.0	A	0.0	A	0.0	A	0.0	A
Southbound Left & Right	12.3	B	12.8	B	12.4	B	12.8	B
Kapa'a Quarry Access Road at Phases B and C								
Eastbound Left & Thru	0.0	A	0.0	A	0.0	A	0.0	A
Southbound Left & Right	9.7	A	9.7	A	9.4	B	9.7	A
Kapa'a Quarry Access Road at Phase D								
Eastbound Left & Thru					0.0	A	0.0	A
Southbound Left & Right					18.3	C	20.8	C

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

2016 and 2026 Segment Levels-of - Service With Project Traffic

The results of the segment analysis are summarized in Table 19. The assumptions such as shoulder widths, lane widths, percent no passing zones and free flow speed used in the analysis assume worse-case conditions. The traffic characteristics were calculated from the results of the traffic projection calculations.

The conclusions of the segment analysis are:

1. For 2016 conditions with traffic generated by Phases A, B and C, all roadway segments will operate at Level-of-Service C.

2. For 2016 conditions with traffic generated by Phases A, B, C and D, Kapa'a Quarry Road north of Kapa'a Quarry Access Road will operate at Level-of-Service D during the morning peak hour. All the remaining segments will operate at Level-of-Service C.

Table 19 Results of Roadway Segment Level-of-Service Analysis - With Project Traffic

	2016 Background Without Project						2026 Background Without Project					
Road	Kapa’a Quarry Rd				Kapa’a Quarry Access Rd		Kapa’a Quarry Rd				Kapa’a Quarry Access Rd	
Location	North of Kapa’a Quarry Access Rd		South of Kapa’a Quarry Access Rd		West of Kapa’a Quarry Rd		North of Kapa’a Quarry Access Rd		South of Kapa’a Quarry Access Rd		West of Kapa’a Quarry Rd	
Time Period	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Inputs and Assumptions												
Class	II		II		II		II		II		II	
Terrain	Level		Level		Level		Level		Level		Level	
Shoulder Width (ft) (1)	0.0		0.0		0.0		0.0		0.0		0.0	
Lane Width (ft) (2)	11.0		11.0		11.0		11.0		11.0		11.0	
Segment Length (mi)	0.5		1.5		0.2		0.5		1.5		0.2	
Two Way Volume	665	545	490	520	510	450	915	890	645	720	805	760
Directional Split	63/37	61/39	55/45	51/49	62/38	73/27	63/37	67/33	52/48	50/50	63/37	70/30
Peak Hour Factor	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97	0.90	0.97
% Trucks & Buses	18%	7%	13%	6%	31%	11%	21%	6%	14%	6%	31%	10%
% Recreational Vehicles	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% No Passing Zone	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Access Points	2		2		3		2		2		3	
Free Flow Speed (mph) (3)	25		25		25		25		25		25	
Results of Level-of-Service Analysis												
% Time Spent Following	64.2	60.2	59.7	59.5	61.0	57.5	71.8	68.8	64.4	64.9	68.7	65.0
Level-of-Service	C	C	C	C	C	C	D	C	C	C	C	C
Volume-to-Capacity Ratio	0.24	0.18	0.19	0.17	0.19	0.16	0.33	0.29	0.23	0.23	0.30	0.25

Notes:
(1) No shoulders were assumed as a worse-case condition.
(2) 11.0 foot lanes were assumed as a worse-case condition.
(3) 25 miles per hour is the minimum speed allowed for the segment analysis.

Mitigation Measures for 2026 Conditions

Mitigation should be considered for two of the study intersections to mitigation anticipated 2026 traffic conditions. No mitigation is required to accommodate 2016 traffic conditions. The following is a summary of the recommended mitigation measures for 2026 conditions.

Kapa’a Quarry Road at Mokapu Boulevard

This intersection will operate at acceptable levels-of-service during the morning peak hour, but during the afternoon peak hour, the volume-to-capacity ratio and levels-of-service are unacceptable. The addition of a an eastbound to southbound right turn and deceleration lane will improve the afternoon volume-to-capacity ratio 0.81 and all volume-to-capacity ratios will be less than 1.00.

Kapa’a Quarry Road at Kalanianaole Highway

This intersection will operate at Level-of-Service E during both peak periods without mitigation. The addition of a second eastbound left turn lane will mitigate the unacceptable level-of-service for this movement. However, the eastbound and westbound through movements will still be overcapacity. The proposed project adds no traffic to these through movements. The low levels-of-service are the result of background traffic growth.

Other Recommendations

1. The project should provide shuttle bus service along Kapa'a Quarry Road between the project and Mokapu Boulevard and Kalanianaole Highway to provide transportation for employees that can use The Bus, which has routes along each of these roadways.

2. No additional improvements are required to accommodate project traffic volumes along Kapa'a Quarry Access Road and the projected traffic volumes of traffic between the various phases is minimal. However, the background traffic along Kapa'a Quarry Road is mostly larger, heavy vehicles. As such, the turning movements into and out of the various phases will have an adverse impact on there through vehicles. Accordingly, the feasibility of a "frontage" road connection the phases should be investigated. Figure 26 show possible location for connections between the Phases. If this does not prove to be feasible, left turn storage lanes should be provided.

3. It is understood from the Department of Planning and Permitting that a sidewalk will be required along Kapa'a Quarry Access Road.

4. It is recommended that an update of this TIAR be performed after completion of Phase C and prior to Phase D. As the mitigation is required to accommodate 2026 conditions. The purpose of the updated TIAR would be to confirm the background traffic growth estimates, the confirm the trip generation rates calculated for the industrial park and the quantify the reduction of peak hour traffic as a result of the traffic management plan.

REFERENCES

1. Transportation Research Board, Highway Capacity Manual (HCM), 2000

2. Institute of Transportation Engineers, Trip Generation 7th Edition, 2003

3. Institute of Transportation Engineers, Trio Generation Handbook 2nd Edition, 2004

4. Institute of Transportation Engineers, Transportation Impact Analyses for Site Development: A Recommended Practice, 2006

FIGURES

List of Figures

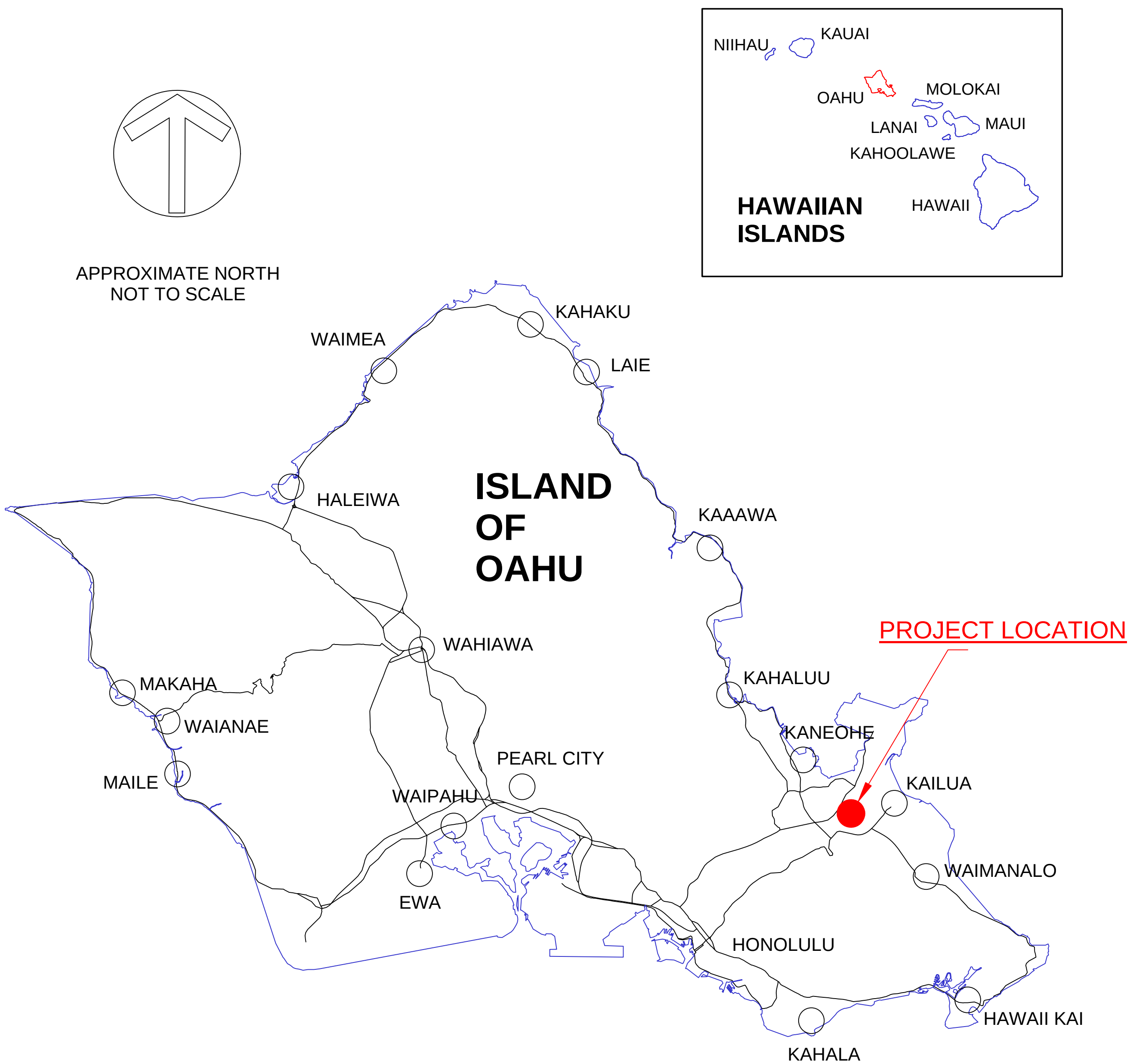


Figure 1
PROJECT LOCATION ON OAHU

Source:
Marc M. Siah & Associates, Inc.
Draft Environmental Assessment for Kapa'a Light Industrial Park
November 2008

Figure 2
VICINITY MAP

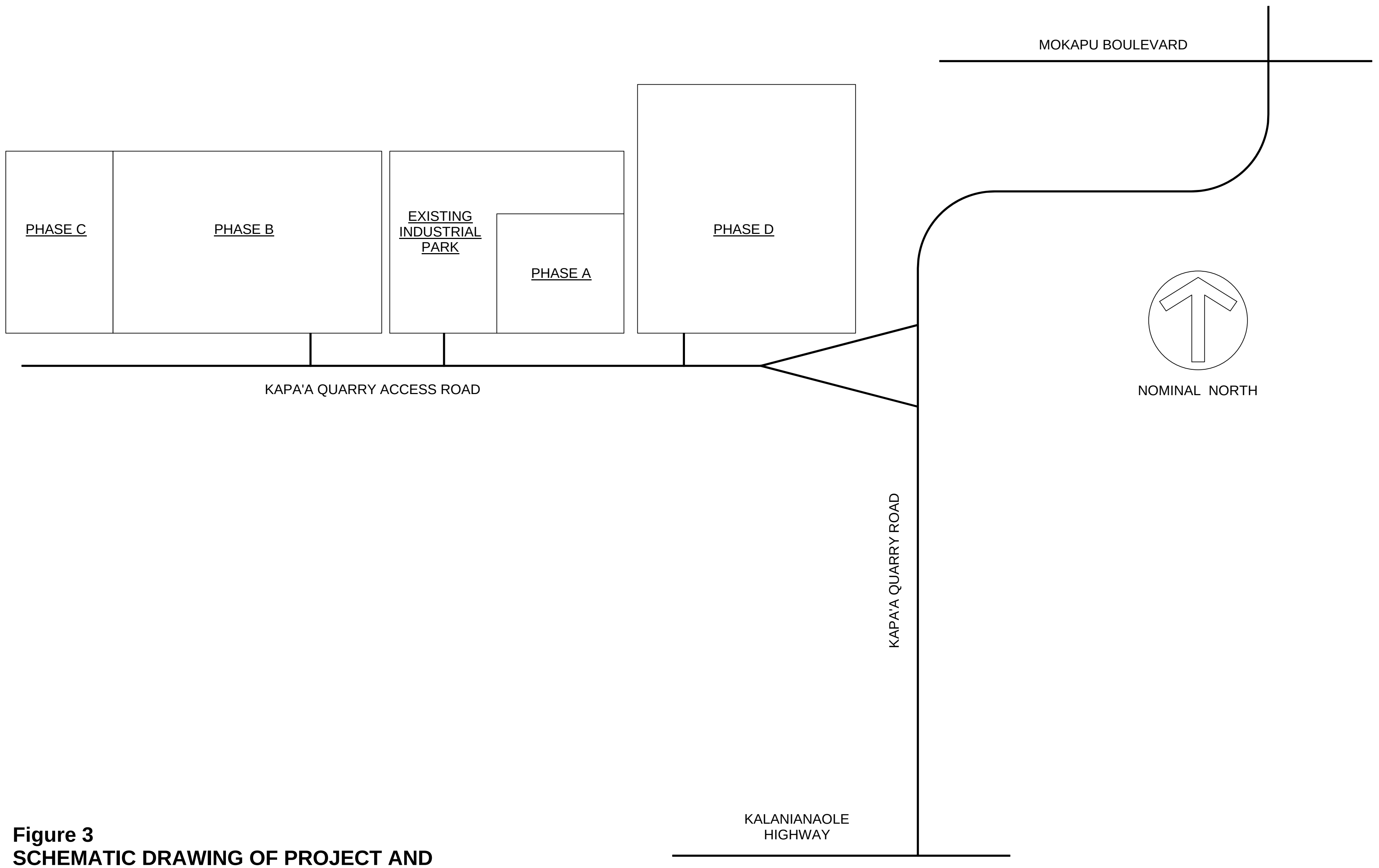


Figure 3
SCHEMATIC DRAWING OF PROJECT AND ADJACENT ROADWAY NETWORK

Phillip Rowell and Associates

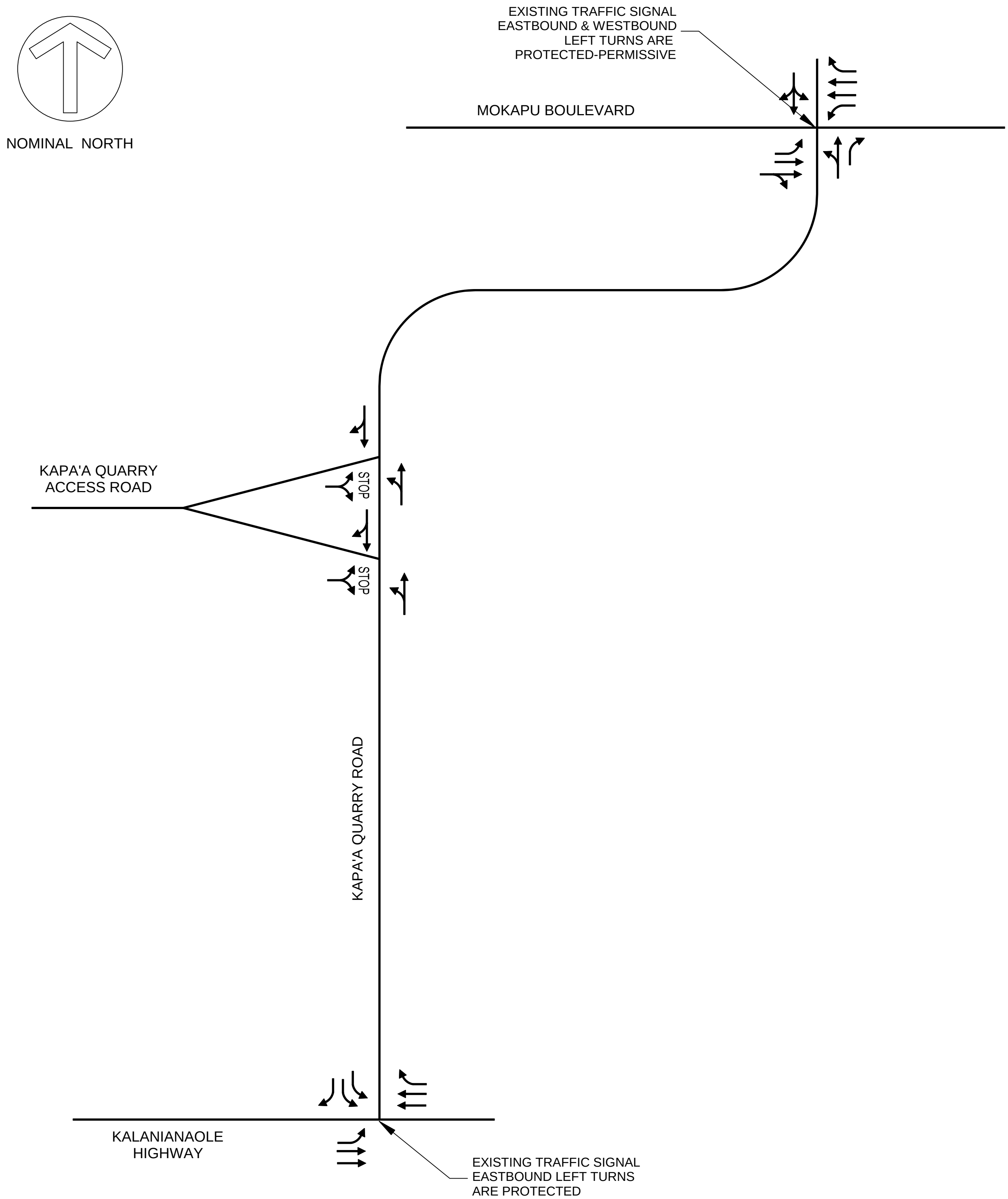
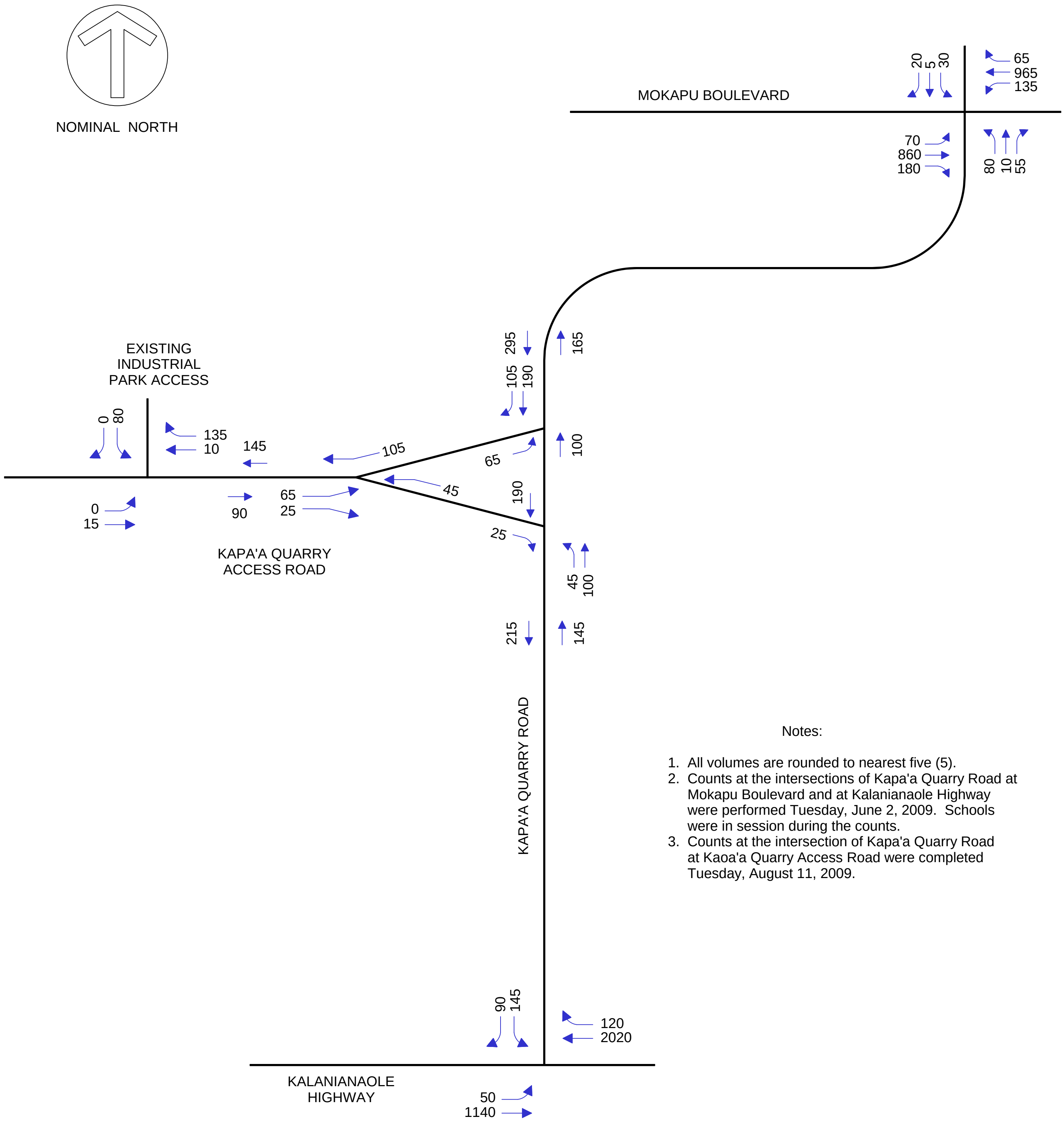


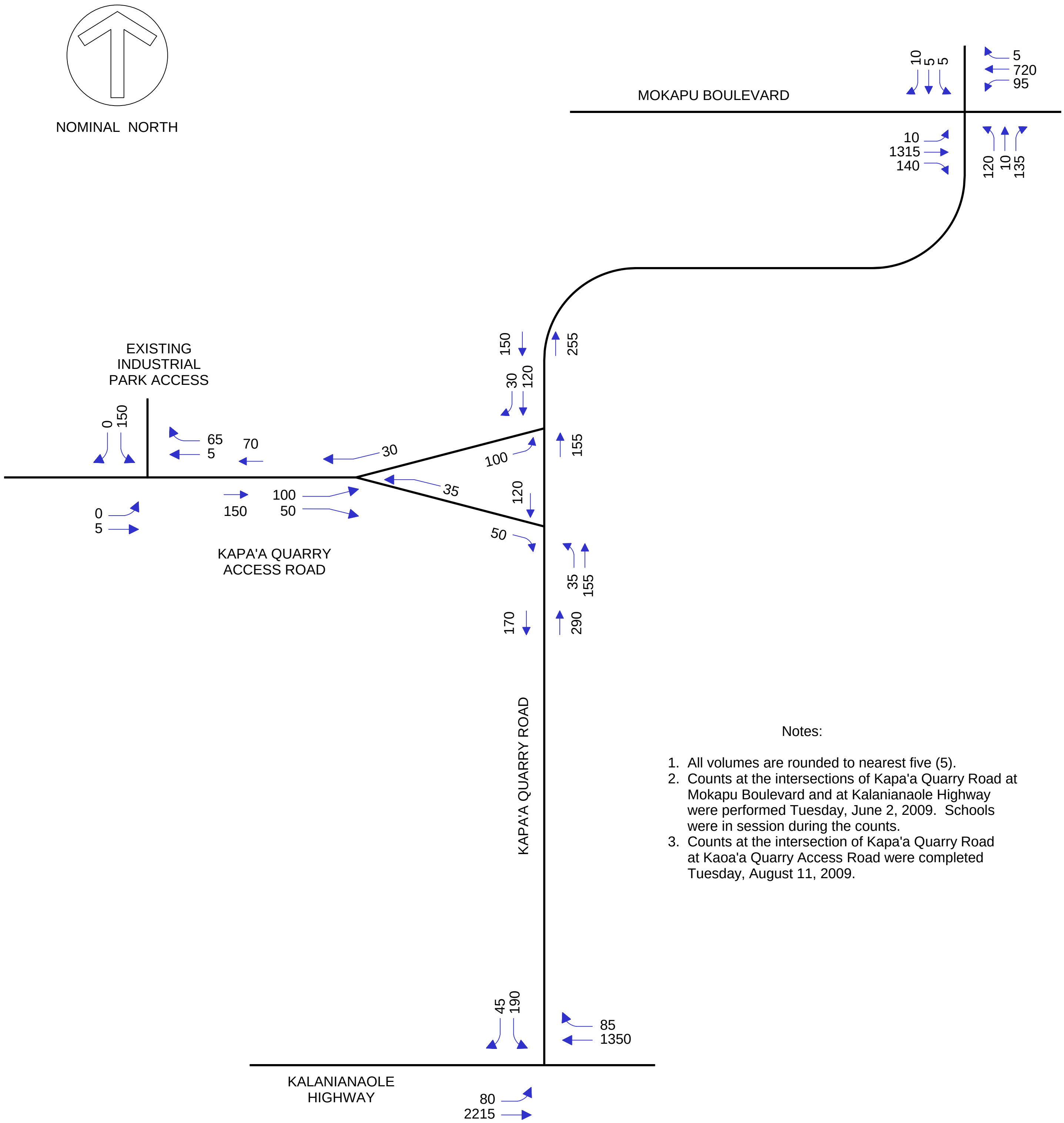
Figure 4
EXISTING LANE CONFIGURATION AND RIGHT-OF-WAY CONTROLS



Notes:

1. All volumes are rounded to nearest five (5).
2. Counts at the intersections of Kapa'a Quarry Road at Mokapu Boulevard and at Kalanianaole Highway were performed Tuesday, June 2, 2009. Schools were in session during the counts.
3. Counts at the intersection of Kapa'a Quarry Road at Kaoa'a Quarry Access Road were completed Tuesday, August 11, 2009.

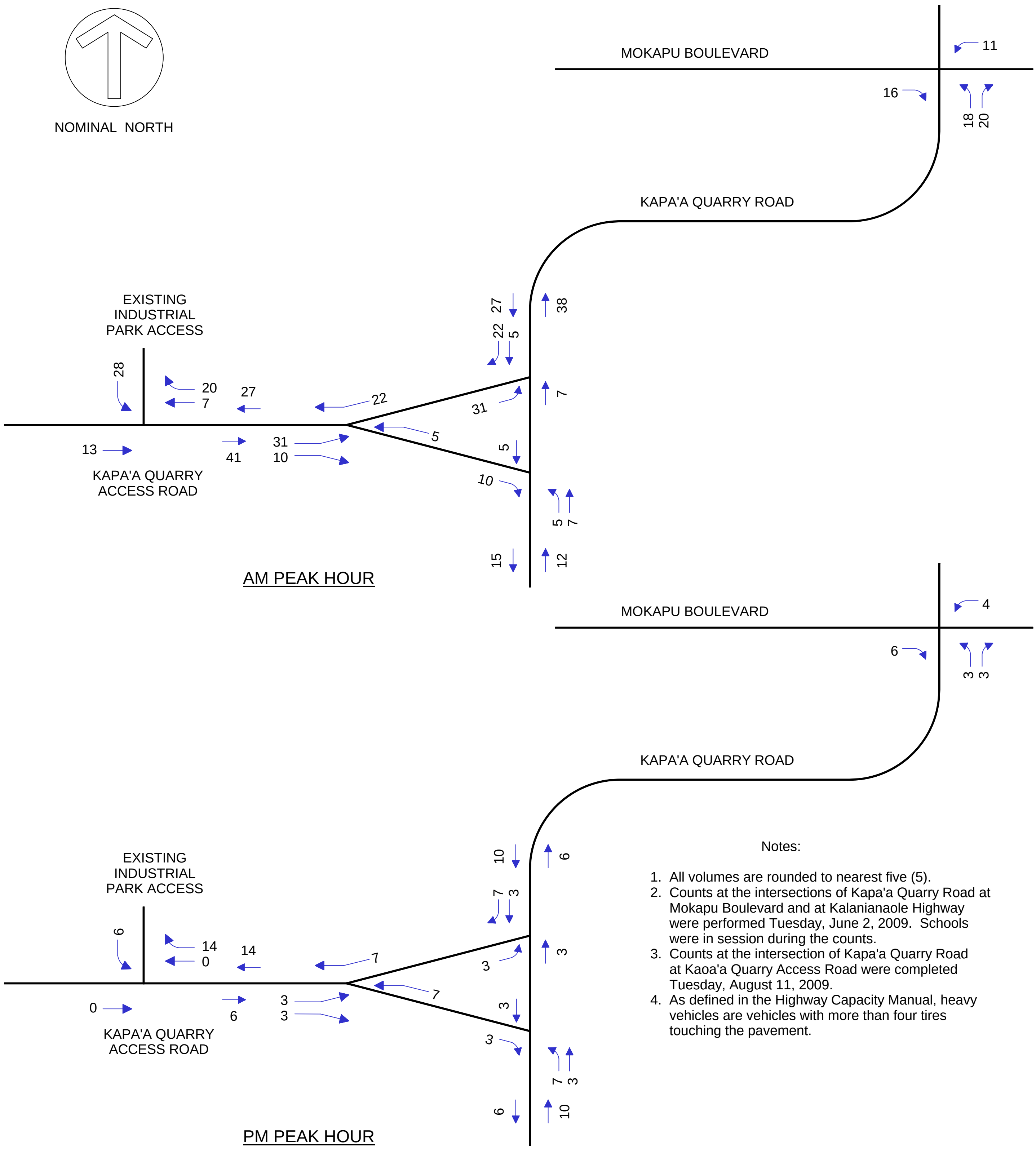
Figure 5
EXISTING (2009) AM PEAK HOUR TRAFFIC VOLUMES



Notes:

1. All volumes are rounded to nearest five (5).
2. Counts at the intersections of Kapa'a Quarry Road at Mokapu Boulevard and at Kalanianaole Highway were performed Tuesday, June 2, 2009. Schools were in session during the counts.
3. Counts at the intersection of Kapa'a Quarry Road at Kaoa'a Quarry Access Road were completed Tuesday, August 11, 2009.

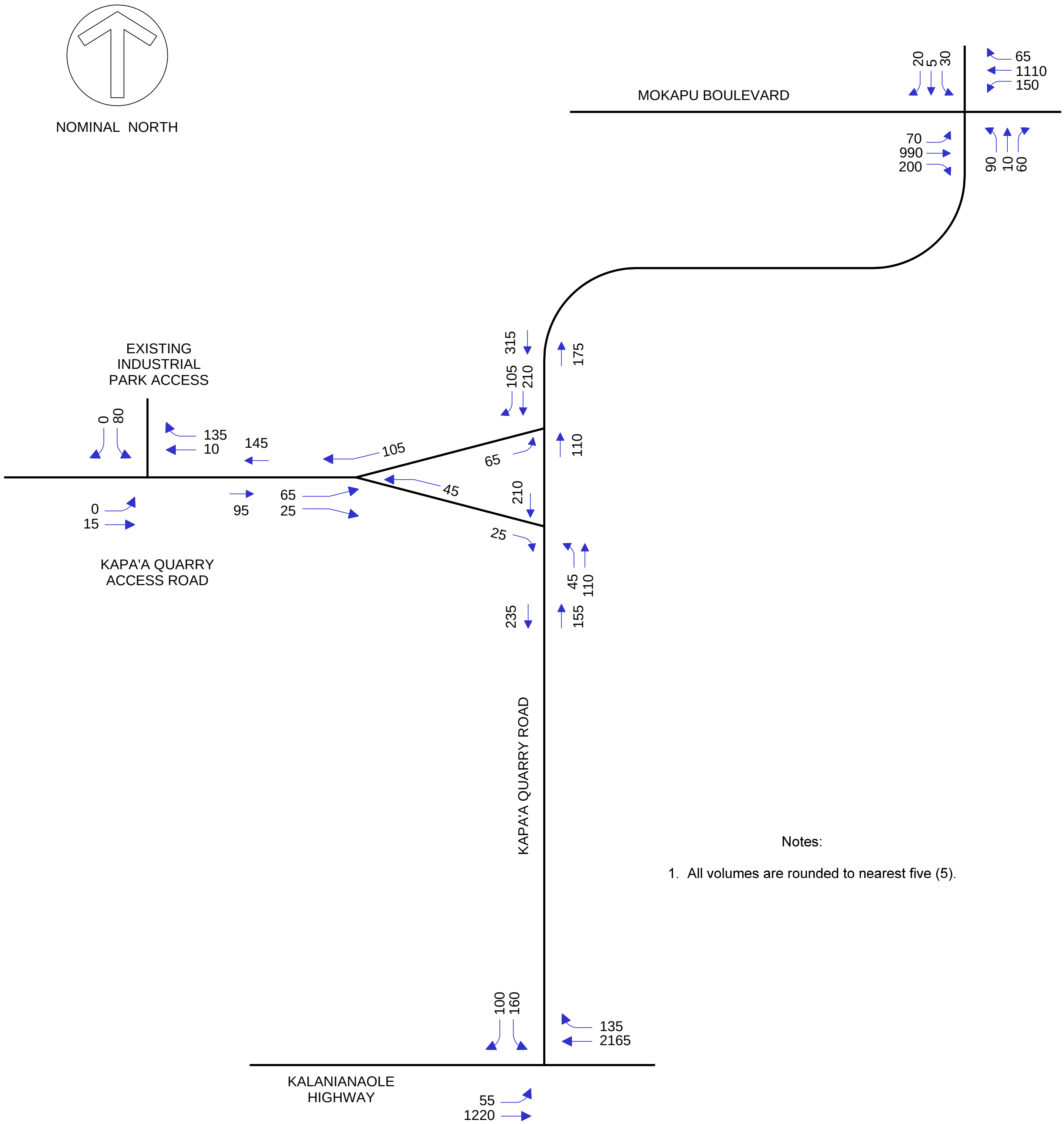
Figure 6
EXISTING (2009) PM PEAK HOUR TRAFFIC VOLUMES



Notes:

1. All volumes are rounded to nearest five (5).
2. Counts at the intersections of Kapa'a Quarry Road at Mokapu Boulevard and at Kalanianaole Highway were performed Tuesday, June 2, 2009. Schools were in session during the counts.
3. Counts at the intersection of Kapa'a Quarry Road at Kaoa'a Quarry Access Road were completed Tuesday, August 11, 2009.
4. As defined in the Highway Capacity Manual, heavy vehicles are vehicles with more than four tires touching the pavement.

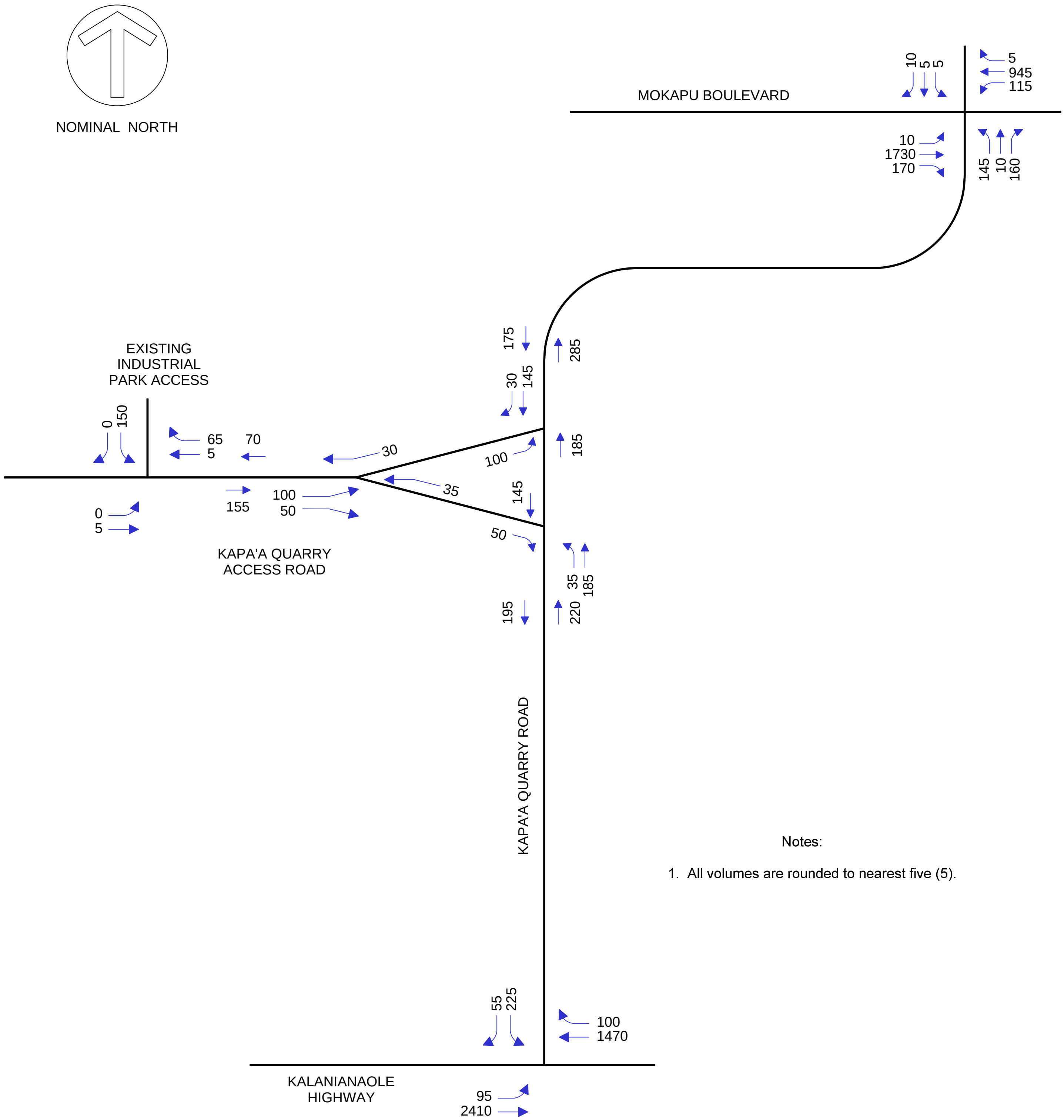
Figure 7
EXISTING (2009) HEAVY VEHICLE PEAK HOUR VOLUMES



Notes:

1. All volumes are rounded to nearest five (5).

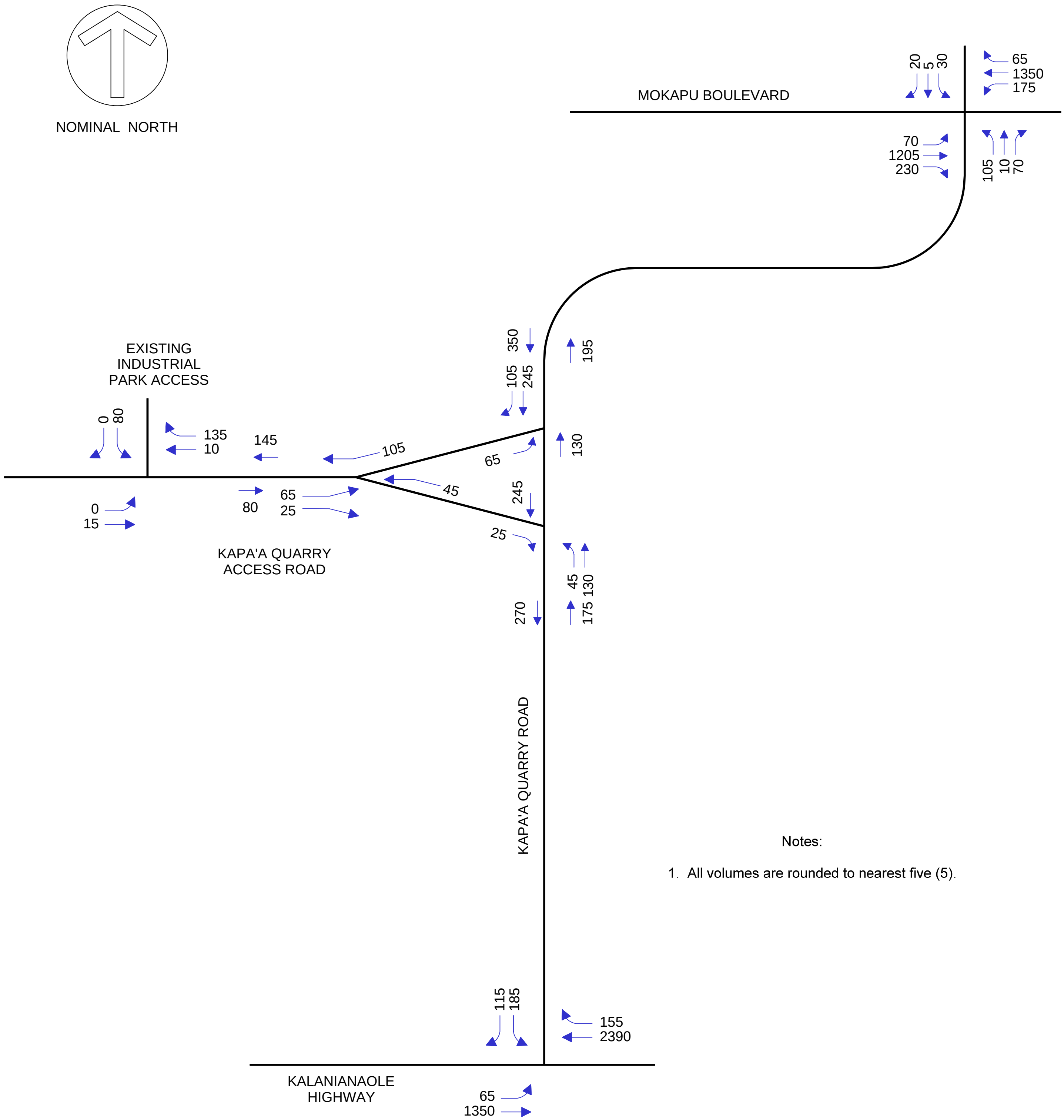
Figure 8
2016 BACKGROUND AM PEAK HOUR TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

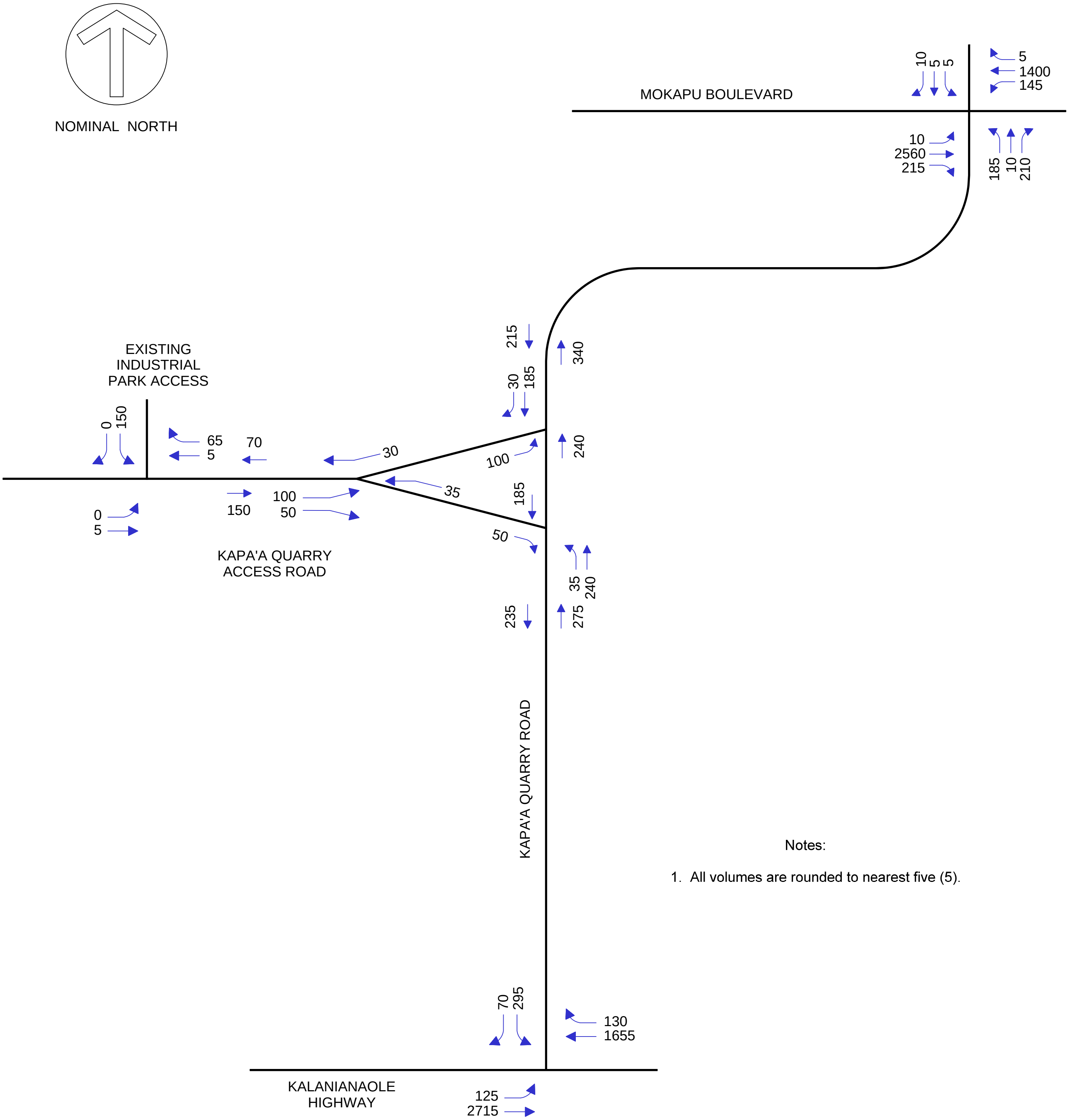
Figure 9
2016 BACKGROUND PM PEAK HOUR TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

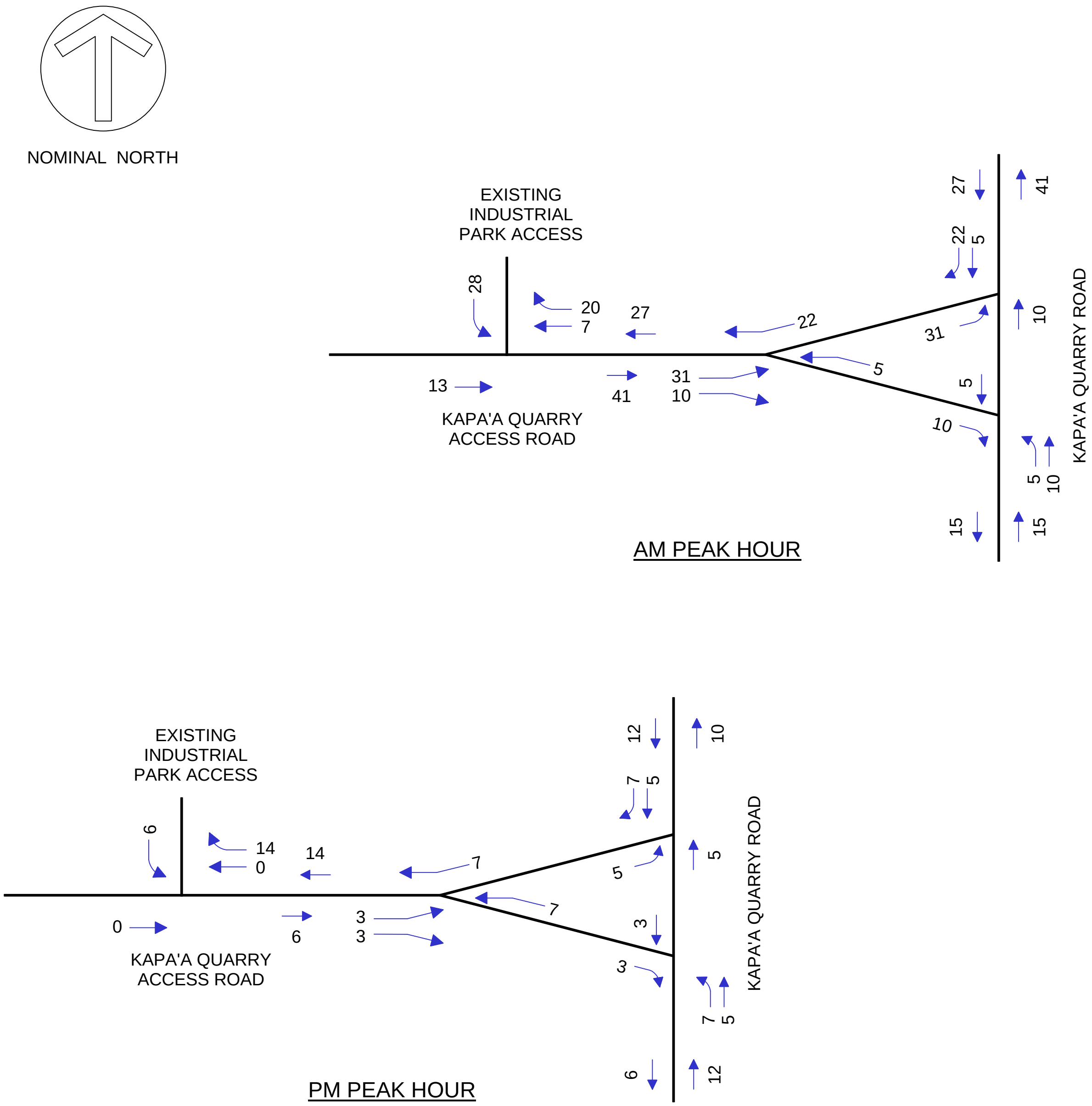
Figure 10
2026 BACKGROUND AM PEAK HOUR TRAFFIC PROJECTIOS



Notes:

1. All volumes are rounded to nearest five (5).

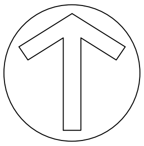
Figure 11
2026 BACKGROUND PM PEAK HOUR TRAFFIC PROJECTIONS

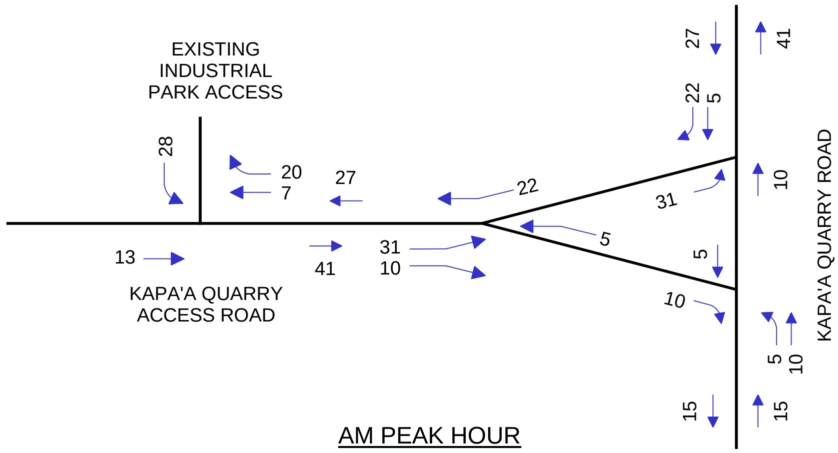


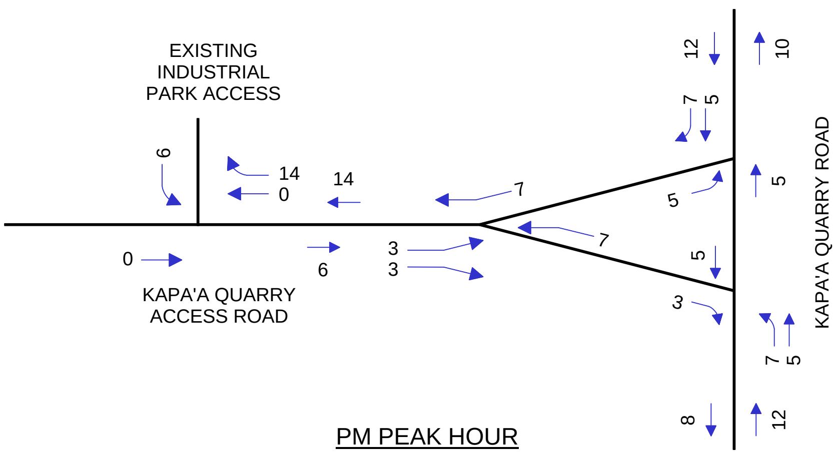
Notes:

1. All volumes are rounded to nearest five (5).
2. As defined in the Highway Capacity Manual, heavy vehicles are vehicles with more than four tires touching the pavement.

Figure 12
2016 BACKGROUND HEAVY VEHICLE PEAK HOUR PROJECTIONS







Notes:

1. All volumes are rounded to nearest five (5).
2. As defined in the Highway Capacity Manual, heavy vehicles are vehicles with more than four tires touching the pavement.

Figure 13
2026 BACKGROUND HEAVY VEHICLE PEAK HOUR PROJECTIONS

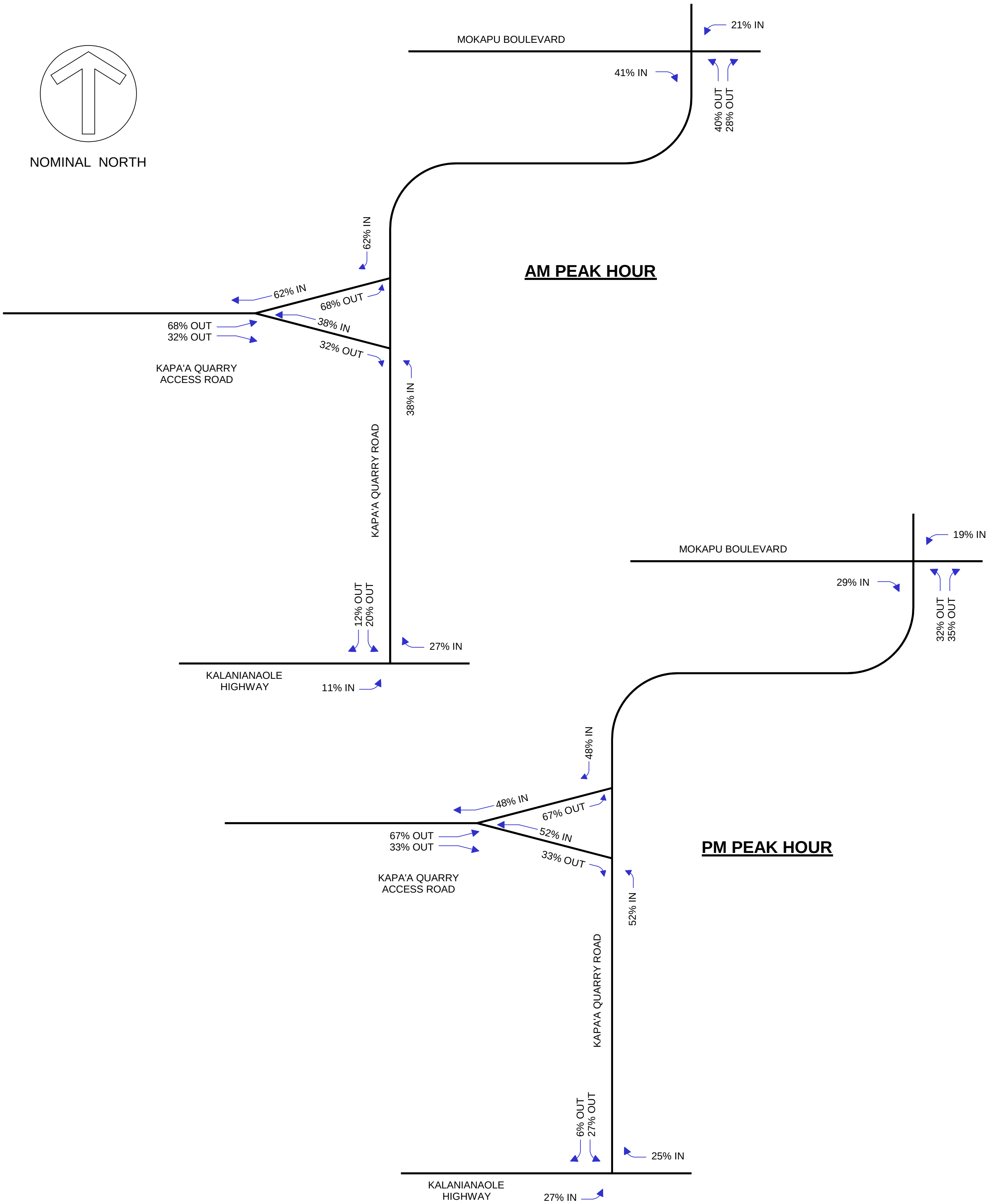


Figure 14
AM AND PM PEAK HOUR TRIP DISTRIBUTIONS

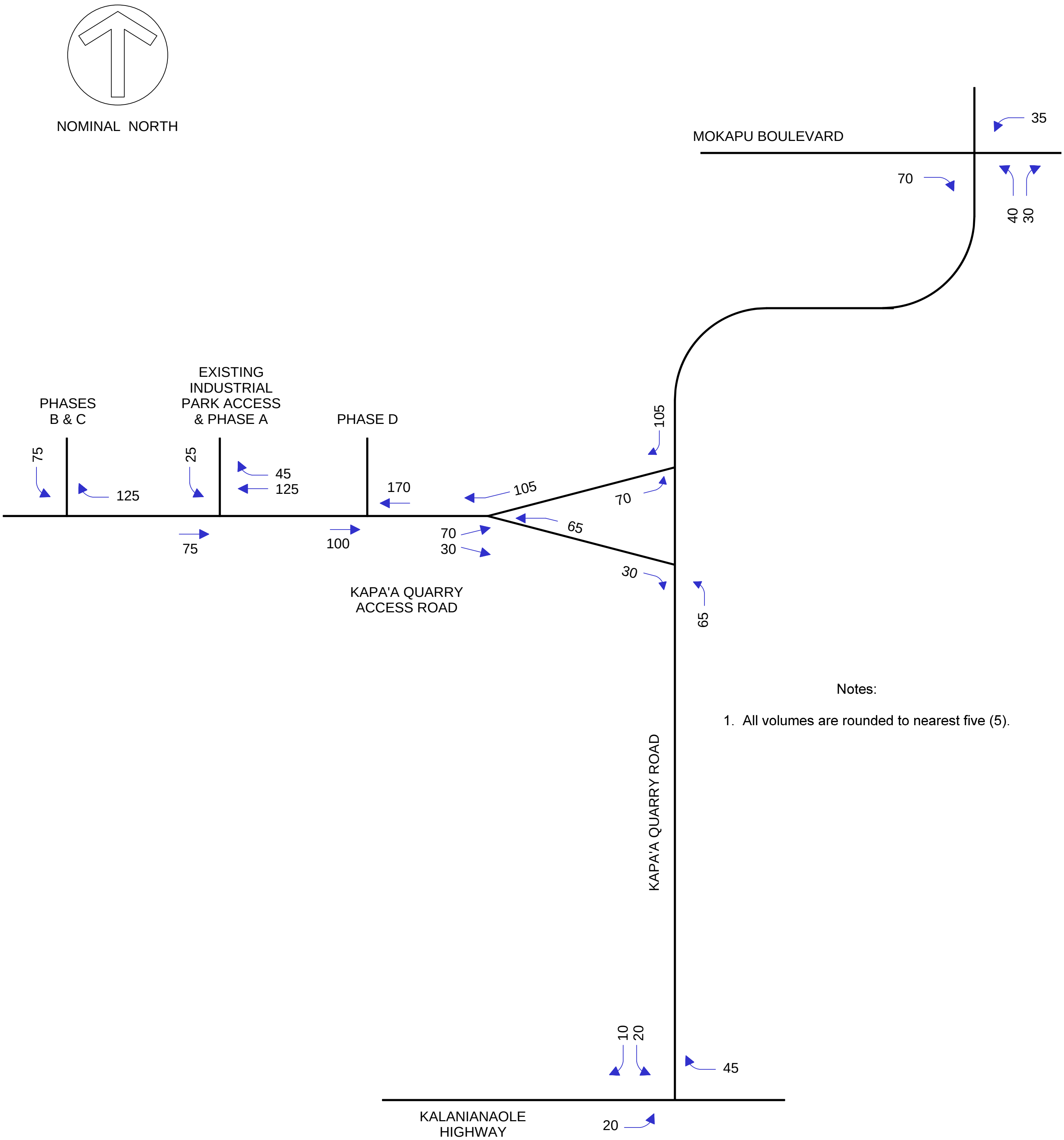
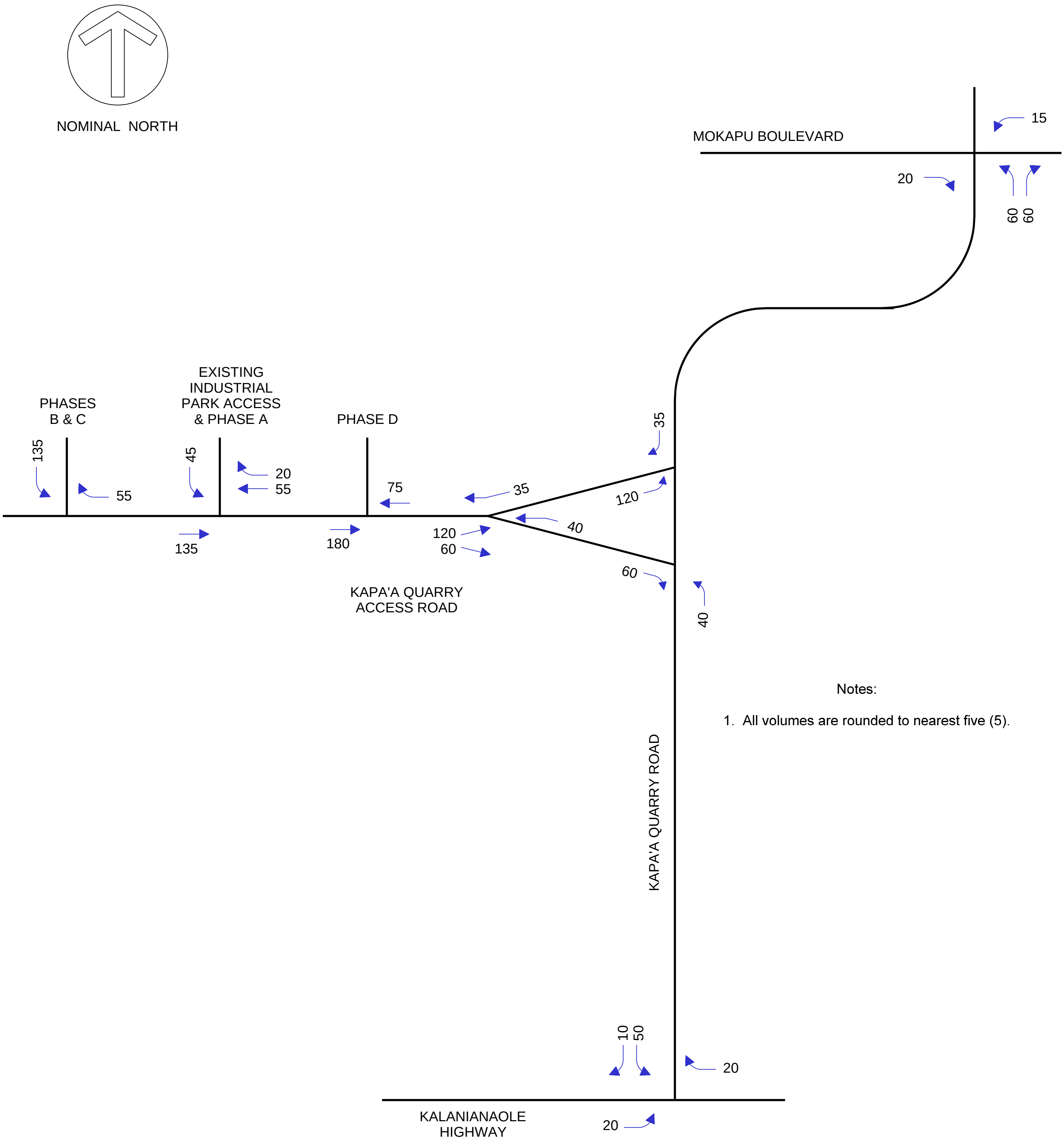


Figure 15
AM PEAK HOUR PROJECT TRIP ASSSIGNMENTS - PHASES A, B AND C

Phillip Rowell and Associates



Notes:

1. All volumes are rounded to nearest five (5).

Figure 16
PM PEAK HOUR PROJECT TRIP ASSSIGNMENTS - PHASES A, B AND C

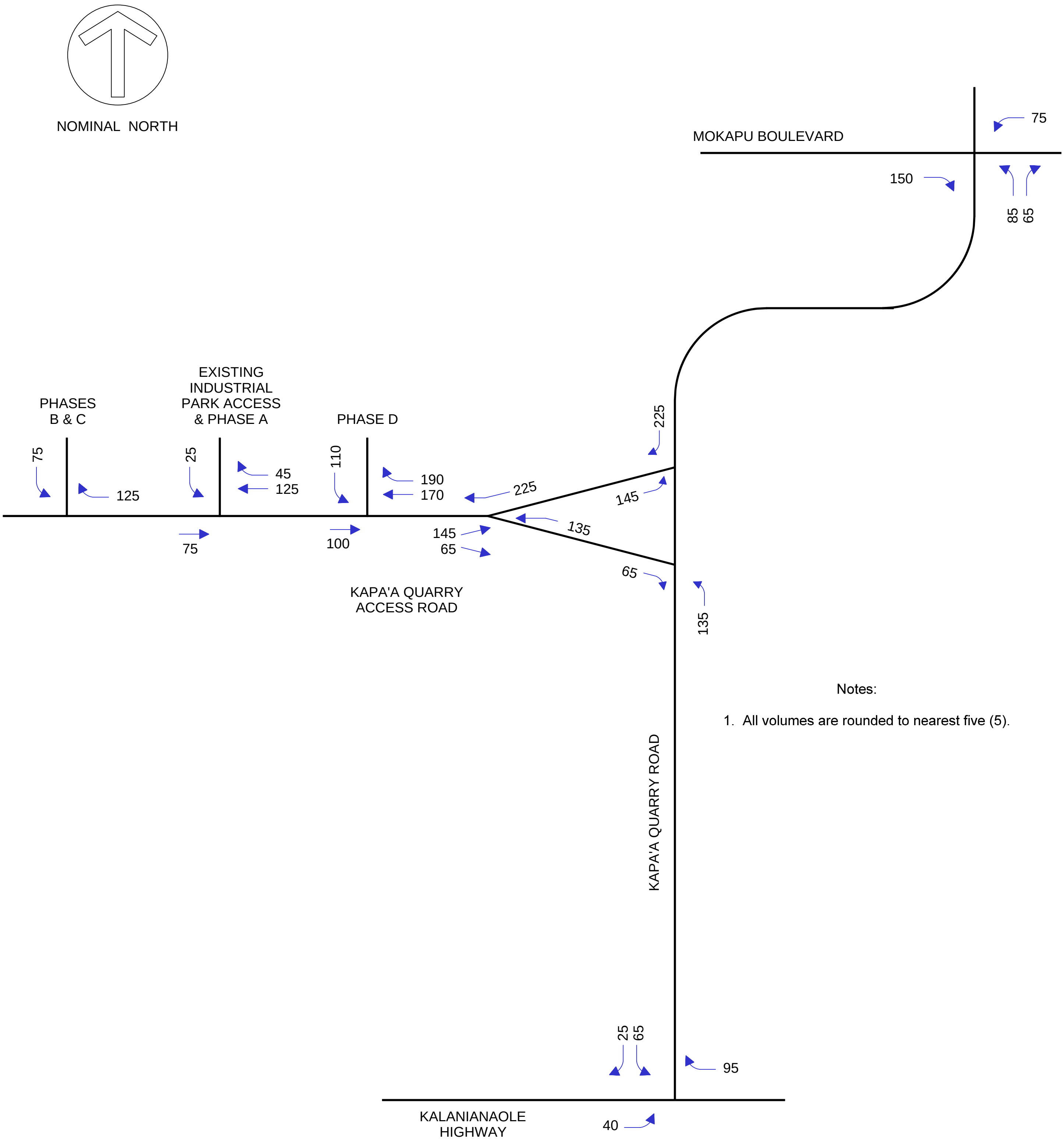
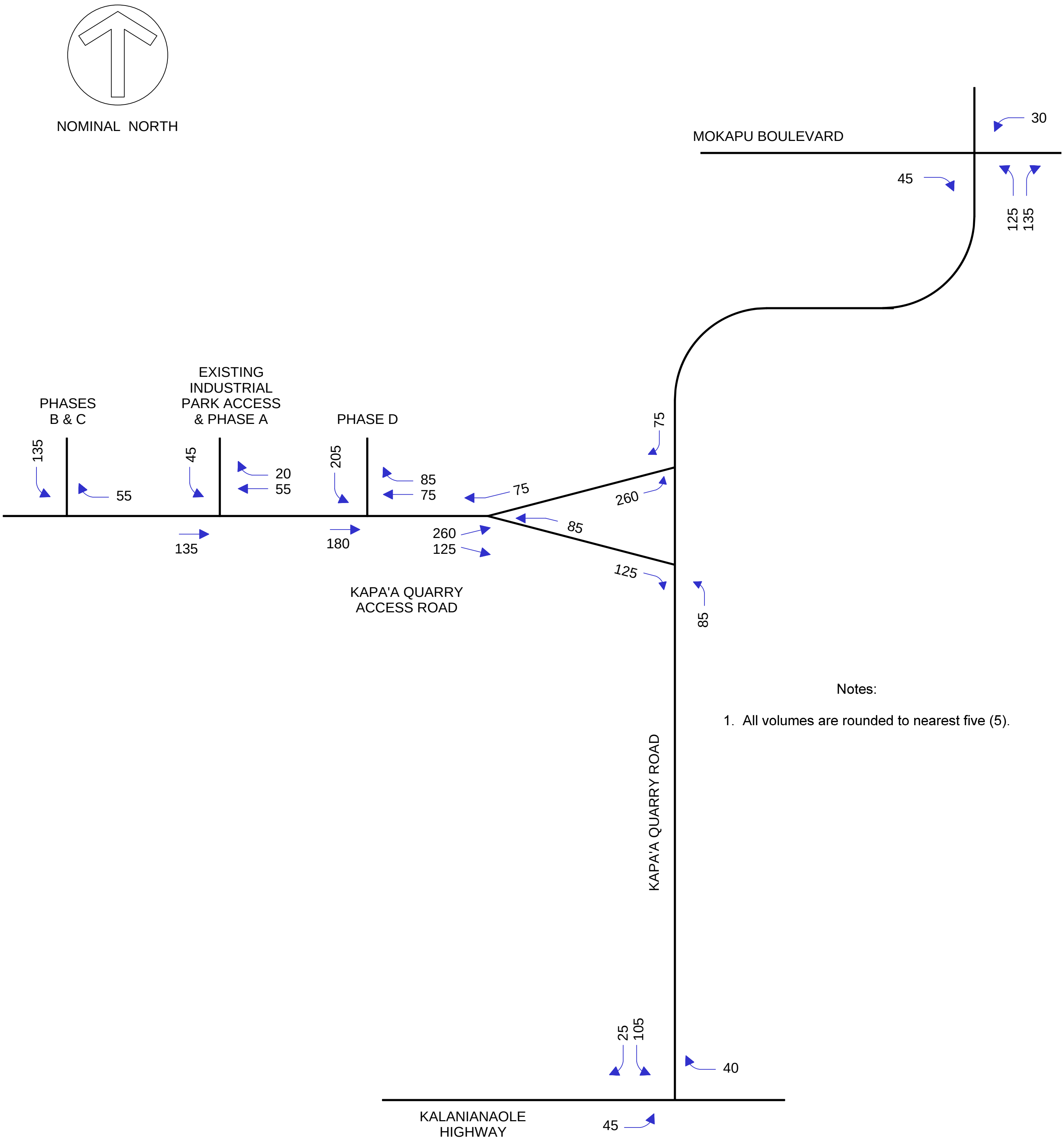


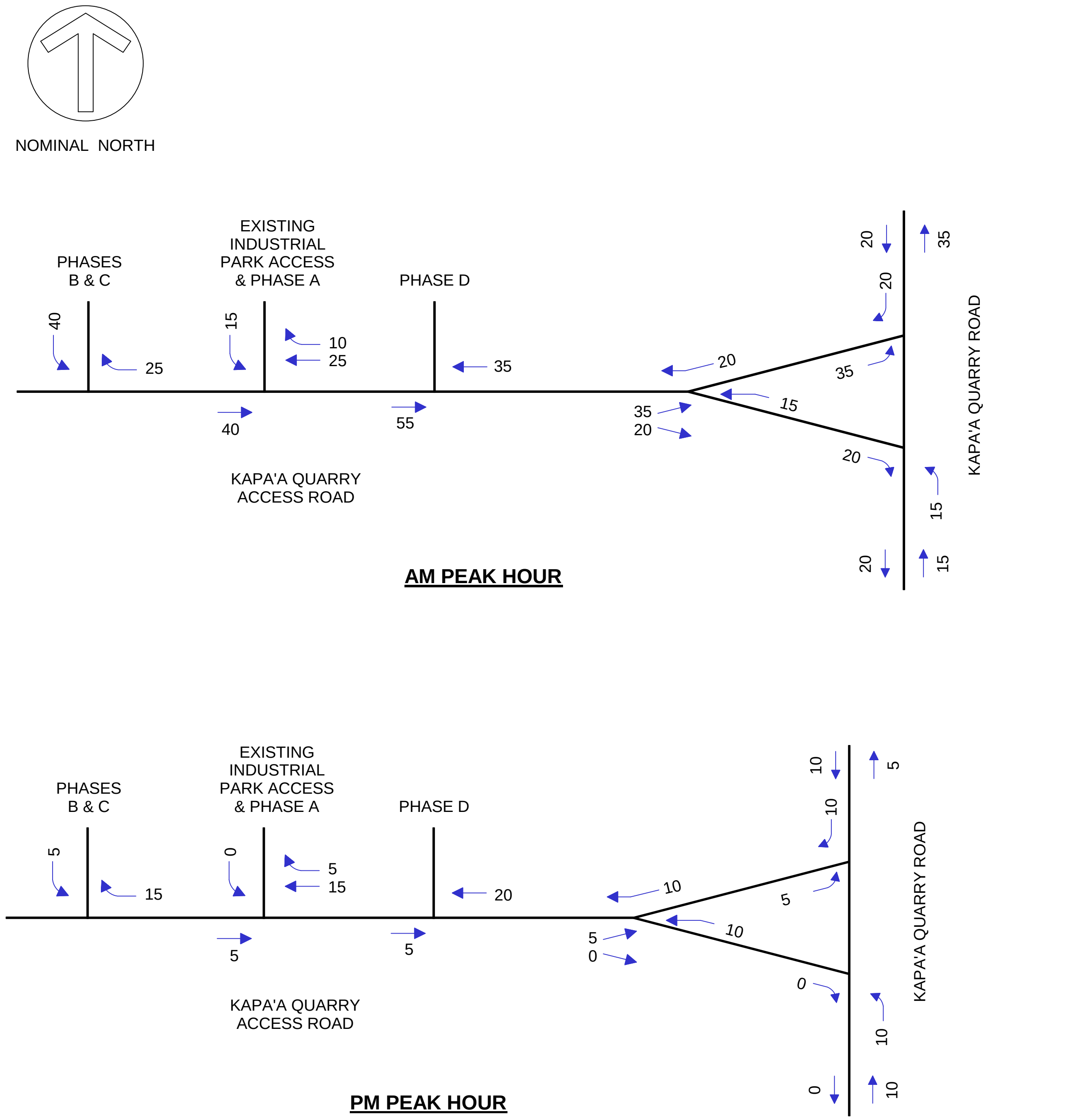
Figure 17
AM PEAK HOUR PROJECT TRIP ASSSIGNMENTS - PHASES A, B, C AND D



Notes:

1. All volumes are rounded to nearest five (5).

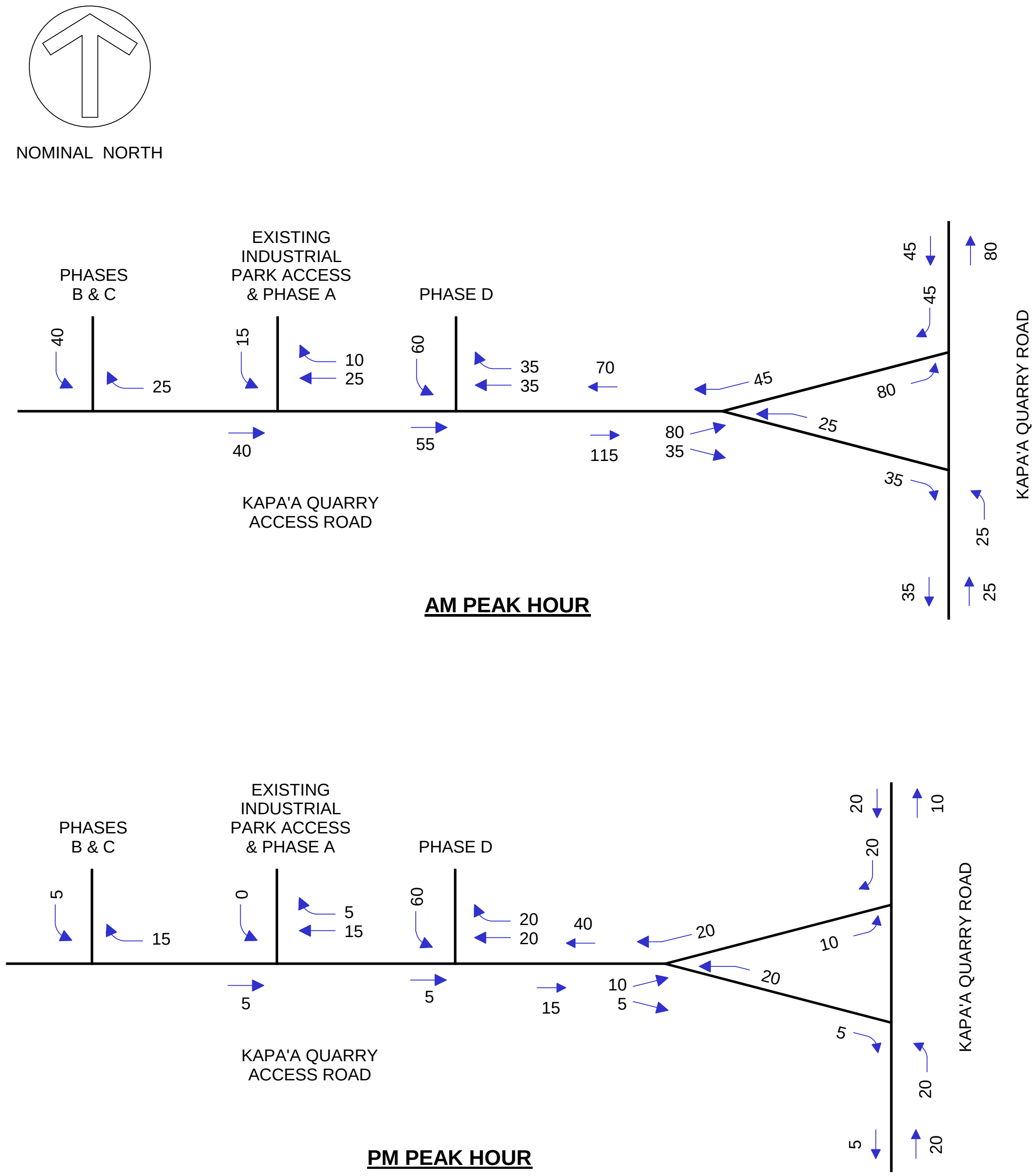
Figure 18
PM PEAK HOUR PROJECT TRIP ASSSIGNMENTS - PHASES A, B, C AND D



Notes:

1. All volumes are rounded to nearest five (5).

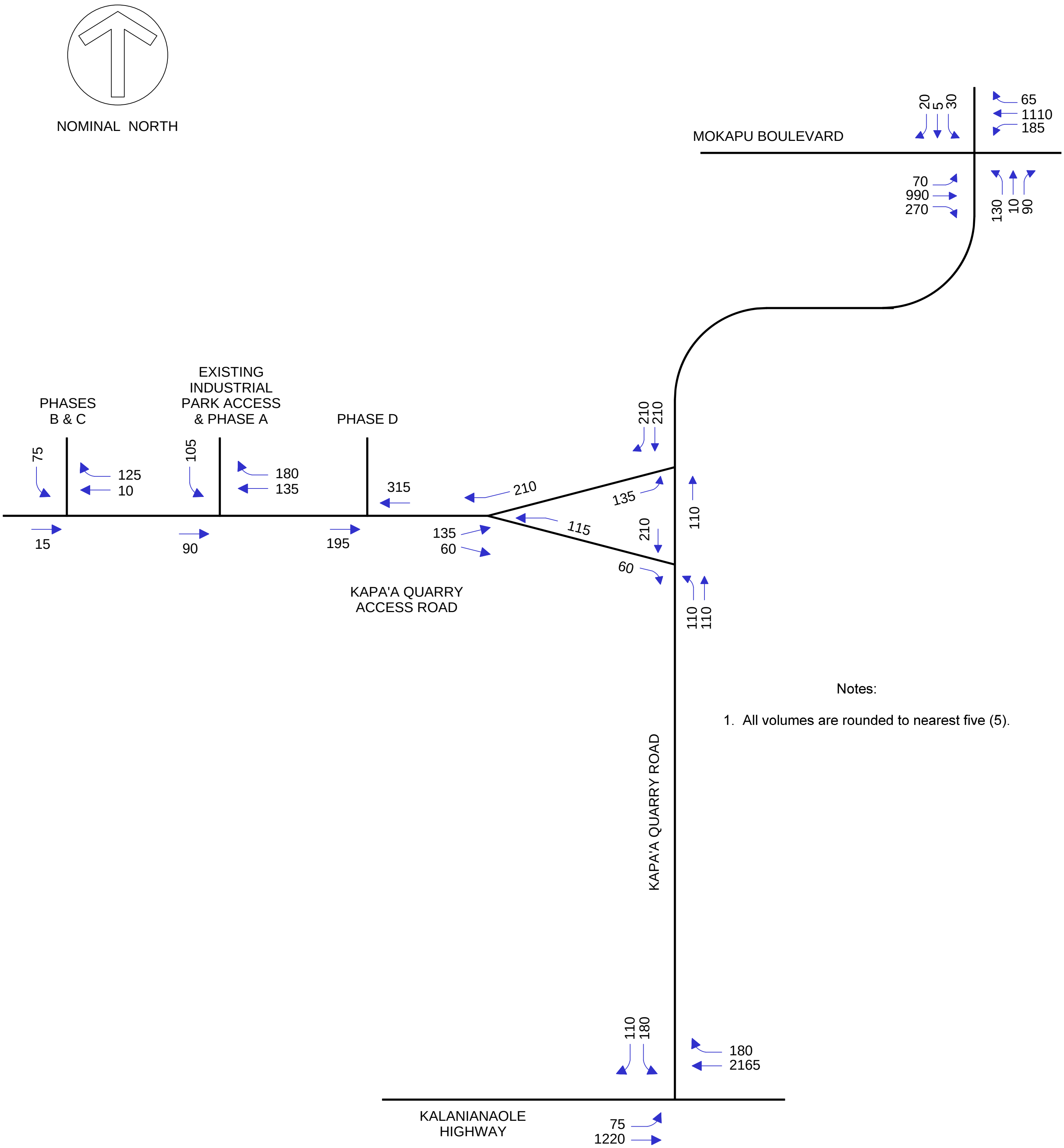
Figure 19
2016 HEAVY VEHICLES TRIP ASSSIGNMENTS - PHASES A, B AND C



Notes:

1. All volumes are rounded to nearest five (5).

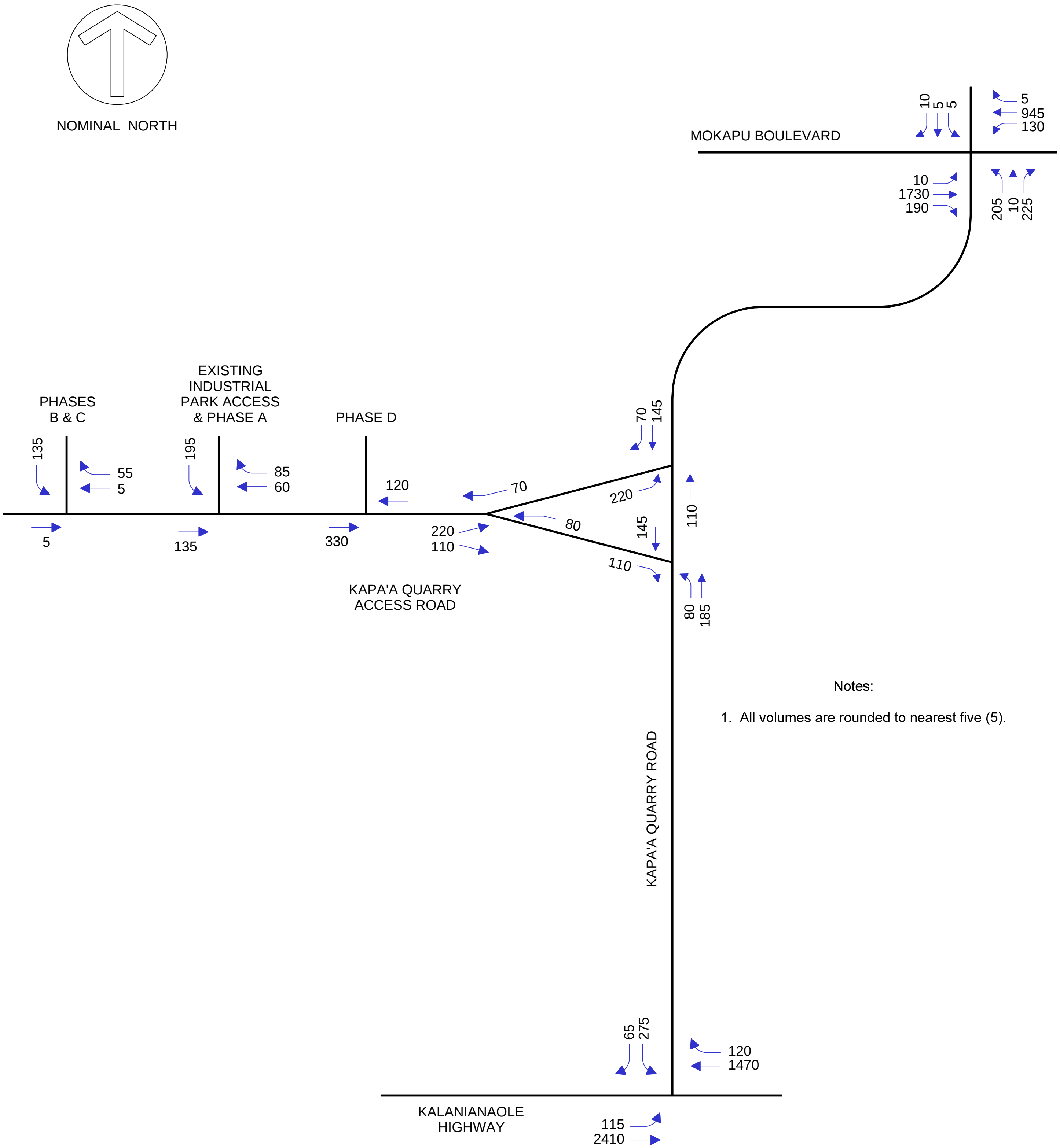
Figure 20
2026 HEAVY VEHICLES TRIP ASSSIGNMENTS - PHASES A, B, C AND D



Notes:

1. All volumes are rounded to nearest five (5).

Figure 21
2016 BACKGROUND PLUS PROJECT AM PEAK HOUR PROJECT TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

Figure 22
2016 BACKGROUND PLUS PROJECT PM PEAK HOUR PROJECT TRAFFIC PROJECTIONS

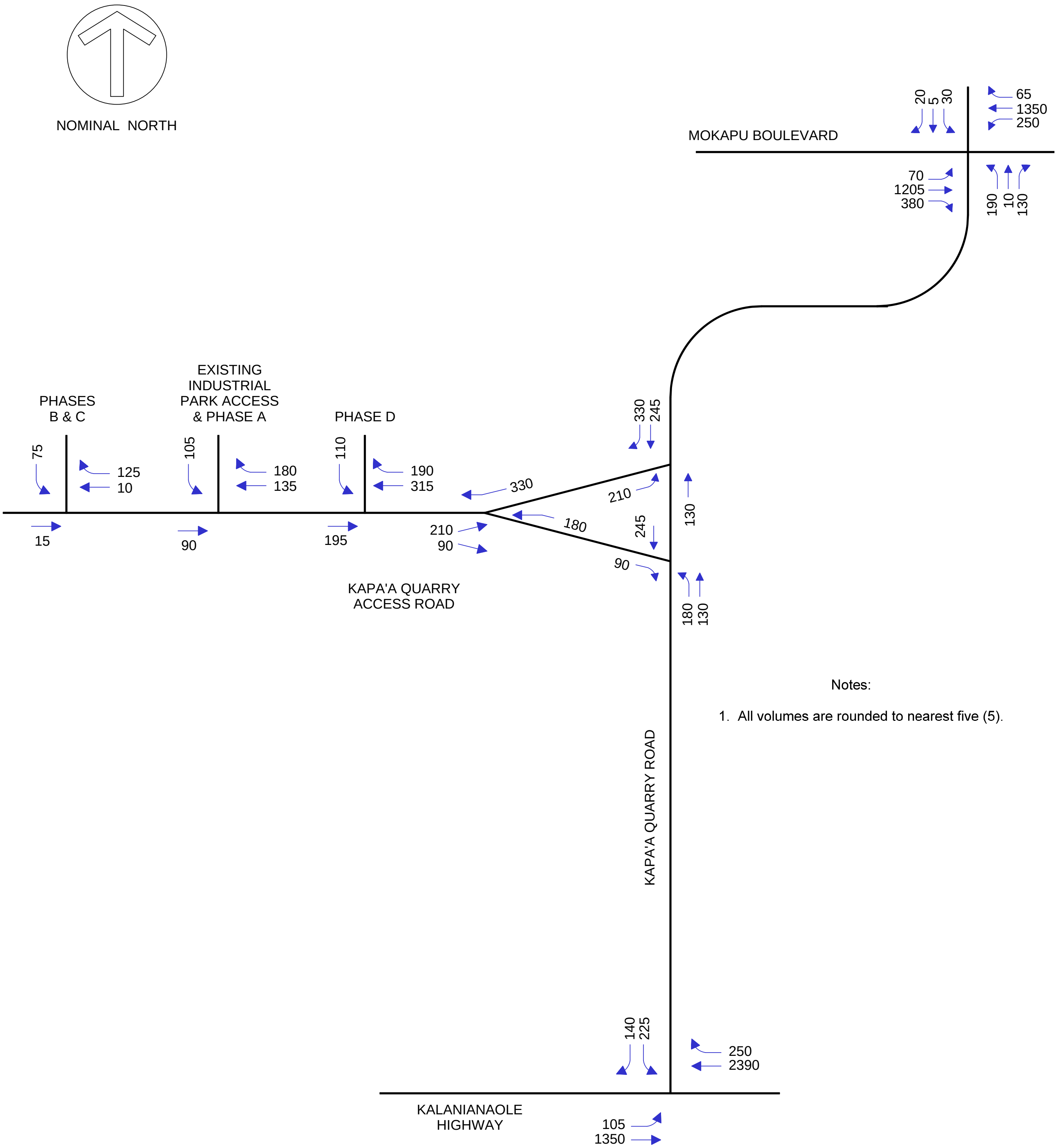
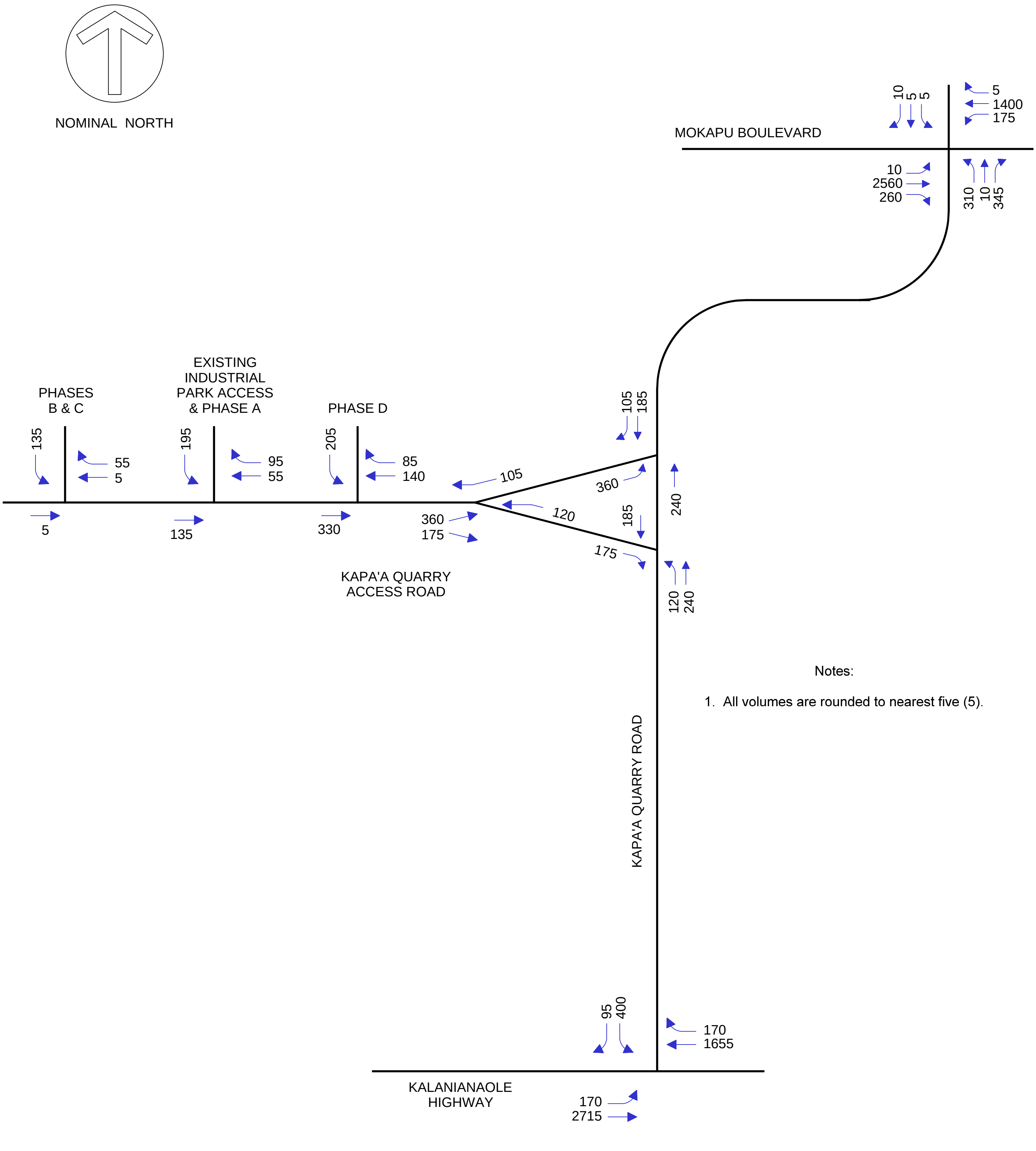


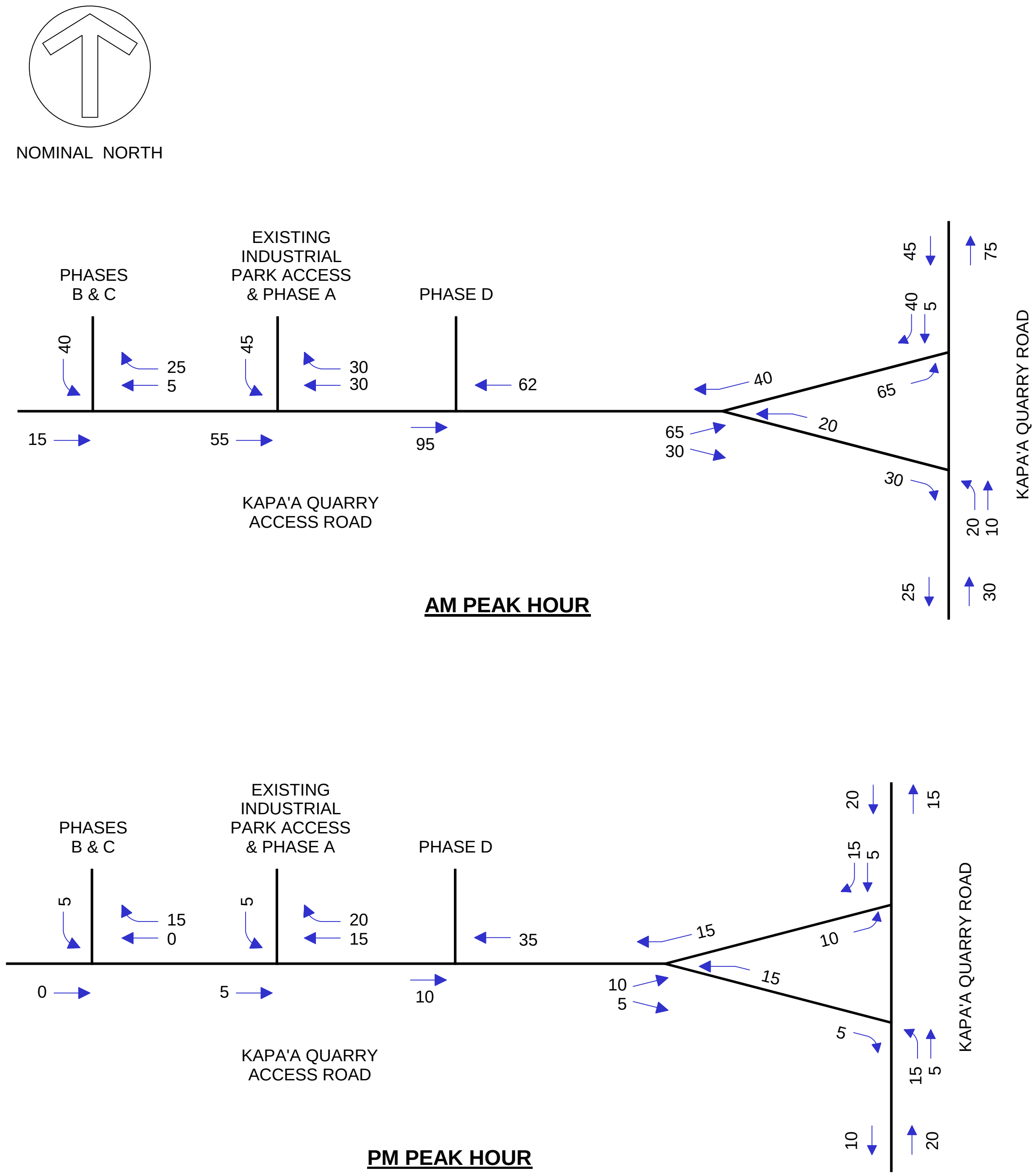
Figure 23
2026 BACKGROUND PLUS PROJECT AM PEAK HOUR PROJECT TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

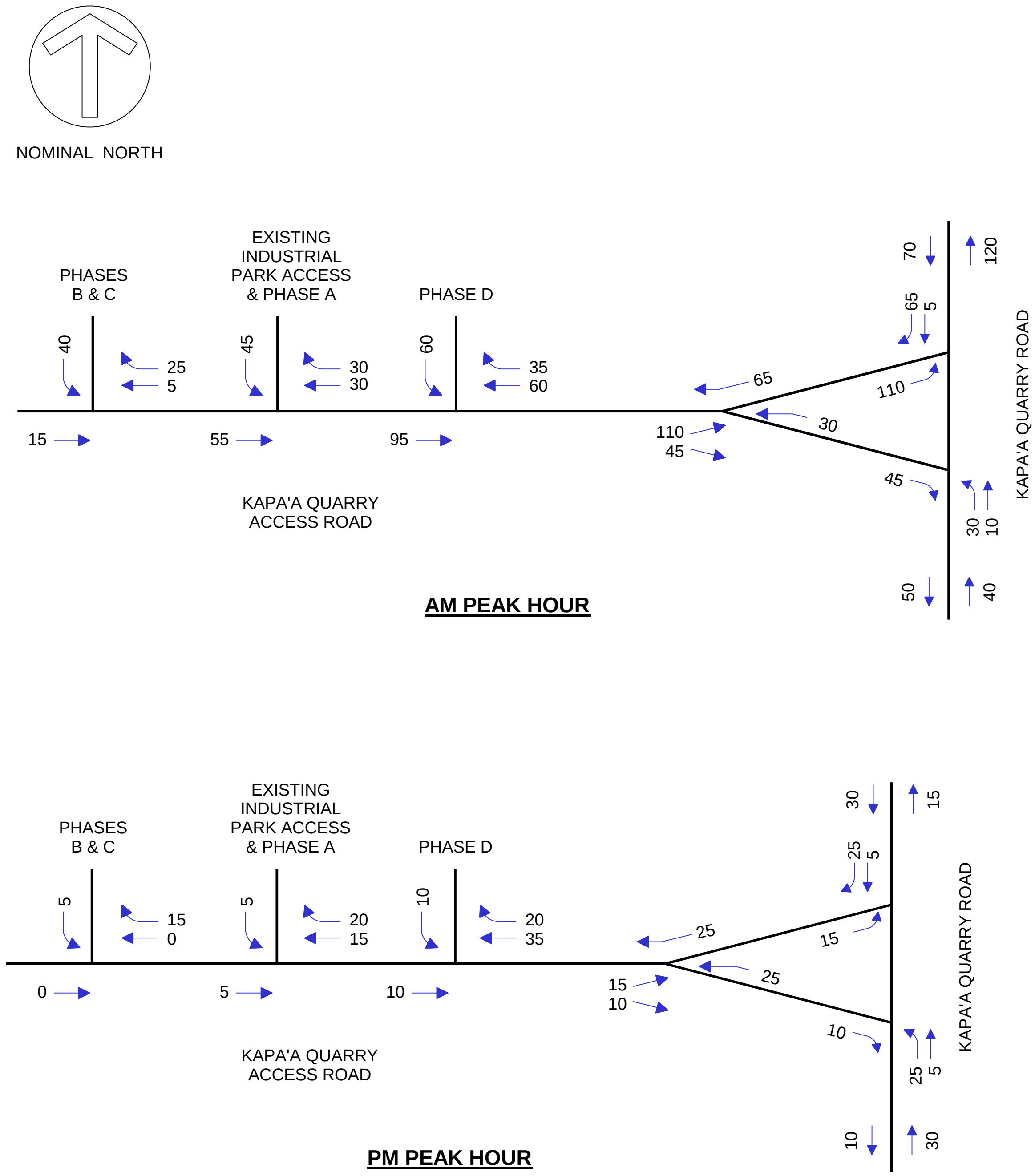
Figure 24
2026 BACKGROUND PLUS PROJECT PM PEAK HOUR PROJECT TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

Figure 25
2016 BACKGROUND PLUS PROJECT HEAVY VEHICLES PEAK HOUR TRAFFIC PROJECTIONS



Notes:

1. All volumes are rounded to nearest five (5).

Figure 26
2026 BACKGROUND PLUS PROJECT HEAVY VEHICLES PEAK HOUR TRAFFIC PROJECTIONS

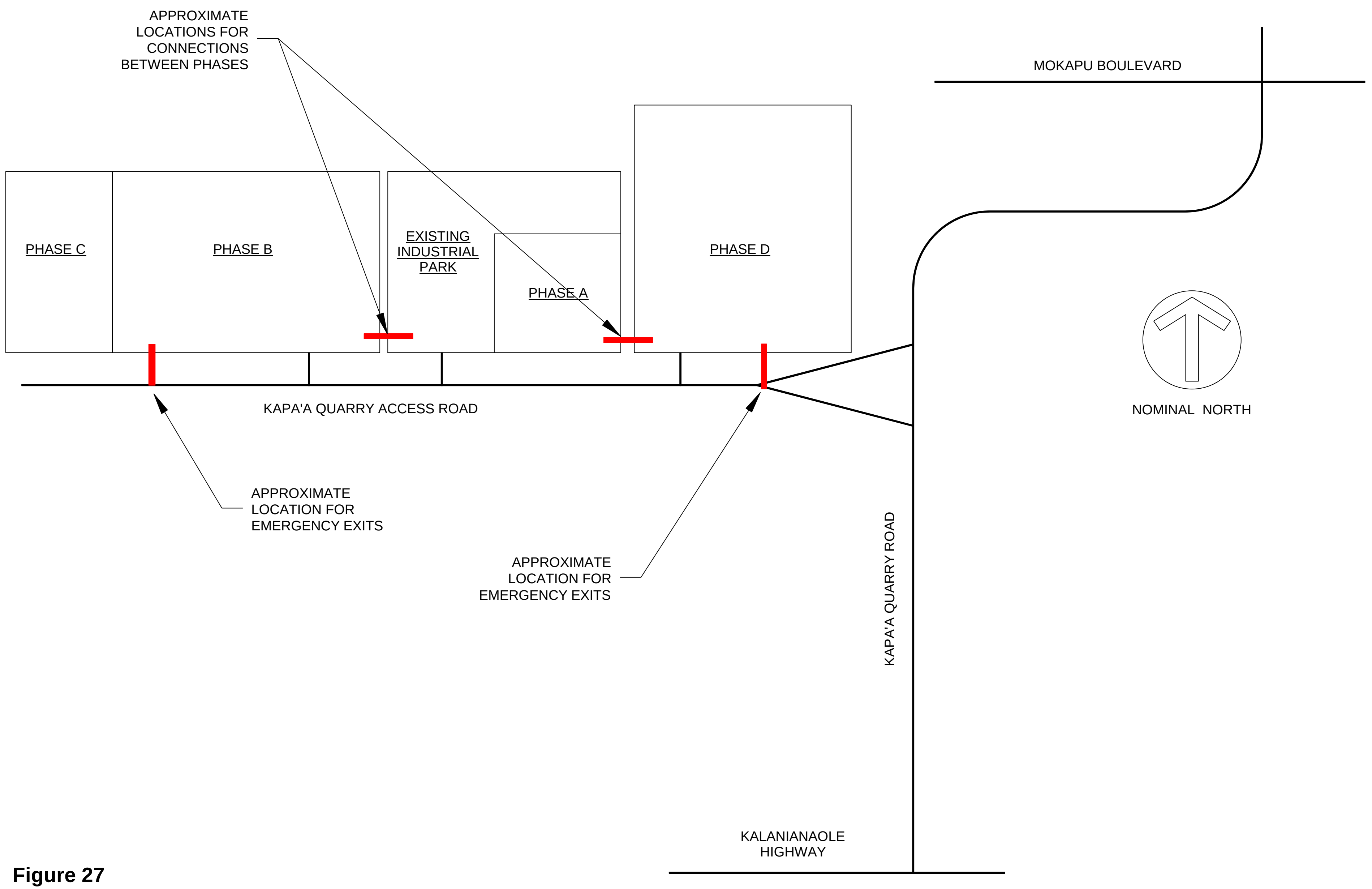


Figure 27
APPROXIIMATE LOCATIONS FOR INTERNAL CONNECTIONS

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Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 6:

Sight Distance Assessment Study

Appendix 1 contains changes from Appendix 1 of DEIS

September 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

Appendix 6 - Contains revisions as indicated in the text

APPENDIX 6 - Sight Distance Analysis

This sight distance analysis is performed for the three driveways of the proposed industrial development. All three driveways of the proposed development connect the interior roadways with the Kapa'a Quarry Access Road.

The relevant sight distance criterion for the driveways of the proposed development is for intersections with stop sign control. The vehicles stopped at the driveways must have sufficient sight distance to permit a safe departure.

Approach:

Departure sight triangles are developed for the three driveways. The graphical depiction of the sight distance triangles is used to determine any possible obstructions for all possible maneuvers from the driveways.

The design speed for vehicles on the Kapa'a Quarry Access Road is 25 mph (compare Table 8 of the Traffic Impact Assessment Report).

Figure SDA-1 illustrates the two type of maneuvers that need to be considered for the driveways.

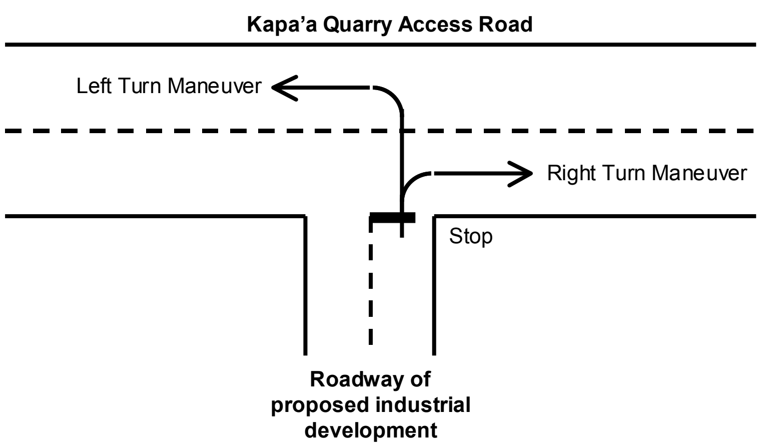


Figure SDA-1: Two types of maneuvers at driveways of proposed development

<u>Turning left into Kapa'a Quarry Access Road:</u>

As illustrated in Figure SDA-1 the left turn maneuver requires the clearing of the traffic on the left and then entering the traffic stream on the right of the quarry access road in the direction of the Kapa'a Quarry Road. The required sight distance for the left turn maneuver is determined by the time it takes for the stopped vehicles to turn left, clearing the traffic from the left, and reach design running speed while avoiding to affect the speed of the approaching vehicle. For the design speed of 25 mph and according to the AASTHO "Green Book" ([1]) the recommended sight distance for this maneuver is 280 feet.

Turning right into Kapa'a Quarry Access Road:

As illustrated in Figure SDA-1 the right turn maneuver requires sufficient sight distance to permit entrance into the quarry access road and then accelerate to the design speed, while avoiding to affect the speed of the approaching vehicle. For the design speed of 25 mph and according to the AASTHO "Green Book" the recommended sight distance for this maneuver is 240 feet.

The geometry of the three driveways should be such that there are no obstructions blocking the view from the stopped car to the approaching traffic within the range of the recommended sight distance.

Description of Traffic Situation at Driveways and Findings:

Figure SDA-2 shows an overview of the proposed site and the location of the three driveways for which the sight distance analysis is carried out. The proposed site consists of the upper and lower portion. The upper portion of the proposed site is served by two driveways, Driveways No.1 and No. 2. The lower portion is served by one drive way, Driveway No. 3, for regular traffic and one auxiliary driveway that would be reserved for emergency vehicles (e.g. fire trucks, police and ambulances). No sight distance analysis is performed for the auxiliary driveway.

Figure SDA-3 provides more details of the Driveways No. 1 and No. 2, which serve the upper portion of the proposed site.

Driveway No. 1 is an existing driveway that connects existing warehouses with the quarry road. Driveway No. 1 would be modified for the proposed development and would connect the proposed warehouses of development Phases B and C with the quarry access road. Under the proposed design approach a vertical retaining wall would be constructed between the closest new warehouse and the roadway of Driveway No. 1. The retaining wall is flared at the junction with the quarry road in order to improve adequate sight distance.

Driveway No. 2 is an existing driveway that connects existing warehouses with the quarry road. For the proposed development Driveway No. 2 would be kept in the existing form or would only have minor modifications. The Driveway would connect proposed warehouses of Development Phase A with the quarry access road.

[1] AASHTO GREEN BOOK - A Policy on Geometric Design of Highways and Streets American Association of State and Highway Transportation Officials

Figure SDA-4 provides more details of Driveway No. 3 and the auxiliary driveway, which serve the lower portion of the proposed site.

Driveway No. 3 would be a new driveway that would connect all warehouses of development Phase D, in the lower portion of the proposed site, with the quarry access road. There are trees along the quarry access road on both sides of Driveway No. 3. The trees belong to the extensive vegetative buffer zones around the lower portion of the proposed site.

The auxiliary drive way would be a new driveway. This driveway would not be available for regular traffic but would be reserved for emergency vehicles. No sight distance analysis is performed for this auxiliary driveway.

Figure~~s~~ SDA-5 ~~and SDA-6~~ shows ~~show~~ the planned layout of and possible sight obstructions at Driveway No.1. The driveway is controlled by a stop sign for traffic leaving the proposed industrial warehouse development. Because of the sight obstruction caused by the vertical retaining wall along the mauka side of the internal roadway leading to Driveway 1, the stop sign bar (line) is placed as close to the intersecting Kapa'a Quarry Access Road as possible. ~~The crosswalk crossing the internal roadway is therefore moved back from the quarry access road.~~ Possible sight obstructions on the makai side of Driveway No. 1 are due to trees that would be planted along the quarry access road.

Note: Figures SDA-5 is revised in accordance with the comments received from the City & County of Honolulu, Dept. of Transportation Services. Figures SDA-6 is deleted.

Figure SDA-7 shows the departure sight triangle for the left-turn maneuver from Driveway No. 1. The location of the observer in the departing vehicle is located 10 feet back from the stop bar. The retaining wall does not represent a sight obstruction for the recommended sight distance of 280 feet. Therefore sight distance for the left-turn maneuver is adequate.

Note: Figures SDA-7 is revised with new Driveway No. 1 configuration.

Figure SDA-8 shows the departure sight triangle for the right-turn maneuver from Driveway No. 1. The location of the observer in the departing vehicle is located 10 feet back from the stop bar. The trees do not represent a sight obstruction and there are no other sight obstructions for the recommended sight distance of 240 feet. Therefore sight distance for the right-turn maneuver is adequate.

Note: Figures SDA-8 is revised with new Driveway No. 1 configuration.

Figures SDA-9 and SDA-10 show the planned layout of and possible sight obstructions at Driveway No.2. The driveway is controlled by a stop sign for traffic leaving the proposed industrial warehouse development. A crosswalk across Driveway No. 2 connects sidewalks along quarry access road. The stop bar (line) is about 3 feet back from the crosswalk. Possible sight obstructions on the mauka and makai sides of Driveway No. 2 are due to trees that would be planted along the quarry access road. Buildings or other permanent structures would be recessed by a considerable distance from the quarry access road and would therefore not represent sight obstructions.

Figure SDA-11 shows the departure sight triangle for the left-turn maneuver from Driveway No. 2. The location of the observer in the departing vehicle is located 10 feet back from the stop bar.

The trees on the mauka side of Driveway No. 2 would be planted and maintained in such a way that they do not represent a sight obstruction for the recommended sight distance of 280 feet. Therefore sight distance for the left-turn maneuver is adequate.

Figure SDA-12 shows the departure sight triangle for the right-turn maneuver from Driveway No. 2. The location of the observer in the departing vehicle is located 10 feet back from the stop bar. The trees on the makai side of Driveway No. 2 would be planted and maintained in such a way that they do not represent a sight obstruction for the recommended sight distance of 240 feet. Therefore sight distance for the right-turn maneuver is adequate.

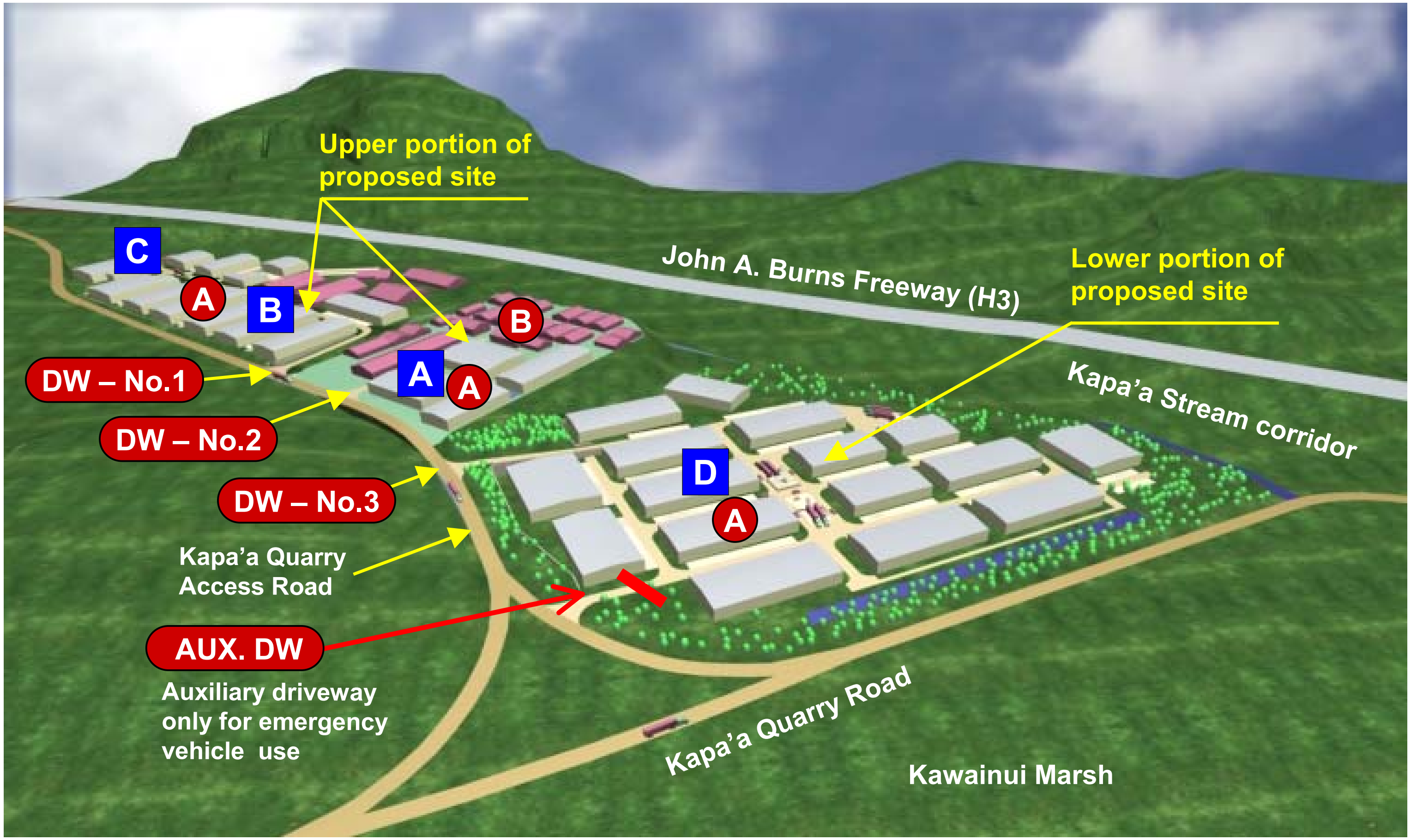
Figures SDA-13 and SDA-14 show the planned layout of and possible sight obstructions at Driveway No.3. The driveway is controlled by a stop sign for traffic leaving the proposed industrial warehouse development. A crosswalk across Driveway No. 3 connects sidewalks along quarry access road. The stop bar (line) is about 3 feet back from the crosswalk. Possible sight obstructions on the mauka and makai sides of Driveway No. 3 are due to trees that would be planted along the quarry access road as part of the dense vegetative buffer zone around the lower portion of the proposed site. Buildings or other permanent structures on the mauka side of Driveway No. 3 would be recessed from the quarry access road by a considerable distance. On the makai side of Driveway No. 3 there are no permanent structures close to the quarry access road that could represent a sight obstruction.

Figure SDA-15 shows the departure sight triangle for the left-turn maneuver from Driveway No. 3. The location of the observer in the departing vehicle is located 10 feet back from the stop bar. The trees on the mauka side of Driveway No. 3 would be planted and maintained in such a way that they do not represent a sight obstruction for the recommended sight distance of 280 feet. Therefore sight distance for the left-turn maneuver is adequate.

Figure SDA-16 shows the departure sight triangle for the right-turn maneuver from Driveway No. 3. The location of the observer in the departing vehicle is located 10 feet back from the stop bar. The trees on the makai side of Driveway No. 2 would be planted and maintained in such a way that they do not represent a sight obstruction for the recommended sight distance of 240 feet. Therefore sight distance for the right-turn maneuver is adequate.

Conclusions:

All sight distances for right-turn and left-turn maneuvers at the three driveways, Driveways No. 1, No. 2 and No. 3, would be adequate, considering the layout of the driveway, roadways as well as buildings, structures and vegetation adjacent to the driveways presented in this sight distance analysis.



A New Warehouses (GREY image; typical)

B Existing Warehouses (RED image; typical)

DW – No.x Driveways (DW) of proposed industrial development; numbers indicated

X Development phase of proposed development schedule

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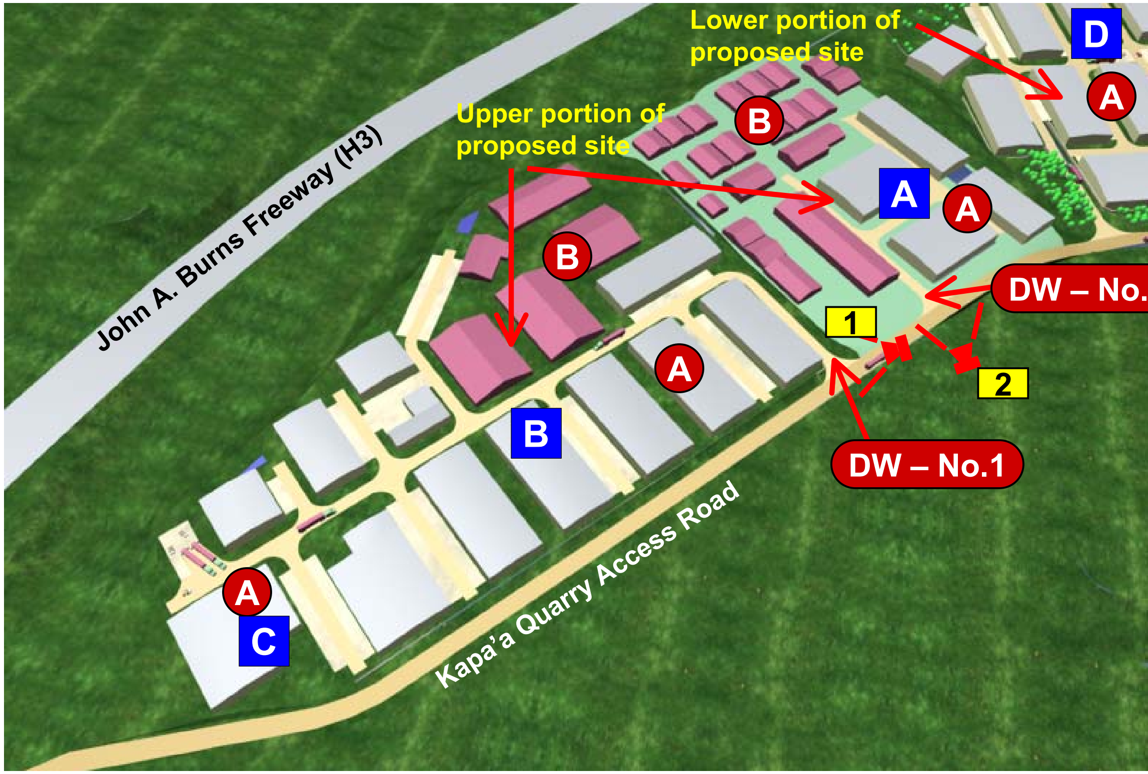
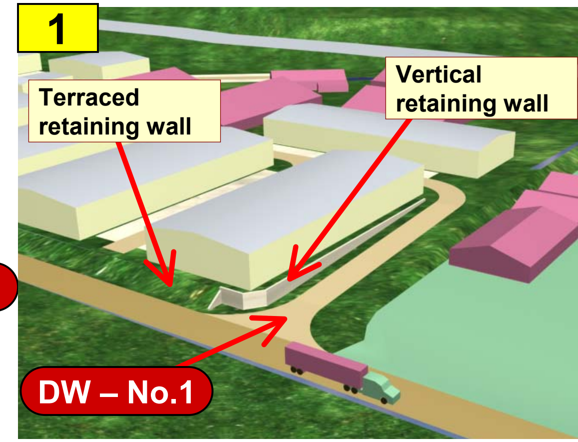
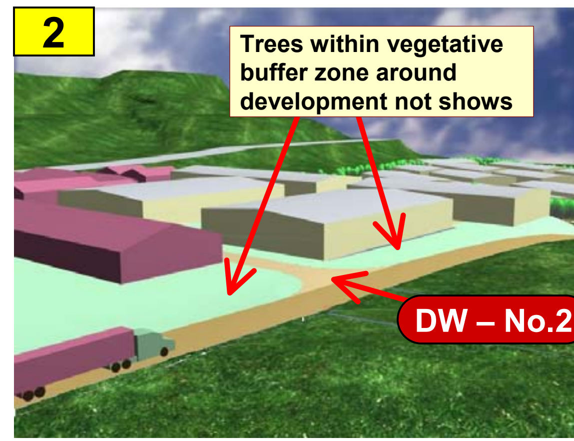
Consulting Civil Structural Environmental & Ocean Engineers
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-2 Overview of proposed site; driveway numbering for sightseeing analysis





Driveway No. 1: Details



Driveway No. 2: Details

A New Warehouses (GREY image; typical)

B Existing Warehouses (RED image; typical)

X Development phase of proposed development schedule

DW – No.x Driveways (DW) of proposed industrial development; numbers indicated

x Direction of view for corresponding picture

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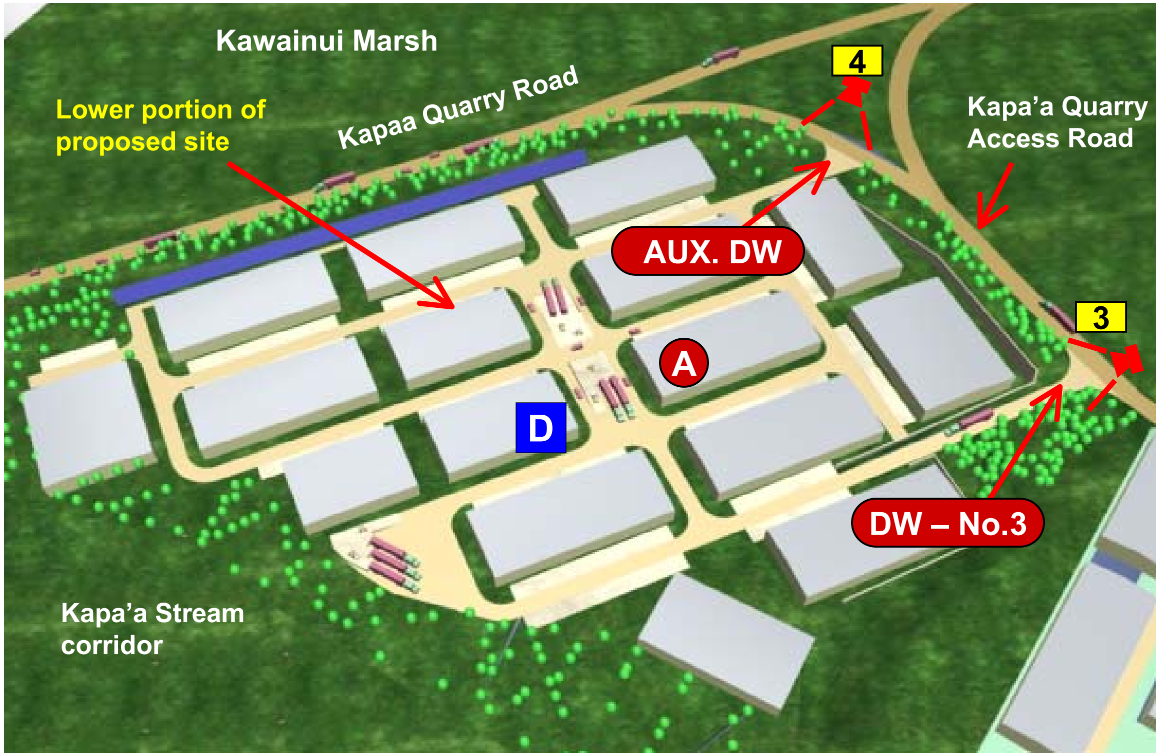
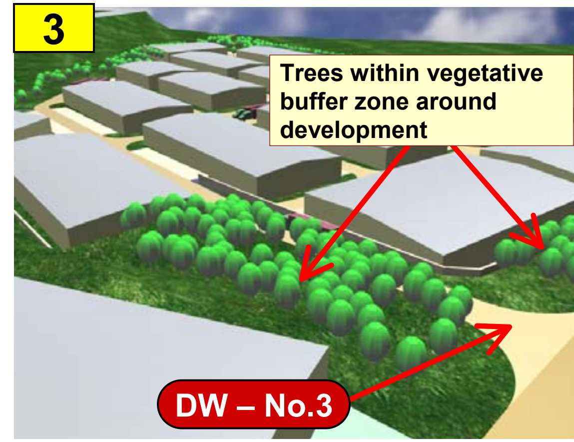
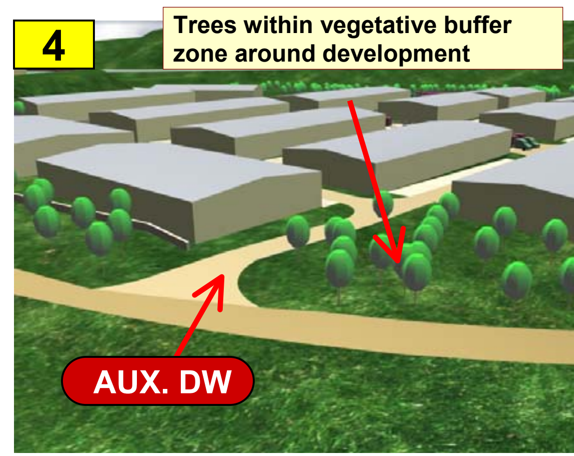
Figure SDA-3 Driveways serving the upper portion of the proposed site





Driveway No. 3: Details



Auxiliary Driveway : Details, this driveway is only used for emergency vehicles and not for regular traffic

A New Warehouse (GREY image; typical)

X Development phase of proposed development schedule

DW – No.x Driveways (DW) of proposed industrial development; numbers indicated

x Direction of view for corresponding picture

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Consulting Civil Structural Environmental & Ocean Engineers
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-4 Driveways serving the lower portion of the proposed site

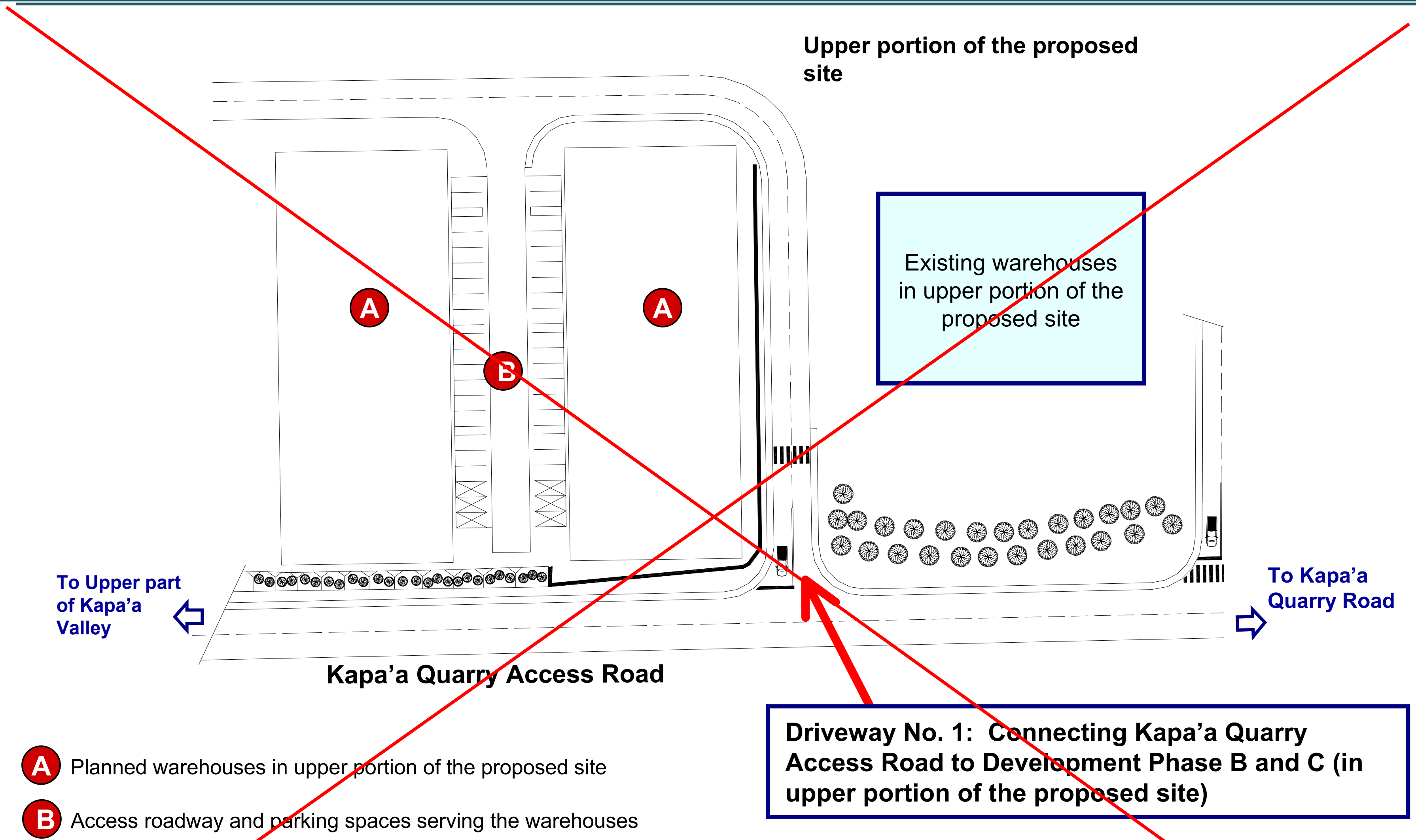

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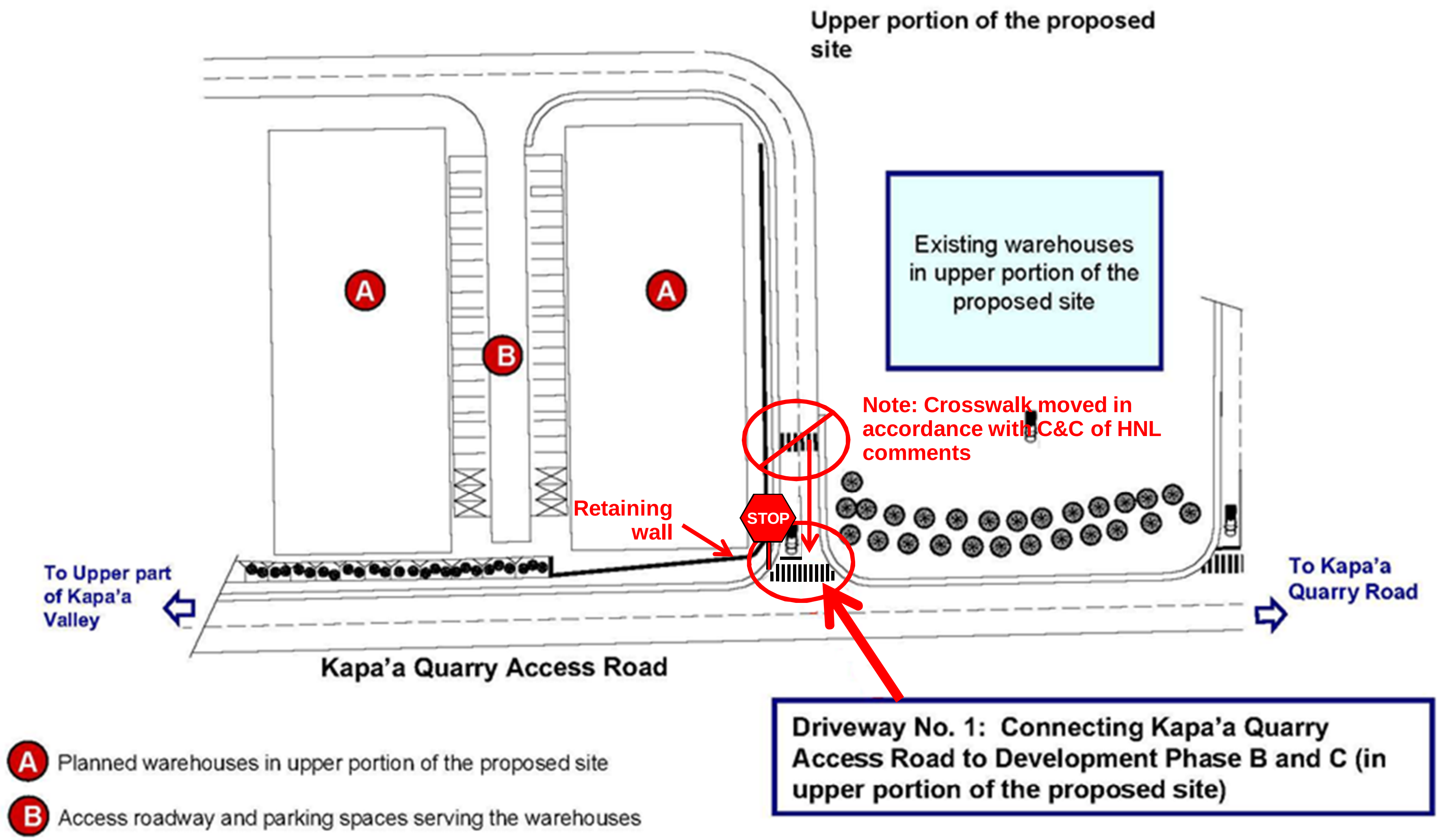
Figure SDA-5 Layout of Driveway No. 1



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Revised Figure SDA-5 Revised Layout of Driveway No. 1

~~Figure SDA-5 Layout of Driveway No. 1~~

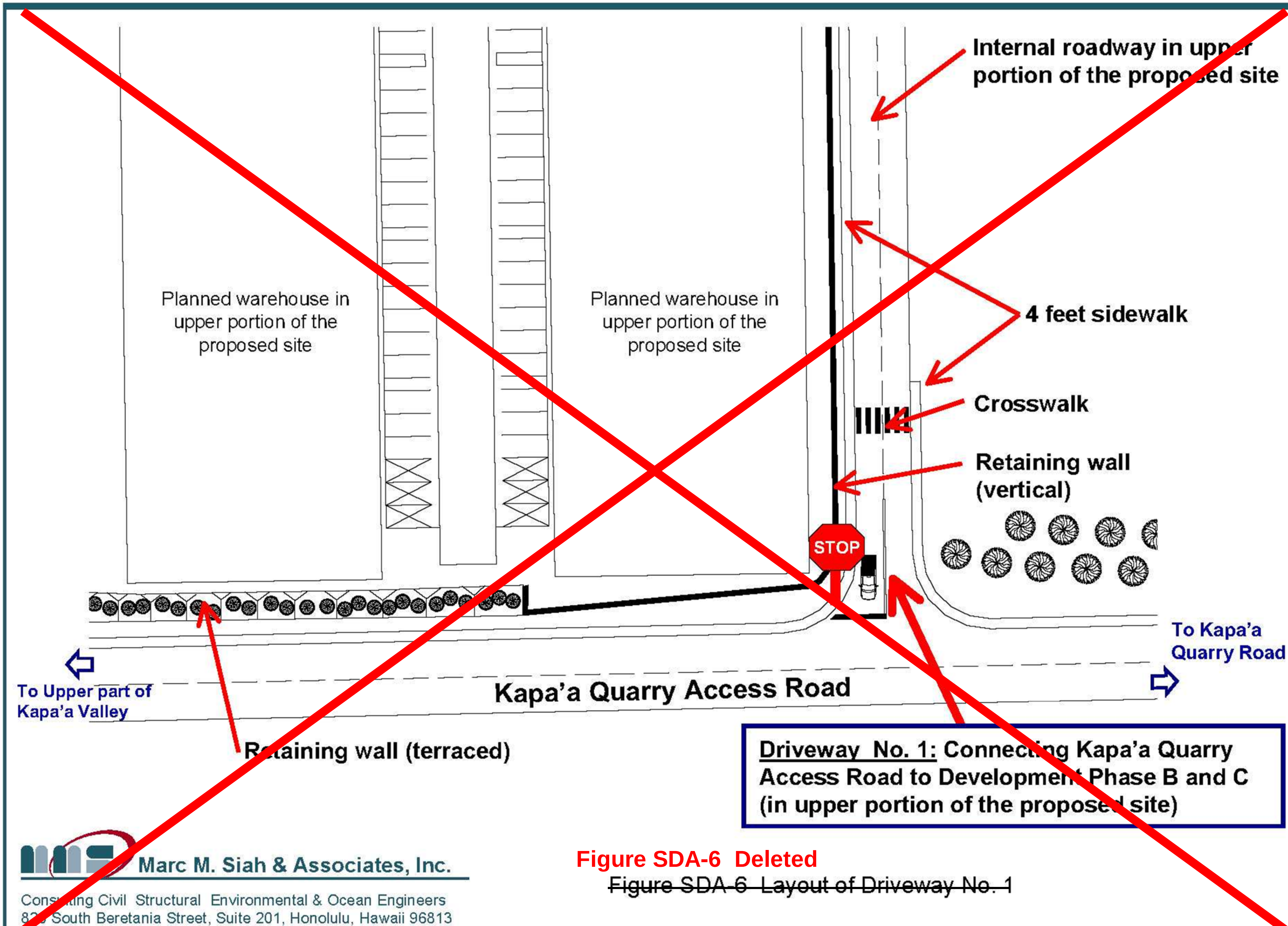
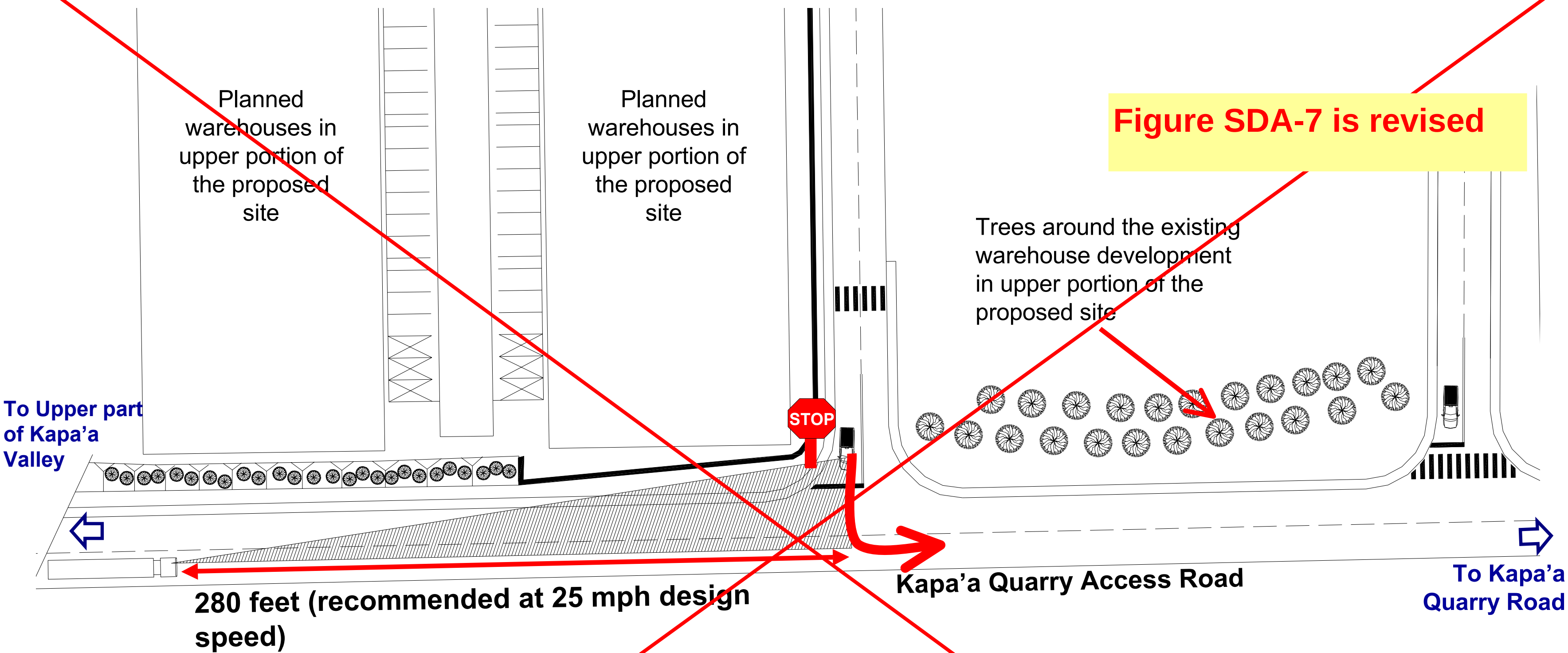


Figure SDA-6 Deleted

~~Figure SDA-6 Layout of Driveway No. 1~~

Figure SDA-7 is revised



Recommended sight distance for left-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for left turn is **adequate**

Driveway No. 1: **Sight Distance Analysis for proposed development– Left turn departure from driveway with stop sign control**

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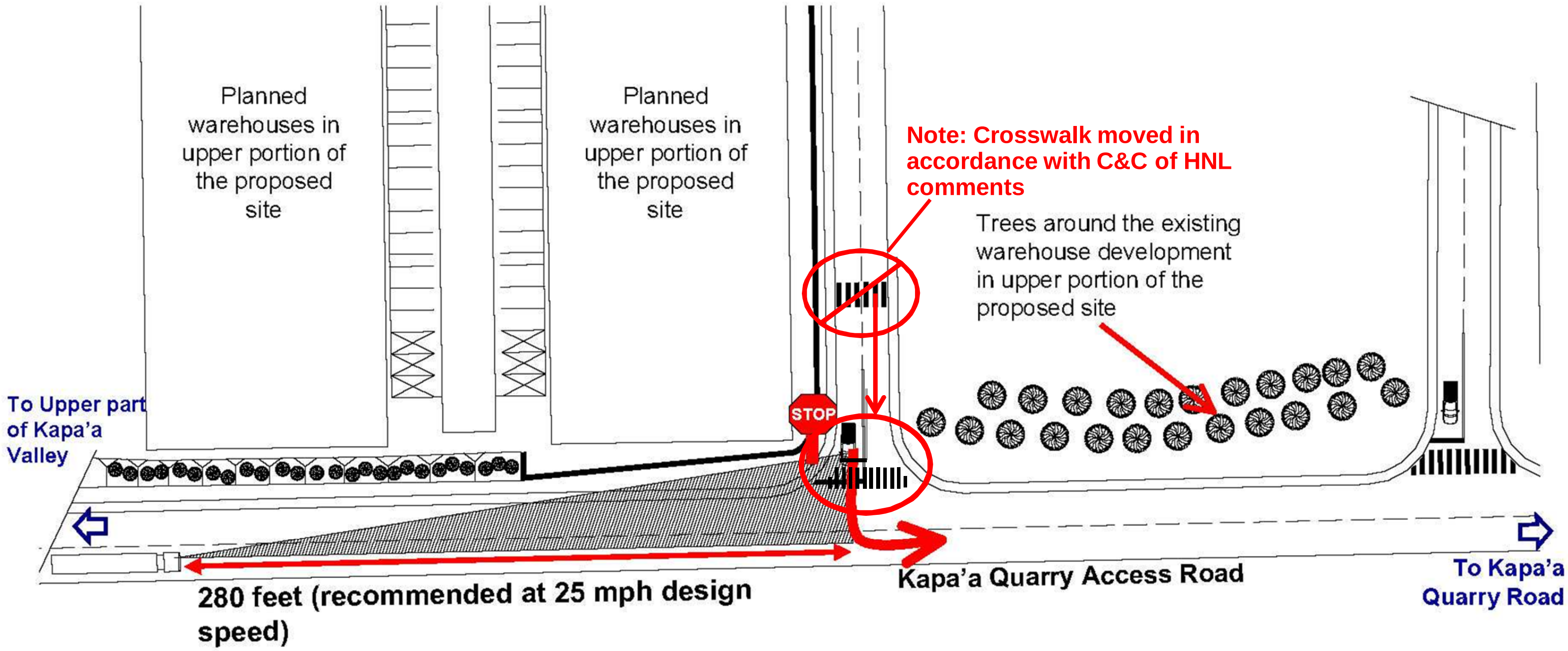
Figure SDA-7 Site Distance Analysis for Driveway No. 1; left turn departure from proposed site



Recommended sight distance for left-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for left turn is **adequate**

Driveway No. 1: Sight Distance Analysis for proposed development– Left turn departure from driveway with stop sign control

Revised Figure SDA-7 Sight Distance Analysis for Driveway No. 1; left turn departure from proposed site

~~Figure SDA-7 Site Distance Analysis for Driveway No. 1; left turn departure from proposed site~~

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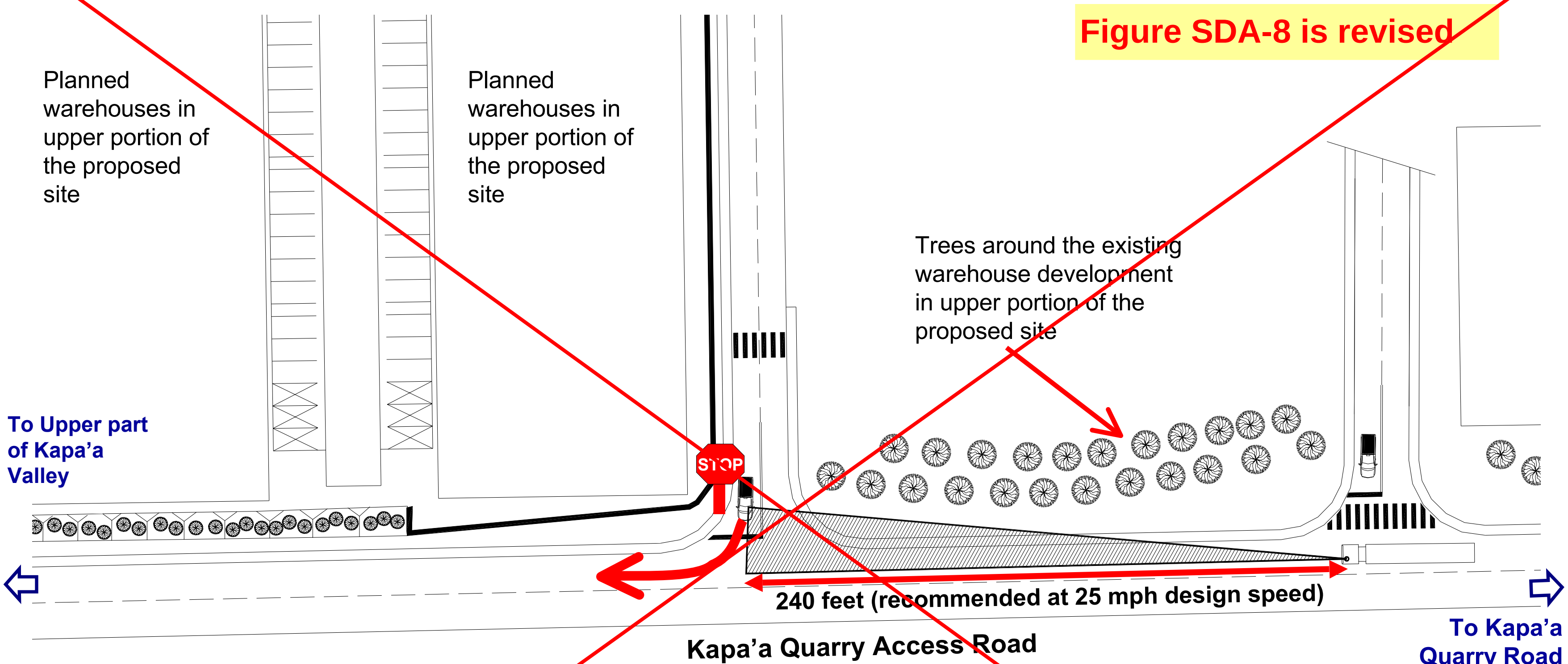

Recommended sight distance for right-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for right turn is **adequate**

Driveway No. 1: **Sight Distance Analysis for proposed development– Right turn departure from driveway with stop sign control**

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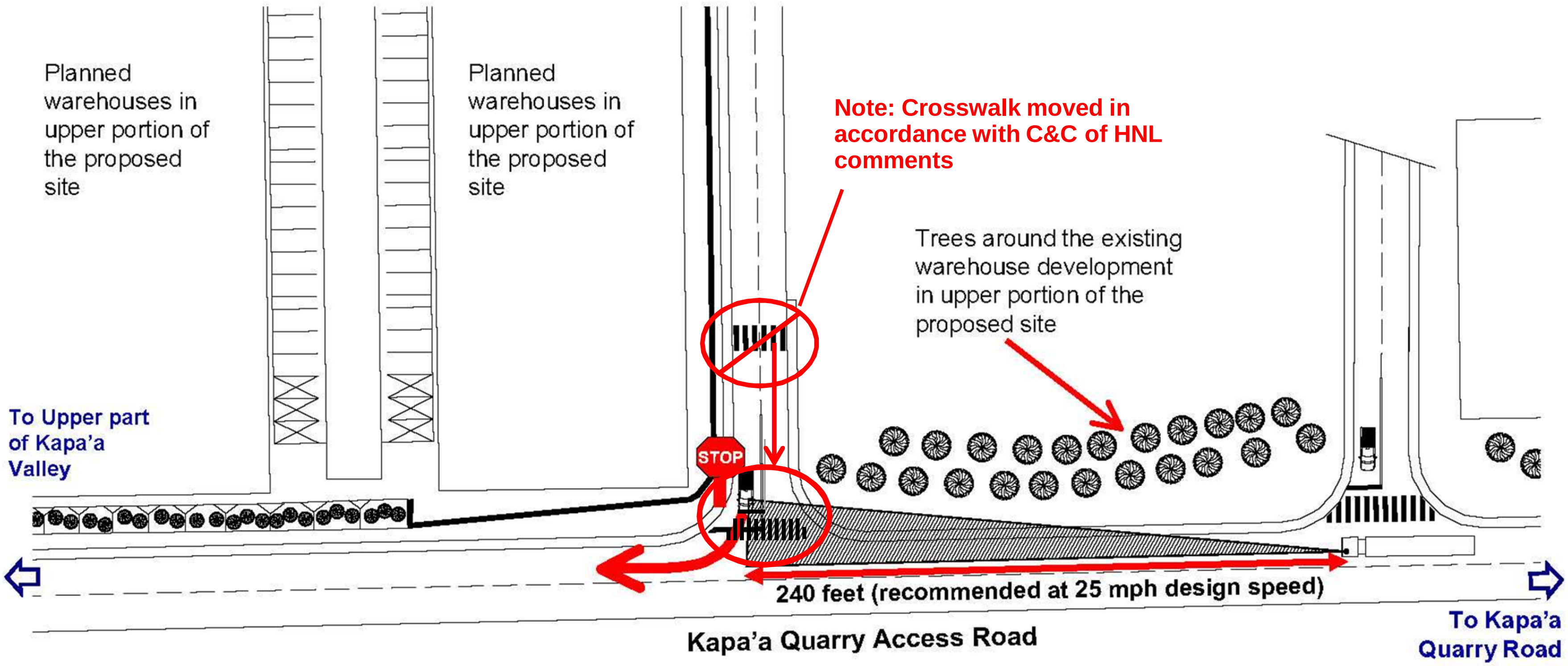
Consulting Civil Structural Environmental & Ocean Engineers
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-8 Site Distance Analysis for Driveway No. 1; right turn departure from proposed site



Recommended sight distance for right-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for right turn is **adequate**

Driveway No. 1: Sight Distance Analysis for proposed development– Right turn departure from driveway with stop sign control

Revised Figure SDA-8 Sight Distance Analysis for Driveway No. 1; right turn departure from proposed site

~~Figure SDA-8 Site Distance Analysis for Driveway No. 1; right turn departure from proposed site~~

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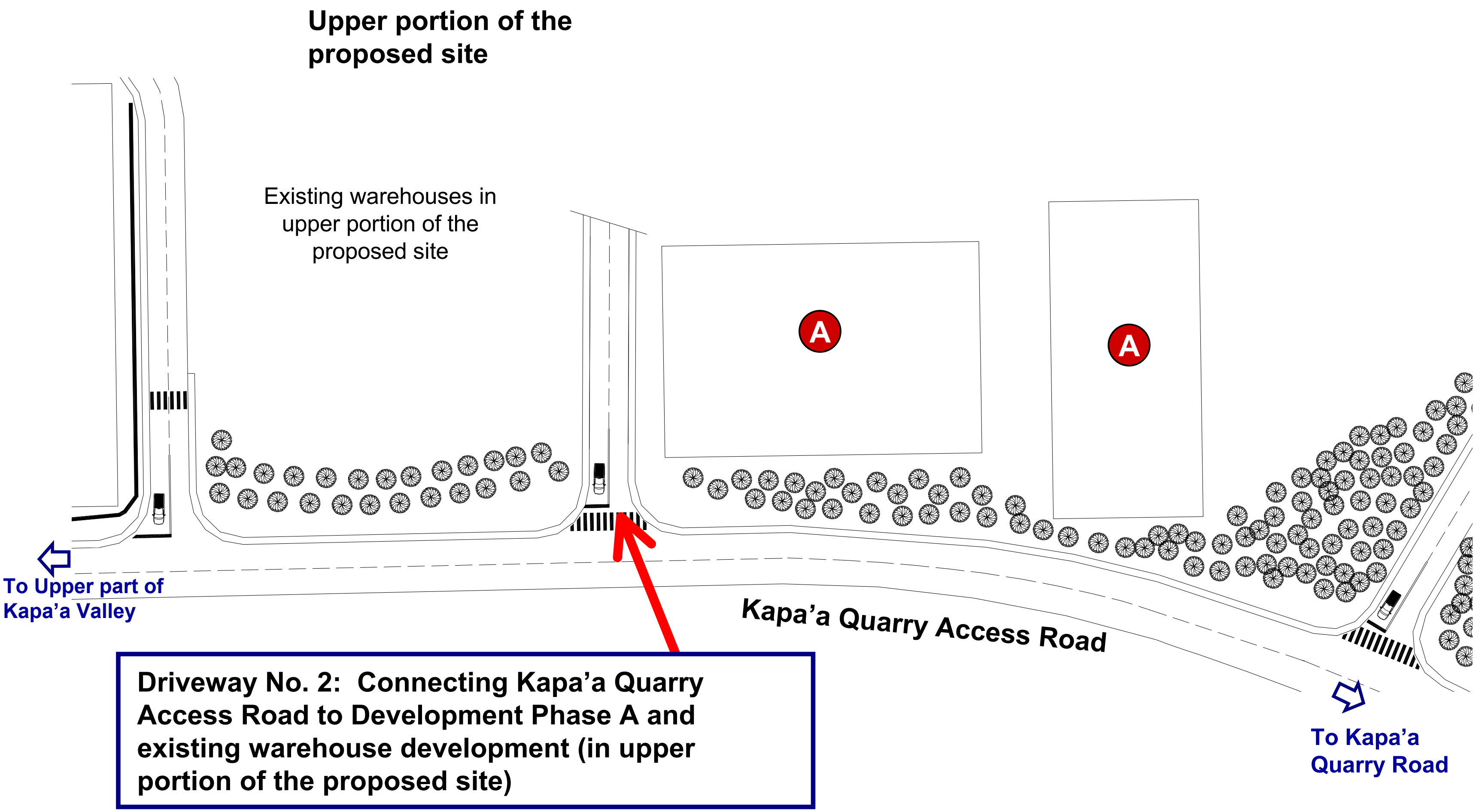
Consulting Civil Structural Environmental & Ocean Engineers
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813



A Planned warehouses in upper portion of the proposed site

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820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-9 Layout of Driveway No. 2

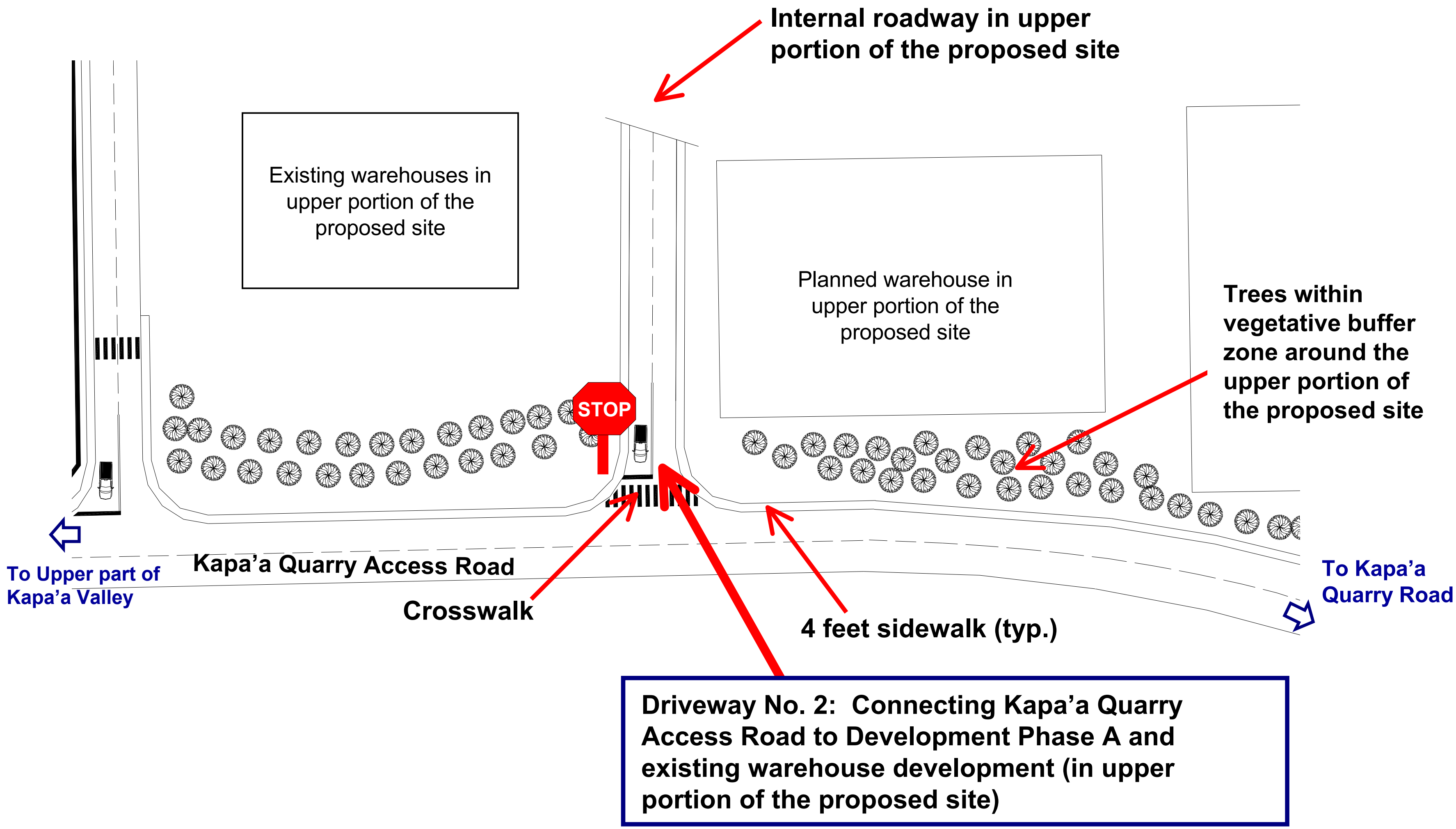

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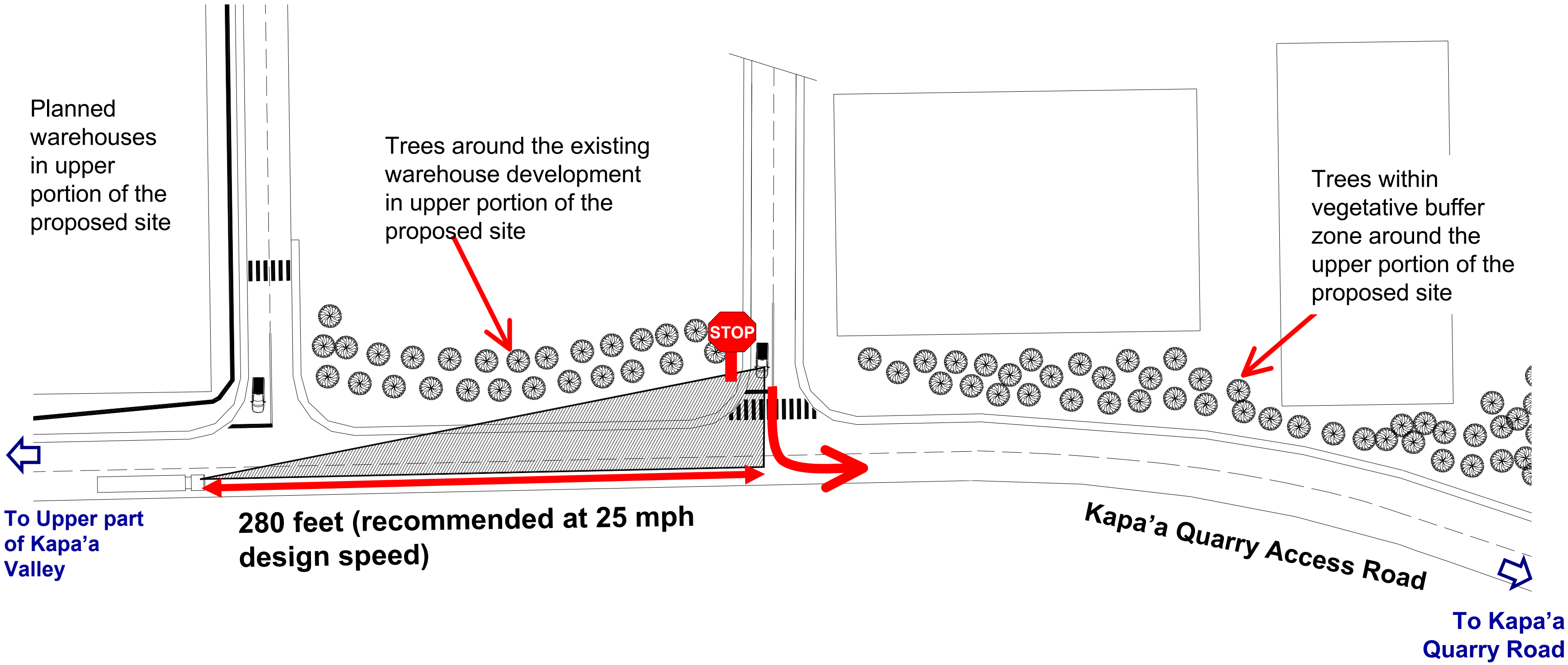
Figure SDA-10 Layout of Driveway No. 2



Recommended sight distance for left-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for left turn is **adequate**

Driveway No. 2: Sight Distance Analysis for proposed development - Left turn departure from driveway with stop sign control

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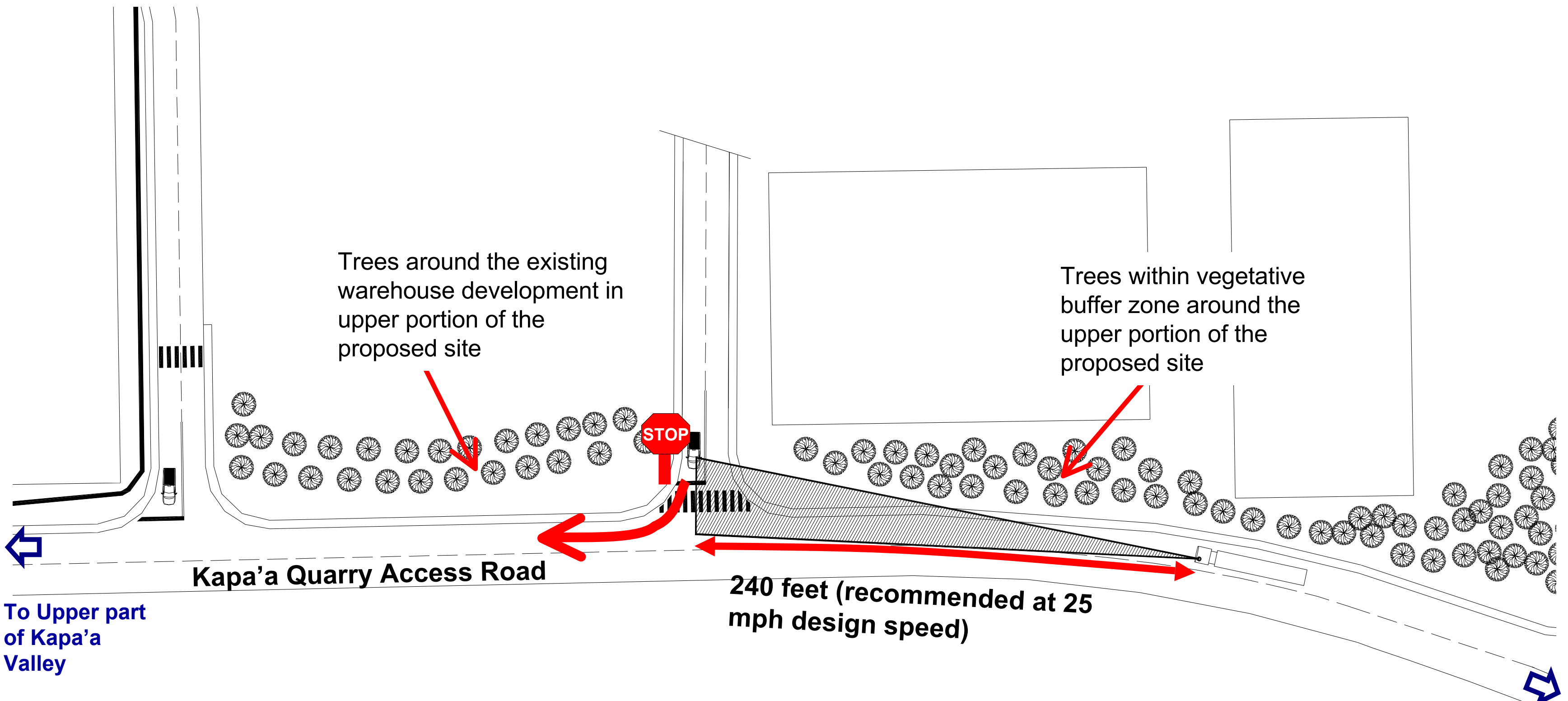
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-11 Site Distance Analysis for Driveway No. 2; left turn departure from proposed site



Recommended sight distance for right-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for right turn is **adequate**

Driveway No. 2: Sight Distance Analysis for proposed development–Right turn departure from driveway with stop sign control

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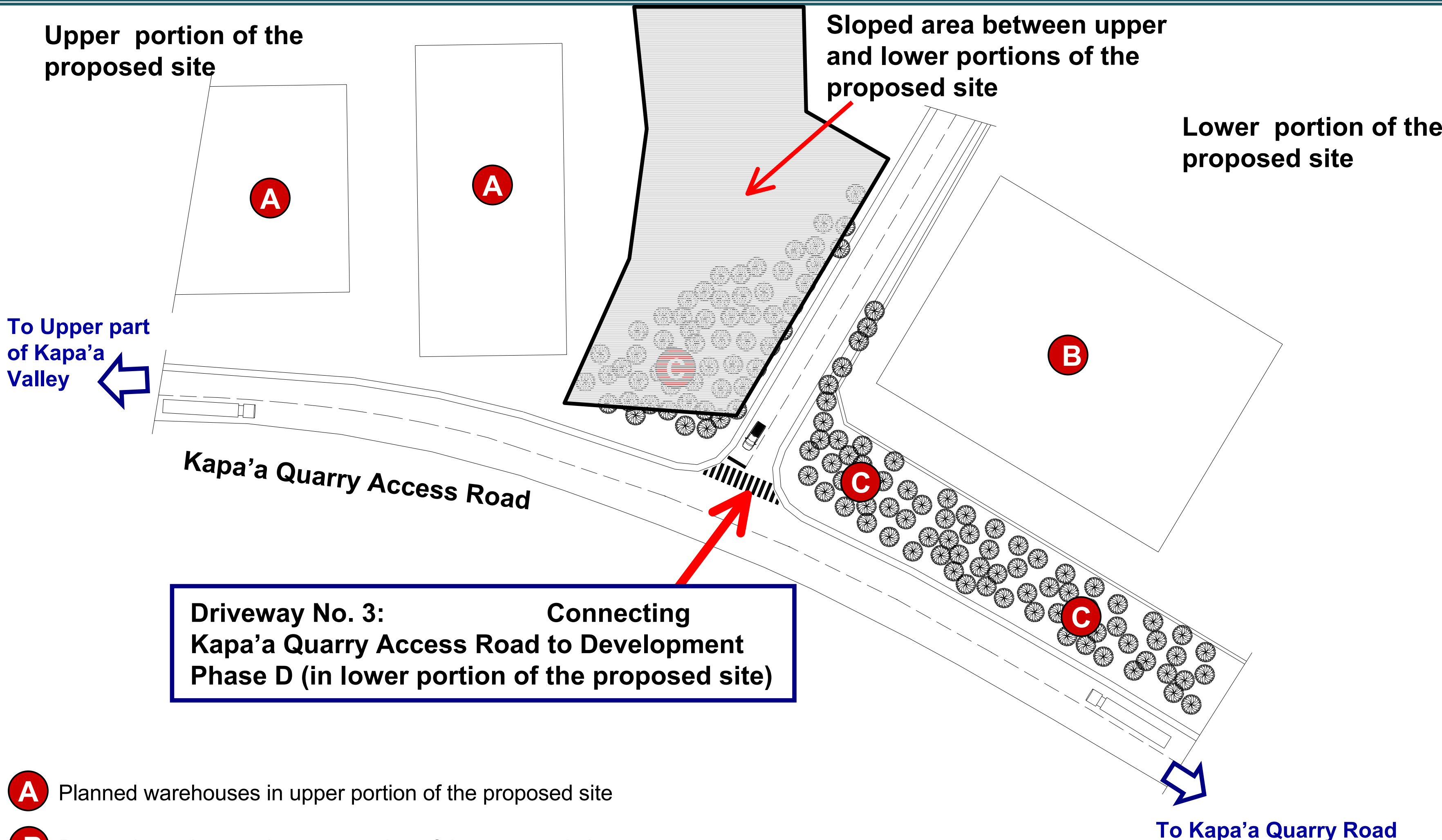
Figure SDA-12 Site Distance Analysis for Driveway No. 2; right turn departure from proposed site



A Planned warehouses in upper portion of the proposed site

B Planned warehouses in lower portion of the proposed site

C Trees belonging to vegetative buffer zone around lower portion of site

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820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-13 Layout of Driveway No. 3

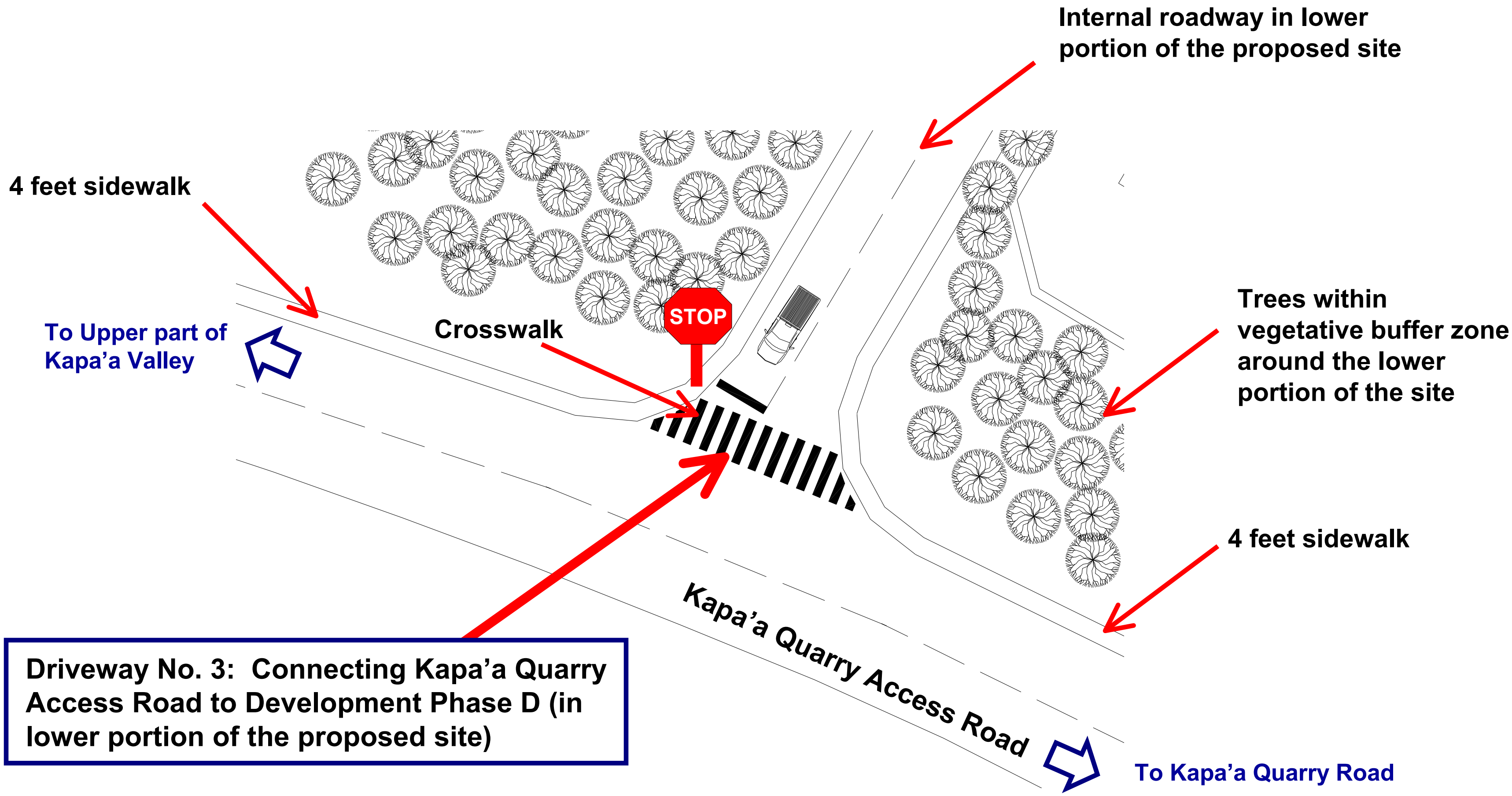

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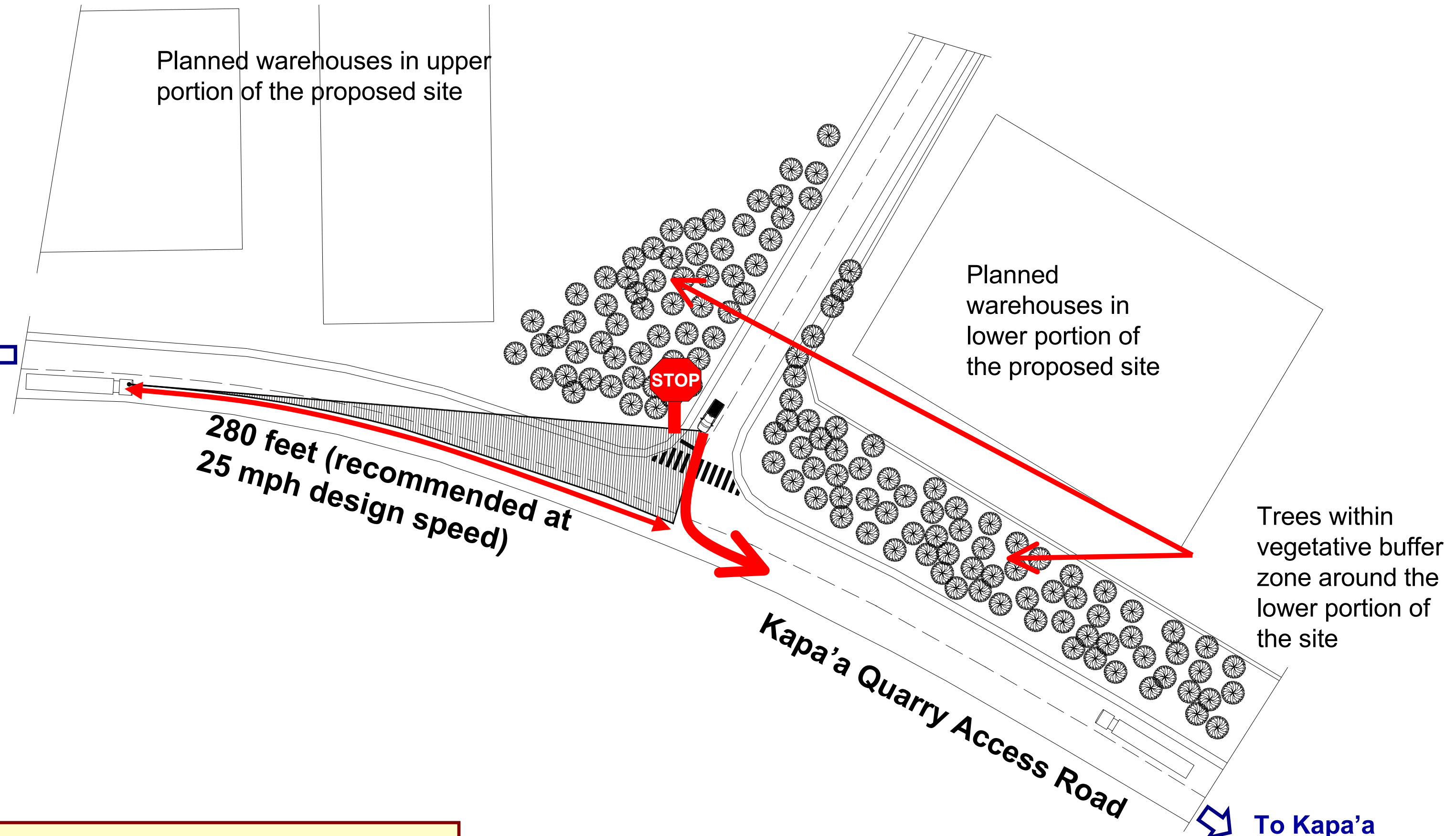
Figure SDA-14 Layout of Driveway No. 3



Recommended sight distance for left-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for left turn is **adequate**

Driveway No. 3: Sight Distance Analysis for proposed development– Left turn departure from driveway with stop sign control

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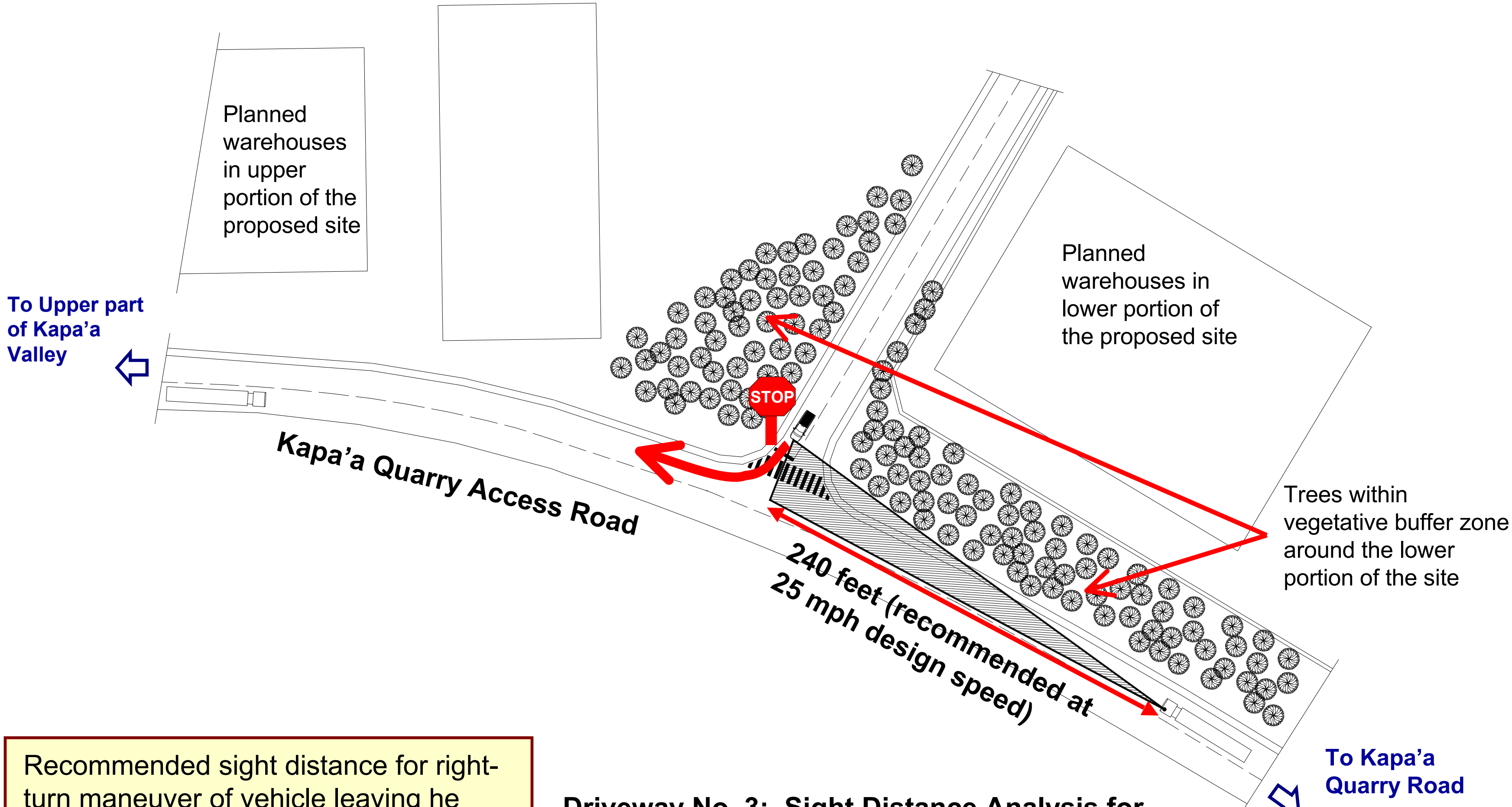
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-15 Site Distance Analysis for Driveway No. 3; left turn departure from proposed site



Recommended sight distance for right-turn maneuver of vehicle leaving he proposed site is **free of obstructions**; Therefore sight distance for right turn is **adequate**

Driveway No. 3: Sight Distance Analysis for proposed development– Right turn departure from driveway with stop sign control

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Consulting Civil Structural Environmental & Ocean Engineers
820 South Beretania Street, Suite 201, Honolulu, Hawaii 96813

Figure SDA-16 Site Distance Analysis for Driveway No. 3; right turn departure from proposed site

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 7:

Water Resources Assessment for the Project Site

<u>Appendix 7 is identical to Appendix 7 of DEIS</u>

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

APPENDIX 7

Draft Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Water Resources Investigation

Assessment of the existing water resources on the site

and of possible impacts of the proposed project on these resources

Prepared for

Kapaa I, LLC

Prepared by

Sustainable Design & Consulting LLC
www.sustain-HI.com

October 2010

1 Table of Contents

Table of Figures:

1. Introduction:

1.1. Project background:

The proposed Kapa'a Light Industrial Park (KLIP) would be built on three contiguous land parcels, TMK 4-2-15:001 (portion of), 006 and 008. The proposed development requires a zone change for two land parcels TMK 4-2-15:001 (portion of) and 006 from General Preservation (P-2) to Light Industrial (I-1). The land parcel in the center of the proposed site, TMK 4-2-15:008, is already zones as Intensive Industrial (I-2) and therefore does not need to be rezoned. The total area of the three land parcels is 79 acres, of which about 16 acres are developed and impervious land, used for an existing warehouse development of 283,000 square feet, and about 29 acres are developed, graded and pervious land, used for various industrial purposes. The proposed project site is divided into two portions, the upper and a lower portion of the site, with the upper portion, being an about level plateau having an approximately 30 -50 feet higher elevation than the lower portion, which is an area that slightly slopes towards the north. Under the proposed project the size of the developed land area would be 43 acres in which about 606,000 square feet of new warehouse space would be constructed.

Figure WRI-1 shows an aerial view of the project site with the upper and lower portions of the site indicated. As can be seen the upper portion of the site, which encompasses the two land parcels TMK 4-2-15:001 (portion of) and 008, is graded and has a number of warehouse structures. The lower portion of the project site does not presently have structures, but it is graded and accommodates certain commercial activities (e.g. Green Waste processing). Figure WRI-1 also indicates the study area for the water resources investigation for the proposed site. The study includes the development footprint of the proposed KLIP, areas in direct proximity to roadways which are adjacent to the site, areas in the Kapa'a Stream Corridor and area, within the three contiguous land parcels, next to the development footprint.

1.2. Methodology

The water resources investigation is conducted to determine the presence or absence of any waters or wetlands under the jurisdiction of the United States found within in the area affected by the project. Before conducting field investigations, federal and state documentation were reviewed, including Natural Resources Conservation Service (NRCS) and surface water and wetland Geographic Information System (GIS) data.

Since the project site is a former landfill for municipal waste and quarry tailing and overburden, the topology, therefore water resources have been significantly affected within the past couple

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Figure WRI-1 Water Resources Investigation Area of decades. Historical aerial photographs were obtained from the University of Hawaii at Manoa library system (map section) to assess to kind of changes the proposed project site have experienced over the past decades. Field investigations were conducted on September 27, 2010 to determine the presence or absence of streams, waters and wetlands in the study area, and in particular within the development footprint of the proposed industrial development. A general reconnaissance of the site was conducted, which involved walking the investigation area and taking photos of points of interest. A photographic documentation was prepared, which is the basis for the discussion in Section 3.

1.3. Kapa’a Stream Watershed and changing land use in Kapa’a valley

The water resources within the investigation site are part of the Kapa’a watershed area. The Kapa`a Stream watershed is an area of about 825 acres located in the Kapa’a valley. The Kapa`a Stream is the main drainage of the watershed to the Kawainui Marsh. The 1,000-acre Kawainui Marsh is the largest freshwater wetland in the State, habitat for four of Hawaii’s endangered waterbirds. Based on several precipitation data and estimation methods (e.g. NOAA, local data and PRISM (parameter–elevation regressions on independent slopes model)) the estimated average yearly precipitation in the Kapa’a watershed is estimated within a range of 50 to 60 inch. The proposed project site covers approximately 6 % of the total watershed area. The project site is located in the lower reaches of the Kapa’a Valley. Over the past several decades the Kapa’a Valley, as well smaller portions of the marsh have been significantly altered by quarry operations with associated landfill operations. A series of aerial photos, Figures WRI-2 through WRI-7 portray the changes in land use and character of the Kapa’a Valley over the past six decades.

Figure WRI-2 shows the Kapa’a valley in 1952. While the initial Kapa`a quarry operations started several years before the date of this image the main land use in the lower reaches of Kapa'a valley remains to be agriculture. A road can be seen on a dam crossing the Kapa'a Valley and thus separating an approximately 35 acre farmland and wetland area in the lower reaches of the Kapa’a valley from the Kawainui Marsh.

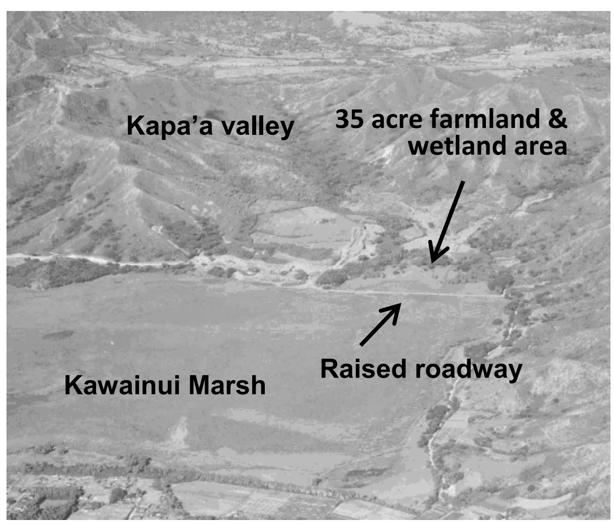


Figure WRI- 2 1952 Aerial Photo of Kapa’a Valley

Figure WRI-3 shows the Kapa'a Valley in 1965. The 35-acre enclosed area has now become a refuse dump. Overburden was used to cover the refuse. The landfill operations continued in the valley and previous agricultural land, stream channel and wetland area were covered with refuse and/or quarry tailings and overburden.

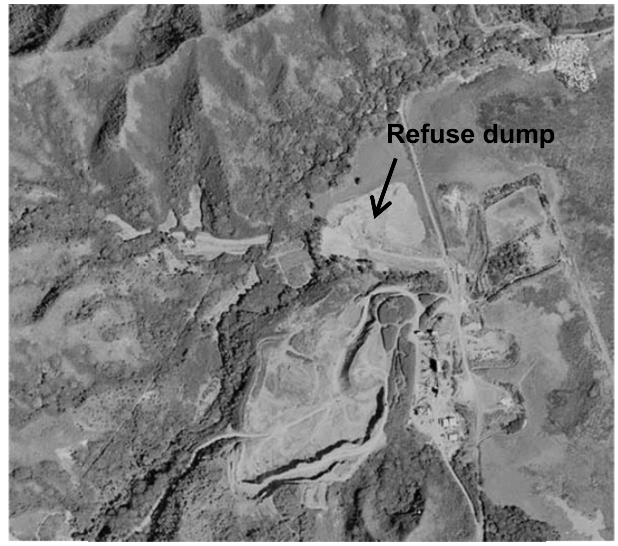


Figure WRI- 3 1965 Aerial Photo of Kapa'a Valley

Figure WRI-4 shows the Kapa'a Valley in 1976. The landfill operation in the 35 acre enclosed area are completed at this time and have resulted in about 25 acres of these 35 acre area to be covered; this about 25 acres area represents the lower portion of the proposed project site. This fill raised the land level an estimated 6 to 20 feet over about 23 of the 35 acres in this lower wetland area (DOH 2007). The photo also indicates that landfill operation have been carried out in the now upper portion of the proposed project site. Figure WRI-4 show that the work on the H3-freeway has begun.

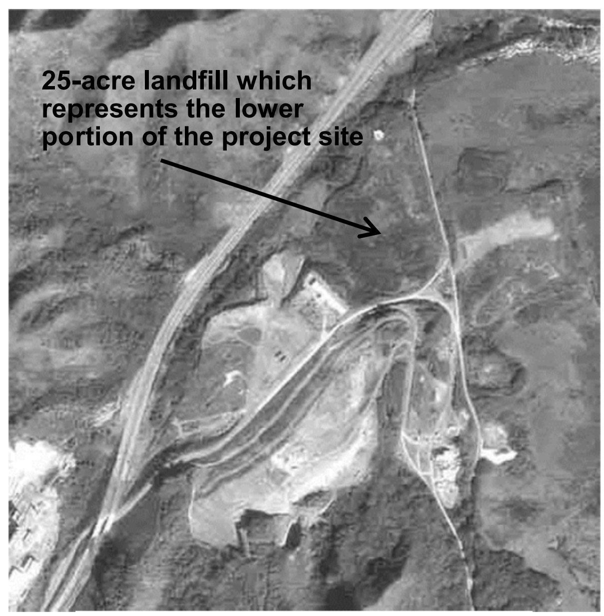


Figure WRI- 4 1976 Aerial Photo of lower reaches of the Kapa'a Valley

Figure WRI-5 shows the proposed project site in 1993. The landfill operation in the lower parts of the Kapa'a valley are now completed. The lower portion of the proposed site, which is the 25-acre landfill area, has a vegetation cover. The upper portion of the proposed project site, about 33 acres large, is shown as a plateau virtually devoid of vegetation and with several light industrial buildings. Since around 1975 light industrial buildings have been constructed within the upper portion of the site.

Figure WRI- 5 1993 Aerial Photo of lower reaches of the Kapa'a Valley

Figure WRI-6 shows the proposed project site in a recent aerial photo dated 2001. In this aerial photo of 2001 about 20 warehouses, 15 of which Quonset huts, are shown in the northern part of in the upper portion of the project site.

Figure WRI- 6 2001 Aerial Photo project site in the lower reaches of the Kapa'a Valley

Figure WRI-7 shows the project site in a recent aerial photo dated 2007. More warehouses are built in the upper portion of the project site. The more recent warehouses are larger and more advanced industrial buildings than the more basic Quonset huts and other buildings that date back 10 to 15 years. The upper portion of the proposed site has paved traffic areas between the buildings and as about 35 warehouse structures. The lower portion of the project site is virtually cleared from vegetation and shows selected industrial activities, such as Green Waste processing.

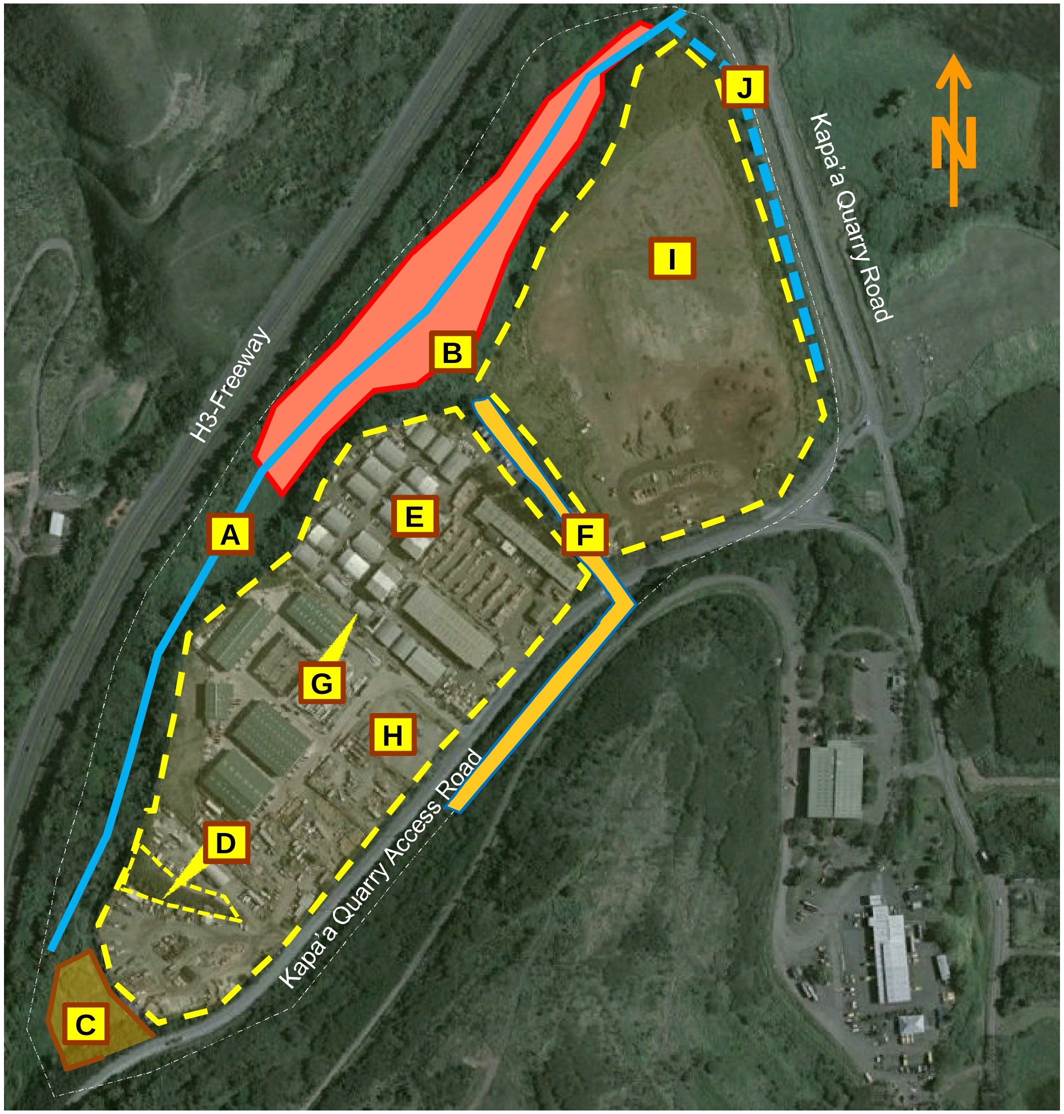
Figure WRI- 7 2007 Aerial Photo of the project site

As a conclusion, the Kapa'a Valley includes landfills associates with former quarry operations or refuse dumps. These landfill operation have significantly altered the appearance, topology and hydrology of the valley. For example, the streambed of the Kapa'a Stream, the main drainage of the Kapa'a watershed, has moved towards the north, as a result of the landfill in the lower portion of the project site . At the present no landfills are operated in the lower stretches of the Kapa'a valley.

1.4. Identified water features of interest on or in proximity of project site

Based on a literature review and previous site visits the following water resource features have been identified. These points of interest for the water resources investigation on the project site are displayed in Figure WRI-8 and are described in the following:

Feature of interest A: The **Kapa'a Stream** is the dominant water resource feature in the Kapa'a watershed. The Kapa'a Stream runs through the project water resources investigation area. While the Kapa'a Stream is not a perennial stream over the entire length through the watershed, the stream appears as a perennial stream throughout the entire length of the investigation area. While the stream is typically less than two feet in width in the upper stream section of the investigation area, the stream develops into a wider perennial



Definition of water resource features of interest identified and examined in the investigation:

A. Kapa'a Stream
B. 13-acres wetland area in the lower reaches of the Kapa'a Stream corridor
C. Drainage basin for runoff from the Kapa'a landfill.
D. Vegetated wedge
E. The water resources within existing industrial development in the upper portion of the project site.
F. Drainage of runoff through culvert and to percolation field on project site
G. Existing drainage swale in upper portion of project site
H. Eight acres of permeable area within development footprint
I. Lower portion of the site
J. Drainage canals along western side of Kapa'a Quarry Road

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Figure WRI-8 : Definition of Water Resource Features of Interest section right upstream of the drainage point to the Kawainui Marsh, which is also the end of the stream. All sections of the Kapa'a Stream are outside the development footprint of the proposed Kapa'a Light Industrial Park. Construction in conjunction with the development will not impact the streambed .

Feature of interest B: The entire **13-acres wetland area** in the lower reaches of the Kapa'a Stream corridor will likewise remain outside the development footprint of the project. The wetland area will not be altered, e.g. filled or drained or otherwise impacted, by the construction. This wetland area is the remaining part of the originally 35-acres large wetland area, which was separated from the Kawainui Marsh in the 1950s when the raised roadway was constructed in the early 1950s and separated this are from the Kawainui Marsh.

Feature of interest C: The area identified under feature "C" is a **drainage basin** that functions as flood control for runoff from the Kapa'a landfill. The drainage basin was a siltation basin for the quarry runoff. Today the area is open space with a thick vegetation cover. The area is south west of the boundary of the development footprint. Runoff that enters the area finally flows to the Kapa'a Stream, mostly as infiltrated groundwater. The runoff from the Kapa'a landfill enters the area "C" through an energy dissipation chute.

Feature of interest D: A natural feature within the development footprint of the project is a **vegetated wedge** that can be observed in the aerial photos. This triangular shaped vegetated area starts within the center section of the development and increases in width towards the edge of the development footprint. During an initial review of aerial photographs this vegetated strip was thought to indicate a water feature, such as a permanent of intermittent drainage swale.

Feature of interest E: The water resources, e.g. **drainage or other water features**, within the existing industrial development in the upper portion of the project site was examined for drainage features. The entire area has a continuous impervious surface, either structures or impervious pavement between the buildings.

Feature of interest F: A review of available site documentation indicated that an area to the south of the Kapa'a Quarry Access Road and the road itself drains into a **drainage swale** along the south side of the quarry access road. The runoff in the swale finally crosses the quarry access road and **flows through a culvert** underneath the road to **a percolation area** which is located between the upper and the lower portions of the project site, before the runoff finally flows to the Kapa'a Stream as underground flow.

Feature of interest G: While much of the runoff from the existing warehouse roofs and the paved areas between the warehouses drains over the edge of the paved area at multiple locations to Kapa'a Stream, there is **one existing drainage swale**, which receives runoff from several adjacent building rooftops and from the paved areas between the warehouses. The runoff in the swale is conveyed to a conventional detention pond, from where the runoff drains to the Kapa'a Stream.

Feature of interest H: There are about **eight acres** within development footprint that are **currently not paved**. Rainwater percolates rapidly into the fill, e.g. mostly gravel or coarse sand, and there are not surface drainage features visible.

Feature of interest I: The **lower portion of the site** consists of landfill area that was graded to create a slightly sloped area of about 22 acres. From earlier observations and available literature the topography of this area (e.g. landfill) has changed the stream bed of the Kapa'a Stream over time. No distinct major drainage swale could be identified and most of the drainage occurs through percolation of the rainwater into the ground. The entire area is not paved and not compacted to the degree that would attenuate rapid percolation of rainwater into the ground.

Feature of interest J: There are **drainage canals** on both side along the northern section of the **Kapa'a Quarry Road** starting at the model airplane in the south and ending at the confluence of the Kapa'a Stream into the marsh. The canal on the western side of the quarry road is within the land parcel TMK 4-2-15:006, directly adjacent but outside the proposed development footprint of the lower portion of the site.

2. Findings of the Field Investigation

During the field investigation on September 27, 2010 all water resource features of interests, with the exception of A and B, the Kapa'a Stream and the 13 acre wetland areas, respectively, were observed and a numerous photos were taken. These photos and the findings are presented and delineated in the following sections .

Comment: Kapa'a Stream and wet-land area (water features A and B): The sections of the Kapa'a Stream with are within the three contiguous land parcel of the project site and the 13-acre wetland area to the north of the lower portion of the project site were previously investigated in detail in the course of a feasibility design effort for a 13-acre bird habitat. The habitat and wetland restoration project was planned to approximately coincide with the delineated wetland area (Area B in Figure WRI-8). The objective of the bird habitat project was to restore the now densely vegetated wetland area to an open wetland area with shallow mud ponds to make the area a conducive habitat for endangered water birds. The feasibility study of the proposed wildlife habitat and wetland restoration project concluded that the removal of the dense wetland plant population might result in a degradation of water quality. The proposed wildlife habitat and wetland restoration project is presently discontinued and might be reevaluated in the future.

2.A. Kapa'a Stream

The Kapa'a Stream has a total length of approximately 1.8 miles, of which 0.7 miles are the lower reaches of the stream within the property of the developer. The stream is the primary drainage for the Kapa'a watershed area which measures some 825 acres (about 1.3 square miles). The stream has a baseflow of 0.8 and 1.2 cbf/sec, in the dry season (May to Oct.) and wet season (Nov. to April), respectively. The Kapa'a Stream is listed on the 2004 List of Impaired Impaired Waters in Hawaii prepared under Clean Water Act §303(d). The identified water quality in Kapa'a Stream as impaired by elevated turbidity, total suspended solids (TSS) as well as nutrients (TN, TP).

Kapa`a Stream flows to the Kawainui Marsh and beyond to the Oneawa Canal, Kailua Bay, and the Pacific Ocean. The streambed of the Kapa'a Stream as well as the water quality have been significantly affected over the past 60 years. Industrial activities such as major quarry operations refuse disposal landfill, deposition of quarry materials over wetlands and mid-valley stream course and the construction of a federal highway through the center of the valley have all contributed to changing stream bed conditions and hydrology. It is doubtful that any significant length of the present streambed is in its original condition or location.

The development footprint of the proposed industrial park will not affect the streambed. The construction of the project , including grading or construction of structures are planned entirely outside the current and future streambed.

2.B. Wetland Area

A larger portion of the Kapa'a Stream corridor within the water resources investigation area is defined as "wetland". The Natural Resources Conservation Service (NRCS) has delineated 13 acres in this area as wetland. The location and extent of the delineated wetland area is illustrated in Figures WRI-9 and WRI-10, which show the original NRCS wetland delineation figure and the project site superimposed on the NRCS delineation, respectively. The NRCS wetland delineation is based on the definition of jurisdictional wetlands (by U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA)) as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR, Part 328.3).

The identification and delineation of jurisdictional wetlands is based on three parameters:

1. Hydrophytic vegetation – plants growing in water or on a substrate that is periodically deficient of oxygen as a result of excessive water content.
2. Hydric soils - soil that formed under saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.
3. Wetland hydrology - permanent or periodic inundation or soil saturation to the surface for sufficient duration during the growing season.

Figures WRI-11 and WRI-12 show two typical characteristics of the thick vegetation cover in the wetland area.

Wetland Deliniation Map

Customer(s): KAPAA 1 LLC
District: Windward SWCD

Field Office: AIEA SERVICE CENTER
Agency: NRCS

Legend

2007WHIP

Kapaa_1_LLC_Wetland

175 0 175 350 525 700 Feet

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Figure WRI-9 : NRCS Wetland delineation for lower reaches of Kapa's Stream

Figure WRI-10 : NRCS Wetland delineation with proposed project sites

Figure WRI-11 Typical Dense Vegetation Cover of California Grass in Wetland Area

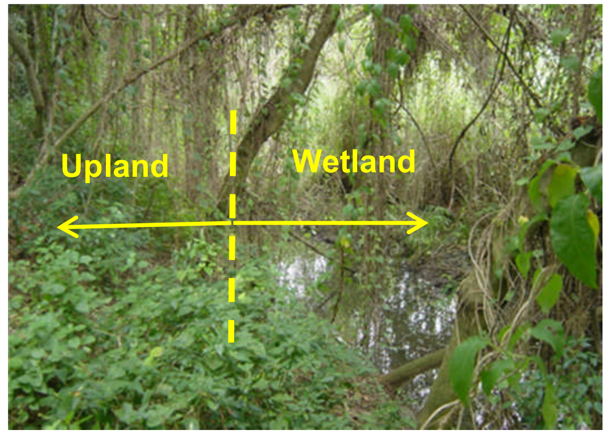

Figure WRI-12 Boundary of Wetland and Upland

The development footprint of the proposed industrial park will not affect the wetland area. The construction of the project, including grading or construction of structures are planned entirely outside the wetland boundaries.

2.C. Drainage Basin for Runoff from the Kapa'a Landfill.

The drainage basin is depicted in views 8 through 11 in Figure WRI-14. The camera position for these views is defined in Figure WRI-13. Please note that all Figures from WRI-13 through WRI-30 are presented at the end of this report.

The drainage basin is an approximately five acre large open area within the land parcel TMK 4-2-15:001 (portion of). This area was once a siltation basin for the Kapa'a Landfill runoff. The runoff from the landfill is conveyed through a concrete swale along the quarry access road (View 10) and enters the area through an energy dissipation chute (View 11). The runoff then discharges to the stream.

The development footprint of the proposed industrial park will not affect this drainage basin. The construction of the project, including grading or construction of structures are planned entirely outside the drainage basin. In the course of construction the now partly non stabilized slope between the development footprint and the basin will be stabilized in an appropriate form.

2.D. Vegetated Strip

Initial reviews of aerial photos suggested that the vegetated strip would indicate the presence of a water feature, e.g. a vegetated swale of ditch. Field investigation revealed that this vegetated area is an earth dike with a vegetation cover of varying width (e.g. brushes and small trees) rather than a swale or ditch. This area is depicted in views 1 through 7 in Figures WRI-14 and WRI-15. The camera positions and directions for these views are indicated in Figure WRI-13.

2.E. Existing Industrial Development in the Upper Portion of the Project Site.

The drainage conditions and soil conditions of the upper portion of the project site are depicted in views 21 through 24 and views 29 through 35, in Figures WRI-18, WRI-20 and WRI-21. Views 21 and 22, shown in Figure WRI-18, depict the older part of the existing warehouse development. The camera positions and directions for these views are indicated in Figure WRI-17.

The space between the warehouse structure is paved with concrete. Site drainage is through shallow swales in the pavement that convey the runoff to the edge of the pavement and to the open space beyond. View 23 shows the vegetated area just north of the warehouse development. Rainwater readily percolates into the ground and there are no drainage ditches or swales visible. View 24 show new construction activities. Drainage occurs through shallow swales in the roadways.

Views 33 through 36 in Figure WRI-21 show the drainage situation in the newer part of the existing warehouse development. The camera positions and directions for these views are indicated in Figure WRI-17. View 32 shows the shallow swales in the concrete pavement between the warehouses. View 35 shows the main roadway with shallow drainage swales in the concrete pavement. View 36 shows the entrance ramp that connects the upper portion of the project site with the quarry access road. Stromwater runoff occurs along the contoured drainage swale in the center of the road towards the drainage ditch along the quarry access road.

2.F. Drainage through Culvert and Percolation Field

The drainage of a small watershed basin south of the quarry access road enters the project site and percolates into the soil of the lower portion of the project site. Views 25 through 28 in Figure WRI-19 depict the runoff conveyance to the project site. The camera positions and directions for these views are indicated in Figure WRI-17.View 25 (looking to the west and away from the marsh) shows the drainage ditch along the quarry access road, which receives the runoff from the small watershed area as well as the runoff from the quarry access road. View 26 shows the drainage ditch and the inlet structure for the ditch (looking to the eat and toward the marsh). View 27 is a close up view of the drain inlet structure, where the runoff from the ditch overflows into the basin. View 28 shows the inside of the inlet structure and the start of the 30-inch pipe culvert. Runoff would flow through this culvert underneath the quarry access road and to the percolation filed on the lower portion of the project site.

Views 43 through 46 in Figures WRI-23 and WRI-24 depict the infiltration situation of the runoff as it leaves the culvert on the project site. The camera positions and directions for these views are indicated in Figure WRI-22. View 43 shows the approximate location of the outlet of the 30-inch culvert. During the field investigation the vegetation around the outlet of the culvert was too dense to make a photo of the outlet of the culvert itself. View 44 shows the soil situation about 10-15 feet downhill from the culvert outlet. No traces of standing water of moist soil could be detected. View 45 indicates the location of the culvert outlet. The exposed soil on the left is land fill. The thick vegetated area to the right coincides with the foot of the slope that separates the lower and upper portion of the project site. The panoramic view 46 shows the situation downhill of the outlet of the culvert. No defined streambed is visible and there appears thick vegetation along the foot of the slope between upper and lower portions of the project site up to the Kapa'a Stream corridor.

2.G. Existing Drainage Swale in Upper Portion of Project Site

Views 29 through 32 in Figure WRI-20 show the only existing larger drainage swale in the upper portion of the project site. The camera positions and directions for these views are indicated in Figure WRI-17. The swale drains several roadway areas and several rooftops adjacent to the swale. Views 29 and 30 show the vegetated and concrete portions of the drainages swale, respectively. Views 31 and 32 depict the detention pond and the drainage structure of the detention pond, respectively.

2.H. Eight Acres of Permeable Area within Development Footprint

Besides warehouses with concrete pavement between them the upper portion features about eight acres of unpaved space that is currently used for equipment storage or as small baseyards. View 34 shows a typical exterior equipment storage which is not paved but has pervious ground cover of gravel and coarse sand. On these eight areas rainwater readily percolates into the ground and there are typically no drainage features.

2.I. Lower Portion of the Proposed Project Site

Views 41, 42 and 47 through 50 in Figure WRI-23 through WRI-26 show different images of the lower portion of the project site. The camera positions and directions for these views are indicated in Figure WRI-20.

Views 41 and 42 show the entire lower portion of the project site. As can be seen there are different operations, e.g. Green Waste processing, conducted on this approximately 25-acre site. View 47 shows the berm of the landfill area above the Kapa'a Stream corridor. The landfill area is between 5 and 15 feet higher than the stream corridor. View 48 shows a panoramic view of the lower portion of the site. Since soil (e.g. Green Waste and gravel) is constantly moved there are no defined ditches or swales. View 49 depicts the typical surface soil condition of gravel and coarse sand. Rainwater readily percolates into the ground. View 50 shows the typical 3-4 foot high earth berm that surrounds the lower portion of the project site.

2.J. Drainage canals along western side of Kapa'a Quarry Road

The drainage canal segment lies along the western side of Kapa'a Quarry Road between the intersection with the quarry access road and the confluence point with the Kapa'a Stream. Views 60 through 68 in Figure WRI-28, WRI-29 and WRI-30 show different images of the canal section. The camera positions and directions for these views are indicated in Figure WRI-27.

Views 60 and 61 show the shoulders of the quarry access road just upstream of the canal. There is no apparent drainage ditch along the north side of the access road, which would convey surface runoff from the roadway to the canal. View 62 shows the south end of the canal. View 63 shows the canal in midsection looking north. There is virtually no shoulder between the quarry road and the canal. The canal surface is about four feet below the road elevation. On the western side of the canal (on the left of the photo) is a 25 feet wide level strip which has a 15 feet dirt maintenance road. Beyond the level strip is a vegetated 8–10 feet earth berm with bushes and small trees.

View 63 shows the drainage ditch in a close-up photo. During the investigation there was no free water surface visible and the surface is made up of a dense vegetation cover. At places grass is seen growing in the middle of the canal. Probing of the surface revealed that the canal contained only wet mud and little free water.

View 65 shows the canal looking south. The quarry road is on the left and a 25 feet wide level strip on the right of the canal. View 66 shows the canal as one approaches the confluence with the Kapa’a Stream, which is a short distance past the large trees.

Views 67 and 68 show the confluence of drainage canal and Kapa’a Stream. As indicated the entire surface of the canal and most of the surface of the Kapa’a Stream is covered with vegetation.

3. Discussion and Conclusion of Water Resource Investigation

The proposed Kapa'a Light Industrial Park would be developed on three contiguous land parcels, TMK 4-2-15:001 (portion of), 006 and 008. The three land parcels have a total area of 77.4 acres. Of these 77.4 acres total land area of approximately 43 acres would be used for industrial development, including the 22.4 acres that are presently already zoned for intensive industrial land use. The area covered by this water resource investigation comprises all of the three continuous land parcels and, in addition, some water features in close proximity of the three land parcels.

As discusses in the sections before, there are several significant water resources, which are shown in the following list:

Table 3-1 Indication of significant water resources within or adjacent of the project sites

No.	Description significant water resource identified for propose project	Identifier in report	Inside three land parcels TMK 4-2-15:001, 006, 008	Inside or affected by development footprint of project
1	Lower reaches of the Kapa'a Stream	A	Yes	No
2	13 acre wetland area	B	Yes	No
3	Drainage basin for runoff from the Kapa'a landfill.	C	Yes	No
4	Drainage swale along and culvert under quarry access road	F	No	No
5	Percolation field for runoff from culvert	F	Yes	Yes **
6	Drainage canals along western side of Kapa'a Quarry Road	J	Yes	No

*Note: statement "Yes**" indicates that the percolation fields will not be inside the graded area of the site. The percolation field would be located within an area that would be restored with native or adaptive plants; the restored habits is located within the project areas for which LEED certification is sought.*

Other water related features on or adjacent to the proposed site are not significant.

As the list above indicates, all of these significant water resources, with the exception of No. 4 in Table 3.1 e.g. the percolation field of the runoff leaving the 30-ich culvert under the quarry access road, are located outside the development footprint of the proposed industrial development and therefore these water resources would not be affected by construction activities, such as stream alterations, grading or deposition of soil.

The one significant water resource feature that would be affected by the proposed industrial development, is the percolation area of the stormwater runoff that enters the lower portion of the site through a 30-inch pipe culvert underneath the quarry access road. The field investigation has detected no permanent stream downstream of the outlet of the culvert inside the lower portion of the site. It appears that water would readily percolate into the ground and that a surface runoff would be only a short distance if sufficient runoff quantity were present in a storm event. The existing percolation area is outside the current graded land within the lower portion of the site. Planned construction of the proposed project within the lower portion of the site would be outside the existing percolation area. If the layout of the proposed development would call for grading and fill that affected the existing percolation field it is recommended that the existing culvert be extended northwards towards the Kapa'a Stream corridor where the percolation could be readily occur and where runoff would continue to flow into the Kapa'a Stream.

In the sustainable design approach (Appendix 4) the existing percolation area would be inside or next to the "habitat restoration" limits, e.g. the sloped area between the lower and upper portion of the site which will remain open and vegetated area and would be restored with native or adaptive. The stormwater runoff entering the site through the 30-inch culvert would therefore be distributed on vegetated land and this would continue the present infiltration of stormwater into the ground and subsequent underground flow of stormwater towards the Kapa'a Stream.

As a final conclusion, the proposed industrial development would therefore not negatively affect any waters or wetland areas under the jurisdiction of the United States .

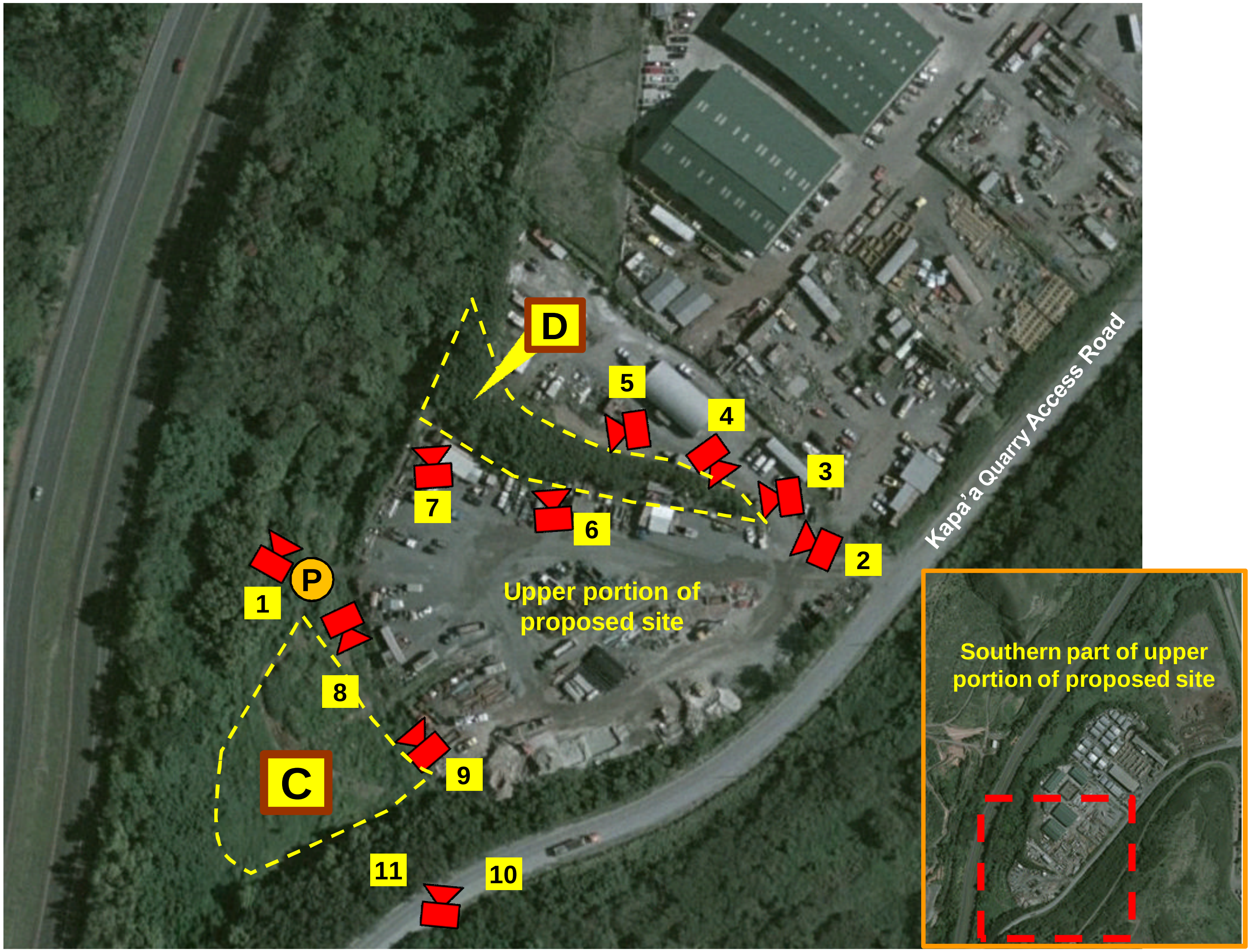

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Figure WRI-13 Definition of Views 1 through 11 in Upper Portion of Site

View 1: in Figure WRI-13 : Panoramic picture of pen space between landfilled site and Kapa’a Stream Corridor

View 2 in Figure WRI-13 : Vegetated strip on earth berm on site; start of the berm

View 3 in Figure WRI-13 Vegetated strip on earth berm on site; entry section of berm

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Figure WRI-14 Display of Views 1 through 3

View 4 in Figure WRI-13 : Vegetated strip on earth berm on site; beginning portion from north side

View 5 in Figure WRI-13 : Vegetated strip on earth berm on site; middle portion from north side

View 6 in Figure WRI-13 : Vegetated strip on earth berm on site; middle portion from south side

View 7 in Figure WRI-13 : Vegetated strip on earth berm on site; end of berm at edge of landfill

View 8 in Figure WRI-13 : Earth dike between the drainage basin and upper portion of the project site; drainage basin is to the right.

View 9 in Figure WRI-3 : Earth dike between the drainage basin and upper portion of the project site; drainage basin is to the right

View 10 in Figure WRI-13 : Drain inlet t is at the yellow pole

View 11 in Figure WRI-13 : View down the energy dissipation chute of the drain inlet, drainage occurs towards the drainage basin in the background

Figure WRI-16 Display of Views 8 through 11

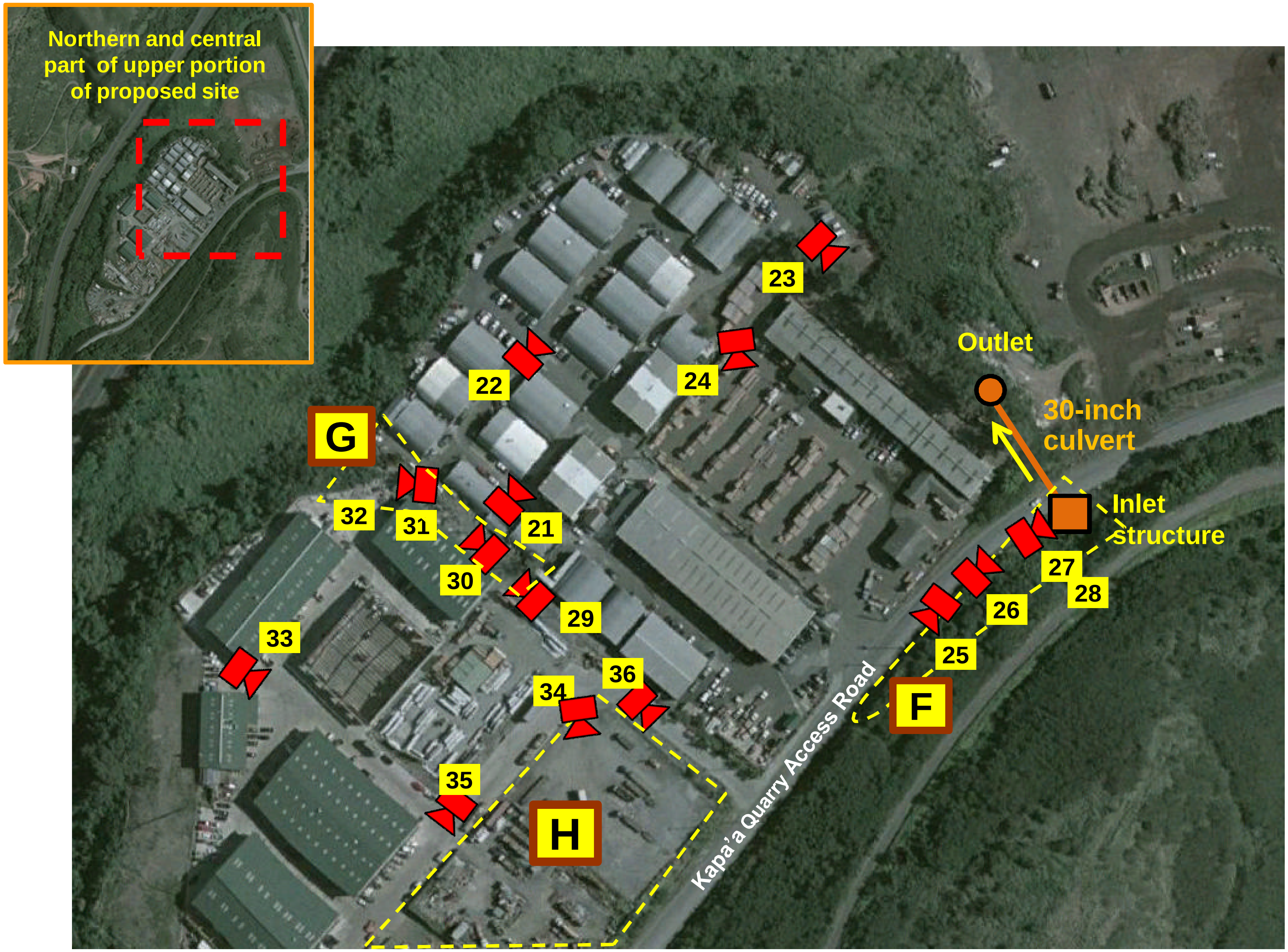

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Figure WRI-17 Definition of Views 21 through 36 in Upper Portion of Site

View 21 in Figure WRI-17: Existing warehouse development, impervious pavement of internal roadways

View 22 in Figure WRI-17 : Existing warehouse development, impervious pavement of internal roadways

View 23 in Figure WRI-17 : Vegetated buffer zone between the upper and lower portions of the project site; gravel and vegetated area

View 24 in Figure WRI-17 : Areas within the existing industrial development; new structures and buildings being added

Figure WRI-18 Display of Views 21 through 24

View 25 in Figure WRI-17 : Drainage ditch along the south side of quarry access road; road drainage is towards this vegetated ditch

View 26 in Figure WRI-17 : Drainage ditch drains into the inlet structure of culvert (at yellow posts); red arrow indicates flow through of culvert under the road

View 27 in Figure WRI-17 : Inlet structure for the 30-inch culvert; ditch along road drains into culvert

View 28 in Figure WRI-17 : View down into the inlet structure of culvert; culvert inlet is at left

View 29 in Figure WRI-17: Drainage swale that conveys runoff from roads and adjacent rooftop to a detention basin; grass swale section

View 30 in Figure WRI-17 : Drainage swale that conveys runoff from roads and adjacent rooftop to a detention basin; concrete swale section

View 31 in Figure WRI-17 : Detention pond at the end of the concrete drainage swale

View 32 in Figure WRI-17 : Detention pond at the end of the concrete drainage swale, discharge structure - stand pipe with oveflow

View 33 in Figure WRI-17 : Drainage situation inside the existing warehouse development (pavement contours funnel runoff to the drain inlets)

View 34 in Figure WRI-17 : The open areas within the existing industrial development are not paved with concrete, but have a gravel surface

View 35 in Figure WRI-17 : Drainage situation inside the existing warehouse development (pavement contours funnel runoff to the drain inlets)

View 36 in Figure WRI-17 : The main entry road to the upper portion of the site; drainage occurs through contoured shallow swale in pavement towards the quarry access road

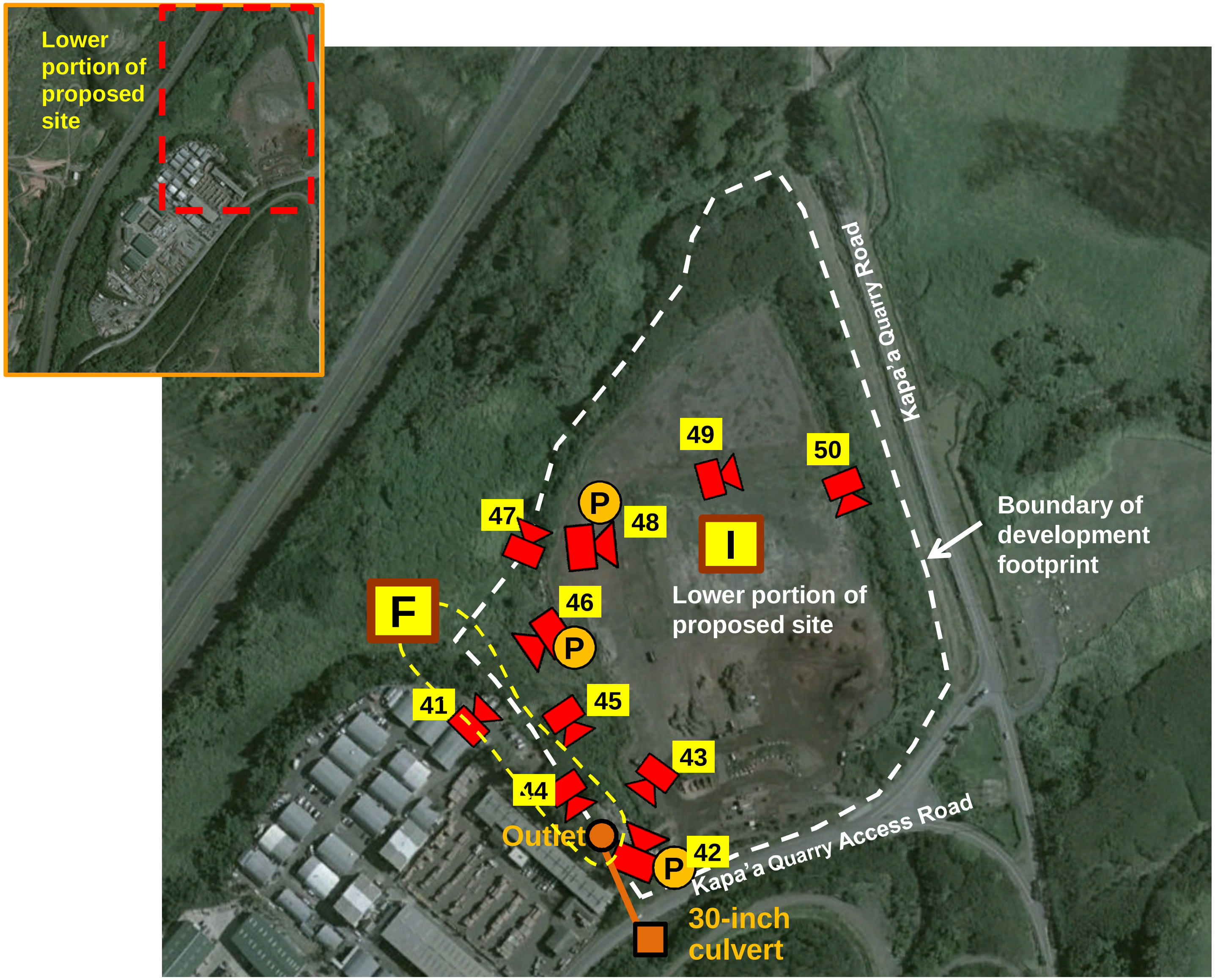

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Figure WRI-22 Definition of Views 41 through 50 in Lower Portion of Site

Green Waste processing is present land use

Exit to Kapa’a Quarry Access Road

View 42 in Figure WRI-22: Panoramic picture of lower portion of proposed site

View 41 in Figure WRI-22 : Overview of lower portion of the proposed site

View 43 in Figure WRI-22 : View of vegetated buffer between upper and lower portion of site: the outlet of the 30-inch culvert is orange arrow

Outlet of 30-inch culvert

Kapa'a Stream corridor

View 46 in Figure WRI-22 : Panoramic picture of foot of sloped vegetative buffer between upper and lower portion of site

View 44 in Figure WRI-22 :
Outlet of 30-inch culvert; the outlet of the pipe is covered by thick vegetation; no traces of standing water or moisture in soil could be detected

View 45 in Figure WRI-22 : Vegetated ditch at the foot of the sloped buffer between upper and lower portion of site; arrows shows outlet of 30-inch culvert

View 48 in Figure WRI-22 : Panoramic picture of the lower portion of site; land is mostly flat and slightly sloped

View 47 in Figure WRI-22 : Edge of the landfill area; left is the Kapa'a Stream corridor

View 49 in Figure WRI-22 : Typical soil surface in the lower portion of the site; surface is mostly gravel with sparse vegetation, no surface stream features, ditches or larger swales were detected

View 50 in Figure WRI-22 : Condition at the boundary of the lower portion at the Kapa'a Quarry Road; an earth berm is containing the site

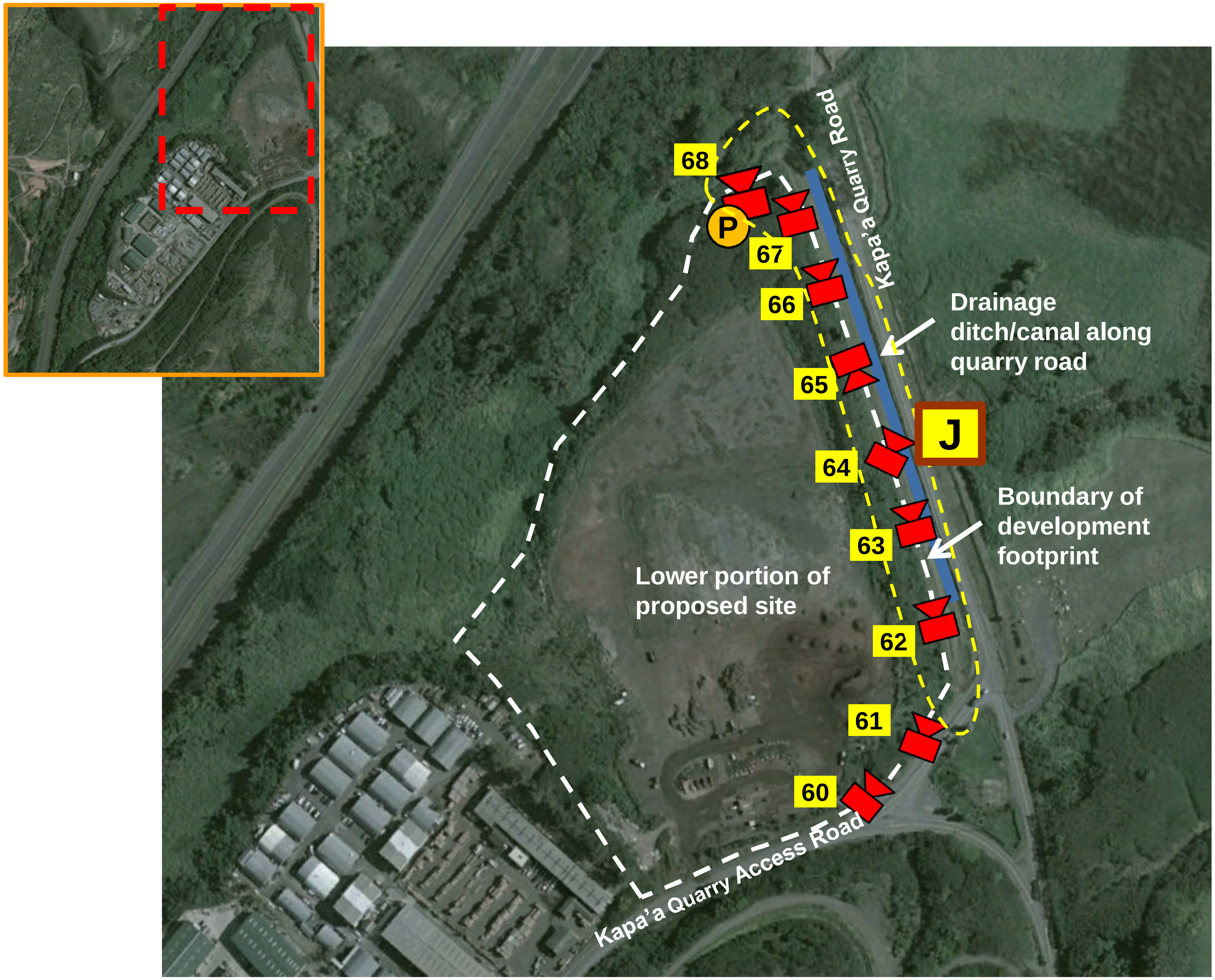

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Figure WRI-27 Definition of Views 60 through 68 of Drainage Canal Along Kapa'a Quarry Road

View 60 in Figure WRI-27: Drainage situation at proposed site in lower section of the quarry access road; ahead is intersection with quarry road

View 61 in Figure WRI-27: The soil condition at the intersection of quarry road and quarry access road; no distinct ditch or gully on the side of the proposed site

View 62 in Figure WRI-27: Drainage ditch /canal along the quarry road; start of canal close to yellow pole

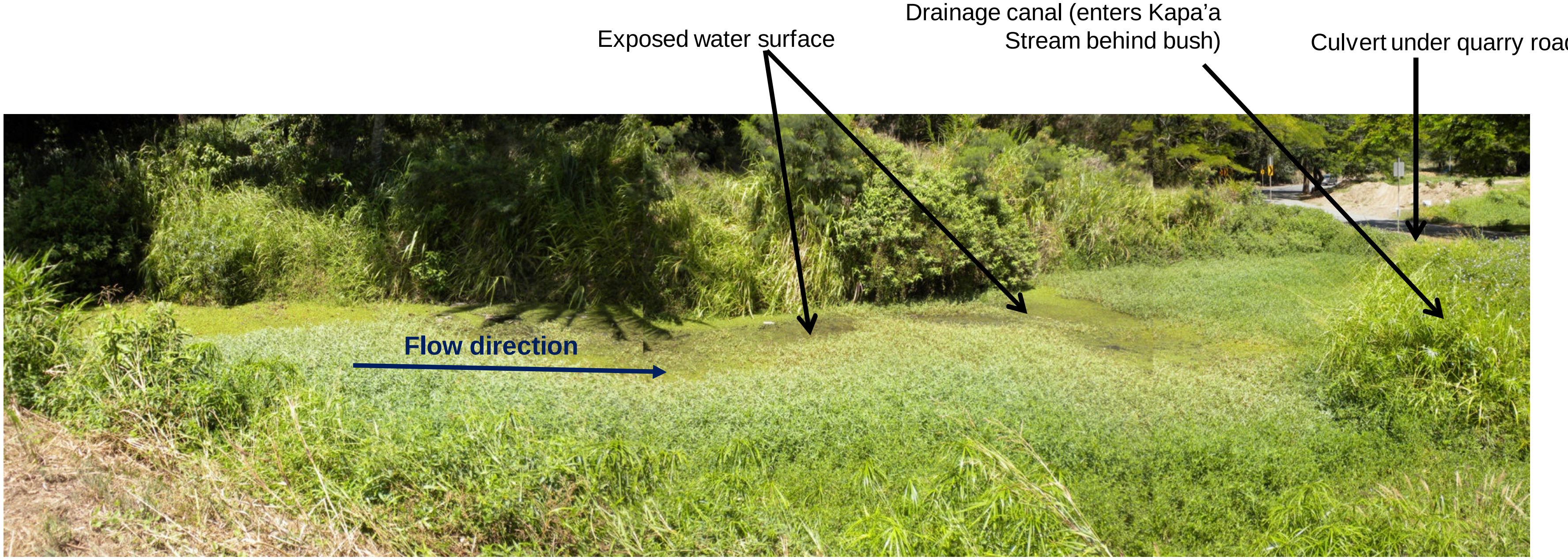
View 63 in Figure WRI-27: Drainage ditch /canal along the quarry road; looking north

View 64 in Figure WRI-27: Drainage ditch /canal along the quarry road; during site visit there was no free water surface; ditch was filled with mud covered by algae

View 65 in Figure WRI-27 : Drainage ditch /canal along the quarry road; looking south

View 65 in Figure WRI-27: Drainage ditch /canal along the quarry road; confluence of drainage canal and Kapa'a Stream close to trees

View 67 in Figure WRI-27 : Confluence of drainage canal and Kapa'a Stream; the canal is indicated with blue dashed line; during the investigation the canal does not show free water surface



View 68 in Figure WRI-27: Panoramic picture of the lower perennial stretch of Kapa'a Stream; the culvert through which the stream flows into the Kawainui Marsh is indicated on the right.

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Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Kailua, Hawaii

Appendix 8:

Visual Impact Assessment Study

Appendix 8 contains changes from Appendix 8 of DEIS

September 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

APPENDIX 8

Final Environmental Impact Statement

for the proposed

Kapa'a Light Industrial Park

Visual Impact Analysis

Assessment of the anticipated impact of the proposed project on important viewplanes around the Kawainui Marsh

A discussion of photographic documentation of existing views and Virtual Reality (VR) 3D renderings for anticipated future views

Prepared for

Kapaa I, LLC

Prepared by

Sustainable Design & Consulting LLC
www.sustain-HI.com

September 2011

Table of Contents

Table of Figures:

Additions to the DEIS:

This Visual Impact Analysis, presented with the FEIS, is appended with a discussion and analysis of one additional viewplane that was added to the Visual Impact Analysis presented with the DEIS. Comments submitted by stakeholders prompted a reevaluation of the selected view planes around the Kawainui Marsh. It was found that views from Viewplane F, which are views from the Kawainui Neighborhood Park, should be analyzed to also include areas adjacent to this popular public park.

It was found that the Kawainui Neighborhood Park is essentially used in two functions: (1) use of the park and lawn (grassy area) for different activities and events and (2) as the northern access to the path along the flood control levee. The governing views associated with two functions are referred to as sub-viewplanes F-1 (for park function (1)) and F-2 (for park function (2)).

While for visual impact analysis for the DEIS no future anticipated views were generated for Sub-viewplane F, new simulated views are produced and presented for this visual impact analysis (only for Sub-viewplane F-2 since views of the Sub-viewplane F-1 do not have direct lines of sight to the proposed project site).

1. Existing Viewplanes

Viewplanes that are relevant for the assessment of the visual impact of the project consist of accessible locations along roads, public parks as well as at special sites, which afford a special aesthetic, cultural or mental significance. For viewplanes to be of significance they must be accessible to and frequented by the public, either within the daily routine, for recreation or for the purpose of spiritual or cultural experience. For example, an important view across of the Kawainui Marsh, which has been cited frequently is from the Kailua Road, where motorists traveling mauka or makai can enjoy the beauty of the marsh with a full panoramic view.

2. Assessment of Existing Views

For this visual impact assessment study eight significant viewplanes were identified. The viewplanes are shown in Figure VIA-1 and are discussed in the following relative to possible visual impacts from the proposed project and the need of more detailed analysis.

Viewplane A: This viewplane indicates views that are available from the vicinity of the Pahukini Heiau. Figure VIA-2 shows the view that is available in Viewplane A. The Pahukini Heiau, a culturally important place, is located about 1,600 feet due south sof the existing warehouse development (upper portion of the site). The closest distance between the Heiau and development in the upper portion and the lower portions of the site would be 1,000 and

2,300 feet, respectively. Both the upper and the lower portions of the project site are not visible from the Heiau. The entire project site, e.g lower and upper portion, is hidden from views by a thick screen of bushes and small trees. Therefore it was determined that the proposed project will not negatively impact viewplane A.

View plane B: This viewplane indicates views that are available from the H3-Freeway while passing the site travelling makai (towards the ocean). Figure VIA-2 shows the view that is available in Viewplane B. It should be noted that the photo representing Viewplane B was taken from a moving car at a location approximately at the start of the deceleration lane of the Mokapu Boulevard off-ramp, therefore at a location where motorists are typically travelling at higher speeds and might not notice the view of the proposed development in the same fashion as an observer that is at rest. Viewpane B represents the closest view that a motorist can have from the H3-Freeway to the project site. At the location where the photo was taken, the thick vegetation buffer (e.g. trees and thick bushes) that normally fringes the H3-Freeway on the south side is interrupted, thus providing a view on the project site. The distance of the location of the viewplane to the centers of the lower and upper portions of the project site is 1,800 and 3,500 feet, respectively. As can be seen in figure VIA 3, the viewplane B will be affected by the proposed project and therefore this viewplane was analyzed in more detail in Section 3 of this visual impacts analysis.

Viewplane C: This viewplane indicates views that are available from Mokapu Boulevard and H3-Freeway off-ramp, at the location that approximately coincides with merging of the off-ramp and the Mokapu Boulevard. The distance of the location of the viewplane to the centers of the lower and upper portions of the project site is 2,500 and 4,000 feet, respectively. Figure VIA-4 shows a panoramic view of the Kawainui Marsh (including the proposed project site). Figure VIA-5 shows a more a more detailed view of the project site. The location of Viewplane C was selected as the station on Mokapu Blvd., where the H3-Freeway off-ramp merges with Mokapu Blvd. Motorists who drive on Mokapu Blvd. can get their first visual impression from the project site at this location, while traveling east (from Kaneohe to Kailua). While traveling east and before reaching this point motorists do not get a view of the project site since the site is hidden from direct line of sight by obstructions, such as bushes and small trees along the south side of Mokapu Boulevard. Similarly, motorists who exit the H3-Freeway at the Mokapu Blvd. exit are getting a view from the project at about this point before they merge into Mokaopu Boulevard. As can be seen in figure VIA 4 and VIA-5, Viewplane C will be affected by the proposed project and therefore this viewplane was analyzed in more detail in Section 3 of this visual impacts analysis.

Viewplane D: This viewplane indicates views that are available from the Model Airplane Park which is located directly opposite of the project across the quarry road on the side of the Kawainui Marsh. Figure VIA-6 shows the view that characterizes Viewplane D. The selected location of the camera for Viewplane D was chosen in approximately the center of the grassy area of the park. The distance of the location of the viewplane to the eastern buffer zone around the lower portion of the project site and the center of the upper portions of the project site is 550 and 2,500 feet, respectively. The Model Airplane Park is the closest viewplane to the proposed project and is therefore visually directly affected by the project. The visual impact of the proposed project on this viewplane was analyzed in more detail in Section 3.

Viewplane E: This viewplane indicates views that are available from Kalaheo Hight School. The distance of the location of the viewplane to the centers of the lower and upper portions of the project site is 4,000 and 5,500 feet, respectively. Figure VIA-7 illustrates the views that are available in Viewplane E. Kalaheo High School is located on the northern side of Mokapu Boulevard at the intersection with Kapa'a Quarry Road. The school encompasses about 15 buildings, parking areas, one athletic field and one tennis court. Buildings A,B,C,E,F and M offer direct line of sights of the Koolau mountain range and some sections of the Kawainui Marsh. While walking the school grounds it could be determined that the athletic field and Building E have the most exposed sights in the direction of the proposed project. As can be seen in Figure VIA-7 the project site remains hidden from direct line of sight for the school grounds. Therefore it is anticipated that the proposed project will not negatively impact Viewplane E, thus Viewplane E was not further analyzed.

Viewplane F: This viewplane indicates views that are available from the Kawainui Neighborhood Park at the end of Kaha Street in Kailua and the adjacent area. The distances of the location of the viewplane to the centers of the lower and upper portions of the project site are approximately 4,400 and 5,600, respectively. Viewplane F incorporates two sub-viewplanes, F-1 and F-2, which can be characterized by two different functions of the park.

Figure VIA-8.A shows views that ~~is available in~~ characterize Viewplane F, e.g. sub-viewplanes F-1 and F-2. Sub-viewplane F-1 represents the views from the parking lot and grassy area south of the parking lot. This grassy area is used by residents for games, get-togethers and physical exercising. Since ~~The~~ the park is surrounded by taller trees and bushes the proposed project is hidden from direct line of sight by ~~the~~ a vegetative buffer. Therefore it was determined that the proposed project will not negatively impact Sub-viewplane F-1, thus Sub-viewplane F-1 was not further analyzed. Sub-viewplane F-2 represents views from the path along the flood control levee. The path can be accessed through the Kawainui Neighborhood Park. A site visit on a weekend in July 2011 suggested that the portion of the path along the flood control levee, which is close the Kawainui Neighborhood Park, is extensively used by residents. The proposed project site is visible from Sub-viewplane F-2.

Figure VIA-8.B defines location of cameras for existing views of sub-viewplanes F-1 and F-2. Six photos and two panoramic views are showing the existing views of sub-viewplanes F-1 and F2. Figure VIA-8.C shows for following views: [1] Sub-viewplane F-1: Figure shows the view from the large grassy area of the park towards the proposed project site. As can be seen there are no direct lines of sight to the proposed project site, since mature trees are blocking the sight. [2] Sub-viewplane F-1: Figure shows the beautifully landscaped area between the parking lot and the Oneawa Drainage Canal. A paved walkway connects the parking area with the trail head of the path along the flood control levee. [3] Sub-viewplane F-1: Figure shows several locations along the paved walkway where the observer can view the marsh through openings in the bushes. [4] Sub-viewplane F-2: Figure shows the southern end of the Oneawa Drainage canal; the path along the flood control levee starts here and winds toward the left, e.g. the south. [5] Sub-viewplane F-2: shows a view towards the south, across the marsh; [6] Sub-viewplane F-2: shows a view towards the project site about 1,200 feet south of the trail head.

Figure VIA-8.D shows two existing panoramic views for Subviewplane F-2 from the flood control levee over the Kawainui Marsh and in the direction of the proposed project site.

The visual impact of the proposed project on Sub-viewplane F-2 was analyzed in more detail in Section 3 of this visual impacts analysis.

Viewplane G: This viewplane indicates views that are available from the Kawainui Marsh from Kailua Road at the height of the flood control levee. The distance of the location of the viewplane to the project site is 7,500 feet (~1.4 miles). Figure VIA- 9 shows the panoramic view that is available to motorists traveling mauka or makai on Kailua Road. The viewplane provides an important visual experience of the open marsh in front of the impressive background of smaller and larger mountains of the Koolau range. As the eye sweeps over the marsh one can detect several structural features at the western edge of the marsh, such as the Mokapu Boulevard overpass over H3 and the two larger buildings of the Kailua Refuse Transfer Station at the Kapa’a Quarry Road. The existing warehouse development in the upper portion of the site is not visible with the naked eye. It cannot be ruled out if and how that the proposed warehouse development in the lower portion of the project site might affect the viewplane. Therefore the visual impact of the proposed project on Viewplane G was analyzed in more detail in Section 3 of this visual impacts analysis.

Viewplane H: This viewplane indicates views that are available from the grounds of the Ulupo Heiau State monument that overlooks the Kawainui Marsh. The Ulupo Heiau is a culturalluy significant place and is listed on the National and Hawaii Registers of Historic Places. The distance of the Heiau to the project site is approximately 7,000feet (~1.3 miles). Figure VIA-10 shows two typical views from the vicinity of the Heiau across the marsh in direction of the project site. Both views in Figure VIA-10 suggest that the proposed project site cannot be directly seen from the Heiau, since the direct line if sight towards the project site is obstructed by trees. Therefore it was determined that the proposed project will not negatively impact Viewplane H, thus Viewplane H was not further analyzed.

3. Assessment of Future Visual Impacts by the Proposed Project

The analysis of the seven viewplanes documented by photographic panoramic and single views suggests that only Viewplanes B, C,D and G would be affected by the proposed project. These viewplanes are analyzed by using renderings of virtual models of the project, which represent the same views and are superimposed on the existing views.

A 3D-CAD model was created for the planned lower portion of the proposed site to simulate the visual impact of the proposed development from differ viewplanes. The 3D-CAD model was then rendered with virtual cameras using the same locations, headings and focal lenses as the digital cameras with which the original photos were taken. The settings of virtual lighting were similar to the natural lighting of the photos representing the existing viewplanes. The virtual renderings are therefore producing the same perspective images as the project would provide after construction.

The objects in the 3D-CAD model, which are the true dimensional spatial representations of warehouse structures, vegetation (e.g. trees in the buffer zones) and roadways were assigned colors that would match the actual visual impact. The selection of colors surfaces rather than photorealistic materials for the rendering of the 3D-CAD model facilitates identification of the proposed development against the existing background images, particularly for views from longer distances to the project. The selection of photorealistic materials for the 3D-objects is better for close-up views. One of the eight viewplanes, Viewplane D (Model Ariplane park) , has shorter distance views on the project, where a more photorealistic representation is more suitable than a shaded model . For Viewplane D photorealistic representations of the trees in the buffer zone were used to provide a more realist view.

All x,y,z dimensions of structures and other objects within the development, such as warehouses, roadways, loading docks, parking lots, vehicles, trees were taken from the concept deign documents. All CAD models of trees placed inside the buffer zones surrounding the site and within the site have near uniform dimension, with some variation. The height of trees was taken as a range from 20 to 25 feet, which would represent a typical size of a fast growing tree after about 5 years of planting (as required to satisfy the credit heat island effect – non-roof of the LEED certification approach).

Figure VIA-11 shows a rendering of the virtual model for the proposed industrial development in the lower portion of the site. The rendering of the virtual model is here superimposed on an oblique Google-Earth aerial image using the same heading and height above ground. The virtual model uses solid colors that closely match the anticipated color scheme of the warehouse structures, the pavement, the vegetated area as well as the trees. The extent of the development in the upper portion of the proposed site is indicated with a red border. As indicated before, no 3D-CAD model was rendered for the upper portion of the site, since it is assumed that visual impact by new construction in the upper portion would be minimal or absent.

The final renderings of the virtual model for viewplanes B, C, D, and H were then merged with the photographic images of the existing viewplane to produce hybrid images of anticipated future views. The resulting hybrid images for viewplanes B, C, D, and H are presented and discussed in the following.

3.1 Simulation of Future Views in Viewplane B

Anticipated future views in Viewplane B are simulated by superimposing the rendering of the virtual model on the existing Viewplane B. Figure VIA-12 defines the extent of the virtual model within the proposed site, which is limited to the lower portion of the site. Figure VIA-12 indicates that the upper portion of the proposed site will not affect the views in the viewplane (indicated by an orange boundary).

Figure VIA-13 shows the anticipated future views resulting from the proposed project. As can be seen warehouse structures within the lower portion of the site are partially hidden behind the tress of the vegetated buffer around the site as well as behind trees panted within the development footprint. The earth berm of the vegetated buffer along the eastern boundary of the lower portion of the project site starts outside the maintenance road for the drainage canal.

The proposed visual impact mitigation measures include vegetated buffer zones around all four sides of the development as well as trees planted within the development footprint and the choice of shades of colors for the roofs and walls of the warehouses that help reducing the visual impact. While the warehouse structures are noticeable, the visual impact the trees and selected color shades for the structures create an effective visual impact mitigating and mitigate the visual appearance of warehouse structures.

The areas between the lower and upper portion of the site has presently some numbers of trees and bushes. The existing trees at the eastern boundary of the upper portion of the site are hiding parts of the upper portion . The project will increase the effectiveness of the screen of existing trees by adding similar trees, thus improving the visual screening. Figure VIA-13 shows several trees that are added to the screen of trees at the eastern boundary of the upper portion of the site.

3.2 Simulation of Future Views in Viewplane C

Anticipated future views in Viewplane C are simulated by superimposing the virtual model on the existing Viewplane C. Figure VIA-14 shows the extent of the virtual model within the proposed site, which is limited to the lower portion of the site. Figure VIA-14 suggests that the upper portion of the proposed site will not affect the views in the viewplane (indicated by an orange boundary).

Figure VIA-15 shows the anticipated future views resulting from the proposed project. As can be seen warehouse structures within the lower portion of the site are partially hidden behind the tress of the vegetated buffer around the site as well as behind trees planted within the development footprint. It should be noted that the 3D-model is rendered in a generic color scheme and not texture mapped. This selection of rendering materials results in a less photorealistic impact as it exaggerates the future development, thus resulting in a visual impact that will be more noticeable than the actual visual impact will be. The more noticeable appearance of the virtual rending helps to distinguish the extent of the proposed development.

As described in the sustainable development approach trees within the development are used for visual impact mitigation as well as for mitigation of heat island effect, direct heat gain of the structures and sound impact. In Figure VIA-15 trees in the area between the upper and lower portion of the site are added to the image to simulate improved visual impact mitigation by using the same type of trees, which are presently planted in this area.

As can be seen the proposed development affect the Viewplane C to a certain extent. The visual impact of the development is, however, is effectively mitigated by the vegetated buffer zone along the quarry road, trees inside the development footprint as well as the color scheme of the warehouse roofs and building skins. As discussed in the sustainable development approach the selection of the color scheme of the warehouse structures must contend with two conflicting design objectives. A darker green color is more favorable to achieve effective visual impact mitigation, while a very bright color for the building exterior walls, preferably a white and reflective color, would be preferable to mitigate heat island effect and increase the thermal performance of the building skin gain of the building envelope. A viable compromise will be selected to optimized color scheme for the roof and the exterior walls.

3.3 Simulation of Future Views in Viewplane D

Anticipated future views in Viewplane D are simulated by superimposing the virtual model on the existing Viewplane D. Figure VIA-16 shows the extent of the virtual model within the proposed site, which is limited to the lower portion of the site. Figure VIA-16 suggests that the upper portion of the proposed site will not affect the views in the viewplane (indicated by an orange boundary).

Figure VIA-16 indicates the camera position as in the eastern part of the model park. The view in this viewplane is the closest of all viewplanes to the proposed project site. The elevation of the camera is below the elevation of the nearest warehouse. As can be seen the image covers only a part of warehouse development in the lower portion of the site.

Figure VIA-17 shows the simulation of the anticipated future views . The representation of the future view suggests that most of the warehouses will be hidden behind the trees of the vegetative buffer along the quarry road. The warehouses appear as bright objects behind the trees of the buffer zone. The earth dike is represented by an inclined green plane on which the trees are standing. The darker rings below the trees are the shades of the trees generated by the virtual lighting. The trees in the background are within the sloped area between the lower and upper portions of the site.

As was stated before shaded rendering was preferred for long distance views since the shaded model emphasizes the virtual model rendering superimposed on the on existing views. Viewplane D, however, is a close-up view of the project site and therefore texture mapping and photorealistic images can help to get a more realistic impression of the view. Figure VIA-18 shows the hybrid image, which simulates the future view in Viewplane D, by means of adding a layer of textured and photorealistic tree images. The heights of the photorealistic trees are in the same range as the segmented tree objects in the shaded model. As noted before the heights of the shaded objects representing trees in the buffer and within the developments range between 20 and 25 feet. Image 1 in Figure VIA-18 suggests that the vegetative buffer can effectively mitigate the visual impact of the development. It should be noted that the actual buffer would have smaller bushes in addition to trees and thus the buffer would offer en even more effective visual screen.

3.4 Simulation of Future Views in Viewplane F

As discussed in Section 2, the proposed project will not result in visual impact for Sub-viewplane F-1, since mature trees and bushes provide a tall and thick vegetative buffer around the grassy area of the park and obstruct the line of sight to the proposed site.

Anticipated future views of Sub-viewplane F-2 are simulated by superimposing the virtual model on the existing Viewplane F-2. Figure VIA-18/Add A shows the location of the cameras of the two panoramic views and one detailed view, which are used for this analysis. Figure VIA-18/Add B shows a comparison between the existing and future views (with the Detailed View 5) of the site from a point of the path along the flood control levee. In the future view buildings of the proposed industrial development would be partially visible behind the vegetative buffer zones of the lower and upper portions of the proposed site. In the future view several tall trees are added to the line of tall trees at the eastern site perimeter of the upper portion of the site, which reduces the visibility of the upper portion of the site from the existing conditions. Figure VIA-18/Add C shows the anticipated future views for the two panoramic view that are defined in Figure VIA-18/Add A:

3.5 Simulation of Future Views in Viewplane G

Anticipated future views in Viewplane G are simulated by superimposing the virtual model on the existing Viewplane G. Figure VIA-19 shows the extent of the virtual model within the proposed site, which is limited to the lower portion of the site. Figure VIA-19 suggests that the upper portion of the proposed site will not affect the views in the viewplane (indicated by an orange boundary).

Figure VIA-19 indicates the portion of the proposed site that will not affect the views in the viewplane (indicated by an orange boundary). Figure VIA-19 shows a line of sight obstruction which is created close to the proposed site by existing structures of the Kailua Refuse Transfer Station and the surrounding trees and earth dikes. These obstructions hide the entire upper portion as well as a smaller part of the lower portion of the site. The parts of the lower portion which are hidden include the sloped area between the lower and upper portions of the site. Therefore the resulting visual impact footprint of the project would be limited.

Figure VIA-20 shows the simulation of the anticipated future views. The inspection of the rendering of the virtual model suggests that the warehouse structures within the lower portion of the proposed site are completely hidden behind the tress of the buffer zone along the quarry road and quarry access road. Therefore the impact of the proposed project on the viewplane would be minimal.

4. Conclusions and Recommendations

The visual impact analysis has identified eight viewplanes representing publicly accessible locations around the Kawainui Marsh, which have the potential of being affected by visual impact by the proposed project:

A. The grounds of Pahukini Heiau
B. The H3-Freeway at the start of the Mokapu Blvd. off-ramp
C. The H3-offramp at the lane merge with Mokapu Blvd.
D. Model Airplane Park
E. Grounds of Kalaheo High School
F. Kawainui Neighborhood Park at end of Kaha Street
G. Southern end of the flood control levee
H. Grounds of Ulupo Heiau

An analysis of the existing views in these eight viewplanes suggest that only four viewplanes, B, C, D and G might be noticeably affected by the proposed project. In Viewplanes A, E, F and H no parts of the proposed project would be detectable to the casual observer. The simulation of anticipated future views in viewplanes B, C and D suggest that the proposed project will be visible and that the visual impact need to be effectively mitigated. The simulation of anticipated future views in Viewplane G indicates that there would be a minimal visual impact, which would be unnoticeable for the casual observer.

The conclusions of the visual impact analysis is summarized in Table 4.1

Table 4.1 Summary of Visual Impact Assessment of eight viewplanes

Viewplane	How viewplane is affected by proposed project	Visual impact mitigation measures
A. The grounds of Pahukini Heiau	The viewplane is NOT affected; the project site is not visible from the grounds of the Heiau	The proposed project is hidden behind a broad buffer of trees and bushes around the grounds of the Heiau.
B. From H3-Freeway at the start of the Mokapu Blvd. off-ramp	The project site is visible; the lower portion of the project site is visible, the upper portion is almost completely hidden by existing treeline. The view is not a continuous visual experience of the project but short lateral visual impressions from vehicles travelling at higher speed through temporary clearings in the vegetation buffer along the H3-Freeway.	Filling in several openings in the thick vegetation buffer on the south side of the freeway would obstruct views on the project. The vegetative buffer around the lower portion and the trees next to warehouses are effective visual mitigation. Filling in the existing treeline at the eastern side of the upper portion is recommended mitigation.
C. H3-offramp at the lane merge with Mokapu Blvd.	The project site is visible; the lower portion of the site is visible, the upper portion is almost completely hidden by existing treeline. Viewpane offers lateral views from travelling motorists, but at speeds that are lower than in Viewplane B.	The vegetative buffer around the lower portion and the trees next to warehouses are effective visual mitigation. Filling in existing treeline at the eastern side of the upper portion is recommended mitigation.
D. Model Airplane Park	The project site is prominently visible, since this viewplane offers the closest views on the project; the warehouses closest to the quarry road would be visible, the upper portion is almost completely hidden by existing treeline. .	The vegetative buffer at the eastern side (with larger trees) of the lower portion of the site, along the quarry road provides an effective means to shield most of the warehouses structures from the view.
E. Grounds of Kalaheo High School	The viewplane is NOT affected; the project is not visible from the grounds of the high school	Visual mitigation not required
F. Kawainui Neighborhood Park at end of Kaha Street <u>and surrounding area; Note that Viewplane F comprises two sub-viewplanes F-1 and F-2</u>	<u>Viewplane F is divided into two sub-viewplanes, F-1 and F-2, where these views represent views from the large grassy area of the park and views from the portion of the path along the levee that is close to the park, respectively. Sub-viewplane F-1 does not have direct lines of sight to the proposed project; e.g. the proposed project is not</u>	• <u>Visual mitigation not required for sub-viewplane F-1.</u> • <u>Visual impact mitigation measures are recommended for sub-viewplane F-2: The vegetative buffer around the lower portion and the trees next to warehouses are effective visual</u>

Table 4.1 Summary of Visual Impact Assessment of eight viewplanes

Viewplane	How viewplane is affected by proposed project	Visual impact mitigation measures
	visible from the grassy area of the neighborhood park. The grassy area of the park is surrounded in the west by a thick screen of high and mature trees, which completely hides direct views on the marsh and in direction of the project. Sub-viewplane F-2 offers direct lines of sight to the proposed project.	mitigation. Filling in existing treeline at the eastern side of the upper portion is recommended mitigation.
G. Southern end of the flood control levee	The viewplane is minimally affected; the lower portion would be hidden behind the vegetative buffer; all of the upper portion of the site and all of the areas of the lower portion with higher elevation are outside of the direct line of sight.	Vegetative buffer around the lower portion of the site will be effective visual impact mitigation and will shield all warehouse structures.
H. Grounds of Ulupo Heiau	The viewplane is NOT affected; the project is not visible from the grounds of the Heiau	Visual mitigation not required

The results of the visualization analysis using virtual reality images super-imposed on actual photographic images of the project site suggest that the visual impact of the proposed development in would be nearly exclusively due to the development in the lower portion of the project site.

The proposed visual impact mitigation measures include vegetated buffer zones around all sides of the lower portion of the site. The vegetative buffer along the quarry road, consisting of a continuous 8-12 feet high earth dike with larger trees and bushes will provide effective visual impact mitigation from all views from the eastern direction, particularly from close-distance views of the Model Airplane park and the adjacent Kapa'a Quarry Road. Trees planted within the development such as those planted on the eastern side of warehouses will add to the visual impact mitigation, particularly for downward views on the project site from the H3-Freeway and Mokapu Boulevard such as in viewplanes B and C.

The areas between the lower and upper parts of the project site will be restored with native or adaptive plants, as part of the sustainable design approach, and additional trees will be planted to provide effective visual impact mitigation. The existing treeline at the top of the sloped areas between lower and upper portions of the side would be augmented by trees similar to the existing trees to fill in a few spaces of light tree cover. These measures will effectively hide the entire upper portion of the development from the identified viewplanes.

The selection of darker shades of green for the roofs and walls of warehouses improves visual impact mitigation; however, darker colors for roof and building walls can deteriorate the thermal performance of buildings and the heat island effect of roofs. A good compromise of darker and lighter shades of green will be determined in the detailed design phase to optimize both thermal performance and visual impact. Added external layers of insulation of the roofs might be considered in conjunction with selecting darker green roof colors, so that good thermal performance of cool roofs could be achieved.

Summarizing, the visual impact of the proposed project should not cause a significant degradation of relevant viewplanes around the Kawainui Marsh. In fact, of the eight identified viewplanes around the Kawainui Marsh, which include heavily travelled roadway, school grounds, a public park, two culturally important sites, e.g. heiaus, and a broad vista of the Kawainui marsh, only three are affected. In all these three cases where viewplane would be affected, the proposed visual impact mitigation measures could significantly reduce the extent of the visual impact.

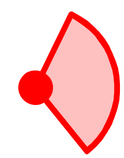
5. Figures:

The following pages show 26 Figures (full page figures, landscape format) which are referred to in the preceding discussion

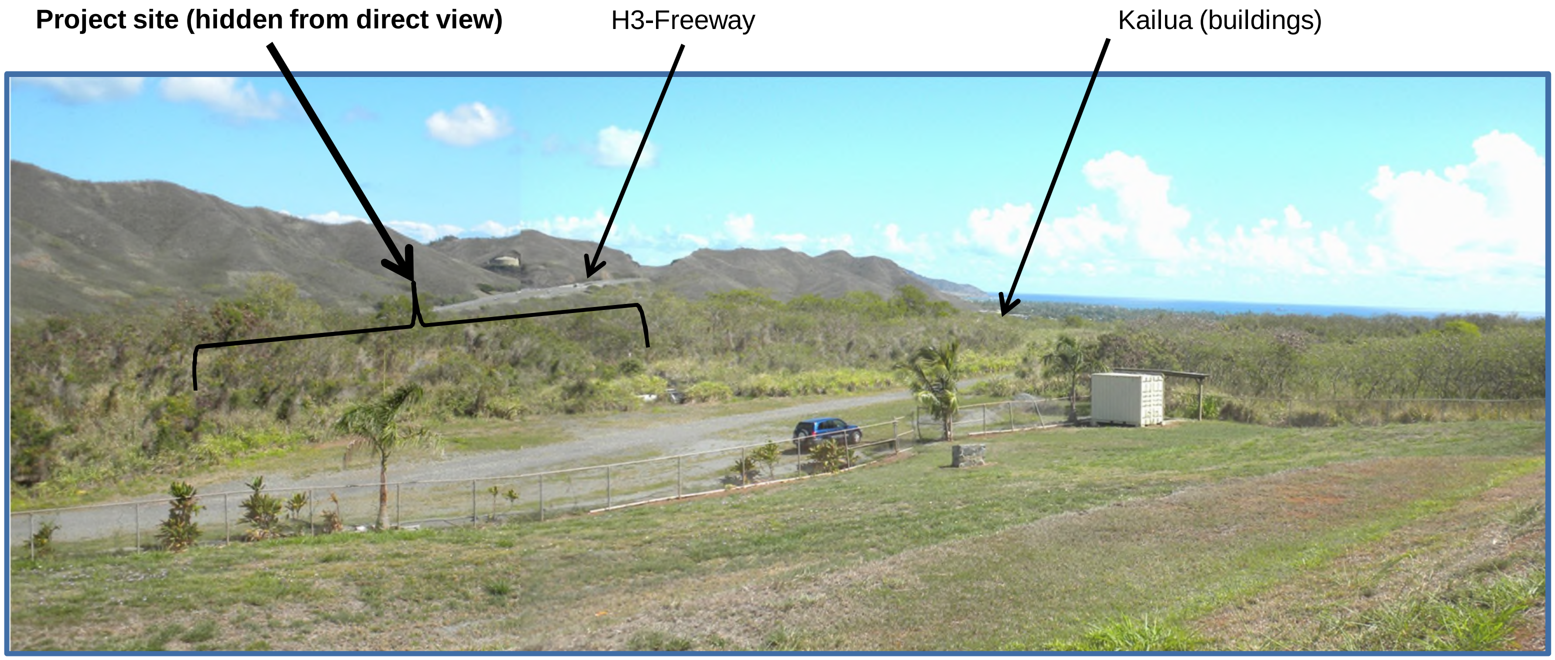
Definition of viewplanes:

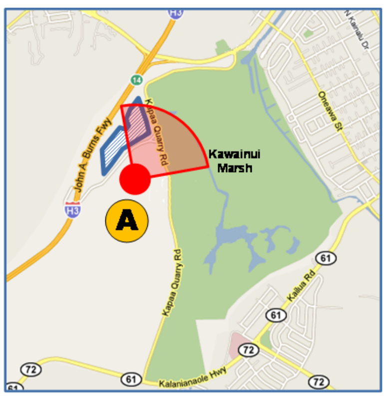
- **A** Panoramic view from Pahukini Heiau
- **B** View from the H3-Freeway; at the beginning of the offramp
- **C** Panoramic view from the H3-offramp at the lane merge with Mokapu Blvd.
- **D** View from the grounds of the Model Airplane park
- **E** Views from the grounds of Kalaheo High School
- **F** View from the Kawainui Neighborhood Park <u>and panoramic view from path on flood control levee</u>
- **G** Panoramic view from the southern end of the flood control levee
- **H** Views from the viewing area of the Ulupo Heiau

Legend:



Location of camera and approximate sweep of panoramic view; in the example view is to the right with a sweeping angel of approx. 135 degree





A Panoramic view; from the Pahukini Heiau towards the project site. The location of the camera is below and directly adjacent, jet outside the sacred Heiau grounds. The project site is hidden by trees and brushes from direct view from the Heiau. (the bracket indicates the length of the existing warehouse development AND the proposed expansion).

Figure VIA-2:
Existing Viewplane A

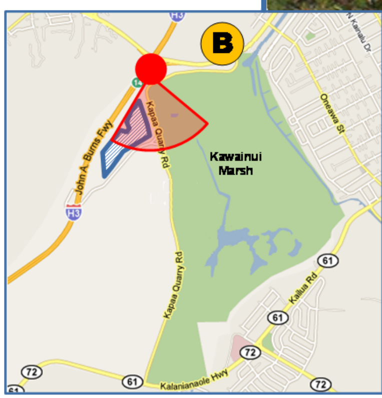
Kawainui Marsh

Model Airplane Park

Kailua Refuse Transfer Station (at quarry road)

Project site (lower portion of site)

Project site (upper portion of site)



B View from the H3-freeway driving makai (towards the ocean). View is towards the project site. The Photo was taken at the start of the deceleration lane of the off-ramp. The photo was taken from a moving vehicle because stopping is not allowed at that point.

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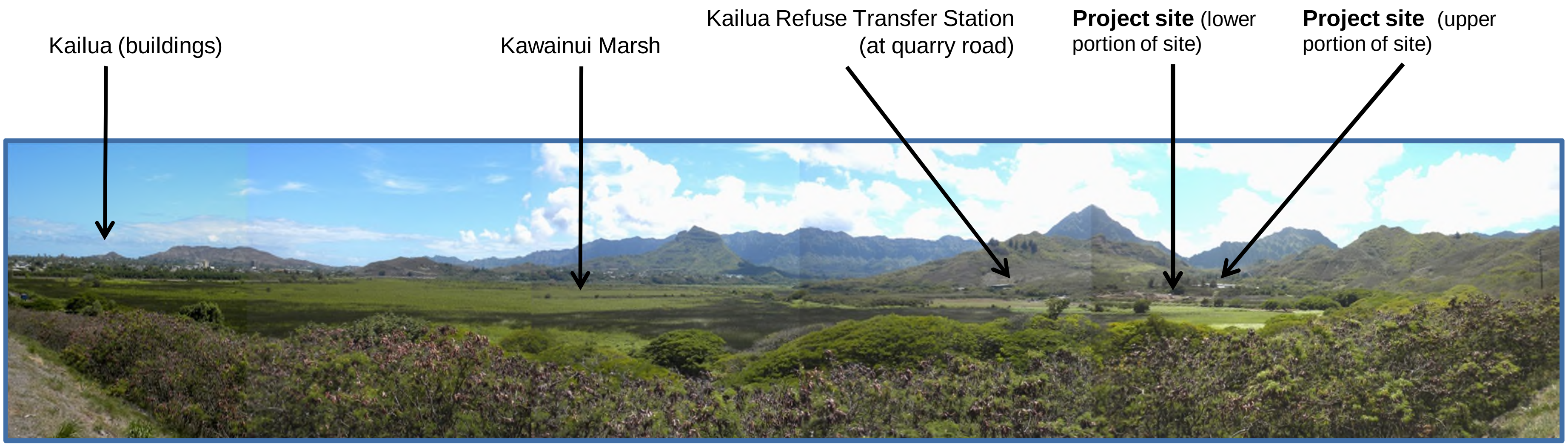
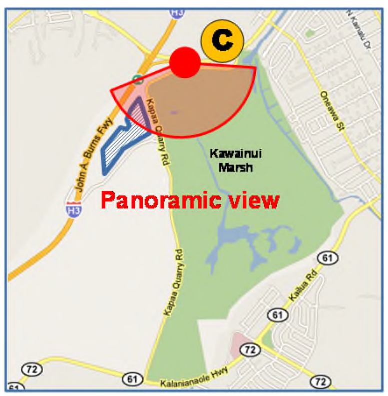
Figure VIA-3:
Existing Viewplane B





C

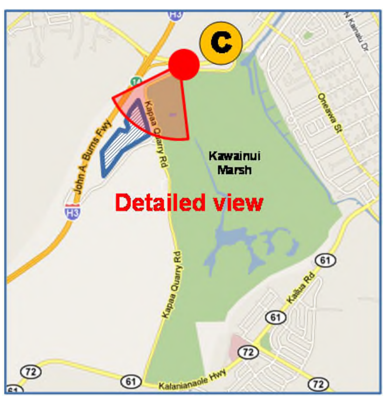
Panoramic view from the H3-offramp (at the lane merge with Mokapu Blvd.) towards the project site. The view provides a wide panoramic view of the Kawainui Marsh.

Figure VIA-4:
Existing Viewplane C – Panoramic View

Kailua Refuse Transfer Station (at quarry road); two buildings

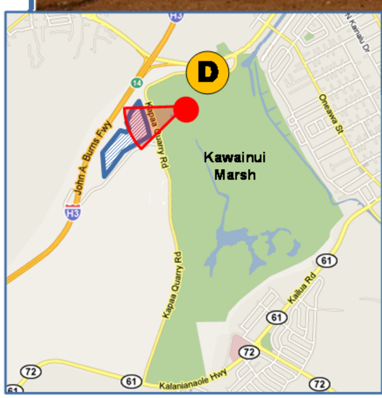
Existing warehouses on upper portion of site (white buildings)

Project site (proposed lower portion of site)



C More **detailed view** of the project site from the H3-Freeway off-ramp. (the bracket indicates the length of proposed development in the lower portion of the project).

Figure VIA-5:
Existing Viewplane C – Detailed View

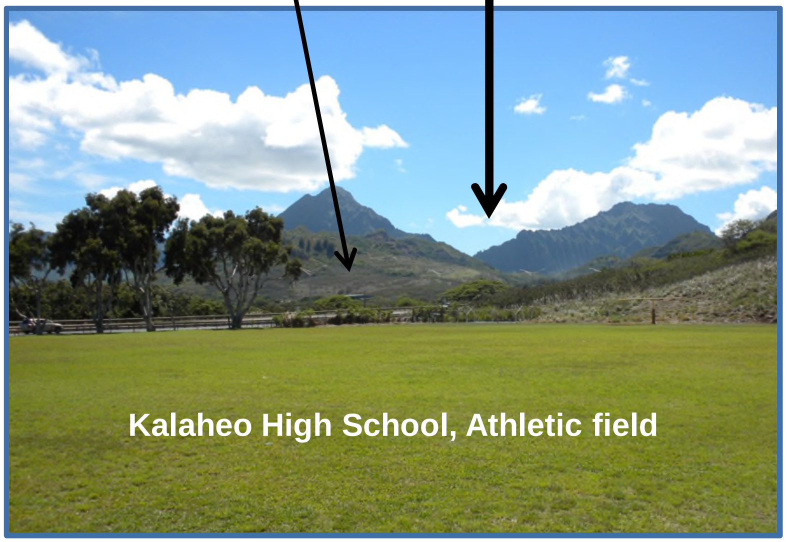


D View from the eastern side of the Model Airplane Park looking west towards the project site. The cars in the foreground parked on the parking lot of the Model Airplane Park.

Figure VIA-6:
Existing Viewplane D – Close-up View

Kailua Refuse Transfer Station
(at quarry road)

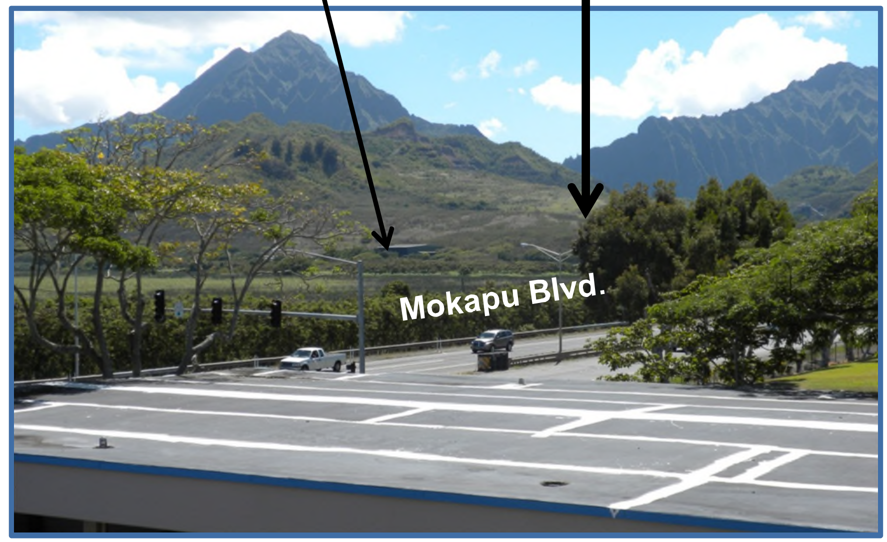
Project site (hidden from direct view)



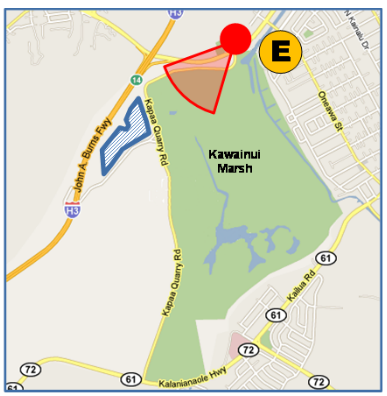
View from Kalaheo school grounds; view from athletic field towards the project site

Kailua Refuse Transfer Station
(at quarry road)

Project site (hidden from direct view)



View from Kalaheo school grounds; view from building A (at ground floor); Bldg. A offers best view towards the project site



E Two views from the grounds of Kalaheo High School. The locations of the cameras are on the athletic field and from the ground floor of Building E, both locations are at the western part of the school campus. On both views the project site is hidden by trees and brushes from direct view from the school grounds. .

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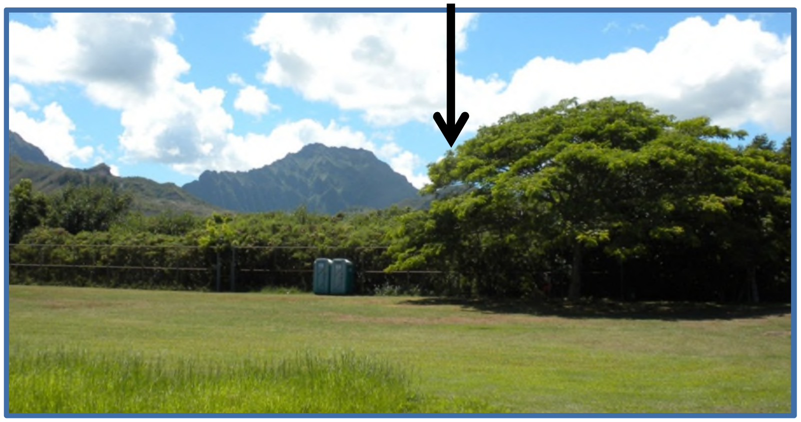
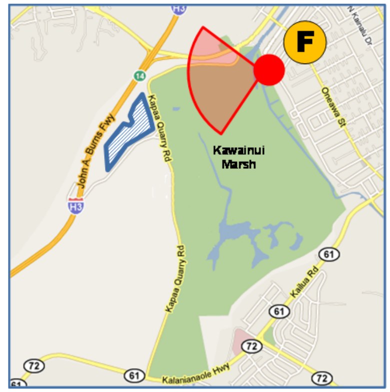
Figure VIA-7:
Existing Viewplane E

Project site (hidden from direct view)



Sub-viewplane F-1: Views from the grounds of the **Kawainui Neighborhood Park** (at the end of Kaha Street, Kailua).



F Viewplane F:

Viewplan F incorporates two sub-viewplanes, F-1 and F-2 <u>Sub-viewplane F-1</u> represents views from the grounds of the Kawainui Neighborhood Park <u>Sub-viewplane F-2</u> represents views from the path along the flood control levee (which terminates at the Kawainui Neighborhood Park)

Project site

Sub-viewplane F-2: Views from the path along the flood control levee.

This Figure is added to the content of the DEIS

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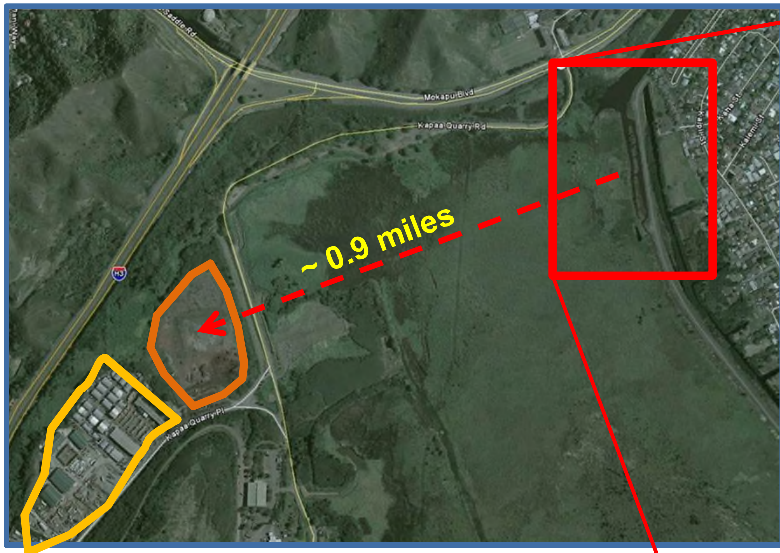
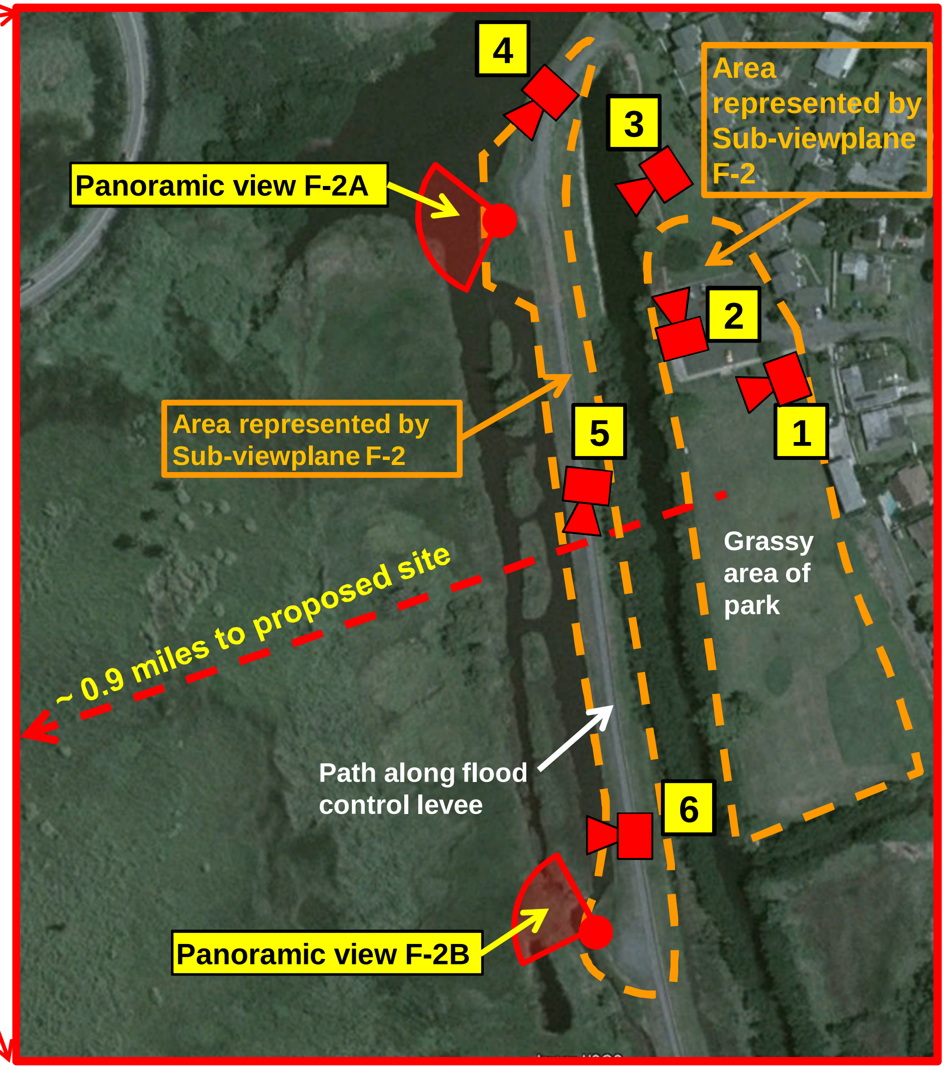
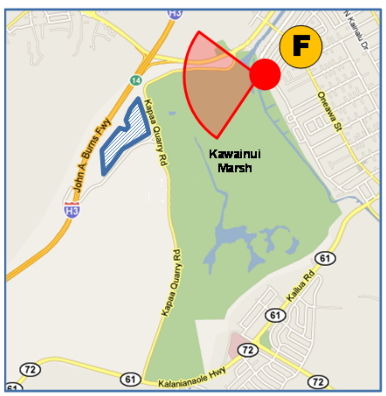
Figure VIA-8.A:
Existing Viewplane F-1 and F-2







F Viewplane F

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Figure VIA-8.B: Definition of the Sub-viewplanes F-1 and F-2 for existing views

1 **Sub-viewplane F-1:** View from the Kawaiinui Neighborhood Park toward the proposed site; shows the grassy area

2 **Sub-viewplane F-1 :** View inside the Kawaiinui Neighborhood Park toward the railhead of path along the flood control

3 **Transition between sub-viewplanes F-1 and F-2:** View from inside Kawaiinui Neighborhood Park towards the propose site

4 **Sub-viewplane F-2 :** View from the northern end of the path along the flood control levee toward the proposed site

5 **Sub-viewplane F-2 :** View along the flood control levee toward the south

6 **Sub-viewplane F-2 :** View from the path along the flood control levee toward the proposed site

This Figure is added to the content of the DEIS

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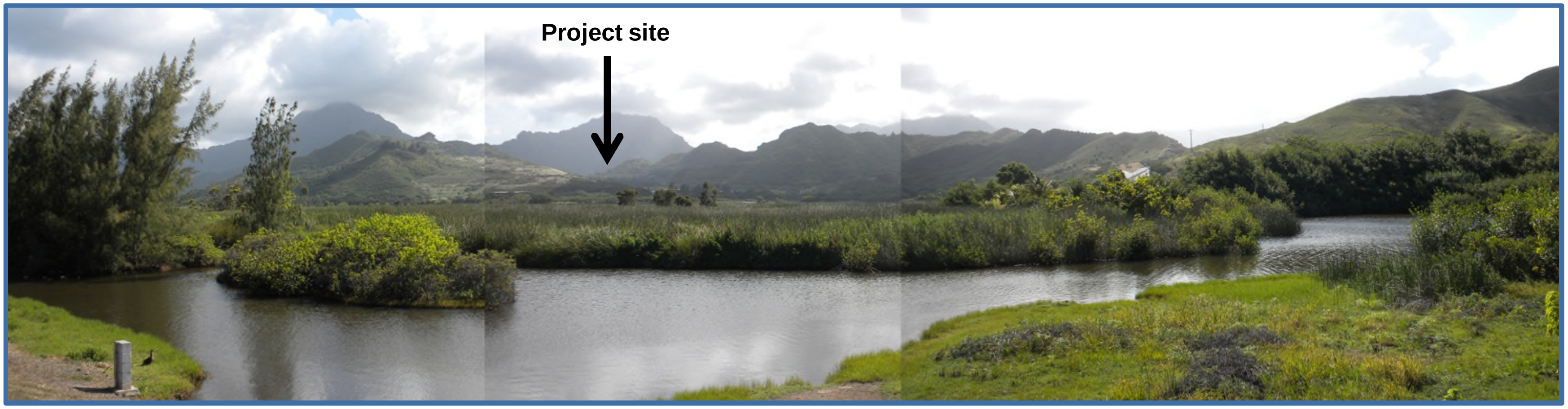
Figure VIA-8.C: Existing views from sub-viewplanes F-1 and F-2



Panoramic view F-2A

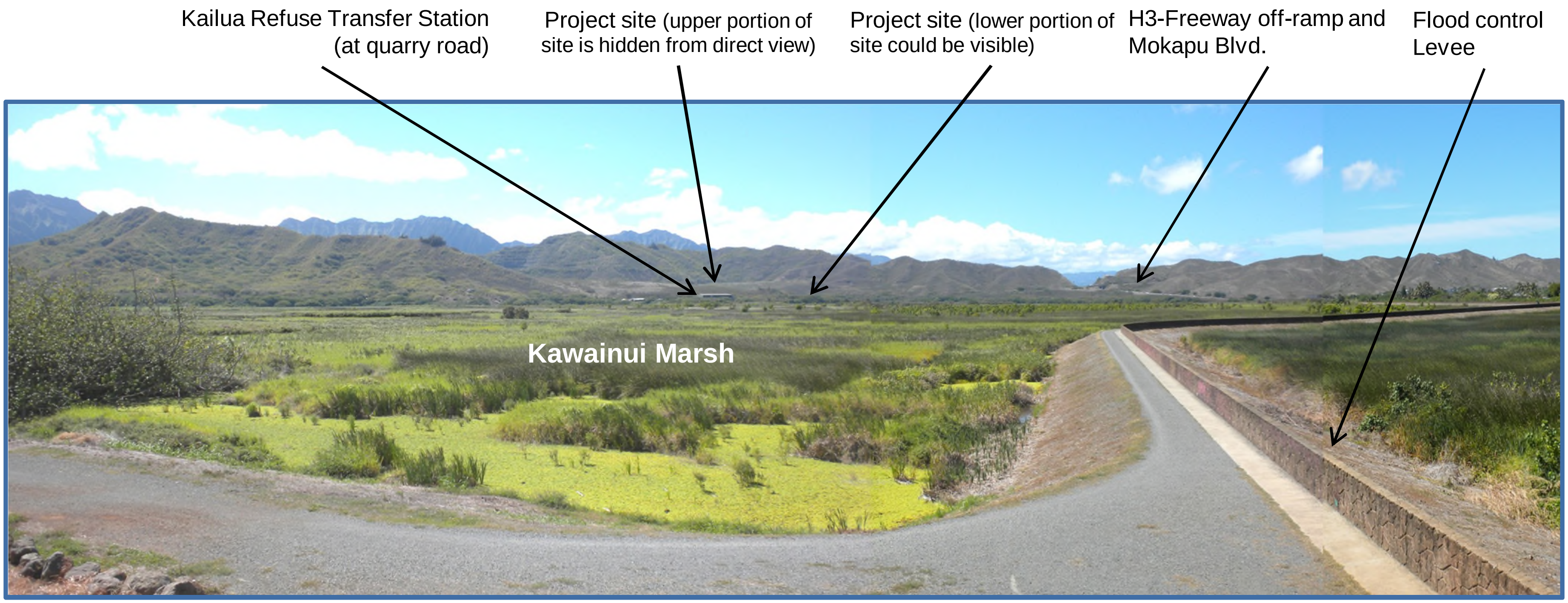
Sub-viewplane F-2: Existing panoramic View F2-A taken from the path along flood control levee toward the proposed site

Panoramic view F-2B

Sub-viewplane F-2: Existing panoramic View F2-B taken from the path along flood control levee toward the proposed site

This Figure is added to the content of the DEIS

Figure VIA-8.D: Existing views from Sub-viewplane F-2



G

Panoramic view; from the southern end of the flood control levee, which protects Kailua neighborhoods from floods in the marsh. The start of the flood control levee is adjacent to Kailua Road. This series of photos were taken from an observation point adjacent to a small parking lot off Kailua Road. The project side is not directly noticeable since it is located behind trees, to the right of the tall building of the Kailua Refuse Transfer Station.

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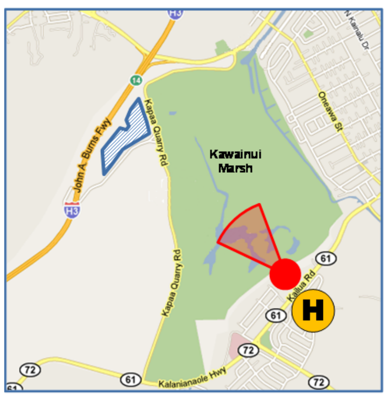
Figure VIA-9:
Existing Viewplane G

Project site (hidden from direct view)

View 1:

Project site (hidden from direct view)

View 2:



H

Views from the grounds of the Ulupo Heiau State Monument. This Heiau is a culturally significant site. The two views show as follows:

View 1: The photo was take at the eastern side of the heiau. The view across the marsh shows the project site being hidden from direct view by the heiau and by trees in the back.

View 2: The photo was take close the viewing area, where information displays are located. The photo was take at a height of approximately 9 feet above the ground to view above the rocks of the heiau; this view, being therefore not a typical view of a visitor of the heiau, does not have a direct view of the project.

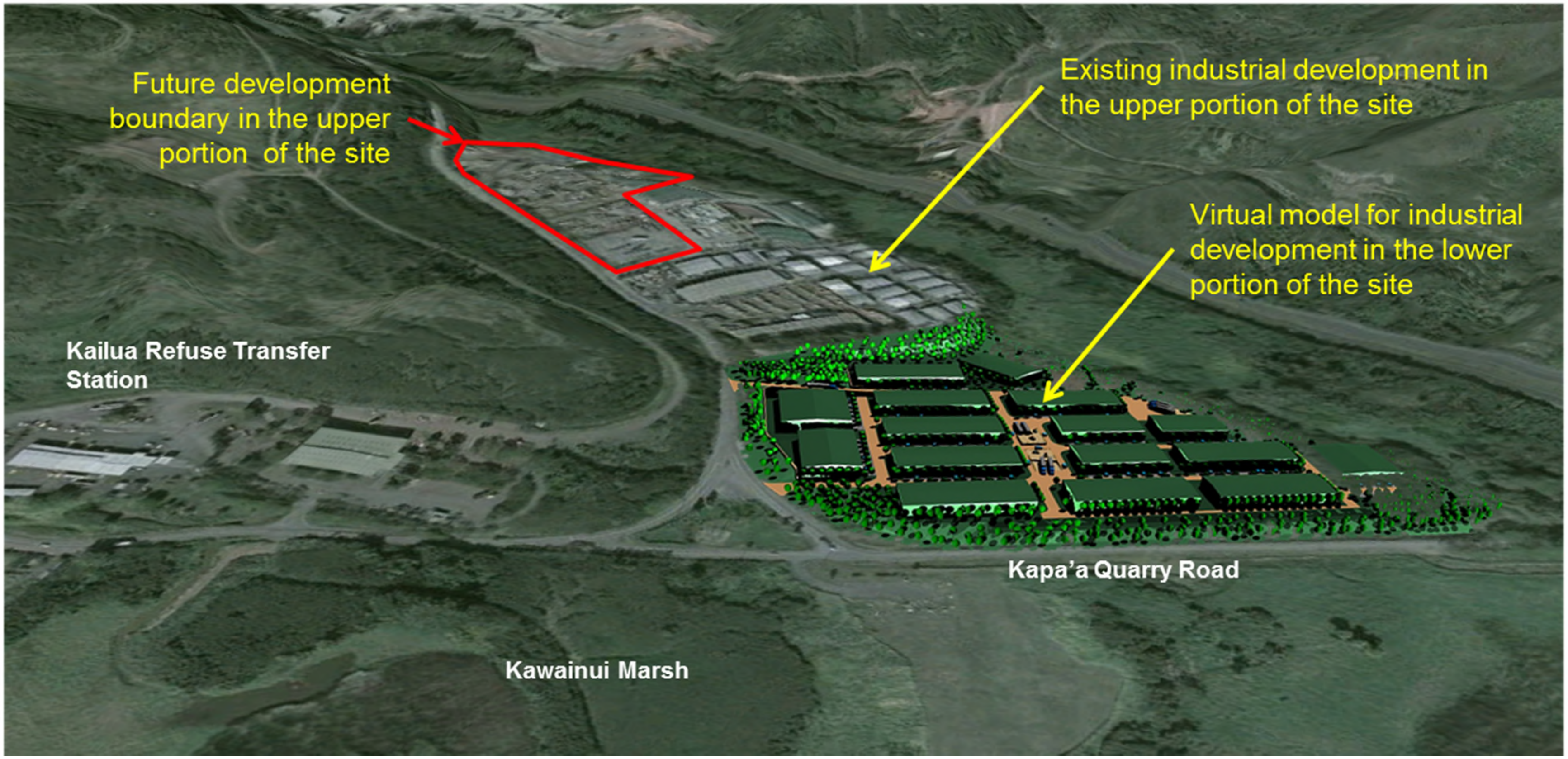


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Figure VIA-11:
Definition of the virtual model of the proposed development in lower portion of the site

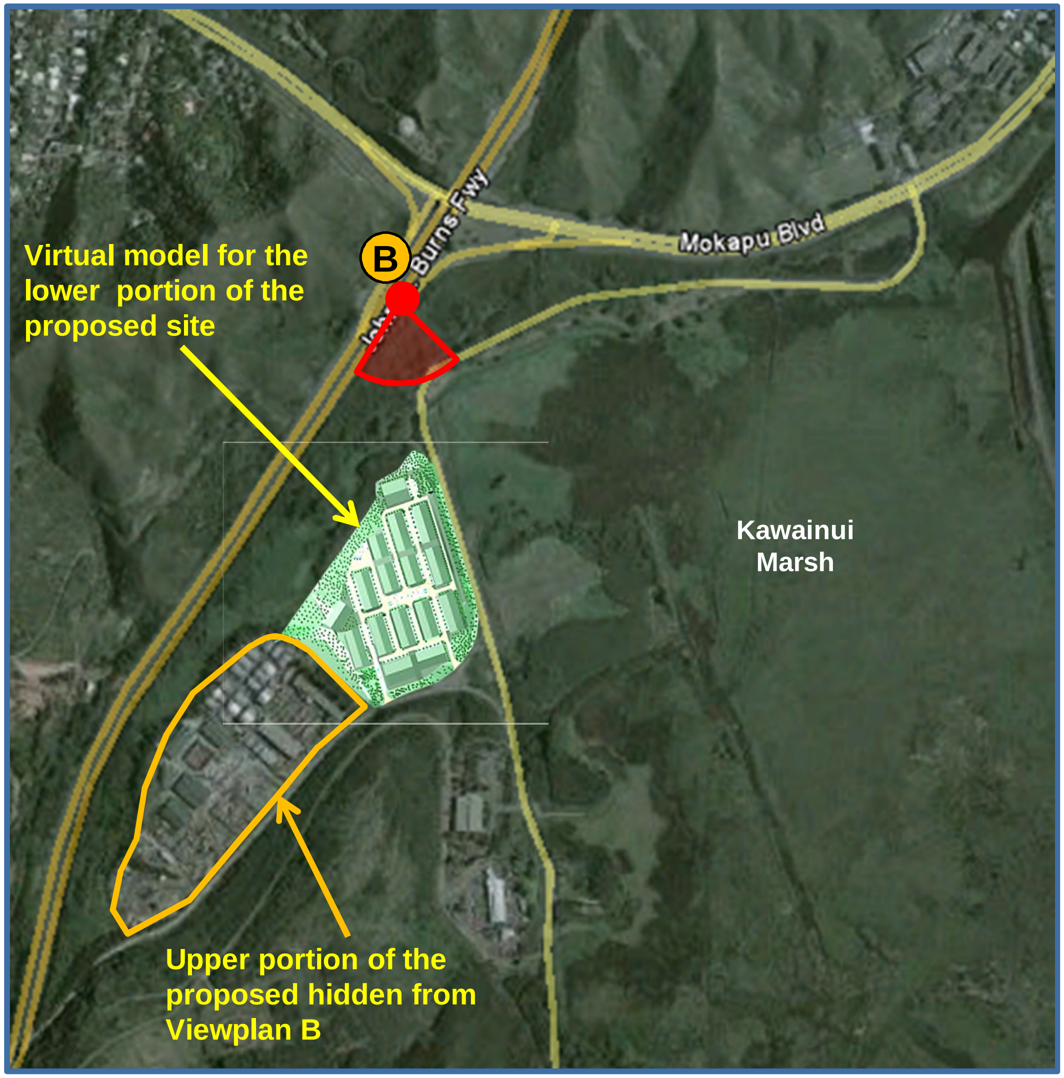

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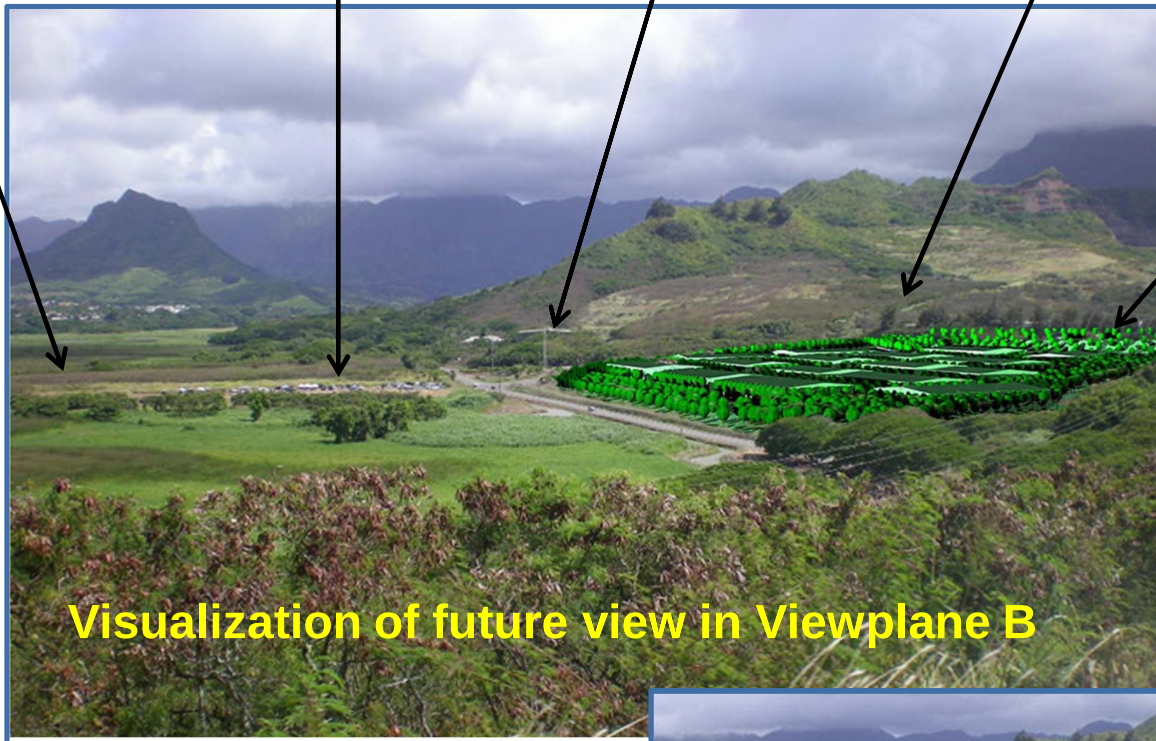
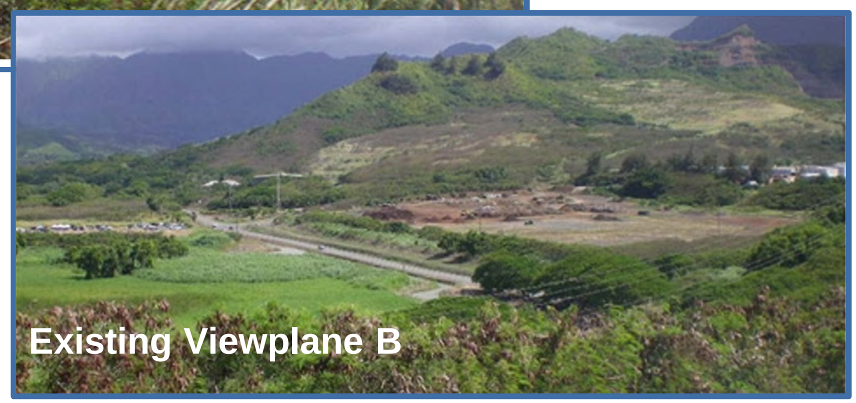
Figure VIA-12: Definition of the Viewplane B for simulated future view





B View from the H3-freeway driving makai (towards the ocean). View is towards the project site. The warehouses in the lower portion of the site are simulated with a rendering of the virtual 3D-model. The proposed mitigation measures include vegetated buffer zones around all four sides of the development as well as trees planted within the development footprint and the choice of shades of colors for the roofs and walls of the warehouses that help reducing the visual impact.

Figure VIA-13: Simulating future view of Viewplane B with virtual model

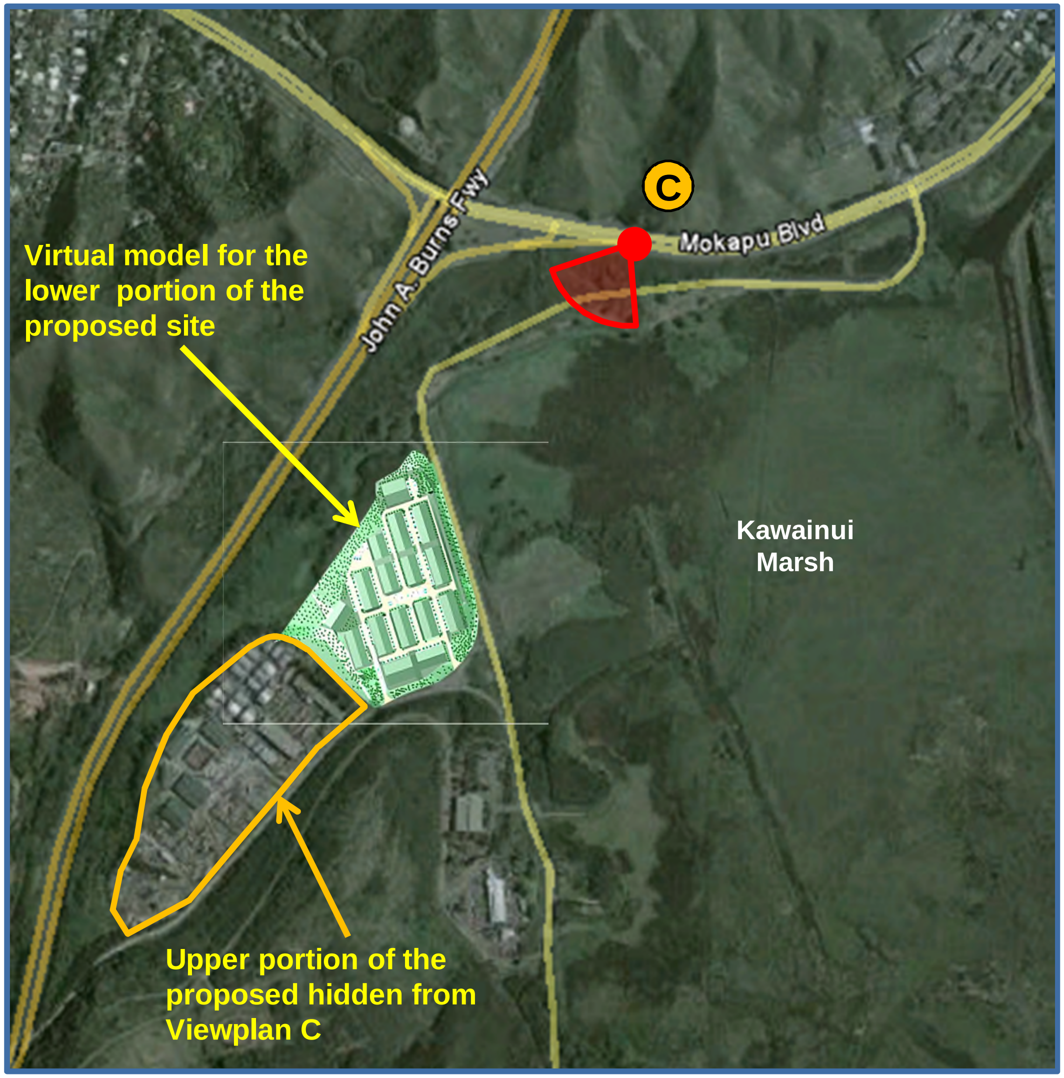


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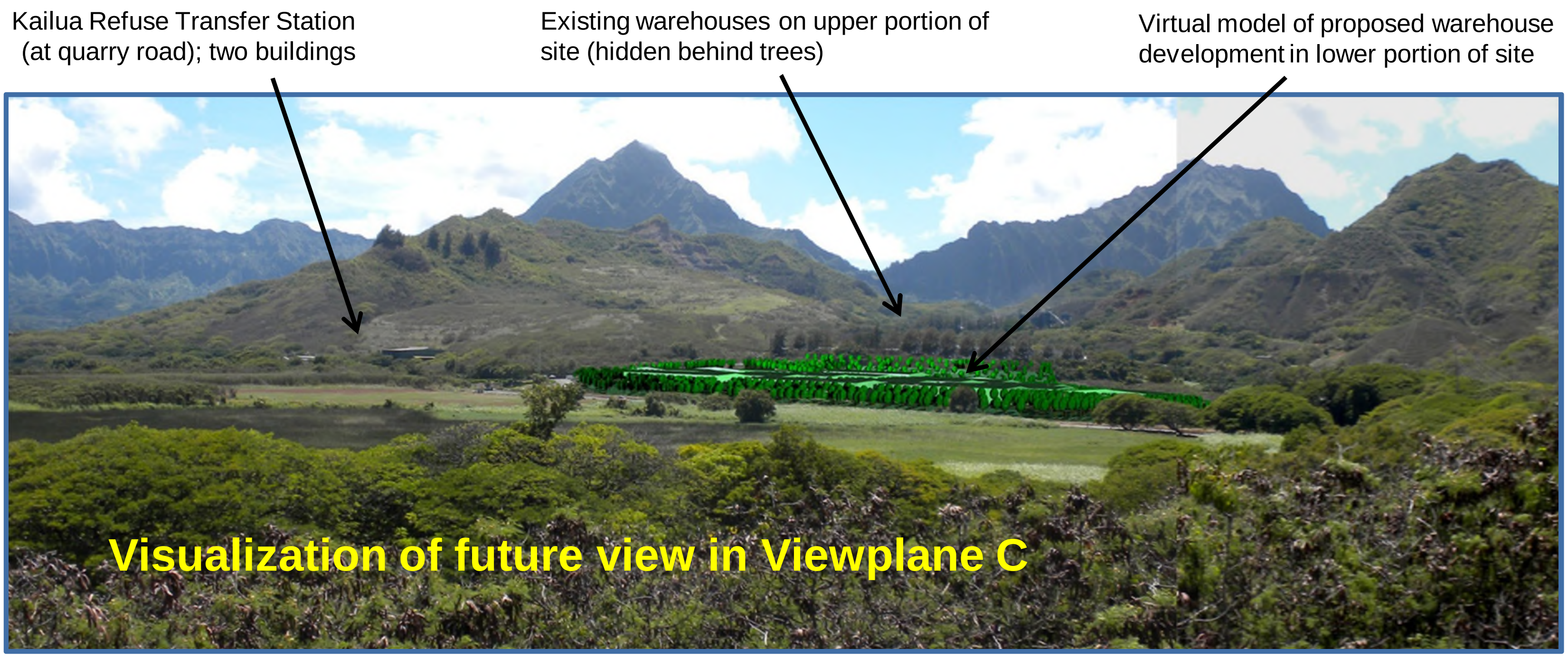
Figure VIA-14: Definition of the Viewplane C (detailed view) for simulated future view



B

View from the H3-freeway off-ramp driving makai (towards the ocean). View is towards the project site. The warehouses in the lower portion of the site are simulated with a rendering of the virtual 3D-model. The proposed mitigation measures include vegetated buffer zones around all four sides of the development as well as trees planted within the development footprint and the choice of shades of colors for the roofs and walls of the warehouses that help reducing the visual impact.

Figure VIA-15: Simulating future view of Viewplane C with virtual model

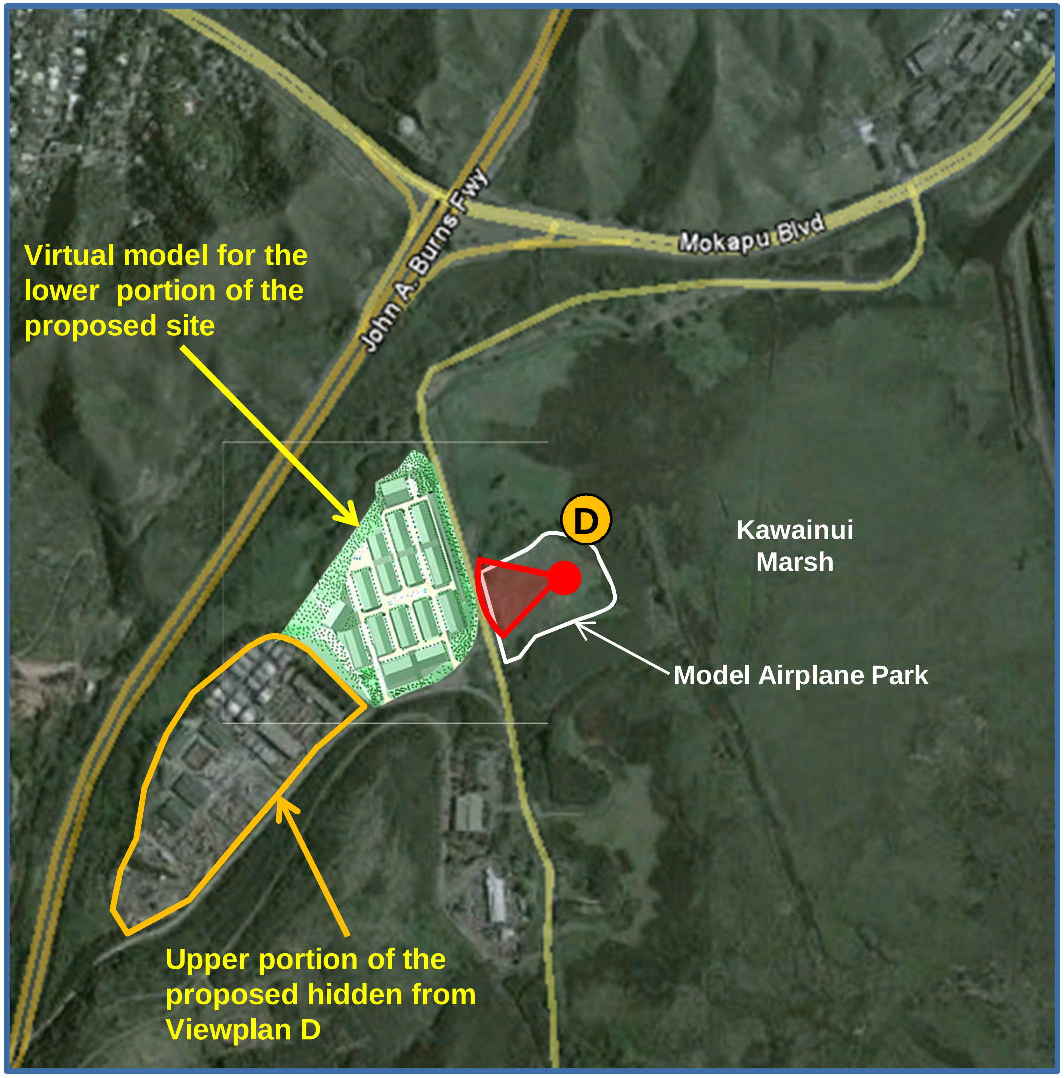


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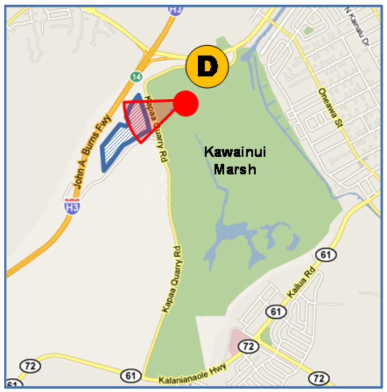
Figure VIA-16: Definition of the Viewplane D for simulated future view



D View from the eastern side of the Model Airplane Park looking west towards the project site. The development in the lower portion of the site is simulated with rendering using a shaded (yet using ray-tracing) representation of the virtual model. (The parts of the proposed development closest to the Kapa'a Stream, e.g. towards the right margin of the rendering, are not shown for this presentation.

Figure VIA-17: Simulating future view of Viewplane D with virtual model

Image 1:
Virtual renderings using **photo realistic models of trees** within the vegetated buffer zone in lieu of the simple color rendered trees. The height of the photorealistic models are the same as the simple tree objects used in the color-shaded-only visualization. .

Image 2:
Virtual renderings using **simplified shaded models of trees** within the vegetated buffer zone.

D

View from the eastern side of the Model Airplane Park looking west towards the project site. The development in the lower portion of the site is simulated with renderings using a shaded) representation of the virtual model.(see image 1 above). In order to simulate a more realistic close-up view, photo realistic models of trees were used in lieu of the simple color rendered trees (see image 2 above).

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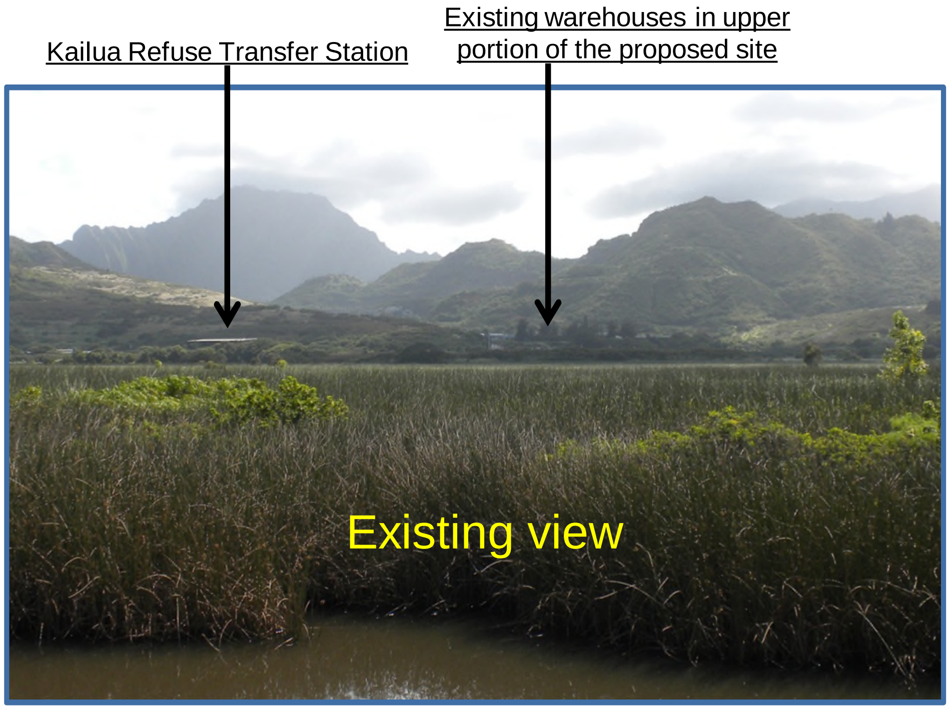
Figure VIA-18: Comparison of shaded object versus photorealistic rendering for close-up view in Viewplane D

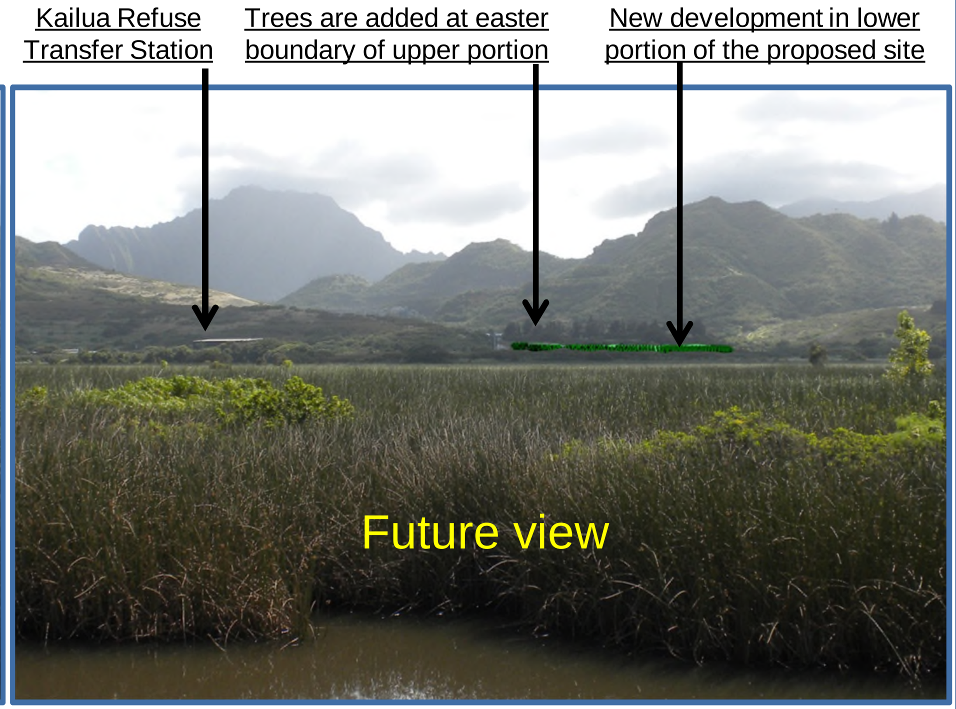
F-2

- Only views of **Sub-viewplane F-2** have direct line of sight to the proposed site.
- In **Sub-viewplane F-1** there is no direct line of sight to the proposed site; the direct line of sight is obstructed with trees.

This Figure is added to the content of the DEIS

Figure VIA-18/Add A: Definition of the Sub-viewplane F-2 for simulated future view



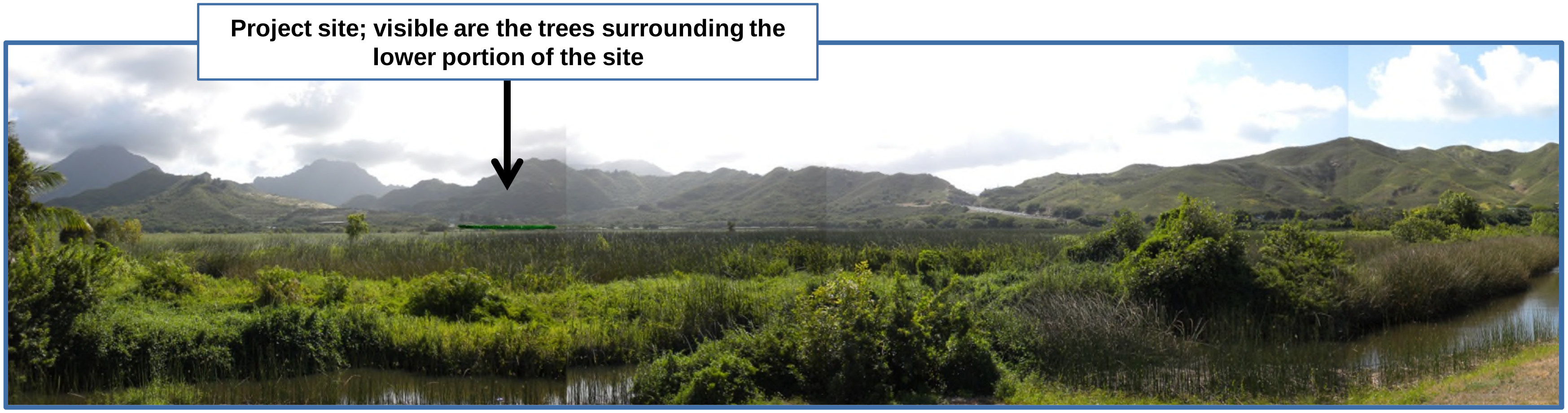


5 Detailed view 5: **Existing view** from the path along the flood control levee (at the location of Detailed View 5; shown in Figure VIA-21.A) over the marsh toward the existing condition of the proposes site development. The existing warehouses in the upper portion of the site are partially visible behind a row of tall trees that are planted at the eastern perimeter of the upper portion of the site (e.g. within the area between the upper and the lower portion of the proposed project sit)e.

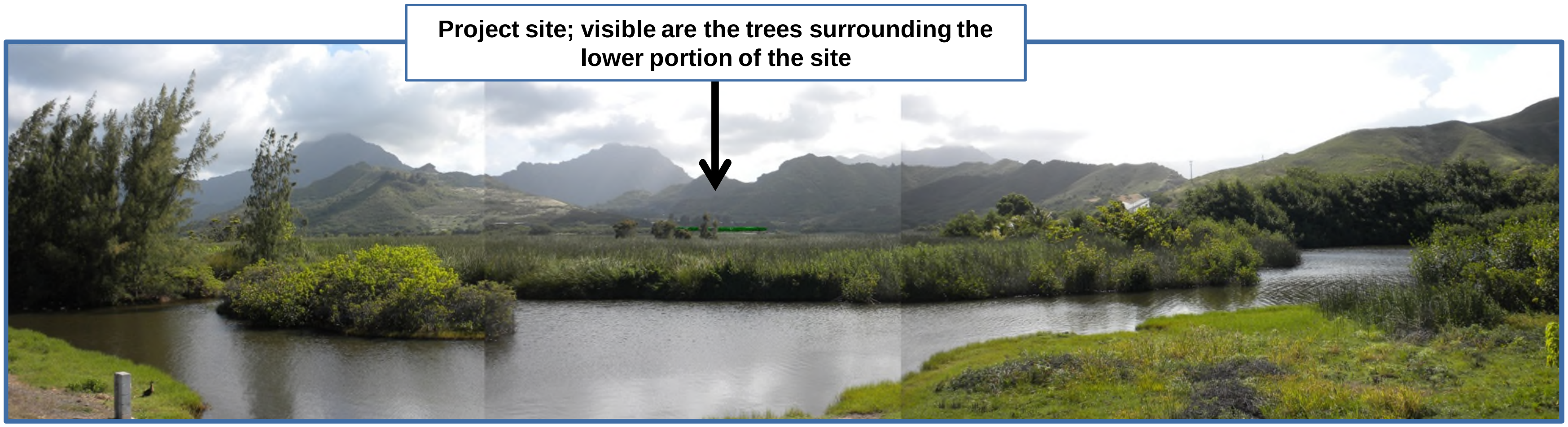
5 Detailed view 5: Rendering of the **future view** is superimposed on the existing view. In this anticipated future view there are several trees added to the existing row of trees at the eastern perimeter of the upper portion of the site . Adding these tress increases the "camouflage" of the upper portion of the site. A computer generated image (color enhanced) indicates the anticipated view of the vegetated buffer around the lower portion.

This Figure is added to the content of the DEIS

Figure VIA-18/Add B: Views in Sub-viewplane F-2 with future simulated view of proposed project superimposed on existing view



Panoramic view F-A Future panoramic view F2-A from of taken from the path along the flood control levee toward the proposed site



Panoramic view F-B Future panoramic view F2-B of taken from the path along the flood control levee toward the proposed site

This Figure is added to the content of the DEIS

Figure VIA-18/Add C: Views in Viewplane F-2 with future simulated view of proposed project superimposed on existing view

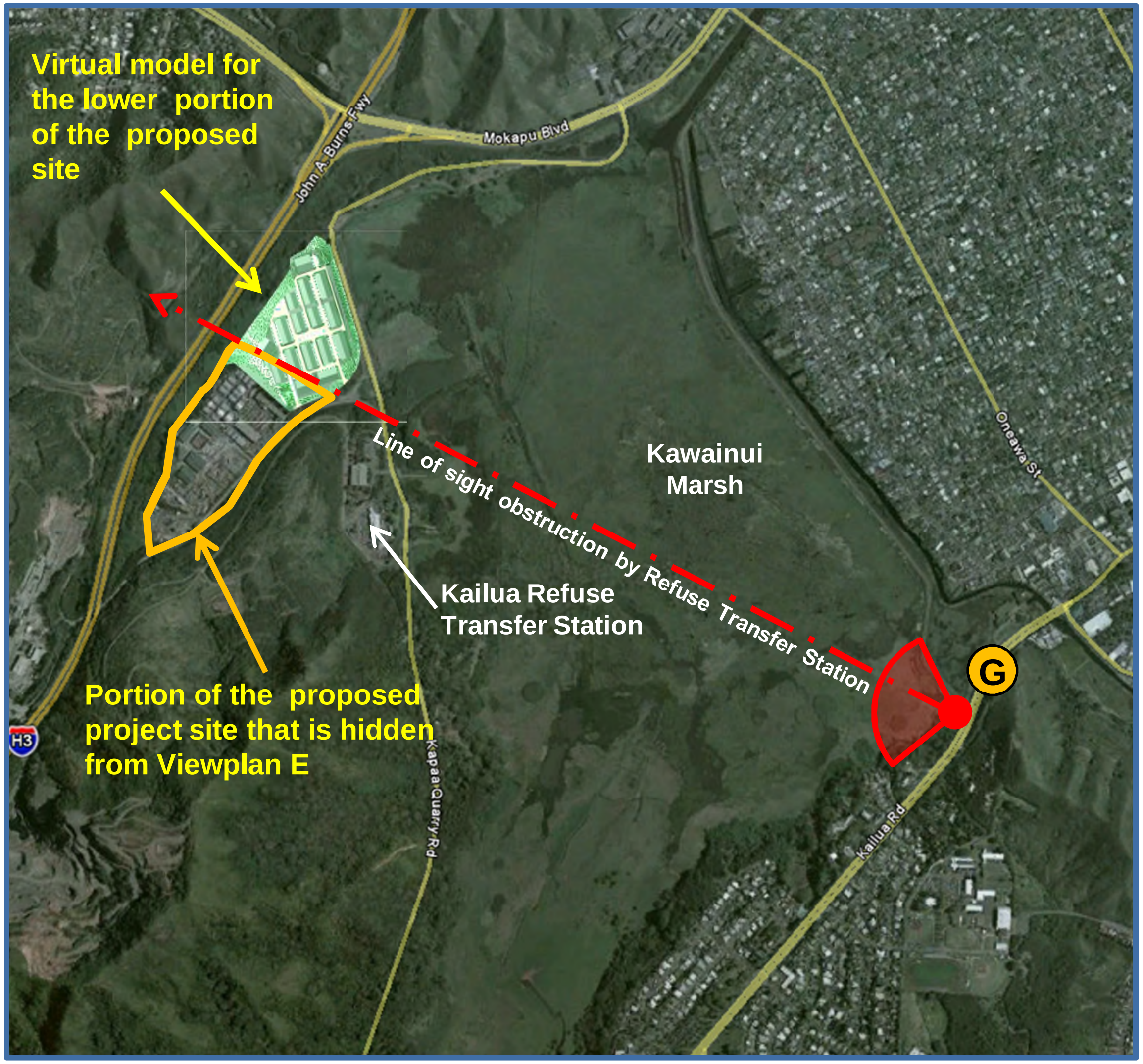


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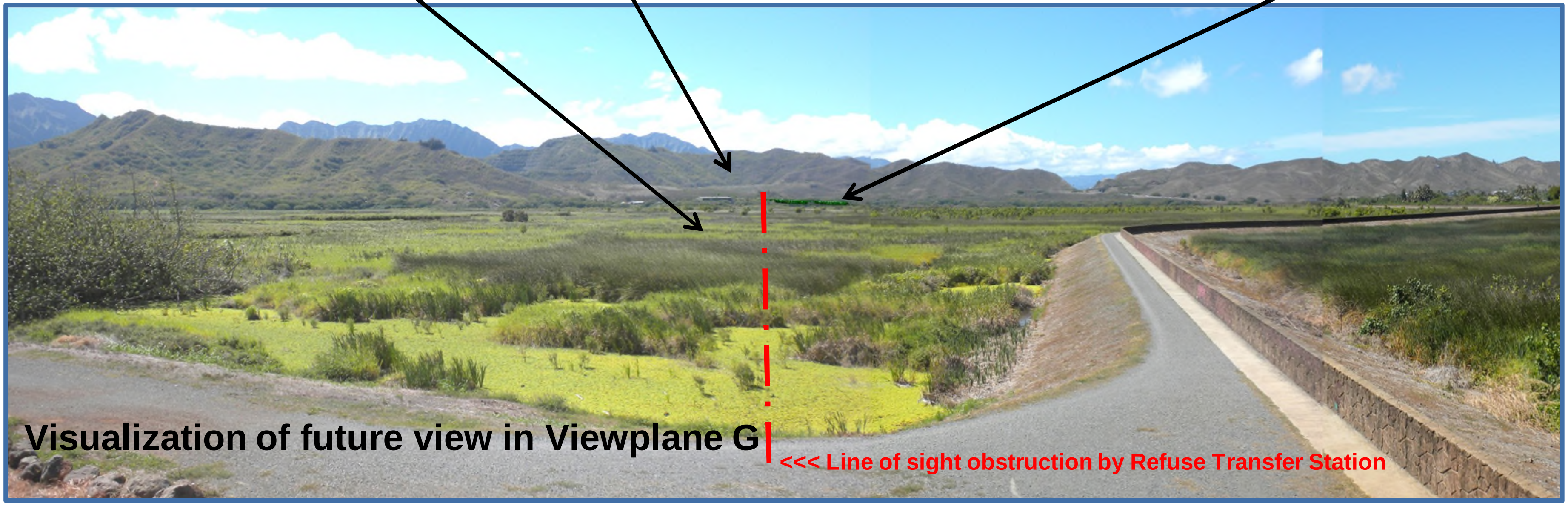
Figure VIA-19: Definition of the Viewplane G for simulated future view

Kailua Refuse Transfer Station (at quarry road); two buildings

Existing warehouses on upper portion of site (obstructed from view by existing structures or vegetation)

Virtual model of lower portion of site



G

View from the south eastern end of the flood control levee. The lign of sight obstruction illustrates that parts of the proposed project site are hidden by structures and surrounding trees and berms of the Kailua Refuse Transfer Station. In the image only portions of the proposed development that are located to the right , e.g. north-eats, of the line would be visible in Viewplane G. The green line of the rendering suggest on trees will be visible, but no buildings.

Figure VIA-20: Simulating future view of Viewplane G with virtual model

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Final Environmental Impact Statement

for the proposed

Kapa’a Light Industrial Park

Kailua, Hawaii

Appendix 9:

Information about previously conducted archeological survey

<u>Appendix 9 is identical to Appendix 9 of DEIS</u>

January 2011

Prepared by

Sustainable Design & Consulting LLC
Technical and Organizational Sustainability Consultants
Honolulu, Hawaii
www.sustain-hi.com

Appendix 9 – Introductory Remarks:

The State Historic Preservation Division, Department of Land and Natural Resources in their letter dated February 23, 2009, suggested citing in the body of the EA and inclusion of a portion of the following report as an appendix:

> *Cultural Survey Hawai's (2000) "Archeological Assessment and Background Literature review Search for the proposed Circle-Kawai Nui Marsh Trail Project, Kailua Ahupua'a, District of Ko'olaupoko, Island of Oahu, Honolulu, Hawaii, TMK: (1) 4-2-013:010 and 038; 4-2-16:001 & 006.*

This report was previously published in conjunction with the Final Environmental Assessment for the proposed Circle-Kawai Nui Marsh Trail Project. The report can be downloaded from the website of the Office of Environmental Quality Control.

http://hawaii.gov/health/environmental/oeqc/index.html

Archaeological Assessment and Background Literature Search for the Proposed Circle-Kawai Nui Marsh Trail Project, Kailua *Ahupua`a*, District of Ko`olaupoko, Island of O`ahu

Prepared for:

Helber, Hastert, and Fee, Planners, Inc.

By

Matt McDermott, B. A.,
Tina Bushnell, B. A.,
Victoria Creed, Ph.D.,
Scott Kikiloi, B. A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaii, Inc.
December 2000

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DOCUMENT CAPTURED AS RECEIVED

I. INTRODUCTION

Cultural Surveys Hawai'i, Inc., was contracted by Helber, Hastert, and Fee, Planners, Inc., to provide an archaeological assessment for the Kawai Nui Marsh Pathway project, Kailua Ahupua'a, Ko'olaupoko District, Island of O'ahu. For decades there has been community, county, and state discussion regarding the construction of a peripheral trail system along the margins of Kawai Nui Marsh. The proposed trail system is to be recreational and interpretive, highlighting the natural and cultural/historical resources of the marsh. The 1994 Kawai Nui Marsh Master Plan, prepared for the State of Hawaii Department of Land and Natural Resources, summarizes some of the objectives and purposes of the marsh trail network:

> The primary planning objective for trails is to provide access along the marsh fringe and to interpret resources for educational purposes. Recommended actions set forth in the 1983 State Resource Management Plan encourage the creation of establishment of safe hiking paths and jogging trails in perimeter areas of the marsh; and the establishment of trails and overlook systems to connect principal cultural features such as heiau, and interpretive centers with wildlife overlooks. The trails could link park space, the visitor center, the ethnobotanical garden, cultural sites, and other master plan components in a contiguous manner. In addition to being a recreational asset, the trails would be of educational value by allowing access to natural areas for group hikes. It is envisioned that the trails would serve school groups of all ages, providing them access to the marsh fringe. However, the trails should also be capable of serving the unaccompanied public via signage and interpretive displays. (Wilson Okamoto & Associates, Inc. 1994:4-15--4-16)

The current report is a step toward making these Master Plan objectives a reality. Kawai Nui Marsh and its periphery were the focus of land use from early prehistoric times into the modern era. This land use has left physical remains, legends, and oral traditions. Historical, ethnohistorical, and archaeological research document the rich cultural resources of the area. One of the objectives of the Kawai Nui Trail is to expose trail-users to this rich cultural heritage. This report looks at the potential, feasibility, and impacts of trail construction from the stand point of historic preservation and historic/cultural interpretation.

Background research for the project was undertaken in the Spring of 2000. The field inspection was done in July 2000. Figure 1 shows the location of the project area and the proposed trail segments.

A. Scope of Work

The agreed upon scope of work consisted primarily of historical and archaeological literature review and a reconnaissance-type field inspection of the proposed pathway alignment. With the background research providing the historical and cultural context of

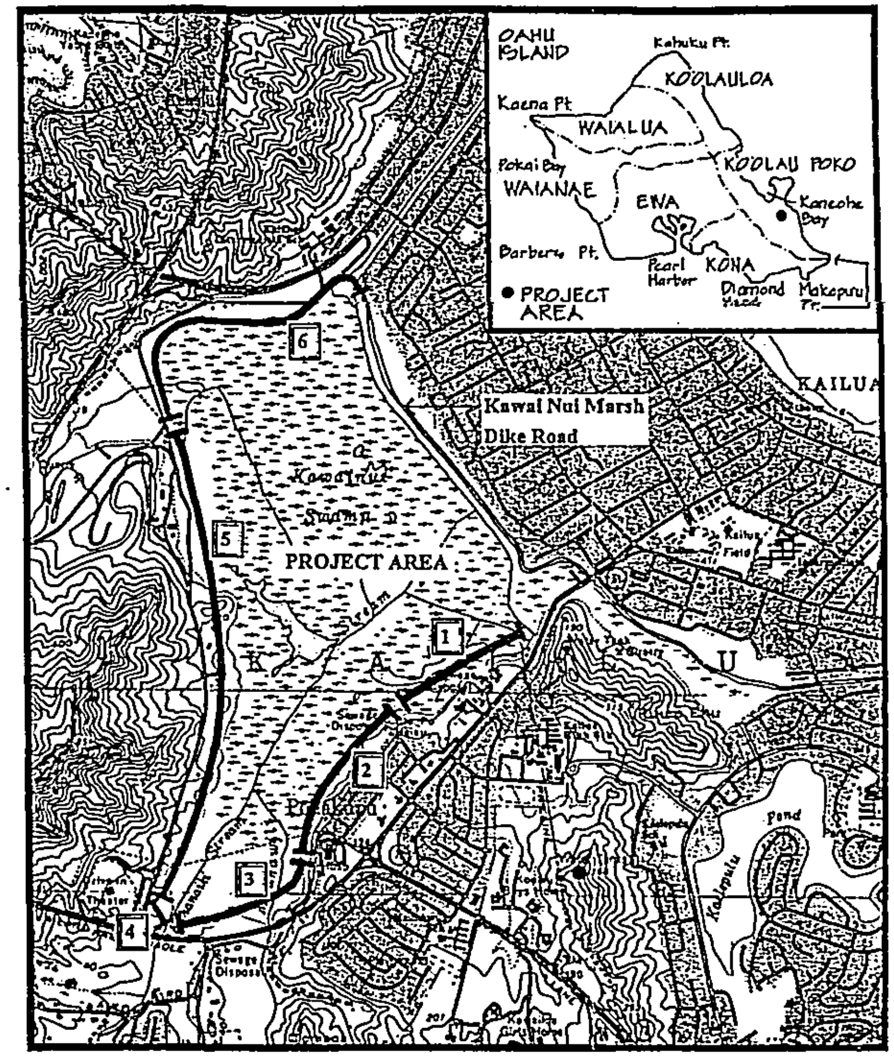

Figure 1 Portion of the 1983 USGS Topographical Map, Mokapu Quadrangle, Showing the Project Area in Hatching and the Proposed 6 Segments of the Circle-Kawai Nui Trail

the Kawai Nui Trail, the field reconnaissance assessed and addressed potential impacts of the pathway construction on the historic properties known to be in the vicinity of the trail alignment. Terrain and vegetation limitations were noted. The interpretive potential of the different sites was considered along with the potential impact to the sites with increased pedestrian traffic through this currently under-utilized area. The specific scope of work included three items:

1. A literature review to a) produce an up-to-date bibliography of all studies on Kawai Nui, b) produce an updated table and map of all archaeological sites in the immediate vicinity of Kawai Nui, c) produce an assessment of the impacts of path development on archaeological resources and of the opportunities presented for archaeological resource interpretation, and d) produce a compendium of information for the interpretation of the archaeology of the entire marsh as well as of the most important archeological sites in the immediate vicinity (Ulupo, Pahukini and Holomakani *Heiau*) for which site interpretation may be desired.

2. A field reconnaissance of the entire proposed pathway to a) better understand constraints and opportunities of archaeological resources, b) to document photographically archaeological sites and opportunities for cultural landscape interpretation

3. Production of this report to document findings specifically dealing with archaeological constraints and their mitigation and archaeological opportunities and their enhancement and interpretation.

This document is not intended for review by the Department of Land and Natural Resources/State Historic Preservation Division as part of the State's historic preservation review process. This document is for planning purposes and is intended to guide decisions regarding the potentials for various trail alignments, for public interpretation of historic properties, and how to mitigate the impacts of trail construction on the adjacent historic properties.

B. The Proposed Trail Alignment

The 1994 Kawai Nui Master Plan has the following to say regarding the location of the proposed trail:

> The trail system in the proposed master plan is a perimeter trail. This was supported by community participants despite concerns about safety and security, and the cost of footbridges or boardwalks across the wetland. However, the primary segments continue to be from Ulupo Heiau to Kukanono Slope, along the Kapa'a Quarry Road slope, and along the flood control levee. Construction of the remaining trail segments to complete the perimeter trail is envisioned as a long-term project. (Wilson Okamoto & Associates, Inc. 1994:4-16--4-17)

Helber, Hastert, and Fee have proposed the completion of the circle-Kawai Nui Trail through the construction of 6 contiguous trail segments, see Figure 1. These trail segments are to be completed as funds are made available.

Segment 1, the first segment proposed for construction, will connect the southern end of the Kawai Nui Dike (or Levee) Road with the vicinity of Ulupo *Heiau*. The terrain in this area is characterized by steep to moderate undulating slopes that meet abruptly at the edge of the marsh. *Hau* bush fringes the marsh edge and forms a thick nearly impenetrable forest throughout the area.

Continuing clockwise around the marsh, Segment 2 will connect Ulupo Heiau with the vicinity of Castle Medical Center. This segment will pass along the Kukanono slope through areas that are currently used by the Knott ranching operation. Some of the more striking natural features of this area include medium to large rock outcrops and the aerial root structures of Banyan trees.

Segment 3 will connect Castle Medical Center with the Pali Highway end of the Kapa'a Quarry Road. This segment extends from the southeast corner of Kukanono Subdivision to Kahanaiki Stream near the intersection of Quarry road and Kailua Road. The natural character of this segment which is currently dominated by the Knott cattle ranch operation, is mostly open land with level terrain. Natural slopes occur along the access road to the ranch operations, as well as at Mokulana Peninsula. The segment is bisected by Maunawili and Kahanaiki Streams. The Army Corps of Engineers has proposed the excavation and maintenance of shallow ponds in the vicinity, generally parallel the two streams in the area. The pond construction is intended to restored waterbird habitats.

Segment 4 is a short trail length that cuts across the corner formed by Pali Highway and Kapa'a Quarry Road. This corner is one of the proposed sites of the Kawai Nui Marsh Visitor Center. The terrain varies from forested slopes to low lying wetland marsh along Kahanaiki Stream. The area incorporates some of the lands proposed to become restored waterbird habitat

Segment 5 will extend approximately 1 ½ miles along Kapa'a Quarry Road from Pali Highway to the vicinity of the Honolulu City and County's model airplane park, near Kapa'a Land Fill. Natural characteristic of the area are similar to those in the Kukanono area (Segment 2), with moderate to steeply sloped terrain that includes a variety of mature tree and shrub species that combine to create a full shade producing canopy. Significant area of the Hau bush also fringe the marsh in some locations. The area includes several prominent rock outcrops including the Na Pohaku O Hauwahine Overlook. Ranch operations (VO Ranch) occupy approximately 10 acres just south of Na Pohaku.

Segment 6 will connect the vicinity of the model airplane park with the north end of the existing Kawai Nui Dike (Levee) Road. A foot bridge may or may not be built to cross Oneawa Canal at the northern end of the Dike Road. Alignment options for this final segment include a pathway on the makai (marsh) side of Quarry Rd. As recommended by the 1994 master plan, or crossings to the mauka side of the road. The natural character of the area makai of Quarry Road is flat, with much of the area consisting of actual marsh features in close proximity to the road. Terrain mauka of the road includes an area of moderate to steeply sloped terrain with a number of mature tree and shrub species to create a more forest-like setting. From the northeastern end of Segment 6, the Kawai Nui Dike Road extends to Segment 1 and completes the perimeter of the marsh.

C. Methods

Background Research

Background research included a review of previous archaeological/historical studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; a review of geology and cultural history documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; and a study of historic maps at the Survey Office of the Department of Accounting and General Services. Land conveyance research related to the *Māhele* of the mid-19th century was done through *Waihona-'Aina.com*, the Internet search company. This research provided the environmental, cultural, historic, and archaeological background for the project area.

Many good historical and/or archaeological sources exist for Kawai Nui Marsh and its vicinity. These include, but are not limited to, Cordy (1977), Kelly and Nakamura (1980), Creed (1992), Clark (1980), Hall (1997), Erkelens (1993), Athens (1983a), Hammatt (*et al.* 1990), and Athens and Ward (1991). The purpose of the background research was to glean information from these existing sources and present it in the context of trail development. Previous historic and archaeological reports were used to prepare site location maps and site tables. Site location data were overlain on the proposed trail route alignment supplied on the Helber, Hastert, and Fee Kawai Nui Maps.

Field Inspection

Using the Helber, Hastert, and Fee trail alignment map with the overlay of the site location information, the trail alignment was walked. Using the site and feature descriptions from previous reports it was usually possible to relocate the previously documented sites. Comparisons were made between the previous description of the site and its present condition. Sites that may potentially be affected by trail construction and use were inspected to assess what the trail impact might be. Recommendations for mitigating trail impacts on specific sites were recorded. Using the site and feature maps from previous reports, proposed trail alignments through or near site areas were sketched. Trail alignments and their relationship to historic properties were photographed. A general assessment of the feasibility of trail alignments based on limiting factors such as vegetation and topography was also made.

II. CULTURAL AND HISTORICAL SETTING OF KAWAI NUI WITHIN THE *AHUPUA'A* OF KAILUA

The history of the Kailua region of O'ahu has been documented in a number of studies including, but not limited to, Hall's (1997) "The History of Kailua", Creed and Chiogioji's (1991) "Facets of Maunawili Valley and Kailua *Ahupua'a* History", and Kelly and Nakamura's (1981) "Historical Study of Kawai Nui Marsh Area, Island of O'ahu". All of these studies detail the legendary history and oral traditions, the legendary rulers and personalities, the early historic accounts, land ownership and utilization changes during and following the *Māhele*, and the changes in land use from traditional to modern times. With so many sources already documenting Kailua's rich historical and cultural past, the purpose of this section is only to orient the present project area within the overall historical and cultural setting. For more detailed accounts of Kailua's past, the reader is referred to the above sources, as well as the ones cited in the following text. Included in this section, under the discussion of the *Māhele* land divisions of the mid 19th century, is a detailed discussion of the Land Commission Awards claimed and awarded along the margins of Kawai Nui Marsh. This information was provided through Waihona Aina Corporation (*Waihona.com*), an Internet *Māhele* database.

A. Setting

Kailua *Ahupua'a* is the largest valley on the windward side of O'ahu, and the largest *Ahupua'a* of the Ko'olaupoko District (approximately 15 km by 11 km). Flanked by the *Ahupua'a* of Waimānalo on the southeast, Kāne'ohe on the northwest and Honolulu to the south, the *Ahupua'a* of Kailua is shaped like a rectangle. From the Ko'olau ridge line it extends down two descending ridge lines which provide the natural boundaries for the sides of the *Ahupua'a*. The fourth side of the rectangle is the reef line of Kailua Bay.

The natural environment includes the sand barrier upon which Kailua Town stands, the mountainous upland terrain and alluvial valleys of Maunawili, the largest fresh water marsh in Hawai'i (Kawai Nui Marsh), another inland pond (Ka'elepulu), approximately 18 permanent and intermittent streams, a freestanding mountain halfway between the shore and the Ko'olau (Olomana--1,643 ft.), several low ridge lines, and off-shore the Mokulua Islands, Mokole'a Rock, and Popoia Island. It comprises 11,885 acres of land according to the Boundary Commission Review of the mid-19th century, but in fact extends beyond the shore approximately a mile out to sea, to the reef.

During the estimated 1000 to 1500 years since initial Polynesian settlement, the sand barrier that forms the shore at Kailua Bay has provided a desirable location for residences with a sunny, dry beach area. The well-watered interior lands, including the two marsh/pond areas of Ka'elepulu and Kawai Nui and the many springs and streams of Maunawili, provided bountiful agricultural and resource gathering areas. During the 15th and 16th centuries Kailua O'ahu was the center of a large royal complex with ample playgrounds for sports and physical training, and recreation (Sterling and Summers 1978:231-232). Supporting this large complex was a most bountiful garden hinterland where fish, fowl, and vegetables were plentiful (*Ibid.*:227-228).

Mele or chants about Kailua frequently mention the two fishponds famous for their mullet and *awa*. They also tout the taro gardens of the area (see Beckwith 1979 and Drigot (1982), in the legendary *mo'olelo*, or epics (e.g. Hi'iakaikapoliopele, Kahinahinanui, Makalei Tree, Ka'ulu are a few of the stories). Early visitors (Bowser (1880), in particular) to the island also mention a wealth of birds in the area.

Beside a sunny beach area and uplands watered by frequent showers, other resources were easily available in Kailua. As the center of the caldera of the ancient Ko'olau Volcano (MacDonald and Abbott 1974:363) a basalt quarry (the present Ameron Quarry is built upon the site of the pre-contact quarry) for material for lithic tools was near at hand. Kailua was a residential district surrounded by *Ahupua'a* that were also highly cultivated and capable of providing ample resources for a large resident and visiting population. Kailua apparently also was a *pu'uhonua* (place of refuge) before Kamehameha I conquered the island of O'ahu. After this time the ancient *pu'uhonua* were abolished.

B. Oral Traditions and Legends

Legends and oral history provide stories for many of the place names and also give specific beliefs Hawaiians held and hold about the land. The name Kailua, meaning "two seas", apparently refers to the two large inland waters, Ka'elepulu Pond and Kawai Nui Pond (Pukui *et al.* 1974:69; Quebral 1991:14). That Kailua was a "fat" land, a land of plentiful food in all times, is suggested by several legends. The *Makalei*, or Fish-Attracting Tree was a mythological tree or stick which could summon fish from Kawai Nui. Reportedly located near the present day Hāmākua Street Bridge, it was described as a never failing source of a plentiful supply of food (Beckwith 1970:279-280 and Pukui and Elbert 1981:382, cited in Kelly and Nakamura 1981:5). Another tradition of the ample productivity of the Kailua region involves the edible, *haupia*-like mud, called *lepo'ai 'ai*, which was available from Kawai Nui Marsh (Kelly and Nakamura 1981:5). This legend implies a bountiful Kailua where even the mud is edible.

Kailua is one of the places where, following their arrival on O'ahu from Kahiki, the *menehune* were assigned to live. These legendary workers are credited with the construction of numerous fish ponds and religious structures. Fornander points out that the term *menehune* in Tahitian had become the name for the lowest laboring class of people--suggesting a Tahitian origin for the term for the legendary workers (Fornander 1969:23).

There are legendary accounts of the prominent Mount Olomana, that is named after a great mythological giant and/or chief (Kelly and Nakamura 1981:1) Tradition also says Kawai Nui was inhabited by a *mo'o* (large dragon-like mythical creature) called Hauwahine, whose name literally means "female ruler". Her residency at Kawai Nui follows Haumea's, the earth-mother goddess whose name literally means "red ruler". She made sure all the people of the *Ahupua'a* shared in the pond's wealth and punished those

who were greedy (Beckwith 1970:126).

Oral history notes that the stones overlooking Kawai Nui on Pu'u 'o 'Ehu are sacred to Hauwahine and her companion (Paki, 1976). The reason for this is connected to the ancient Hawaiian notion that the channel/canal beneath Pu'u o Ehu connects Kawai Nui and Ka'elepulu and was considered to be the coital connection between the two fishponds, giving the area great *mana*. Kawai Nui Marsh was considered male and Ka'elepulu Pond, female. They mated at Kawailoa according to a Hawaiian tradition (Paki 1976).

Traditional history credits Kailua as the residence of many prominent O'ahu ruling chiefs. There is 'Olopana "who with his brother Kahikiula came to O'ahu from Kahiki . . . He is said to have established several *heiau* in Kāne'ohe and Kailua, including Pahukini and Holomakani in the Kawai Nui area" (Kelly and Nakamura 1981:3). One of the earliest great chiefs to reside in Kailua was Kakuhihewa, who built himself a great house at 'Alele in Kailua (*Ibid.*:5). At approximately the same time (the 16th century) another prominent chief, Kūali'i, born at Kalapawai, Kailua, and raised in Kualoa and Kailua, had his navel cutting ceremony at the *heiau* of Alala (present day Lanikai point), and, after being the hero of many battles, became the high chief of all O'ahu (*Ibid.*:6) In early historic times the conquering chiefs Kahekili followed by Kamehameha I resided in Kailua for a time (*Ibid.*:6-7).

C. Early Population Estimates

The drastic depopulation of the Hawaiian Islands following the introduction of Western disease has been documented in a number of sources (Bingham 1847; Stannard 1989; and Bushnell 1993). According to one estimate the population of Hawaiians and part-Hawaiians fell from approximately 300,000 in 1778 to 82,593 by 1850 (Schmitt 1968:43, 74, cited in Kelly and Nakamura 1981:10). Population counts from the 1830s place the population of Kailua at approximately 760 individuals (Schmitt 1973:19 cited in Kelly and Nakamura 1981:10). This low population figure is incongruous with the productivity of the region, but well in keeping with population decline estimates due to western disease. Westerners passing through Ko'olaupoko in the mid 1840's made note of the cold and flu symptoms among the native Hawaiians and that much formerly productive land appeared abandoned (Wyllie 1948:20 cited in Kelly and Nakamura 1981:10).

D. Early Historic Accounts

Historic accounts of Kailua before the 1850s are rare. One of the only accounts that could be located is that of Levi Chamberlain, a missionary who made a circuit around O'ahu to inspect the mission schools in 1828. This account is particularly important because Chamberlain travels through and describes the landscape in the immediate vicinity of the current project area. Chamberlain describes his progress from the settlement at Kailua through the low hills, today called the Kalaheo hills and the location of Kalaheo High School, that separate Kailua from Kāne'ohe.

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Directing our course towards Kāne'ohe, the next district, we were obliged to pass over a tract of low land mostly overflowed with water by the late rains. Here I was obliged to wade, as the distance was too great to admit of my being carried on the shoulders of my attendants, as was generally the case in passing a small stream of water. After emerging from the flat, our path was not improved, for we had now to walk through mud instead of water--we walked some distance along the steep hill, and at length by a winding path ascended to the top of it. We sat down to rest for a few minutes, and I found myself upon the summit of a ridge extending from the mountains in a right line to the sea and dividing the low lands of Kailua from those of Kaneohe. (Chamberlain Ms.:664 in Kelly and Nakamura 1981:7).

It is clear from this account that this west-northwest portion of Kailua, in the vicinity of the current project area (Segment 6), was low lying and prone to flooding. As we shall see in later discussion, this does not appear to change with the passage of time.

E. *Māhele* Records

Māhele records are an important resource for determining land-use during the first half of the 19th century. In the great division of lands among Kamehameha III and his people between 1848 and 1853, approximately 250 Land Commission Awards (LCAs) were claimed before the Board of Commissioners to Quiet Land Titles (Land Commission) in Kailua. Many persons claimed their land from the time of their *makuakane* (ancestors) but no one indicates any time farther back than the time of Kaloli (contemporaneous with Kamehameha I). The most recent claims are probably those granted by Governor Kekū'anao'a. Not all claimants told how long they had occupied the land but of those who do they refer primarily to the ruling chiefs and then some refer to the local *konohiki*.

Many Kailua claimants list kings, queens, *kuhina nui* or governors to provide a time frame for when they received their land. The earliest such reference appears to be Kaloli, the wife of Kalaniopu'u who lived from 1752 to 1782 (Kuykendall 1980, vol I:30-32), followed by Kamehameha I, *Mo'i* or king and conqueror of O'ahu in 1795 (p.87), Liholiho, King Kamehameha II in the 1820s, Kaomi, the Tahitian companion of Kamehameha III who died in 1833 (p. 135), Boki, governor in 1820s and his wife Liliha, *kuhina nui* - after 1829 and during the 1830s, Kīna'u, Queen from 1832-1839, Ka'ahumanu, Queen and *kuhina nui* in 1820s and Kekū'anao'a, the governor of O'ahu in the 1830s and 40's (p. 286), Paki, a high chief during the same period (p. 286), and Kamehameha III during the early 1840s. Some claimants give specific dates and these range from 1828-1846. Thus, the people established in Kailua by 1848-1853 only ascribe their roots to the land for the period of the 60-70 years before the Land Commission Awards. While some claimant's lands may have been in their family for longer periods, it would not have been politic in the land commission claims for land offered to them by Kamehameha III to refer to rulers prior to the Kamehameha dynasty.

At the time of the *Māhele*, it would appear that Kailua, Kāne'ohe and Waimānalo

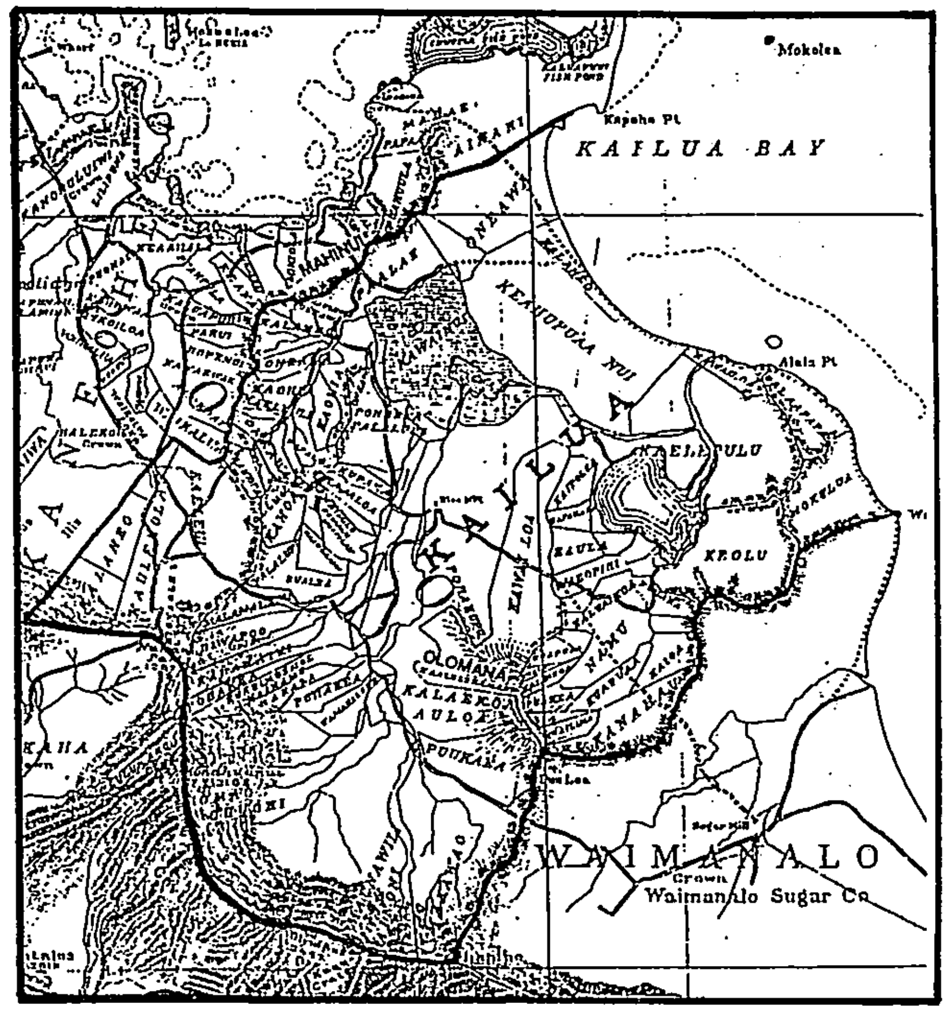

Figure 2 Map Showing the *'ili* Land Divisions of Kailua *Ahupua'a*, From John M. Donn, 1902, Hawai'i Terr. Survey

family, and then to important ali'i, particularly warrior chiefs for Kamehameha I. The entire *Ahupua'a* of Kailua was awarded to Queen Kalama. Within the *Ahupua'a* the Crown took for itself the *'ili* of Kawailoa which surrounds the Olomana peaks, with a portion in Maunawili Valley and the major portion descending to the sand barrier and yet another detached portion of this *'ili* is found along the shoreline. Princess Victoria Kamāmalu was awarded the *'ili* of Ka'elepulu which has both a down land and upland portion.

At the time of the *Māhele* land claimants testified before the Land Commission. This testimony provides valuable information in terms of land use circa 1850 and before. The LCAs records for Kailua document a thriving area of garden areas clustered along its 18± permanent and intermittent streams. The Maunawili/Kahana'iki Stream delta is a large, marshy low-lying area with no more than a 6% slope, with fertile soils along stream beds with many taro *lo'i*. Kapa'a Valley is narrow but also had many gardens along its stream. Other fertile areas are on the *mauka* side of Ka'elepulu Pond (modern fill now surrounds most of the former pond) going toward Waimānalo; and several very fertile areas are found within the present-day MidPac Country Club. The two great lagoonal fish ponds joined underneath the lookout point of Pu'u o Ehu and a few LCAs are found nearby. Another area between Keolu Hills, just to the southeast of the Pond/Lake, which shows fertile soils but does not have recorded Hawaiian farming there. This isn't to say that farming wasn't taking place there, merely that we have no record of it. A very narrow fertile area sits on the Pohakupu upland about the location of Kailua High School. These fertile soil areas are the location of most of the awards in the LCAS Native Register, Foreign Testimony and Native Testimony.

'Ili are the land divisions within the *Ahupua'a* and these were governed by the lesser chiefs and *konohiki*. The *'ili* of Kailua are shown in Figure 2, a portion of a map prepared by John Donn in 1902. Land divisions came about supposedly under the reign of Ma'ilikūkahi (born about 1360 A.D.), one of the chiefs who spent time in Kailua. There were approximately 70-80 *'ili* exploited in Kailua at the time of the *Māhele*.

A majority of the *'ili* in Kailua, O'ahu were divided up among 41 of Kamehameha III's high chiefs. Others (39 *konohiki* awards) received *'ili* or partial *'ili* from Kamehameha III (13 or 20% of the 60 *ali'i* granted land in Kailua). These 39 are given 38 *'ili* (two each get a half of Pohakupu). Thirteen of the 60 high chiefs and *ali'i* retained the majority of the 70-80 *'ili*. At least two of the descendants of these chiefs still live on their land in Kailua; the descendants of Kuke (Tute) and the descendants of Peleleu. In addition to the names of those persons applying for a claim, we have witnesses' names and names of neighbors. Field boundaries are described by naming the neighboring cultivators, and many of these names did not appear on the LCAs list. Some claimants mention where they are cultivating under the aegis of another. In all, there are about 251 names given in the Native Register, Foreign and Native Testimony in the claims dealing with the Kailua, O'ahu area. Of these 251, 200 persons are mentioned tilling the land in Kailua Ko'olaupoko in some way. About 65% of those working the land actually applied for an award.

In the *Māhele* records, 123 house lots are mentioned in the awards. This, probably does not offer a true reflection of habitations, as the majority of 171 claimants probably lived within the *Ahupua'a*. Where "kauhale" or homes are mentioned the location of these house lots is typically bounded "on all sides by upland." However, although they were close to the fields, they had to be out of the wetlands. There are several house lots in the vicinity of the current project area.

Ali'i in Kailua don't specify what use they are making of their land in the LCAs. Most land use information comes from the LCAs (*kuleana*) belonging to commoners. In Kailua most claims include taro patches. All the many upper and lower valley streams are lined with taro *lo'i*. Upper valley springs also have their taro patches. Some 1255± taro lo'i are listed in the LCAs. (Where Native Register and Foreign Testimony differ, the smaller number was used for conservative estimation, (cf Kelly 1981:27)). Kelly researched both the *'ili* of Olohana and Kumu and found no boundaries ever defined, the LCAs listed there all claimed taro *lo'i*. Although we don't have information on the size of the taro patches, we know that there were 1255 taro *lo'i* being tilled by some 200 claimants at the time of the *Māhele* in Kailua, O'ahu.

Kailua LCAs list other crops: *malos* of *wauke* or tapa fields, bananas, sugarcane, 'awa, sweet potatoes and gourd fields; coconut, hala, kukui, koa, and fruit trees and one in Kukanono mentions cotton growing. An upland *'ili* is named for a koa pit, which would indicate that at some time in the past, koa existed in the area. Other woods mentioned in the *'ili* names are noni ('Ainoni - "to eat noni"), koa (Kālaikoa - "to hew koa"), 'ohia (Ka'ohia), kukui (Kukuimoemoe - kukui and sleep or ambush), and kamani (Kalelekamani - "where the kamani trees sway."). Wauke (paper mulberry), Melons and potatoes, potatoes or sweet potatoes and *'awa* are some crops mentioned in the LCAs. Four *'ili* in Kailua have names associated with tapa/kapa. Kapaloa (long kapa), (LCAs 2464, 8799 mention a *mo'o* or *kula* without specifying what kind of cultivation) Kapa'ele (dark kapa), Kapalai (silent kapa), Kapalepo (dirty kapa). There are many *mo'o* (garden plots) mentioned in the LCAS testimonies with no crop designated. According to local farmers (Rocky Mikami, pers. comm.) the small piles of rocks in rows that one encounters on hillsides in Kailua are a sign of sweet potato patches and because sweet potatoes were a staple of the Hawaiian diet, it would make sense that these *mo'o* where crops are unspecified were mostly being used to grow sweet potatoes.

No mention of livestock shows up in the claims, but presumably there was some. Mention is made of numerous fisheries and pools where fish would have been raised. Early 20th century testimony (S. Mahoe) indicates that the fishermen at the shore traded ocean fish for taro with the upland farmers and this is probably a long-established pattern.

F. Land Commission Award Information for Kawainui Trail Segments

Queen Hakaleleponi Kapakuhaili Kalama (ca 1820-1870), wife of Kamehameha III received the entire ahupua'a of Kailua of 11,885 acres as Land Commission Award 4452: portion 12 at the time of the *Māhele* (1848-1853). There are over 250 claims for the entire *ahupua'a*, of which 28 Land Commission Awards are in or surrounding the marsh (See Table 1 following this section).

Segment 1, (TMK 4-2-13 and 4-2-16)

This segment extends from the southern (Kailua Rd.) Terminus to the levee to Ulupo Heiau. The TMK maps and the J. Iao 1919 map traced from W. Wall 1899 (R.M. 2049) and A. Bishop 1888 map (R.M. 1434) show slightly different locations for the Land Commission Awards. On TMK maps there is only one award located towards the ocean (north) and east of Ulupō *heiau* - No. 10183.

LCA 10183 - Makea claims and is awarded LCA 10183 in the *'ili* of Kumu. The award is shown on TMK 4-2-16, but no maps indicate the *'ili* and its boundaries. No. 10183 award is for one *apana* of 1.442 Acs, where Makea has 14 *lo'i* since the time of Liholiho (1820s). He died in 1848, before the claim was fully processed. Kumu inherits his land.

Segment 2, (Portion of TMK 4-2-13)
This pathway segment extends from the spur trail leading to Ulupō Heiau to the service access road behind Castle Hospital. In this section we find 7 land claims with 11 portions (*apana*) of land claims: (1) *Māhele* Award 7; (2) LCA 2536:3; (3) a portion of LCA 4452: 12 to the Queen for half the 'ili of Pohakupu; (4) LCA 4896, (5) LCA 5833:3; (5) LCA 6099 1&2; (6) LCA 7147:2; and (7) LCA 9546;2,3,&4 (Figure 2)

Four *kuleana* awards in 5 parcels are shown on both Wall and Bishop maps as along the marsh and east of the *heiau*. These same *kuleana* appear on TMK 4-2-13, i.e. Segment 2 (which we will assume is more accurate). Here they appear towards the marsh and inland of Ulupō *heiau*.

Māhele Award 7 - Kaluaiainanea (M.Aw. 7) received ½ of Pohakupu (the Māhale Awards were reserved for the *ali'i*,) of 38.27 Acs. It appears that Kaluaiainanea did not live permanently in Kailua, as he only claims the 'ili land, the planted trees, and some coconut and hala trees. This land with such resources would have provided him with goods needed for a person of his status to provide for the higher chiefs and the King (tithing or taxes) and his own retinue. He receives his right from the *Mo'i*, King Kamehameha III. He does not state an earlier right in the land; so he may not have been one of the many Kamehameha I's warriors and entourage, who got compensated in land for their part in helping to conquer O'ahu when Kamehameha I unified the islands. No land use is given, but the land extends into the marsh and there may have been *lo'i* near the Maunawili Steam and *kula* upland.

LCA 2536:3 - Ukikolo who was awarded the *heiau* site (*apana* 3). The other two apana are in Segment 3 (*Apana* 1 is for 2 *lo'i* and apana 2 is for 4 *lo'i*). Ukikolo (LCA 2536), possibly the descendant of an *ali'i*, listed in other Kailua claims as a *konohiki*, does not receive a *Māhele* Award, but is awarded 3 *apana* or parcels totaling 4.19 Acs. He appears to have been a permanent resident of Kailua and claims *lo'i*, *kula* and house lot. He notes that his ancestors received these lands from Kamehameha I (previous to his death in 1819) and indicates his ancestors were likely part of the Hawai'i Island soldiers and retinue awarded lands in Kailua. Since his house lot includes the Ulupō *heiau*, his ancestors may also have been the caretakers of the *heiau*. According to claim 6969 Ukikolo is a *konohiki*.

Ukikolo's properties include Ulupō *or Upo heiau*, the *'ili* of Manu and its *kula*. His house site in Kukanono includes the *heiau*, which is not named in the claim. At the time of the *kuleana* awards the few *heiau* mentioned are often described as house sites standing on former *heiau*. If it were not for the protest of Kahele, the konohiki, whose property surrounded Ukikolo's, the fact that this site had been a *heiau* wouldn't have been part of the *kuleana* record. Kahele believes that the *heiau* site should have been part his, the *konohiki's*, property. Despite Kahele's protest Ukikolo receives the property and his lands were bequeathed to his daughter, Kaiwikuilani, when he dies of small pox in 1853.

Ukikolo also claims several other *'ili*. His award (2536) consists of a) 2 *lo'i* at Olohana along Maunawili Stream (see map); 4 lo'i at Manu and it is notable that he does not receive his other *'ili* he claims in Malamalama (an *'ili* kupono - not subject to the *konohiki* management of an *ahupua'a* but owing fealty only directly to the Highest Chief).

LCA 4452:12 is a part of the entire *ahupua'a* awarded to Queen Kalama and is one of several *'ili* of Pohakupu shown on the map as belonging to Queen Kalama. Although Native Testimony (page 358 volume 10) says that all those lands (Kailua being one of them) are for Hazaleleponi Kalama as fee simple without a half division for the government, in fact, another large portion of Pohakupu, directly *makai* was for the Government.

LCA 4896 - Kekoahaleole (LCA 4896) is awarded a .844 Ac.-parcel for 7 *lo'i* in Pohakupu. This parcel is surrounded by Paki *mauka*, the *kahawai* on the Koolauloa side, Holoaa's *lo'i makai* and *kula* on the Waimānalo side. He received these *lo'i* from Holoaa in 1843. This parcel is one of 5 that he receives in Kailua. He appears to be a permanent resident of Kailua with his house lot in the *'ili* of Palawai, where he is awarded 3 *apana* He cites 1843 as the date of his acquisition of this land from Liliha, a former *kuhinanui* or regent of O'ahu (the wife of Boki). Thus he may be a more recent arrival to Kailua than Ukikolo. Or he may have been an even earlier resident, among those conquered, who would find it more politic not to mention tenure prior to the time of the Kamehamehas.

LCA 5835 - Kaleiokane claims (LCA 5835) five *lo'i* at Kekai and his *kula* house lot at Kapia. Like Ukikolo, he too is probably the descendant of one of the warriors or retinue of Kamehameha I since he claims his right from that time. He is probably a resident of Kailua since he was awarded the .37 Ac. in Pohakupu and .52 Ac. in Kihewakukakua

(Kapia) (where witnesses claims he has both 6 lo'i and his house lot). It would appear that his house lot was actually in Pohakupu or what became Pohakupu. Claimant died in 1848 at the beginning of the *Māhele* land division and is survived by Makalani, his widow.

LCA 6099:1 &2 - Miomio (LCA 6099) claims a *kula* house lot (6900:2) at Kukanoa [Kukanono]. He also claims a *mo'o* at the shore, and a *kula* planted in 'awa way inland near Kukapoki (Maunawili) (another *heiau*). His witness in the Native Testimony ascertains *Apana* 1 is 10 *lo'i* and *Apana* 2 is the house lot. The two pieces total 1.088 Acs. He derived his land from Kaleohano at the time of Boki (about 1824). He does not receive his claims at the shore or in Maunawili, but he does receive this 10-lo'i piece below Ulupo *Heiau* in addition to his house.

LCA 7147 - Kahelo (LCA 7147) is a *konohiki*, and claims the 'ili of Kukanono contesting Ukikolo for the parcel containing the *heiau*. He is awarded 4.19 Acs in 3 pieces at Olohana, but Ukikolo is awarded the *heiau* land. No land use is given, but because of its location within the marsh, it is likely that this land was used for *lo'i*.

LCA 9546 - Kapolo , claims 1 and gets 4 *apana*. The 1.4 Ac.-parcel at Ulupo may be the 2nd parcel described in the Native Testimony as bounded on all sides by upland. No land use is described. Kapolo died in 1848, leaving his wife Kaulailaa as his heir. He receives an *apana* at Ulupo of 1.4 Acs; this would have been his house lot; and he receives two other *apana* which are out in the marsh along Maunawili Stream. These most likely would have been used for *lo'i*.

Segment 3 includes the area from the southwest corner of Kukanono Subdivision to Kahanaiki stream near the intersection of quarry Road and Kailua Road. It includes 7 *'ili*: Kamakalepo, Kapaloa, Kapia, Manu, Manulele & Kaihee (TMK 4-2-13). This area includes 3 *Māhele* Awards, and 11 land claim awards in 14 parcels. These include: (1) *Māhele* Award 6; (2) Māhele Award 27:1; (3) Māhele Award 47:1&2; (4) LCA 2536:1&2; (5) LCA 2544:1; (6) LCA 2575:1; (7) 5825 (8) LCA 6153; (9) LCA 6813:2; (10) LCA 6969:2; (11)LCA 7113:1&2; (12) LCA 7122:3; (13) LCA 8162; and (14) LCA 9539:2.

Māhele Award 6 - Honaunau, an *ali'i* (M.Aw 6), is awarded ½ 'ili of Manulele in Kailua in Māhele Award 6 (12.88 Acs in 2 *apana*). Honaunau also claimed and received lands in Lahaina, Maui and Ewa, O'ahu. Honaunau died in 1854 and since his wife Julia Kekoa died before him, he left his property to an adopted son, Beritani [Pelekane] and an adopted daughter, Halakaipo. A. Paki was to be administrator. Honaunau claims his right from the King, but does not mention which king (Barrère 1994:56). No land use is given, but because this is in the marsh, it is likely *lo'i* land with perhaps some other *kula* type plantings.

Māhele Award 27- Kalawaiaku, an *ali'i* is awarded a *Māhele* Award (M.Aw 27). The claim for the *'ili* of Kapia is listed under land claim 7146 which was not awarded. Also under another claim, 5668, Kalawaiaku claims several *po'alima* (land that is worked by others for him) and the *'ili* of Manu in Kailua and other pieces in Nu'uanu. He received the 'ili of Kapia, supposedly in 2 *apana*, which amounted to 14.12 Acs. He does not receive the

other claims. No land use is given, but its location would indicate *lo'i* land, with perhaps some *kula*.

> Since his inherited land (aina hooilina) was an aina panalaau ("conquered land") it is safe to assume that it had been given in reward by Kamehameha after the Battle of Nuuanu, as so many of the Koolaupoko lands were (Barrère 1994:176).

This large land area would have been ideal for *lo'i* , since it lies between the two streams.

Māhele Award 47- Kaeliwai, an *ali'i*, is awarded a Māhele Award (M.Aw 47). The claim for this award is described in land claim 6237 which is not awarded. Kaeliwai claims ½ of Kaaihee 'ili in Kailua) which is 2 *apana* amounting to 9.12 Acs, as well as land in Wai'anae and land on Molokai.

> Kaeliwai requests Government to take his ½ interest in ili Kaihee in payment for fee simple title to his houselot in Honolulu (Barrère 1994:106).

However, he receives his claim for Kaihee. Kaeliwai was the son of Lono (father) and Kapau (mother) and was married to Paalua, the granddaughter of Hewahewa. It is not known when he died, but is thought to be some time after 1860. He had no children (Barrère 1994:107). He does not state the right for his claim. He does not mention land use.

LCA 2536:1&2 - Ukikolo, whose house lot is in Kukanono (Segment 2), also claims 2 patches in "Olohana", an ili (Section 1) bounded on the Waimānalo side by the stream and 4 patches in "Manu," an ili (Section 2) which is also bounded on the Waimānalo side by the stream. Section 1 he received from Hekona in 1845 or 1856 and Section 2 he received some time before Poki (or Boki) went to Kahiki in 1828.

LCA 2544:1 - Lapalapa claims a *mo'o* at Manu from the time of Kaiola. And he has some orange and lemon trees at Hoaauloa. He is awarded 4 *lo'i* and a house lot; 1 apana in *'ili* of Manu for 1.38 Acs and another *'ili*, Kalaiopuu, for 6.46 Acs. The section 1 description describes the land as bounded by Ukikolo *makai* and the stream on the Waimānalo side. Section 2 is described as being in the upland.

LCA 2575:1&3 (2?) - Hekona claims an *'ili*, Manulele, and a *kula* from the time of Kaleohano. He had one *mala ipu* [gourd garden] in the *kula* of Pohakupu. The second claim is for *'ili* of Olohana. He is awarded 10 *lo'i* and a house lot in the *'ili* of Olohana ((2.29 Acs). His *lo'i* land is bounded by the stream on the Koolauloa side. His house lot is bounded on all sides by upland. He received his land from Honaunau in the time of Liliha. He died in 1849 and his widow, Kamakakau is his heir.

LCA 5825 - Kaanaana claims 4 *apana* which contain a mo'o, 4 *lo'i*, and a *kula* house lot. He receives only 1 *apana* in Kaaihee of 2.297 Acs. His section 1 is bounded by an *'auwai mauka* and the river on the Waimānalo side. It is likely that he received a consolidated parcel of land to make up for the 4 parcels claimed, since he only received 1 of them. He received his land in 1840 or thereabouts and appears to be a resident of Kailua. It is likely that this is *lo'i* land and his house may have been higher up on the same piece of land.

LCA 6158 - Nanawahine claims 2 *lo'i* at Manulele and a *mala* of *wauke* at Kawailoa from the time of Kalola (a wife of Kamehameha *ca.* 1795).He received 1 *apana* of .22 Ac. He does not receive his nearby *wauke* land.

LCA 6162 - Punipeki (LCA 6162) claims 12 *lo'i* at Olohana, and a small *kula* in Pohakupu. He receives 1 *apana* in Olohana of 2 *lo'i* totaling .47 Ac.

LCA 6807:2 - Kapano claims a *mo'o* from 1833. This parcel (6807:2) is 8 *lo'i* and he lists his neighbors and Kuula and Kaleo with *nahelehele* (fallow land or waste land) on two sides. He receives 2 *apana* in Kamakalepo of 11.59 Acs and another *apana* which today would be in an area across the highway in Maunawili away from the presently bounded marsh for other *lo'i* and his house lot.

LCA 6811:1- Kuula claims a *mo'o* of 4 *lo'i* in Kamakalepo. He received his lands in 1846. This land is bounded by Keliikanakaole (claim 6813) on the *makai* side. He receives 1 apana of 2.56 Acres.

LCA 6813:2 - Keliikanakaole (LCA 6813) claims the *'ili* of Kamakalepo and has there 19 lo'i and a house lot in 6 portions of Kamakalepo. Portion 2 is shown on the TMK map. He also claims a lo'i in Kapalai and one in Moapilau and orange trees in Kahanaiki and a lauhala tree in Haimilo. Only three *apana* in Kamakalepo are awarded (7.126 Ac.). His tenure dates from the time of Kinau (Queen from 1832-1839).

LCA 6969:2 - Kuwahine (Kuahine) claims 30 *lo'i*, a *kula* and a house. Five of his patches are in the 'ili of Manu, the others in Kawailoa. Section 2 is bounded by the creek on the Waimānalo side. He receives a 1.3 Ac.-parcel in the *'ili* of Manu and 1.52 Acs in Kawailoa.

LCA 7113:1&2 - Keaka claims ½ Manu 'Ili. He claims it is his one-half right from the King. He resides at Kapamoo, not in Kailua. Keaka receives 1.52 Acs in Manu and 1.52 Acs in Kawailoa, both are for taro lands.

LCA 9589:2 Kaikihoio claims a *mo'o 'Āina* at Palawai which is bounded by the creek on Koolauloa side and a hill called Auelepu *mauka*. He is awarded 2 pieces of land totaling 4.36 Acs. The parcel in the marsh is section 2 for which there is no separate description. Kaikihoio received his land in 1842. He died in 1848 and Ohole, his wife is heir. This claim is contested by C. Kanaina who claims Kaikihoio has all the patches and he has none, but the award is upheld. Being on the Maunawili Stream, it is likely these were taro patches.

Segment 4 is the southwest corner of the marsh and does not contain any Land Commission claims.

Segment 5 runs approximately 1 ½ mile along Quarry road, from the intersection at Kailua Road to the Model Airplane Park. In this portion there are 1 *Māhele* Award and 4 awarded claims in 5 parcels..

Māhele Award 9:2 - Hale receives a *Māhele* Award (M.Aw 9) the 'ili of Kaakepa, in 4 *apana* of 60.56 acres. The portion within the marsh is portion 2. The claim for this property is made in claim No. 7273, which he does not receive. In order to get his *Māhele* Award, Kaakepa he relinquished his claim to the *'ili* of Pohakea 'ili (which contains the site of the Holomakani *heiau*). In Claim 696, for Hale's Honolulu property, Piikoi testifies that Hale is a "kanaka hana (worker/servant) of the King (presumably Kamehameha III) or a "Kanaka maoli (native Hawaiian) (Barrère 1994:27). It is quite curious that a worker/servant or native would receive a *Māhele* Award if he weren't an *ali'i*. It is also interesting that he should have had the care of Pohakea *'ili* prior to the *Māhele*. It is even more interesting another *apana* or part (*lele*) of Kaakepa is probably the present site of the Pahukini *heiau* (TMK 4-2-15). The other large section of Kaakepa is cut in two sections by H-3 Highway, closer to Kahekili Highway. A prominent Hawaiian, S. Kaapuiki also claimed Pohakea as a *konohiki* award (Baker and Baker 1989). The fact that Hale was not a resident of Kailua, and had the stewardship of these two lands, one with the Holomakani *heiau* (this *heiau* was thought to have been destroyed and was only recently re-located), and the other with Pahukini *heiau* would fit the pattern of a person of a family in the forces or retinue of King Kamehameha I, who was given land in Kailua for his services during the unification of the islands. It makes one wonder if there were certain persons entrusted with the care of these *heiau* lands. There was no probate when he died so it may not be possible to find out more information about Hale although there are several Hale families on O'ahu. No land use is given.

LCA 6808:1 - Poniuohua claims a *mo'o* in the *'Ili* of Kamakalepo with fifteen taro *lo'i*. He has a house nearby in the *'ili* of Haimilo where he has some fruit trees in the land of Kaoo (8797). His *lo'i* are along the river. He is awarded 3 *apana*, totaling 5.254 Acs., all in Kamakalepo. He acquired the land in 1843.

LCA 7122:2 - Tehuarii Tute (Kuke) A Tahitian Missionary from the London Missionary Society in the Society Islands arrived, with his wife, L. Kalawela, in Hawaii in July 1826 and became the private chaplain of both Kamehameha III and IV. Tute was the *konohiki* of Oneawa and claimed and received 6 parcels for Oneawa of 674.90 Acs in Kailua. Tute bequeathed his property at his death, in 1858 (age 77), to his Hawaiian born daughter, Manaiula Sumner (Barrère). No land use is given in the document.

LCA 7588 - Kamoonohu, an *ali'i*, divides his land with the King, but he is not given a *Māhele* award. He claims the 'ili of Palahele (or Palapule) in Kailua, and Mooiki in Hamakua Hawaii Island. He receives Palapule in Kailua in 1 piece totaling 7.88 Acs. Kamoonohu had his land from Kamehameha I and was either a retainer/warrior or a descendant of one. No land use is given. It is likely that the *lo'i* land would be down near the marsh and other things might have been planted on the higher ground.

LCA 8797 - Kaoo claims 1 apana of *kula*, house lot, and a *hala* tree in Kapaloa. The testimony declares there is also *kalo* land. Kaoo acquired this land at the time of Liliha (1829-30). He died in 1848 of smallpox. He is awarded 2 parcels next to each other, both along the Kahanaiki stream. His 2 parcels total 2.61 Ac.

LCA 8799 - Kauakamalii claims two *lo'i*, one *kula*, and one house lot, in Kapalaoa, He has other claims elsewhere in the *Ahupua'a*. He received the land from his grandfather, Kaliu, in 1839, and Kaliu acquired it from Keano during his lifetime. He is awarded 1 apana of 2.658 Acs.

Segment 6 extends from the Model Airplane Park to the proposed Kalaheo Park on Mokapu Blvd. There are no Land Commission claims in the marsh for this section.

Settlement Pattern within and near the Marsh

As reflected by Land Commission documentation, the settlement pattern along the margins of Kawai Nui Marsh during the mid 1800s was dominated by both dry-land and irrigated agriculture with associated dispersed habitations. Agricultural lands included numerous spring and stream watered pond fields (*lo'i*) with their associated irrigation and drainage ditches (*'auwai*). Dryland agriculture would have dotted the hill slopes above the marsh. Crops included traditional Hawaiian economic plants as well as Western introduced economic plants, such as fruit trees. House lots would have been dispersed on the higher grounds surrounding the marsh. *Māhele* records indicate differing periods of occupation of the land claimants. Some appear to be long time local residents. Others evidently received their land from the Kamehameha dynasty relatively recently. The distribution of LCAs indicated that the southern end of the marsh, closer to Maunawili, Pahukiki *Heiau*, Holomakani *Heiau*, and Ulupo *Heiau*, was more developed agriculturally and may have been the site of more residences.

Table 1 lists the LCAs for the vicinity of Kawai nui marsh. The table was compiled using LCA information available through *Waihona-'Aina.com*. These data provide insight into the specific land-use that was under way along the trail alignment during the mid-19th century. Several of the LCA correspond to specific State Inventory of Historic Places site numbers. For example State site 50-80-04-3957 corresponds to LCA 7147.

Table 1: Land Claim Awards within the Present-day Boundaries of Kawainui Marsh, Kailua, listed by Segments

Land Claim #	Claimant	Kawai Nui Trail Segment	'Ili (land division)	Land use	Acreage awarded
4452	Kalama, Queen	in particular, 1 & 3	entire Ahupua`a (in particular) Kawainui Fish pond, Pohakupu	none given	11,885 Acs
10183	Makea	Segment 1	Kumu	14 *lo`i*	1 *apana* of 1.442 Acs
Māhele Award 7	Kaluaiainanea	Segment 2	½ of Pohakupu	no land use given, probably *lo`i* near Steam and *kula* upland.	38.27 Acs
2536:3 2536:1 2536:2	Ukikolo	Segment 2 Segment 3 Segment	Ulupo, Kukanono Olohana Manu	house lot 2 *lo`i* 4 *lo`i*	3 ap.; 4.19 Acs
4896	Kekoahaleole	Segment 2	Pohakupu	7 *lo`i*	1 ap. .844 Ac
5835	Kaleiokane	Segment 2	Kekai Kapia	5 *lo`i* *kula* house lot	.37 Ac. .52 Ac.
6099:2	Miomio	Segment 2	Kukanono	*kula* house lot 10 lo`i	2 ap.; 1.088 Acs.
7147	Kahele	Segment 2	Olohana		3 ap.; 4.19 Acs
9546	Kapolo I	Segment 2	Ulupo	house lot?	1 of 4 ap.; 1.4 Acs
Māhele Award 6-	Honaunau	Segment 3	½`ili of Manulele	no land use given; likely *lo`i* land with some *kula* ?	2 ap.; 12.88 acs

Land Claim #	Claimant	Kawai Nui Trail Segment	'Ili (land division)	Land use	Acreage awarded
Māhele Award 27	Kalawaiaku	Segment 3	*'ili* of Kapia	no land use given; likely *lo'i* land with some *kula* ?	2 *ap.*; 14.12 Acs.
Māhele Award 47	Kaeliwai	Segment 3	½ of Kaaihee	no land use given; likely *lo'i* land with some *kula* ?	2 *ap.*; 9.12 Acs
2544:1	Lapalapa	Segment 3	Manu	*mo'o*	1 ap.; 1.38 Acs
2585:1 & 2	Hekona	Segment 3	Manulele Pohakupu Olohana	*'ili & kula* *ipu* garden 10 *lo'i* and a house lot	not awarded not awarded 2 ap.;2.29 Acs
5825	Kaanaana	Segment 3	Kaaihee	*lo'i* and house lot?	1 *ap.*; 2.297 Acs
6153	Nanawahine	Segment 3	Manulele	2 *lo'i*	1 *ap.*; .22 Ac.
6162	Punipeki	Olohana	Olohana Pohakupu	12 *lo'i* kula	1 ap.; .47 Ac. not awarded
6807:2	Kapano	Segment 3	Kamakalepo	8 *lo'i*	2 ap.; 11.59 Acs
6811:1	Kuula	Segment 3	Kamakalepo	4 *lo'i*	1 ap.; 2.56 Acs.
6813	Keliikanakaole	Segment 3	*'ili* of Kamakalepo Kapalawai	19 lo'i and a house lot 1 *lo'i*	*3 ap.*; 7.126 Acs not awarded

Land Claim #	Claimant	Kawai Nui Trail Segment	Ili (land division)	Land use	Acreage awarded
6969:2	Kuwahine (Kuahine)	Segment 3	Manu Kawailoa	5 *lo`i* 30 *lo`i*, a *kula* and a house	1 ap.; 1.3 Ac. 1 ap.; 1.52 Acs
7113:1 & 2	Keaka	Segment 3	½ Manu `Ili Kawailoa	taro lands	1 ap.; 1.52 Acs 1 ap.; 1.52 Acs
9539:2	Kaikihoio	Segment 3	Palawai	*mo`o* (lo`i)	2 ap.; 4.36 Acs
Māhele Award 9	Hale	Segment 5	Kaakepa	no land use given (lo`i land?)	4 *ap.;* 60.56 Acs
6808:1	Poniuohua	Segment 5	Kamakalepo	15 *lo`i*	3 *ap.;* 5.254 Ac
7122:2	Tute / Kuke	Segment 5	Oneawa *`ili*(s)	no land use given, (marsh edge lo`i land?)	6 ap.; 674.90 Acs
7588	Kamoonohu	Segment 5	Palapule	no land use given(lo`i land?)	1 ap.; 7.88 Acs.
8797	Kaoo	Segment 5	Kapaloa	*kula*, house lot, and a *hala* tree	2 ap.; 2.61 Ac.
8799	Kauakamalii	Segment 5	Kapaloa	2 *lo`i*, a *kula*, and a house lot	1 ap.; 2.658 Acs.

F. Ranching

In the early 1900s Kāne'ohe Ranch comes to dominate land holdings in the Kailua and Kāne'ohe area. Included within this acreage is much ranch land which has been bought, sold, let and used as ranch land by numerous parties since the mid-1850s. Kelly and Nakamura's history (1981:34-35) mentions that Government land sales amounting to 3,000 acres were sold to 21 buyers in Kailua between the years 1849 and 1863. The largest parcel went to William Jarrett of the *'ili* of Maunawili in 1849. The second largest was 399.5 acres to T. Cummins in Mokulua. Both parcels were used for ranching. Other land holdings which were turned into ranch land in the mid-1850s included the *'ili* of Mōkapu and 'Oneawa (by William Sumner and J. I. Dowsett) and the *'ili* of Puanea and 'Ohua'uli (by the son of Paula Marin, Paul F. Manini). These large land holdings were used for years as ranch lands before becoming part of the Castle's Kāne'ohe Ranch. Cattle, sheep, and horses, were thus allowed to roam at will through may parts of Kailua, and would have destroyed many gardens and abandoned habitation areas. Kelly and Nakamura point out that although specific records are not available, based on tax information, it is not unreasonable to estimate that several thousand head of cattle were grazing in Kailua by 1876 (1981:69).

Kāne'ohe Ranch (Castle Trust) eventually acquired much of the land in Kailua (Hall 1997:84). Kāne'ohe Ranch, in addition to ranching, grew pineapple and sugar cane. The With the decline of rice farming around the margins of Kawai Nui, cattle stock move onto the abandoned agricultural lands. Ranching in Kailua continues to this day, albeit on a drastically reduced scale.

G. Growth of Cash Crops in Kailua

For the nearly 100 years following the *Māhele*, Kailua grew into an important area of commercial agriculture. Until the early 1900s, rice was the major crop. Rice was followed by truck farming of taro and Western crops. The truck farming gave way to surburbanization, as Kailua became the premier bedroom community for growing Honolulu.

The Reciprocity Treaty between the United States and the Kingdom of Hawaii allowed for the duty free exportation of Hawaiian sugar to the U. S. This 1876 treaty greatly fanned the flame of the already smoldering Hawaiian export sugar industry. The duty free export of rice was also covered under the treaty, however, it was the growing Asian population, first Chinese and later Japanese, brought to Hawaii to supply labor to the escalating export sugar industry, that provided the main impetus for the expansion of rice growing. With local consumption steadily growing, and duty-free export, rice growing in Hawaii had a boom period of its own.

Unlike the adjacent *Ahupua'a* of Ko'olaupoko, Kailua's main cash crop became rice rather than sugar. Kailua's numerous abandoned taro *lo'i* in the former taro lands of Maunawili and Kawai Nui provided perfect areas for the expansion of rice. At one time

there were multiple rice mills functioning in Kailua *Ahupua'a*. By the first part of the 20th century, rice growers in California were using more modern production methods to reduce their costs. This lead to the rapid decline in rice farming in Hawaii (Kelly and Nakamura 1981:51-63).

Sugar never became an important crop in Kailua itself, but the need for water for the adjacent sugar lands of Waimānalo was an important factor in the transformation of the Kailua water shed. Following the 1876 Reciprocity Treaty the adjacent *Ahupua'a* of Waimānalo became the site of rapid sugar development, what became the extensive Waimānalo Sugar Company's fields. The development of these fields relied upon water from Kailua. As early as the late 1870's a system of flumes, ditches, and tunnels were built in the *mauka* portions of adjacent Maunawili to collect water from the abundant springs and streams. By 1881 close to 1,000 acres of sugar had been planted and milling operations were underway in Waimānalo (Kelly and Nakamura 1981:76). Expansion in acreage continued, increasing the need for water. By the 1920s improvements to the Waimānalo Irrigation System included catchment tunnels that were excavated into the base of the Ko'olau in Maunawili to increase flow.

Also, completed in 1923, was a system of pumps, pipelines, tunnels, and ditches, that conducted water from Kawai Nui Marsh into the Kailua ditch, a portion of the Waimānalo Irrigation System. This system continued to supply Kawai Nui water to Waimānalo until the early 1950s (Harland, Bartholomew, and Associates 1959:53-54; Hall 1997:94; Kelly and Nakamura 1981:778-79;). According to Wilcox (1996:111) two pumps lifted water from Kawai Nui and took it to the head of a 10,000-foot system of small tunnels, most through stone or hard earth, into a reservoir in Waimānalo.

In 1909 the Hawaiian Copra Company is established on the sandy area that is today bounded by Kalaheo and Oneawa Streets. Over 130 thousand trees were planted in an operation that involved leveling "the sand dunes and smooth[ing] out the sand hillocks" (*Honolulu Star Bulletin*, Sept. 12, 1931 cited in Kelly and Nakamura 1981:100; Hall 1997:77-78). The name Coconut Grove stuck, referring to most of the sand barrier area of Kailua. Clearly this leveling and smoothing of former dune areas had a great impact on the archaeological record of this area of Kailua.

The most prominent inroad made by sugar agriculture in Kailua was the establishment of the Hawaiian Sugar Planter's Association's field laboratory in 1926. It was established in former rice fields in stream bottoms, near present day Kailua Town. By *1946 the laboratory was in the process of moving further mauka into Maunawili (Kelly* and Nakamura *1981:100*).

By the 1950s, the truck farms that had flourished since the turn of the century within the bounds of present day Kailua Town, are slowly replaced by housing, municipal, and retail developments. Kailua is promoted as the bedroom community for Honolulu businessmen, only "8 miles and 20 minutes" from Downtown. Residential developments are planned for more outlying areas of Kailua Town, such as Olomana, Pohakupu, and Oneawa Hills (Hall 1997:141).

H. Kawai Nui Flood Control

As Chamberlain's early account, quoted above, shows, Kailua has historically been susceptible to flooding. From 1902 to 1940, Kawai Nui Marsh was hit with numerous heavy rainfalls resulting in major alluvial run-off. The Kawai Nui Marsh area became the target for federal flood control projects in the 1930's and a report was authorized by the Flood Control Act of August 11, 1939 (Wheeler 1949: 3; Kelly and Nakamura 1981). Plans for this project initially called for a canal that was expected to provide for a discharge of water at the rate of 4,000 cubic feet per second and maintain control of the water levels in the marsh. The plan for the canal was drawn out on an aerial photograph in December of 1948 (figure 22 in Kelly and Nakamura 1981:87). In March of 1951 Kailua experienced a major flood, resulting from two days of continuous rain (Swain and Hexel 1971: 8), where Kawai Nui overflowed and 250 people were forced to be evacuated. The flood extended from Noela Place to Uluniu St. (Brady 1959:10).

As a result of this flood, the Territory of Hawai'i implemented its "pilot channel" project, where in 1952 the 'Oneawa canal, which extended from Kawai Nui marsh to Kailua Bay, was built. Part of this pilot canal project was the "inner canal, that ran perpendicular to 'Oneawa, which was expected to carry the water away from the marsh and prevent flooding of adjacent residences. Both the "inner canal" and the larger 'Oneawa canal are directly adjacent to the current project area (Segment 6 and the Kawainui Dike Road. The excavation and dredging associated with the construction of these two drainage channels would have directly affected the current project area.

The completion of the 'Oneawa Canal (1952) led the Kailua community to believe they were safe from flooding, however this was not the case. In March of 1958, heavy rainstorms again flooded Kailua, forcing the Army engineers to admit publically that "the present Kawai Nui Canal system would not be able to handle such a downpour..." (Brady 1959: 10).

A study published in 1971 (Swain and Huxel 1971: 18) revealed that the shallow water table beneath the frequently flooded areas and the lack of drainage was the primary reasons responsible for continued flooding in the low land areas.

III. PREVIOUS ARCHAEOLOGY

A. Summary of Previous Archaeological Research in Kailua *Ahupua'a*

This previous archaeology section is intended to compliment the cultural and historical background section. It discusses the archaeology of Kailua *Ahupua'a* in general, with many specific references to Kawai Nui, to provide an archaeological context for the trail. The specific archaeological sites that circle Kawainui Marsh will be listed and summarized by trail segment at the end of this section.

Twentieth century archaeological findings from inventory surveys, data recovery projects, and inadvertent finds during development are the main source of our knowledge about the archeological record in Kailua. Archeological work in the last 25 years in Kailua has been fairly extensive. This work has been concentrated along the margins of Kawai Nui Marsh and within Maunawili Valley for the most part. This is largely due to the fact that most of the *makai* portions of the *Ahupua'a* had been developed prior to the implementation of State and Federal Historic Preservation Rules (Dye 1992). The many archaeological reports dealing with Kailua are listed and briefly summarized in Table 1.

The earliest habitation of the Kailua area is still under debate. A radiocarbon date obtained from a charcoal enriched soil layer has been interpreted as evidence that human habitation of Kailua began somewhere in the neighborhood of 350-650 A. D (Clarke 1980: 32-33, 77-78). This site is located within the current project area. This date is not universally accepted, however, it is fairly well agreed among the archaeological community that by approximately 1200-1300 A. D. dramatic changes in the pollen record are indicative of the expansion of agriculture in the Kailua area, most likely in the well-watered margins of Kawai Nui Marsh (Hammatt *et al.* 1990; Athens and Ward 1991). Human colonization of the region would clearly have had to precede this agricultural expansion, perhaps by many centuries. Erkelens (1993:51) reports three early dates, A.D. 1024-1296, A.D. 779-1256, and A.D. 770-1270, from his excavations along the Kukanono slopes within the current project area. It is logical that Kailua, and other regions of Ko'olaupoko, with their abundant marine and terrestrial resources, would have been attractive to the initial Polynesian colonizers.

The work of Hammatt (*et al.* 1990) and Athens and Ward (1991), has largely discredited Kraft's (1980) earlier assertions that Kawai Nui Marsh was an open water embayment at the time of initial Polynesian colonization. Athens and Ward (1991) suggest the Kawai Nui Embayment was sealed off during the first millennium B. C. as the result of a drop in sea-level. They correlate the Kawai Nui event with similar events at the same time in Kahana Valley and Ft. Shafter Flats, O'ahu.

Remains of upland terraces show that taro has been grown extensively and intensively in Kailua since the 13th or 14th century, and possibly earlier (Allen 1981, Williams, Mills and Allen 1995). The work of Cordy (1977, 1978), Allen (1981, 1986-87), and Athens (1983a) all document the mix of irrigated and dryland agriculture that was carried out in Kailua during prehistory and continuing into the historic period. Dryland agriculture, including yams, gourds, and sweet potato, would have been carried out on slopes and on drier flat-lands. Modification to the landscape would have been variable, ranging from none at all to the construction of terraces and mounds for planting. According to Handy (1940:155) the beach barrier at Kailua (current day Coconut Grove) was famous for its production of sweet potatoes, grown in small mounds. Irrigated agriculture would have been carried out along streams and below springs. Associated landscape modifications would have included construction of terraces and/or pondfields, *'auwai*, and earthen and stacked-stone berms. These types of dryland and irrigated agricultural features have been found in Maunawili and along the margins of Kawai Nui Marsh.

Previous archaeological investigations in Kailua have located dispersed prehistoric habitation remnants. This is in keeping with the observations of early Westerners in Hawaii that the settlement pattern for the most part was dispersed habitations scattered across the landscape amid agricultural fields. It should be remembered that settlement data is conspicuously absent from the lowland, beach berm areas of Kailua, due to early development of these areas.

McAllister (1933) reported eight *heiau* within the *Ahupua'a* of Kailua, and it is not unreasonable to conclude there were several more of which McAllister's informants had no knowledge. This is well in keeping with Kailua's status as a productive *Ahupua'a*, the residence of *Ali'i*. The three known *heiau* closest to the current project area are McAllister's sites 359 Pahukini *Heiau*, 360 Holomakani *Heiau*, and 371 Ulupo *Heiau* (located within the project area)--see discussion below.

In the last eleven years over 15 reports of inadvertent finds of human skeletal remains have been made in Kailua, on the sandy beach berm of Coconut Grove and Lanikai. As with other near shore sandy areas in Hawaii, clearly Kailua was used for burial of the dead. These burial remains are not nearly as extensive, however, as the hundreds of human burials discovered from nearby Mōkapu peninsula (Snow 1974).

Table 2. Previous Archaeological Reports, *Ahupua'a* of Kailua, Ko'olaupoko, O'ahu

Reference	Location	Description and Results
Thrum, various 1907-1918.	Kailua *Ahupua'a*	In his articles for the *Hawaiian Almanac and Annual* (1907-1918) Thrum is the first to document many of the *heiau* in the *Ahupua'a* of Kailua.
McAllister 1933	Kailua *Ahupua'a*	McAllister's island-wide survey of the major archaeological sites of O'ahu supplies some of the first detailed descriptions, maps, and photographs of Kailua's archaeological remains. He describes 16 sites within Kailua *Ahupua'a*, including Kawai Nui pond (#370), Ka'elepulu fishpond (#377), Ulupo *heiau* (#371),Holomakani *heiau*, and Pahukini *heiau* (#359). In all eight *heiau* are reported for Kailua.

Handy 1940	Kailua *Ahupua'a*	Handy's discussion of traditional Hawaiian agriculture gives regional descriptions of what crops were planted where within the Hawaiian chain. Kailua *Ahupua'a* is described as a rich, productive, well terraced taro growing area (p. 99). The "sandy plains" of Kailua were planted in sweet potato, using a planting system of small soil mounds (p. 155, plate 8)
Clark and Connolly 1977	Hāmākua Drive along Kaelepulu Stream.	This survey identified five stacked-stone alignments, a possible wall alignment, a potential habitation site, two agricultural sites, the remains of an irrigation ditch, and surface midden. A possible *heiau* was also recorded, however, when Hommon (1982) and Morgenstein (1982) revisited this project area, they found no remains of the possible *heiau* structure reported by Clark and Connolly.
Cordy 1977	Kawai Nui Marsh	Cordy, working for the U. S. Army Corps of Engineers, performed archaeological survey, historic document research, and aerial photograph analysis, for the alignment of a proposed City and County sewer-line along the south and southeastern margin of Kawai Nui Marsh. He documented historic house sites and both dryland and wetland agricultural features, including terraces.
Cordy 1978, Morgenstein 1977-	Kawai Nui Marsh	Agricultural features from Cordy's earlier identified "Site 7" (from Cordy 1977) were subjected to excavation to determine the chronology of land use. Previous examination of aerial photographs revealed extensive agricultural fields in this southern extension of Kawai Nui Marsh. Excavations revealed sequential land use of the area, from prehistoric irrigated taro agriculture, into historic irrigated taro agriculture, into later historic rice agriculture. Prehistoric agricultural features, such as terrace walls, were found buried below sediments, suggesting that they had not been substantially disturbed by later historic rice and livestock grazing activities in the area.
Dye 1979	Kapa'a Ridge	Reports the discovery, mapping and excavation of Bishop Museum site # 50-Oa-G6-31, a combination of terrace remnants and cobble paving, thought to be prehistoric agricultural remnants. The site is located just below the summit of Ulumawao Ridge, in a hanging valley of an intermittent stream. After the work was completed these features were destroyed by the expansion of the Ameron Quarry facility
Kraft 1980	Kawai Nui Marsh	John C. Kraft is a specialist in prehistoric and historic coastal land form changes. Based on his research, which included coring various spots around the marsh, Kawai Nui Marsh was a shallow marine embayment of the coastal reef tract, very similar to present day Kāne'ohe Bay. Between 6000 and 2800 years B. P., before the Kailua sand berm had formed, corals grew and marine foraminiferal sands and carbonate muds were deposited around the margins of the embayment. Only after 2800 B.P. did the sand berm begin to form, slowly closing off the embayment. Until 400 or 500 years B. P. both the north and south outlets of the embayment ('Oneawa and Ka'elepulu) remained open. Kraft suggested the possibility that formation of the sand berm could be related to human factors, such as the construction of stacked stone fish ponds within the embayment. According to Kraft's recreation, the terrigenous in filling of the margins of the embayment was a relatively recent development, in the last 400-500 years B. P., with most taking place in the last 200 years.

Allen-Wheeler 1981	Kawai Nui Marsh	Allen-Wheeler conducted excavations in the Marsh with results that confirmed and refined Krafts' (1980) sequence of Kawai Nui development from embayment to marsh. Terrestrial in-filling of the marsh began about 650 A.D. with the formation of a peat layer. By 1300 A. D. a layer of alluvial soil had been deposited--possibly the result of human agricultural activity within Maunawili. Rapid alluvial in-filling continued at a rapid rate until the present. Taro cultivation within the marsh could not have taken place until approximately 1200 A.D.
Morgenstein 1982; Hommon 1982	Hāmākua Drive adjacent to Ka`elepulu Stream	Morgenstein and Hommon report surface survey and subsurface testing conducted to assess the potential of archaeological features along the Ka`elepulu truck sewer line. The investigation documented layers of historic fill in the upper layers and the presence of one potential agricultural bund, thought to be associated with rice farming, below.
Neller 1982a	Kawai Nui, Kukanono area TMK 4-2-13:38	Neller reports the work he undertook in Kukanono as part of a field school on behave of the Sierra Club School Hikers Program and Hawaii Science Teachers Association. These limited subsurface investigations were carried out in the same area reported by Clark (1980) and Athens (1983a). Neller dismisses the early date reported by Clark (1980).
Neller 1982b-	Maunawili Valley TMK 4-2-09:1	This short letter report documents a field trip to investigate archaeological sites in the back of Maunawili Valley. The reported locations of McAllister's sites 373 (Halaualolo *Heiau*), 374 (Kukapoki *Heiau*), and 375 (house sites, were visited. The extensive agricultural terraces, abandoned *lo`i*, were noted along large portions of both Omao and Maunawili Streams.
Athens 1983a	Pohakupu Kukanono slope S.S. #50-80-11-2022	Working in much the same area documented by Clark (1980), these investigations consisted predominantly of surface collections and subsurface testing. Excavation revealed that the abundant surface features (primarily agricultural mounds and terraces) were built in the most recent soil layers after 1900 A. D. Only one small area of the project area contained undisturbed prehistoric deposits. An earth oven in this prehistoric deposit was dated to the 13^{th} to 16^{th} centuries A. D., calling into question the early dates (4^{th} to 7^{th} century A. D.) obtained by Clark on the same slope of Kawai Nui. Soil erosion on the Pohakupu-Kukanono slope was apparently intense during the prehistoric period and soil deposition and development was infrequent prior to construction of the historic terraces.
Athens 1983b	83 Kihipai Street, Kailua TMK 4-3-57:65	This report documents the 11 grid units excavated in site 50-Oa-G6-40, the H.A.R.C. site. The site consists of marine midden, and subsurface features including hearths and pits. Radiocarbon dates indicate occupation of the site sometime in the mid- 13^{th} to early 15^{th} century. Midden remains were analyzed and conclusions suggest a change through time in the exploitation pattern. Athens suggests the use of the Kailua accretion barrier for habitation may have started about the same time as the occupation of the site. This site was originally located and excavated by Wheeler (1981)-.

Toenjes and Donham 1986	Maunawili Valley	This reconnaissance for the City and County's Maunawili District Trunk Sewer was located along Maunawili Stream north (*makai*) of Maunawili Road to the southern extent of Kawai Nui Marsh and Kalaniana`ole Highway. One historic site, a ditch which once carried water from Maunawili Stream to a rice mill, and several potentially prehistoric terrace remnants were discovered within the project area. The authors report previously unreported archaeological features within the vicinity of the project area, associated with Maunawili Stream.
Brennan 1986	Maunawili Valley	This reconnaissance survey was done for Royal Hawaiian Country Club, Inc., for a parcel proposed for a golf course in MAUNAWILI. Brennan located and described 42 sites, some of which had been previously identified. Sites include historic features (a bath site), a *heiau* (which appears to match McAllister's site 374, "*Heiau* on the land of Kukapoki") prehistoric irrigated taro fields, habitations, walls, burials and stream embankments.
Allen 1986, 1987	Maunawili Valley	These mitigation and data recovery plans and preliminary reports detail the results of archaeological investigations at the site of the Royal Hawaiian Country Club, Inc. golf course. Sites investigated included historic habitations, charcoal kilns, roads and trails, and agricultural sites. The final report for these investigations is forthcoming
Shun, Price-Beggerly, and Athens 1987	Kailua *mauka*, west of the Pali Golf Course	This inventory survey of approximately 200 acres, the site of a proposed golf course, revealed that the area was not used extensively by traditional Hawaiians for habitation, agriculture, or other activites. Historic document research revealed that Pineapple agriculture (c. 1912) and truck farming, in the 1920s, were some of the greatest land uses of the parcels. Sites found included a small terrace complex, two charcoal kilns or seepage wells, a habitation complex, and a rock wall.
Williams 1988	Maunawili	This reconnaissance survey took place to investigate the proposed new location for the displaced Luluku farmers (by H-3 development). 13 sites were recorded in this *mauka* portion of Maunawili (640'-920' elevation), including probable historic charcoal kilns and agricultural complexes.
Szabian 1989	Foot of Mount Olomana	During this archaeological reconnaissance survey of the proposed site of the Women's Community Correctional Complex (adjacent to Maunawill Elem. School) no new surface or subsurface archaeological sites of deposits were discovered. The authors did remap the remains of Kukuipilau *Heiau* (State Site # 50-80-11-372), which was first reported by Thrum and McAllister (site # 372), and re-discovered by Neller. They also note the freshwater spring "Kawailoa freshwater spring" adjacent to the *heiau*.

Hammatt, *et al.* 1990	Kawai Nui Marsh	The sediments from sediment cores from 10 locations in the Marsh were analyzed to characterize their "depth, age, and nature". Conclusions: Kawai Nui was marine bay with open circulation and tidal activity for most of the Holocene. Around the end of the first millennium B. C., in a relatively sudden geological event, the bay was partially blocked by a sand barrier, becoming a lagoon of mixed fresh and saline waters. This change is marked by a 600% increase in sedimentation rates on within the Kawai Nui basin. The lagoon persisted until as late as 570 A. D. By 1400 A. D. the lagoons outlet to the sea was closed and the Kawai Nui basin, already largely filled with terrestrial silty clays developed its wetland appears of today. Pollen samples which bracket the periods from bay to marsh show no apparent changes resulting from early Polynesian settlement. At approximately 1400 A. D. there are dramatic changes showing voluminous drops in mixed mesic forest species and an increase in grasses and sedge. These changes may well be the result of increases in Hawaiian subsistence activities.
Quebral, Orndoff, and Athens 1991	Hāmākua Drive and Pu`u o Ehu Ridge	Four most likely historic sites were locate during this inventory survey along the margins of Ka`elepulu Stream, in an area that has seen modern in filling. Although background research indicated the importance of the project area for traditional agriculture, no specific indication of traditional Hawaiian land use was found. The project area was used for historic rice cultivation and livestock grazing.
Athens and Ward 1991	Kawai Nui Marsh	Thirty-seven core/auger units were dug along the eastern margin of Kawai Nui Marsh, in the vicinity of the drainage control levee. Conclusions: The marsh basin was transformed into a relatively closed, freshwater system at about 200 B. C. Data from other locations on O`ahu (Ft. Shafter Flats and Kahana Valley) support the conclusion that the transformation was due to regional causes, namely a fall in mean sea-level, rather than local forces, as had previously been proposed. The Kailua sand berm begins to form between 600 and 1000 B. C. Until approximately 1000 A. D., the Kailua lowlands were dominated by *Pritchardia*-palm forest. After 1000 A. D. these forests decline rapidly. The vegetation transformation is attributed to rising human population levels and the expansion of agriculture. Counts for cheno-am type and grass pollen rise dramatically after approximately 1200 A. D. These pollen types are indicators of disturbed environments and are thought to be indicators of the expansion of agriculture. Based on increases in sedge pollen after about 1000 A. D., it appears that Kawai Nui basin was too deep to support a marsh community, exept along its margins, until this time.
Hammatt and Shideler 1991	Maunawili	This inventory survey for the Na Ala Hele Trail Corridor through the *mauka* portion of Maunawili Valley found seven sites. Sites included the Old Pali Road, two probable historic charcoal kilns, and a large agricultural complex. It was unclear if any of the sites were prehistoric.
Hammatt, Pfeffer and Creed 1993	Pu`u o Ehu Ridge TMK 4-2-03:46	This inventory survey for the proposed location of the Kailua 272 Reservoir found no historic properties. Oral history research did reveal the traditional Hawaiian significance of Pu`u o Ehu peak as a spot overlooking the waterway that joined Ka`elepulu and Kawai Nui ponds.

Brennan 1994	Maunawili Valley	This short letter report, address to Dr. Tom Dye, SHPD, documents and explains significance evaluations for 8 newly recorded sites in Maunawili. These sites were found during monitoring for the Royal Hawaii Country Club Golf Coarse. Features include pondfields, firepits, trash dumps, a cemetery documented from oral history, habitations, slope retainers, terraces, and a possible military training bunker.
Hammatt, Creed and Masterson 1994	Maunawill Estates (TMK 4-2-63:31,38)	This reconnaissance survey of a 10 acre parcel revealed no historic properties.
Williams, Mills, and Allen 1995	Upper Maunawili Valley	Excavations at six sites within upper Maunawili Valley (the location of the Luluku Banana Farmers Relocation) are reported. These six predominantly prehistoric agricultural sites, based on radiocarbon dating results, were constructed between 1260 and 1650 A. D. These radiocarbon dates suggest that extensive agricultural and other cultural activities began in the valley by the 14th century, and possibly a few centuries earlier. No human burials or definite habitation areas were discovered in the six sites, but evidence for pre-Contact habitation was found at a previously unidentified site.
Hammatt and Chiogioji 1997	`Auloa Road	This reconnaissance assessment of a 0.8 mile section of `Auloa Road, immediately *makai* of Castle Junction, found no historic or archaeological sites, other than the previously recorded Kāne`ohe Ranch office building and the adjacent war memorial monument (State site 50-80-10-1360).
Hammatt and Medeiros 1999	Kailua Ahupua`a TMK 4-3-28:73	Inadvertent burial find of a single individual, represented by the remains of one bone fragment (radius or ulna) in situ. The lower skeletal remains were recovered by SHPD/DLNR staff, while the contents of the excavated sand was intensively screened and fragmented remains were recovered. The remains collected by the Burial Program staff included both femora, both fibulae, one tibia, both innominates, both humeri, proximal fragments of right ulna and radius, distal fragment of left ulna, mandible, sacrum, and a frontal fragments of the cranium.
Medeiros, Bush, and Hammatt 2000	Kailua Ahupua`a TMK 4-3-53:29	Inadvertently discovered burial of a single individual was partially recovered because of previous disturbance of this Kailua project area. A total of 6 human bones were recovered during the length of this project, including 1 adult skull (minus the mandible), 1 rib fragment, 1 carpal fragment, and two unidentified fragments. This represents less than 5% of the total remains. The remains collected appear to represent one individual. The ethnicity of the remains is not apparent, especially with the low percentage of the entire burial recovered. There was no evidence near the remains, or anywhere within the stratum containing the burial, to suggest ethnicity.
Kikiloi, McDermott, and Hammatt 2000	Kailua Ahupua`a TMK 4-2-17:por 4	Archaeological inventory survey with a focus on the evaluation of subsurface deposits of a small lot on the north-northwest margin of Kawai Nui Marsh. Backhoe testing revealed modern fill sediments overlying sandy marsh type sediments at a depth of 1.25-1.5 m below the current land surface. No historic properties documented. This margin of the marsh was heavily modified by the dredging of the adjacent Oneawa and "Inner" canals that control Kawai Nui drainage.

B. Summary of Recorded Historic Properties at Kawai Nui Marsh By Trail Segment

The recorded historic properties around the margin of Kawai Nui Marsh are shown on Figure 3, an adaptation from the State Historic Preservation Division/Department of Land and Natural Resources GIS historic property location data base. More detailed site location information, and in some instances site maps, are provided in the discussion of each individual segment of the Kawai Nui Trail, see below. Table 3, below, is a site number correlation list that outlines the various site designations that have been used for the Kawai Nui periphery sites over the years.

Segment 1

There are five archaeological sites within Segment 1 of the Pathway. These include State Site #s -371, -2022, -2027, -3957, -3958, and -4042.

Site -371, Ulupo Heiau:
Site -371, Ulupo Heiau is a large *luakini* type *heiau* (state-temple where human sacrifice occurred) that is located on a natural promontory west of the Kawainui Marsh. The *heiau* platform measures 140 x 240 feet, with walls up to 30 feet in height. In May 1971, Ulupo Heiau was submitted to the Hawai'i Historic Places Review Board and placed on the Hawai'i Register of Historical Places on June 21, 1971. It was later listed on the National Register of Historic places on November 9, 1972.

According to McAllister (1930), "Its earlier importance and size is indicated by the large open terrace... the paving is now very rough, undoubtedly having been disturbed by relic hunters. The stones used average about 1.5 feet in size. The sides of the terrace are not evenly faced, but are roughly piled at about a 45-degree angle... this huge mass of stones completely dominates the surrounding taro patches and it is little wonder that the construction of the temple is attributed to the *menehunes*... (the menehune pathway)... is most clearly visible on the side of the *heiau*, but at the top is confused with the disturbed paving.... The south half of the structure is completely covered with *hau*... There is evidence of a small inclosure, but the southern walls and extent of the *heiau* were obliterated in the construction of a cattle pen..."

The following features were catalogued in McAllister's 1930 survey:

1. Sides of terrace form slope 30 feet high roughly piled with stones
2. Crudely built wall 40 feet from top of terrace, 5-6 feet high, broken lines indicate slight evidence of terracing.
3. Walls evenly faced with 2-foot stones, 4 to 5 feet high and wide on three sides, open on *heiau* side.
4. Small inclosure 4 feet wide, 7 feet long, walls 2 feet high outside, paved flush with 6-inch stones on *heiau* side.

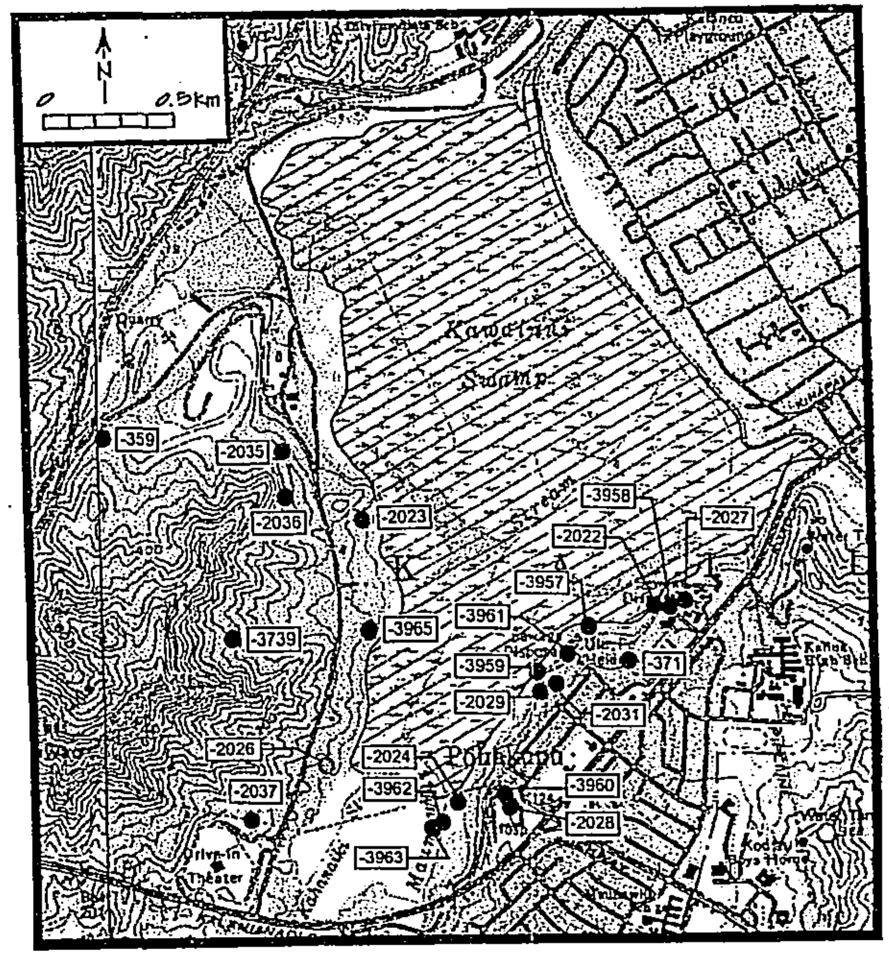

Figure 3 Portion of the 1983 USGS Topographical Map, Mokapu Quadrangle, Showing the Location of Recorded Historic Properties Adjacent to the Project Area (Created Using Information from the SHPD/DLNR GIS Data Base)

Table 3: Kawainui Archaeological Sites - Correlation Table of Site Nomenclature & Site Descriptions

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a& b) #	Cordy (1977/ 1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-359	359	50-Oa-G6-4	---	---	---	—*heiau* located by McAllister and now in middle of landfill in Kapa'a Quarry. This site is now on the National Register and State Register of Historic Sites as State Site 50-80-11-359. This *heiau* was also called *Mo'okini heiau* referring to many lineages; the name *pahukini* means "many drums" (see Pukui & Elbert, 1974). Thrum also lists an alternate name of Makini. It is said to have been built by the high chief Olopana in the 12th century and is a *luakini* or state-class of *heiau*, important enough to accommodate preparations of war and other highly important state matters. Rescued from oblivion in 1987 when a restoration project was begun. The upkeep is now shared by Ameron HC&D and the Lani-Kailua Business & Professional Women's Club.	Pahukini Heiau TMK 4-2-15:1
50-80-11-360	360	50-Oa-G6-5	---	---	---	-*heiau* that McAllister (1933) noted on Ulumawao Ridge, NE of the quarry; supposedly built by high chief Olopana in the twelfth century. The name means "wind running or racing". Holomakani (Site 369; State site 50-80-11-369), McAllister lists on the slopes below Pahukini, & was thought to have been destroyed when the land it occupied was cleared for agriculture (Sterling & Summers 1978:229). Between the present landfill and Kalanianaole Highway, a site was recently located which may be this *heiau*. C. Kawachi of the State Historic Preservation Division and staff did a field check on 6/15/88 (memorandum) in response to a call from Susan Miller to check the site. LCA 6966, awarded to Keala, listed its land use as "a kula." State archaeologists said that this site may be Holomakani Heiau (Site 360).	Holomakani Heiau TMK 4-2-14:2

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a& b) #	Cordy (1977/ 1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-371	371	50-Oa-G6-1	---	---	---	—*heiau*, (State site #50-80-11-380) agricultural *heiau* dominating the Kawainui Marsh. Located on the southeast side of marsh in the area known as Kukanono, near the present YWCA site. Its large 43 m. (140') x 9.1 m. (30') high terrace dominates the marsh. Its name means "night inspiration." It is said to have been built in a night by the Menehune, The spring beneath was used for washing the pigs before bringing them up to the temple oven (Akuni Ahau in Sterling and Summers, 1978). The land was accepted as a part of the territorial park system in 1951 and now is a state park.	Ulupo Heiau TMK 4-2-13:2
50-80-11-2022	---	50-Oa-G6-32	cluster 1	site 1	site 1	Series of terraces from marsh edge up edge of slope, a long retaining wall upslope, ruins of a historic house, a spring, excavation yielded charcoal dates in range of A.D. 353-655 & A.D. 529-0965, Artifact found on surface	Kawainui Terraces 2022 TMK 4-2-13:38
50-80-11-2023	---	50-Oa-G6-33	clusters 10 & 11	---	---	cluster 10: 12 features: retaining walls, L-shaped alignments of rocks, terraces, a roadbed, a level terrace or platform, surface scatter; cluster 11: 2 retaining walls	Kawainui Cluster 2023 TMK 4-2-13:10
50-80-11-2024	---	50-Oa-G6-34	cluster 7	---	site 4	mounds, wall remnants, a terrace	Makalii Slope Cluster 2024 TMK 4-2-13:10
50-80-11-2026	---	50-OA-G6-36	cluster 12	---	---	a large agricultural terrace; 67 m. long along marsh edge in a NE/SW direction, 14 m SE/NW; walls single-course high; rusting crane	Kapaloa Agricultural Terrace 2026 TMK 4-2-13:10
50-80-11-2027	---	50-Oa-G6-37	cluster 15	---	---	stone-walled enclosure, linear pile of rocks, terrace, surface artifacts	Kukanono Habitation Site 2027 TMK 4-2-13:38

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a& b) #	Cordy (1977/ 1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-2028	---	50-Oa-G6-38	cluster 14	---	---	2 walls which meet at a right angle	Ulukahiki Walls 2028 TMK 4-2-06:4 or 7
50-80-11-2029	---	50-Oa-G6-39	cluster 13	site 7	---	large agricultural complex of rectangular fields, probable water channel; excavation yielded basaltic glass date A.D. 1738+34 years as well as large taro root stains and taro pollen	Kawainui Marsh site 7 TMK 4-2-13:14, 16:06
50-80-11-2030	---	50-Oa-G6-40	Allen-Wheeler 1981	---	---	excavation exposed a truncated cultural layer under modern fill and overlying beach sand producing prehistoric artifacts. Dates obtained were between A.D. 1374 to 1630	Kihapai Occupation Site 2030 TMK 4-02-57:65
50-80-11-2031	---	50-Oa-G6-41	Athens 1983	---	---	evidence for prehistoric occupation/ many surface artifacts; corrected carbon dates range A.D. 1240-1385 obtained were between A.D. 1374 to 1630	Kawainui Slope Site 2031 TMK 4-3-13:38
50-80-11-3957	---	50-Oa-G6-32	cluster 2	site 2	site 2	9 dryland agricultural terraces, 20 mounds, small c-shaped structures, walls, a walled depression, remains of a historic structure; surface artifact recovered.	Kawainui Agricultural Complex 3957 TMK 4-2-13:38
50-80-11-3958	---	50-Oa-G6-32	cluster 3	site 3	---	terrace, walls 38+ m. & 28+ m. long	Kukanono Terrace 3958 & Habitation Complex TMK 4-2-13:31 or 38
50-80-11-3959	---	50-Oa-G6-32	cluster 4	site 4	site 3	26 mounds, 19 dryland agricultural terraces, linear walls, one 53 m. long, a historic house foundation, a prehistoric basalt mirror found on surface & other prehistoric basalt artifacts, large boulder grindstone; historic artifacts, date ranges from AD 1362+ 70 to A.D. 1742 + 79	Miomio Agricultural & Habitation Complex TMK 4-02-13:38

State Site #	Mc Allister #	Bishop Museum Site #	Clark (1980a& b) #	Cordy (1977/ 1978) #	Ewart & Tuggle (1977) #	Site Description	Site name/ TMK
50-80-11-3960	---	50-Oa-G6-32	cluster 5	site 5	---	a large *lo'i*, ca 40 x 30 m.; a stone and earthen platform, a stone-lined channel 10 m. long, stone mounds	Pohakupu Agricultural Cluster 3960 TMK 4-2-13:38
50-80-11-3961	---	50-Oa-G6-32	cluster 6	site 6	---	stone mounds, a stone-edged canal, terraces, retaining walls	Kukanono Cluster 3961 TMK 4-2-13:38
50-80-11-3962	---	50-Oa-G6-34	cluster 8	---	site 5	3 historic buildings	Makalii Historic Site 3962 TMK 4-2-13:10
50-80-11-3963	---	50-Oa-G6-34	cluster 9	---	site 6	earthen mounds	Makalii Mounds 3963 TMK 4-2-13:10
50-80-11-3964	---	50-Oa-G6-36	---	---	sites 8, 9	recently abandoned houses	Kaeleuli House site TMK 4-2-15:06
50-80-11-3965	---	50-Oa-G6-36	---	---	site 7	low stone terrace perpendicular to stone wall; abut at SE corner	Pohakea Terrace 3965 TMK 4-2-13:10
50-80-11-3739	---	50-Oa-G6-85	---	---	---	Kawachi (1988) did a field inspection and describes a large level terrace (30 by 15.m.), NW-SE with three levels of wall terracing. Suggests this is a *heiau* and may be Holomakani Heiau. Pantaleo and Cleghorn (1989) did a reconnaissance survey, found the same feature and describes it as a large, rock-faced terrace and an L-shaped terrace. Mentions this site as a possible *heiau*, but does not associate it with Holomakani.	Unnamed Heiau, possibly Holomakani TMK 4-2-14:2

5. Inclosure 4 feet wide, 7 feet long, walls 2 feet high and wide on three sides, open on *heiau* side.
6. Curved arm of large 2-foot stones, 6 feet wide, 3 feet high.
7. Stone-paved area, slightly depressed.
8. Slope 5 feet high probably formerly depressed.
9. Circular inclosures with low surrounding walls similar to pens 16 and 17.
10 outer wall to pen 11.
11. Former cattle pen now planted in bananas
12. Stone mound 4 feet high, 10 feet in diameter, with several large flat stones about base.
13. Round pile of stones 4 feet in diameter, large stones on outside and small stones in center.
14. Small mound of stones.
15. Irregular wall built of 6-inch stones, 10 feet long, 2 feet high and wide.
16. Pen similar to Pen 17 with better constructed walls 2 feet high, but rough paving, small break in wall to south.
17. Circular pen paved with 3-inch and 4-inch stones, 9 feet in diameter, with walls of roughly piled stones 1 foot high, small break in wall to south.
18. Open terrace 140 by 180 feet by 30 feet high.
19 portion of low terrace 1 foot high.
20 Partial inclosure, with flat stones forming pathway.
21 Portion of low stone wall.

Later surveys of the *heiau* revealed some features not previously noted, specifically three "niches" in the western slope, the side that overlooks Kawainui Marsh. The three "niches" are of different sizes in the approximate center of the slope. It has been suggested that these might have been emplacements for wooden idols.

Site -2022, Kawainui Terraces: Excavation (Clark, 1980)

Site -2022, called the Kawainui Terraces, is considered a substantial site. It has been recorded during several surveys of the Kawainui Marsh. The site has been disturbed in the recent past. There are 34 features in Site -2022 of seven basic types:

1. DRY FIELD AGRICULTURE TERRACES: Most of the terraces (21 features) are probably associated with dry field agriculture (Features 1-4, 6-17, 21-22, 28-30). These terraces are marked by retaining walls that range from single to several courses high (0.2-1.4 meters).

2. IRRIGATED AGRICULTURE TERRACES: The remaining (5) terraces (Features 23-27) are situated perpendicular to a small spring most likely were constructed to be irrigated by the spring. The terraces are retained by single-course stone walls.

3. LINEAR WALLS: Three free-standing linear walls, two run perpendicular (Features 18, 31) to the marsh edge and one is roughly parallel (Feature 19).

4. ENCLOSURE: One small oblong enclosure (Feature 5) that measures 2 m N/S x 3 m E/W, with a single-course stone wall.

5. J-SHAPED STRUCTURE: Cordy (1977: 45) stated this feature was "suggestive of prehistoric house patternings". The structure has a retaining wall (1 stone high). This feature was test excavated (Clark, 1980:64-65). One stratum was exposed with charcoal flecking. 176 artifacts were recovered, most from the first 5 cm. 169 artifacts were non-indigenous, 7 were indigenous (basalt flakes). Clark concludes that there is no evidence to support this was a prehistoric house site. One sondage was excavated and a C14 sample collected, although it is not associated with any cultural feature. The calibrated calendar age was A.D. 353-655.

6. STONE PLATFORM: Small, crude stone platform 8 m x 1.8 m x .2 m (Feature 20).

7. HISTORIC STRUCTURE FOUNDATION: Constructed of stones and mortar (Feature 32), a local informant identified this site as a piggery. There is also the remains of a historic building (Feature 33) associated with piggery. An aerial photograph shows these structures still standing and a local informant confirms the site was abandoned in the 1950s.

One test pit was excavated at Site -2022. Excavation revealed a number of artifacts such as glass shards, ceramic sherds, nails, metal, .22-caliber cartridge casings, a metal clamp, mortar fragments, tar, and basal flakes. This mixed assemblage of traditional Hawaiian artifacts with historic materials indicates the continuation of land use in the vicinity from prehistoric times.

Site -2027, Kukanono Habitation Site:

Site -2027, called the Kukanono Habitation Site, consists of six features located along a basalt outcrop bluff. There are four types:

1. STONE WALL ENCLOSURES: 2 features were considered stone-walled enclosures. The walls of both measured 0.5 meters (one-course) high and 2.5 meters (one-course) wide.

2. LINEAR PILE OF ROCK: 1 features was considered a linear pile of rocks that was 7 meters long, 2 meters wide, and 0.7 meters high. A metal cable twisted around some of the rocks indicate that it is historic in nature, although post-construction collapse may account for this positioning.

3. LINEAR WALL: 1 feature was considered a linear wall (Feature 4). It extends for 16 meters and then turns into a retaining wall that extends over 8 meters. The wall runs parallel to the bluff edge.

4) SMALL TERRACES: 2 features were considered small terraces. Both terraces

are fronted by retaining walls several courses high.

Surface artifacts include one basalt adze fragment and one piece of pearl shell. Clark (1980) suggested that the enclosures may represent prehistoric residential structures, while the rock pile may be historic in nature. No excavation was conducted at this site.

Site -3957, Kukanono Residential Complex

Site -3957 (also called cluster 2 and 3 in Clark (1980)) is comprised of a cluster of features located just north of the Pump House (formerly known as "Kukanono Sewage Plant" in Clark 1980). There were 72 features located within this area (Clark 1980 Map; Erkelens 1993 Map), with 5 basic types:

1. TERRACES: 22 features were considered agricultural terraces and typically consisted of a retaining wall, one to two courses high (0.3 to 0.5 meters).

2. C-SHAPED STRUCTURES: 5 features were C-shaped structures, that ranged from 2 to 4 meters across and the retaining walls were one coarse high.

3. MOUNDS: 35 of the features were stone mounds that were roughly circular at the base, and showed variation from oval to rectangular in cross-section. The mounds are generally well built structures in the form of a truncated cone. The sizes of the mounds vary from 0.7 meters on the shortest axis, to 1.5 - 3.0 meters on the longest axis, and 0.5 - 1.8 meters high.

4. LINEAR WALLS: 3 free-standing linear walls are located in this area. They range from 12- 25 meters long, and 0.4 - 0.7 meters high.

5. HISTORICAL RESIDENCE: 2 identifiable historic features were found in this area that consists of a roughly circular cluster of rocks with interspersed historic glass and ceramics. Nearly 40 meters to the south lies the foundation of a historic structure that has a foundation constructed of mortared stones and has two concrete steps facing the marsh. One basalt adze was located on the surface. Structure is visible on 1928 USGS quad map.

Four test pits were excavated in Site -3957 by Clark (1980).

TP1: Test pit 1 was excavated in a terrace retaining wall. The location was chosen because the wall appeared prehistoric and a date for wall construction was desired. Three non-indigenous artifacts were found (2 glass sherds, one brownstone ceramic sherd) within the wall construction. This is a clear indication that this feature was constructed post-contact (within the last two hundred years). A small subsurface retaining wall (E2) was found during the excavation of the terrace retaining wall. The top of the feature was found at 30 cmbs and this wall runs parallel to the originally excavated wall. Thirteen artifacts were found, seven non-indigenous (five glass sherds and one ceramic sherd) and six

indigenous artifacts , two volcanic glass flakes and four basalt flakes.

TP2: Test pit 2 was excavated on the next terrace up slope from TP1. There was charcoal flecking throughout the unit. This was interpreted as an indication of generalized surface burning in the vicinity. One subsurface feature was encountered, a stone alignment, at a depth of 31 cmbs. A charcoal sample was collected from a piece of burned branch for radiocarbon dating. Thirty-six artifacts were found in the first 15 cm, 27 non-indigenous and five indigenous. The indigenous artifacts include three volcanic glass flakes, one basalt flake, and one basalt flake with modified edge. From 15-30 cmbs, four basalt flakes were recovered.

TP3: Test pit 3 was excavated on the Feature 54 Terrace. No sub-surface features were identified during excavation. Ten artifacts were collected including nine non-indigenous and one indigenous artifact.

TP4: Test pit 4 is situated at the base of Feature 93, a stone mound. Mound construction consists of larger boulders around the perimeter with an interior fill of smaller pebbles. Five indigenous artifacts were found, three basalt flakes and two volcanic-glass flakes. A few fragments of carbonized kukui were also found.

Subsurface excavations revealed an abundance of artifacts in the vicinity, such as bottle glass, glass, volcanic glass, numerous basalt flakes, coral, midden, lithic tools, ceramics, charcoal flecking, historic machinery pieces, wire, mortar, and metal. Also, features such as grindstones, *'auwai* (water irrigation channels), stone alignments, *imu* (cooking pits), hearths, and post molds were discovered within the subsurface strata.

As part of a University of Hawaii archaeological field school, Conrad Erkelens (1993) studied site -3957. His objective was to provide empirical evidence for rates and causes of geomorphological alteration of Kawainui Marsh in order to better establish models concerning settlement patterns, agricultural intensification and the evolution of social stratification. Up to now, the generally accepted hypothesis is that Hawaiian slash and burn agriculture caused accelerated erosion of slope areas which resulted in dramatic alteration of the physical environment. Newly discovered surface features (12 new features were discovered, including modified springs, mounds, walls, and one enclosure) were mapped. Twenty-nine test pits were excavated. Analysis of the stratigraphy and related archaeological features indicated that:

> at Kukanono there is no evidence of colluvial or alluvial flows occurring that could have moved large volumes of sediment recently or in the past. . . . While it is certain that Kawainui Marsh has been in-filled by deposition, evidence from Kukanono suggests Hawaiian agricultural practices had little impact on this long term natural process. The majority of the sediment deposited in Kawainui is more likely the result of runoff from Kahanaiki and Maunawili Streams over the millennia rather than the result of rapid deposition from Hawaiian induced erosion of the landscape. (Erkelens 1993:42-43)

Excavation results support the evidence that the Kawainui Marsh area was settled by at least 1000 BP and land use was continuous thereafter. In addition, there is substantial evidence for pre-contact habitation occurring in the lower slopes surrounding the marsh. A additional grindstone was discovered during this study (Erkelens 1993).

Site -3958, Kukanono Terrace and Habitation Complex:
Site -3958 is composed of comparatively few features (6): three terraces (Features 34, 35, 37) and two linear walls (Features 36, 38). The three terraces are divided from the linear walls by a spring rivulet. One terrace which lies adjacent to the rivulet may have been irrigated by it. One of the linear walls lies perpendicular to the marsh edge and the other lies parallel to the marsh edge. Other features exist in the dense *hau* thicket, but could not be mapped. No excavation was conducted at this site.

Site -4042
In 1923 a system of pumps, pipelines, tunnels, and ditches, was completed to conduct water from Kawai Nui Marsh into the Kailua ditch, a portion of the Waimānalo Irrigation System. This system continued to supply Kawai Nui water to Waimānalo until the early 1950s (Harland, Bartholomew, and Associates 1959:53-54; Hall 1997:94; Kelly and Nakamura 1981:778-79;). According to Wilcox (1996:111) two pumps lifted water from Kawai Nui and took it to the head of a 10,000-foot system of small tunnels, most through stone or hard earth, into a reservoir in Waimānalo. This entire system was given State Site # 50-80-15-4042 in 1992 (Creed 1992). The pump house and the associated canal are located within the present project area in Segment 1. The pump house foundation is a rectangular concrete foundation with some construction of mortared basalt boulders. This pump house once housed the pumps that lifted water out of the marsh and into the pipe line. Several large diameter iron pipes are located within the structure. There is a canal that extends out from the pump house into the marsh. The banks of this canal are lined with basalt boulders near to the pump house, but are earthen further out towards the marsh.

<u>Segment 2</u>

There are seven recorded archaeological sites within Segment 2 of the Kawainui Path. These include State Site #s, -3961, -3959, -2031, -3960, -2024, and a good portion of -2029.

Site -3961, Kukanono Cluster 3961
Site -3961 is located west of the Kukanono Sewage Treatment Plant. Land disturbances from the sewage plant construction separate Site -3961 from Site -3957 to the north and Site -3959 to the south. There are six recorded features at this site: No test excavation was done at this site.

STONE MOUNDS: Two stone mounds were recorded, ranging in size from 1-2 meters in diameter to .4-1 meter in height.

TERRACES: Two terraces were recorded, one may be natural and the other is probably historic as it has mortar in its construction.

C-SHAPED RETAINING WALL: with mortar chunks and mortar rocks found in the wall construction indicating its historic construction.

CANAL: stone-lined canal measuring 1-1.5 m wide, 0.6 m deep and almost 12 m long.

Site -3959, Miomio Agricultural & Habitation Complex
Site -3959 is located on the slopes fronting Kukanono Subdivision and south of Kukanono Sewage Treatment Plant. Site -3959 is separated from Site -3961 in the north by land disturbances created by construction and from Site -3960 in the south by a rock outcropping. The northern portion of the site has been previously disturbed and is now used for cattle pasture. A total of 49 features were recorded with the majority located in the southern part of the site. The site is divided into a north and south segment by an erosional gully (Clark, 1980).

DRYLAND TERRACES: 19 dryland terraces with retaining walls, often utilizing natural outcropping. Terrace heights range from 0.5 to 1.2 meters in height.

STONE MOUNDS: There are two types of mounds: free-standing and terrace. Free-standing mounds. Twenty walls seem to be free-standing and four are terrace mounds.

LINEAR WALLS: two linear walls, one 53 meters in length and 0.5-0.9 m high. This wall may correspond to the boundary between Kukanono and Pohakupu *ʻili*. The second wall is short, 2.5 m long, and crudely constructed.

HISTORIC DUMP: scatter of metal, concrete and other items

HISTORIC CONCRETE FOUNDATION: pre-1940 aerial photographs show several structures in this location

Test Excavations at Site -3959

Clark (1980) excavated two test pits in Site -3959, one in a terrace-style mound situated next to an earthen terrace. The second test pit was excavated in a free-standing mound.

TP 6: Excavated within a terrace-style stone mound with a perimeter of large boulders surrounding an interior of pebble fill and earth. Excavation proceeded to a depth of 35 cmbs. Charcoal was noted throughout. Forty-six artifacts recovered, 25 indigenous and 19 non-indigenous. The indigenous artifacts include basalt flakes, volcanic-glass flakes, one volcanic glass core. The non-indigenous artifacts include glass sherds, ceramic sherds, nails (including square nails) and mortar fragments. Most of TP6 had a mix of indigenous and non-indigenous artifacts.

TP 8: excavated to 35 cmbs in a free-standing mound. Mound construction consists of a outer perimeter of larger boulders with an interior cobble fill. No subsurface features or artifacts were observed.

Neller (1982) led a group of Sierra Club High School Hikers in an Ecology Camp at Kawainui Marsh. Nine test pits were excavated in the old Miomioi LCA 6099. Several prehistoric artifacts were found including basalt waste flakes, adze blanks and adze fragments, worn basalt flakes, hammer stone fragments, stone abraders and polishing stones, cut bone, bone fragment, large amounts of unworked coral (3533.1 gm), few marine shell fragments. The majority of the artifacts were historic including bottle fragments from the 1800s, metal objects and few ceramic sherds. Also found was a large grinding stone on the Kukanono slopes. "The abundance of artifacts in the disturbed cultural layer verifies the former use of the area by prehistoric Hawaiians, 19th century native Hawaiian farmers, and 20th century Japanese-American farmers, and suggests that habitation sites existed somewhere in the immediate area" (Neller 1982). The entire project area was previously disturbed by farming and grading. The test pits were not excavated to an adequate depth to determine the presence or absence of buried, undisturbed archaeological features in the study area.

Site -2031, Kawainui Slope Site 2031

Site -2031 has no surface features except for a pig pen foundation (still in use in 1959 according to aerial photographs). However, the large quantities of surface artifacts suggest subsurface deposits. Six trenches and a "strat pit" were excavated and a probably earth oven was located. In addition, several pit features were identified. Artifacts are almost exclusively indigenous with the exception of two small metal fragments which were the result of infiltration from upper levels. Corrected age ranges are of AD 1240-1385.

Athens (1983) undertook archaeological investigations of both Sites -3959 and -2031 due to a proposed residential development and recommendations by the Bishop Museum. Objectives were to date and determine the function of a sample of the surface features and conduct a search for possible subsurface deposits that might be of very early date. Excavation revealed that all the surface features were built in the most recent soil layers after AD 1900. Above the marsh slope, undisturbed prehistoric deposits were located at G6-41 (State Site -2031). An earth oven gave dates of between the 13th and 15th centuries. Analysis of a large collection of stone artifacts recovered suggests this area was being used as a reduction area for lithics. The presence of a large boulder grindstone is further evidence. Athens suggests that the lack of prehistoric agricultural features on the slopes may indicate that this area was being used only for non-intensive forms of agriculture, such as for breadfruit and other trees and bushes that can tolerate marginal soil conditions. Athens questions Clark's (1980) early dates (5th and 8th century AD) considering that the C14 samples that were dated did not come from *in situ* archaeological features and were not primarily deposited stratigraphically. Athens' investigations indicate that prehistoric habitation was most intensive in the area above the slope in the vicinity of G6-

41 (Site -2031). This is indicated by the distribution and densities of surface and subsurface lithic artifacts. A wide range of adze sizes and six awls suggests a variety of different woodworking activities were being performed. Athens suggests there is a lack of prehistoric agricultural features and implies the use of a cropping system.

Site -3960, Pohakupu Agricultural Cluster 3960

The site is situated near the marsh and separated from Site -3959 by a basalt outcrop. There are natural springs in the area (at least 3). Site -3960 has 11 features (Clark 1980).

LO'I: dimensions are c. 40 by 30 meters separated from the marsh by a stone and earthen embankment. *Lo'i* are fed by a natural spring directed through a stone-lined channel. Waimanalo resident, Norman Kawachi remembers his father using the existing *lo'i* for taro and watercress in the 1930s.

STONE MOUNDS: five free-standing stone mounds, two built by Mr. Kawachi's father during land clearing.

LINEAR WALL: also constructed by Mr. Kawachi's father, 16 meters long and 0.5-0.7 m. high.

RETAINING WALL: three retaining walls, two bordering natural springs.

TERRACE OR PLATFORM: crudely constructed

Cordy (1978) excavated one test pit in Site -3960 and found one artifact (dated AD 1692-1788) and charcoal. Cordy suggested the charcoal was evidence of some type of agriculture, being practiced at the same time as agriculture in the swamp.

Site -2024, Makalii Slope Cluster 2024

The site is located up slope approximately halfway between Uluoa and Manu-Laiki Streets within the Kukanono subdivision. It is somewhat isolated from other sites along the Kukanono slope. It consists of one terrace and four small stone mounds. No test excavation was carried out on this site (Clark 1980).

Site -2029, Kawainui Marsh Site 7

Site -2029 consists of a series of walls through the marsh from Pohakupu slopes to Maunawili Stream (1400 feet). These features were studied through analysis of aerial photos (Cordy 1977). Site 7 is a remnant of the abandoned field system that was once extant in this portion of Kawai Nui Marsh. Four test trenches were excavated, two across a wall (1 meter high and 2.4 m wide), another trench across a second wall (0.5 m wide) and the last trench on the slope (in Site -3960) overlooking the marsh. The first wall can be dated to AD 1704-1772. Taro root stains in soil layers are evidence of taro cultivation, though taro pollen percentages were low. In Site -3960, there is evidence of agriculture in the form of charcoal. Dated at AD 1692-1788, this trench is evidence of contemporaneous cultivation in the marsh and on marsh slopes. Analysis of aerial photos show rectangular to square fields approximately 60 by 90 meters in size. The field remnants seem to cover an area of 250 acres (Cordy 1978).

Allen-Wheeler (1981) did further research at the site. The objective was to determine more precisely the geophysical setting of the marsh sites at the time that initial occupation took place centering on archaeological excavation of the marsh floor. "The general theoretical focus concerned the evolution of land-use and human occupation in and around the marsh and, by extension, in windward O'ahu, during the prehistoric and early historic periods" (Allen-Wheeler 1981). As in Cordy's study in 1978, the research centered on the Marsh floor itself (Site -2029), rather than the surrounding slopes. A review of maps and aerial photographs was undertaken. A ground survey was conducted. Two former canals were identified, one along the north border of LCA 6969:2 and the other alongside Maunawili Stream at the base of the Pohakupu slopes. Four trenches were excavated where taro and later rice were grown. Trench A was excavated to expose a standing wall (visible above ground) situated perpendicular to Pohakupu slope. Trench B was excavated in a feature identified from aerial photos, aligned perpendicular to field boundaries. Trench C was excavated to test agricultural plots visible in aerial photos (not recorded by Cordy). Trench D could not be completed. Based on palynological, stratigraphic, and sedimentological analysis, the settlement pattern for Kawainui was presented. At approximately AD 500-600 there was initial settlement of the Pohakupu/Kukanono area. The higher ground of the marsh slopes sloped met a coral and cobble beach on a marine bay, that was to become Kawai Nui Marsh. Initial land use of the area was interpreted as marine and coastal bay exploitation, possibly accompanied from the beginning by dryland cultivation on the hill slopes around the bay. Wetland agriculture developed later. After AD 1300, pond-field cultivation expanded into the wetlands in the marsh. The adjacent hillsides were terraced for dry and/or wet cultivation during the late prehistoric or early historic periods.

Site 2028, Ulukahiki Walls 2028:
Located behind Castle Hospital, off of Ulukahiki Street the site consists of two standing walls (.7-1.5 meters high) meeting at right angles to each other. Clark (1980) suggests that the north-south wall relates to the old road and both walls are historic. No site map. No excavation made.

Site 3962, Makalii Historic Site 3962:
This site is composed of the remains of a historic building. No site map and no excavations were made by Ewart and Tuggle (1977). No site description in Clark (1980).

Site 3963, Makalii Mounds 3963:
This site is composed of some earthen mounds located in a *hau* grove immediately west of a "farm lot". No site map and no excavations were made by Ewart and Tuggle (1977). No site description in Clark (1980).

<u>Segment 3</u>

There are no recorded archaeological sites along this segment of the proposed pathway.

<u>Segment 4</u>

There are no recorded archaeological sites along this segment of the proposed pathway.

<u>Segment 5</u>

Site 2026, Kapaloa Agricultural Terrace 2026:
Located approximately 500 meters north of Kalanianaole (Pali) Highway and Kapa'a Quarry Road intersection, this site is along the marsh edge. A rusted crane (approximately 80 m north of the site) supposedly marks the general location of this site. The site consists of a large terrace, with walls 65 m long NE-SW and 14 m long SE-NW. Walls are one course high and the terrace is built on partially flat region next to marsh (Clark 1980). There is no site map for this site and no subsurface testing was done. This site is not marked on the SHPD GIS map of Kawainui sites (but the approximate location has been added to the adaptation of this map that is Figure 3) and may be difficult to relocate based on available information.

Site 3965, Pohakea Terrace 3965:
A low stone alignment forming a terrace approximately 5 m. in length, with a stone wall running perpendicular. No site map, no excavations (Ewart and Tuggle 1977).

Site 3739, thought to be Site -360, Holomakani Heiau:

Holomakani *Heiau*, Kapa'a, Kailua--McAllister's Site 360. This *heiau*, on the mountain side of Kawainui fishpond, was destroyed and the land used for agricultural purposes. It was just beneath Pahukini. Said to have ben built by Olopana (McAllister 1930:182)

More recently a large stacked stone terrace was re-discovered on the slopes above the Kapa'a Quarry Road. This terrace is thought to be the remains of Holomakani *Heiau* (Kawachi 1988)

Site 2023, Kawainui Cluster 2023:
(Clark, 1980) Located east of the Kapa'a Quarry Road and eastern Kapa'a Land-Fill Access Road junction, the site consists of 11 features, separated into two clusters. This area is also known as *Na Pohaku o Hauwahine* overlook and the most striking feature is the basalt outcrop that provides a splendid view of the entire Kawainui Marsh. This basalt outcrop also serves as a focal point for several archaeological features, the outcrop being incorporated into feature construction. Features radiating out from the outcrop include retaining walls, linear walls, L-shaped alignment of rocks, terrace (6 x 3 m.), portion of old

north-south running road bed, platform. Nearer the marsh is another set of features including two retaining walls covered in short grass and *hau*. One test pit was excavated in the terrace located near the basalt outcrop. Excavated to a depth of between 33 and 43 cmbs, two distinct strata were identified with cultural material in both including charcoal. One subsurface feature was recorded, a single use fire pit or the dump of a more permanent hearth. Several artifacts were collected including two glass shards, basalt flakes, volcanic glass flakes, one basalt grinder, one probable adze flake.

Site 359, Pahukini Heiau: (McAllister, 1933)

Pahukini Heiau is one of the larger religious sites on the windward side of O'ahu. It's remnants include a large enclosure that measures 176 by 110 feet. It is located along a ridge in Laonia, on the Kapa'a slope, facing the range of hills dividing Kaneohe from Kailua. The site is today enclosed by the Kapa'a Land-Fill. It is believed to be of *po'okanaka* (human sacrifice) class. Oral traditions indicate Chief 'Olopana built this *heiau* at around AD. 1100, naming it Pahukini, which means many drums. On the north wall is a small inclosure which Thrum believes is of "modern service" (32 x 38 feet in dimension). The paving has been moved around and piled into small mounds throughout the heiau. The site has also been disturbed by a heavy growth of guava, lantana and other shrubbery withing the heiau.

Along one end of the structure a ledge several feet in width ran probably its entire length, resembling a prominent feature of the temple of Puu o Mahuka. Like the rest of the site, this structure has also been disturbed.

Segment 6

Site 8964, Kaeleuli House site:

"North of the stream, two recently abandoned house sites were located"...modern trash suggests they were occupied until recently (Ewart and Tuggle, 1977). No site map, no excavation. This site location is not marked on the SHPD GIS map of Kawai Nui March historic properties; see Figure 3.

Kawainui Marsh Coring:

(Hammatt *et al.*, 1990) The U.S. Army Corps of Engineers proposed construction of open water channels in the marsh for flood control. There was concern for impacts to archaeological resources within/surrounding the marsh. Objective of study was to (1) characterize depth, age and nature of sediments to be impacted in relation to present marsh sediments and (2) reconstruct environmental history of marsh to determine nature and location of native Hawaiian use including shoreline habitation, fishponds, agricultural sites. Ten sediment cores were taken from Kawainui Marsh and analyzed for pollen, organic clay mineralogy, stratigraphy and heavy metals. Results of paleoenvironmental study of Kawainui Marsh were:

1) the marsh basin is not a uniform bowl-shaped depression
2) during most of the Holocene, Kawainui was a marine bay with open circulation and tidal activity. The bay was partially blocked by sand barrier by 1000 BC.
3) Kawainui became a lagoon with alternating fresh and saline environments until as late as AD 570. By AD 1400, the ocean inlet was cut off and the basin became filled with terrestrial silty clays.
4) The transition from bay to lagoon was marked by a dramatic increase in sedimentation rate (600%)
5) There are no apparent changes in pollen zones during early Polynesian settlement. Dramatic changes appear in pollen zones by AD 1400 associated with dramatic decreases in mixed mesic forest species and increases in grasses and sedges. These changes may be related to increased Hawaiian agricultural and subsistence activities.
6) Vast numbers of *loulu* palm (*Pritchardia*) may have provided a major food supply to Hawaiians during early Hawaiian occupation. The dramatic decrease of *loulu* may be the result of human impact.

(Athens and Ward, 1991): This report documents archaeological work along the marsh levee. Athens and Ward evaluated the presence and absence of significant archaeological sites, which might have been affected by flood control project at Kawainui Marsh. Thirty-seven core/auger units were placed along both sides of the levee and two units were tested within the marsh and analyzed for pollen, stratigraphy, and sedimentation rates. In addition, a surface survey and the excavation of three test units on the south end of the levee (where two sites were known to be located) were conducted. No archaeological remains were found in the project area. However, much information was gained on the following areas A) prehistoric human occupation in and around the marsh, B) initial Polynesian settlement of Hawai'i, C) the natural history of windward O'ahu. The following are the results of the Athens and Ward studies conducted at Kawainui Marsh:

1) The sediments of Kawainui Marsh provide a continuous record of sedimentation and in-filling since before 2000 BC.
2) The marsh basin was transformed into a closed, freshwater system at about 200 BC
3) It is probable that the change from a marine to freshwater basin at Kawainui Marsh was due to a fall in sea-level
4) The initial appearance of the Kailua sand berm (or accretion barrier) above water probably dates to before about 600 BC, but not earlier than about 1000 BC.
5) The sediment cores from Kawainui yield a rich assemblage of angiosperm palynomorphs
6) The lowlands prior to Polynesian contact and up to roughly AD 1000 were dominated by Pritchardia palm forests.
7) The pollen diagram of Kawainui is distinctive for its triad of dominant types—*Pritchardia, Dodonea*, and *Kanaloa Kahoolawensis*.
8) After about AD 1000, the dominant plant species decline precipitously. This may be related to rising human population levels and the expansion of agriculture.
9) The pollen record from Ft. Shafter is comparable in diversity to that of Kawainui Marsh.

10) There are few "Polynesian Introduced" species in the pollen record. Only three species were found--*Aleurites moluccana (kukui), Cocos nucifera (niu), and Cordyline fruticosa (ti)*. These occur late, after about AD 1000 to 1200.
11) Sedimentation data indicates that the commonly held belief that agricultural practices of prehistoric Hawaiians were responsible for in-filling of the basin is incorrect...Natural processes rather than human activities (particularly agriculture) are paramount with respect to causation for coastal progradation and basin in-filling.
12) Lack of charcoal particles suggests fire had little or no effect on natural vegetation communities in the Kawainui basin watershed.
13) Remains of vegetation associated with disturbed environments begins to rise dramatically at about AD 1200. The significance of this information is that it provides a time frame-about AD 1200--for the onset of what was probably the rapid growth of a previously small population and inland agricultural expansion.
14) The sedge pollen suggests the Kawainui Marsh was an open body of water prior to AD 1000. After this, the marsh spread rapidly.

IV. ASSESSMENT OF SEGMENT 1

Segment 1 begins at the hairpin turn in the gravel access road that connects the southern end of the Kawai Nui Marsh Dike Road with Kailua Road. The trail segment continues in a generally southwest direction, parallel to Kailua Road, to the vicinity of Ulupo Heiau. Segment 1 runs along the marsh-side of several recognizable Kailua Road properties, including St. Johns Evangelical Lutheran Church, the Kawai Nui Vista Subdivision, the Kailua Baptist Church, the Kailua Methodist Church, and the state owned parcel containing 'Ulupo *Heiau* itself.

The following discussion of Segment 1 will be by different geographical components of the segment. The properties along Kailua Road and the specific archaeological sites will be used to demarcate these different components of the segment, shown in Figure 4. Discussion of the individual components will proceed from the Kawai Nui Dike Road southwest towards 'Ulupo Heiau.

Of the five proposed segments of the circum-Kawai Nui Marsh Trail, Segment 1 will be the most difficult trail section to construct. For the most part, the land form in Segment 1 is steep, sometimes vertical, basalt bedrock outcrops and basalt boulder covered slopes. Much of the vegetation is dense *hau* thickets that will need to be cut back and maintained along the route. These conditions will make trail construction and maintenance challenging. They will also make combining vistas of the marsh with access to the archaeological sites along the marsh edge difficult. For instance, in many places to be near the archaeological sites a "*hau* tunnel" will have to be cut that will not allow views of the marsh. The specifics of these trail construction challenges will be discussed below under the different components of Segment 1.

Before discussing the trail alignments it should be mentioned that there appears to be a good location for parking at the beginning of Segment 1 at the access road that connects Kawai Nui Dike Road with Kailua Road, see Figure 6. There is room for 10 to 12 parking stalls along the lower portion of the access road. Within the *hau* immediately southwest of the access road's hairpin turn is a 20 by 20 or 30 by 30 meter area that could also be made available for parking with grubbing and grading. This area within the existing *hau* could be selectively grubbed to allow shade for the parked cars and the hikers entering and exiting the circum-Kawai Nui trail system.

Component 1 extends from the hairpin turn in the access road that connects Kawai Nui Dike Road with Kailua Road to the northwest end of the Kawai Nui Vista Subdivision. This component will be the easiest to construct because it will be the least hampered by rugged terrain and dense vegetation. The difficulty in the construction of Component 1 will be crossing the rugged terrain associated with the intermittent drainage that runs between St. John's Lutheran Church and the Kawai Nui Vista Subdivision and getting around the Kawai Nui Vista Subdivision itself, see discussion below. Closest to the hairpin turn vegetation in this component of Segment 1 is fairly high canopy of *hau* intermixed with bamboo. Further along, closer to St. Johns, the vegetation changes to grasses, vines, and

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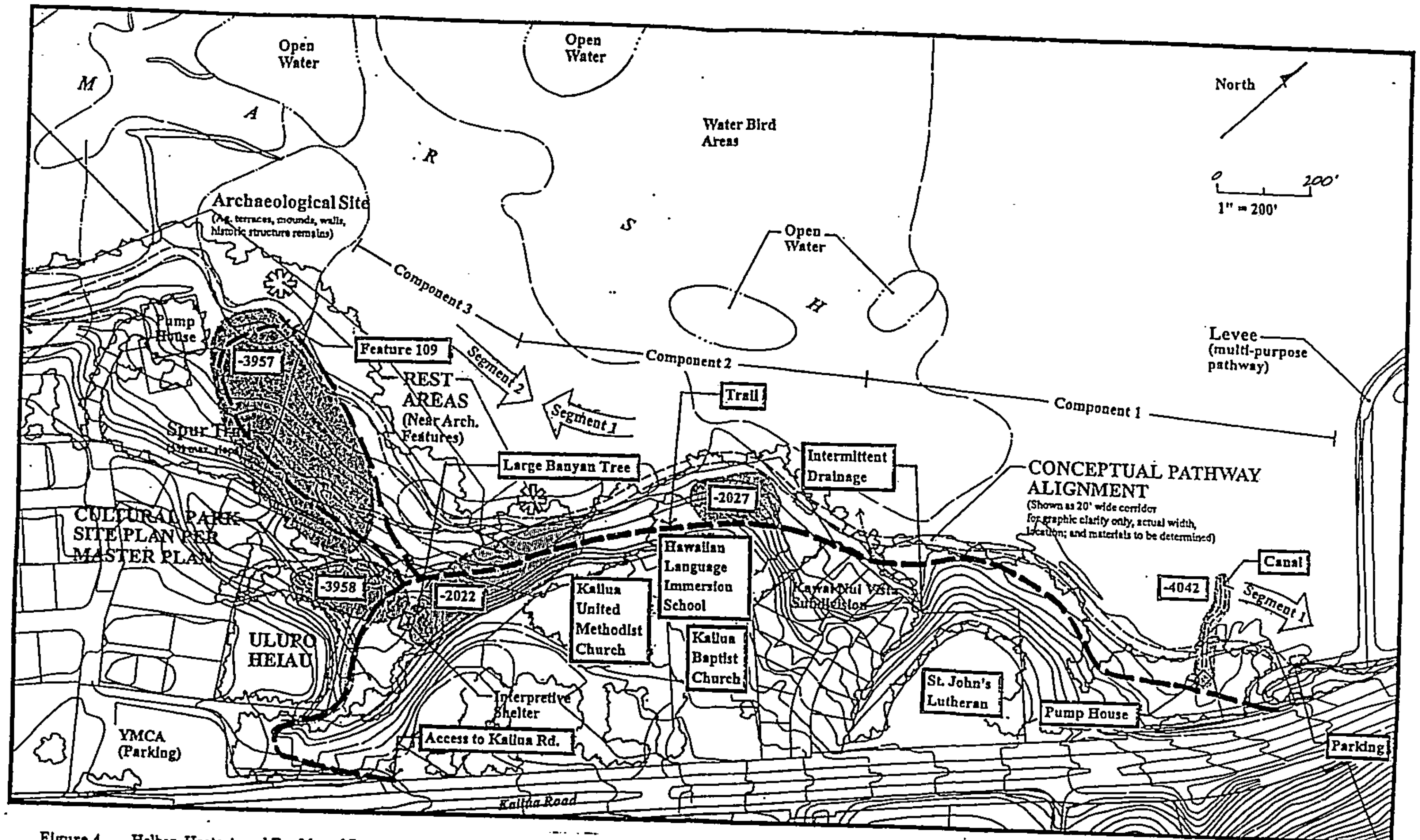

Figure 4 Helber, Hastert, and Fee Map of Segment 1 Showing Sites, Locations, and Landmarks Discussed in the Text.

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koa haole. Some good vistas of the marsh are possible in Component 1 of Segment 1. Only a single historic site is located in this first component of Segment 1.

The single historic property of note within component consists of an excavated canal and an associated housing foundation for a pumping facility. These features are part of the Waimanalo Irrigation System. Completed in 1923, the Waimanalo Irrigation System is a system of pumps, pipelines, tunnels, and ditches that conducted water from Kawai Nui Marsh to the Waimanalo sugar cane fields until the early 1950s (Harland, Bartholomew, and Associates 1959:53-54: Hall 1997:94, Kelly and Nakamura 1981:78-79). According to Wilcox (1996:111) two pumps lifted water from Kawai Nui Marsh and took it to the head of a 10,000-foot system of small tunnels to a reservoir in Waimanalo. The Waimanalo Irrigation System was nominated to the State and National Registers of Historic Places in 1992 (Creed, application form, 1992). The system was given state site # 50-80-15-4042, but was not placed on either the State or National Registers.

The location of the pump housing structure and canal is shown on Figure 4. The pump housing structure is roughly rectangular and constructed predominantly of mortared basalt boulders. There are the remains of some large diameter iron pipes within the structure. The associated canal extends out into the Kawai Nui Marsh from the pump housing structure. This canal alignment is visible on the Tax Key Map 4:2: 13 and can be seen from Kailua Road where it extends into the marsh. The canal side walls are lined with dry masonry basalt boulders immediately at the pump housing structure. Further from the pump structure the side-walls of the canal alignment are earthen. Both the canal and the pump structure are overgrown with *hau* trunks. The base of the canal is standing water and mud. For the trail to cross the canal a bridge would be needed. It is better that the trail alignment pass around the canal and pump structure, towards Kailua Road, avoiding the need for a bridge. The canal and pump structure are part of site # 50-80-15-4042 and have interpretive value as physical remains of the engineering feats undertaken by the sugarcane industry in Hawaii. I recommend that an interpretive plaque be installed along the trail where it passes near the site.

Once past the features of site # 50-80-15-4042 the trail should continue through the hau vegetation. There is an existing trail that can be improved upon. This existing trail is extant between the dike access road to the area in back of St. John's Lutheran Church. During the initial portions of the trails, no views of the adjacent marsh will be possible because of the dense *hau* vegetation. However, because of the relatively high canopy of this *hau* thicket, the trail alignment should not be hampered by vegetation. Approximately 150-200 feet past the pump structure, the vegetation becomes grasses and *koa haole*. At this change in vegetation there is a good vantage point of the marsh and the Kawai Nui Dike Road--see Figure 6. Once the trail emerges from the *hau* thicket, it can follow closely the boundary of the marsh, which will be intermittently visible between the *koa haole* vegetation. Vegetation clearance along this entire portion of Component 1, from the *hau* thicket to the intermittent drainage (between Kawai Nui Vista Subdivision and St. John's Lutheran Church), could be cut down and maintained with little effort, thereby exposing the marsh view.

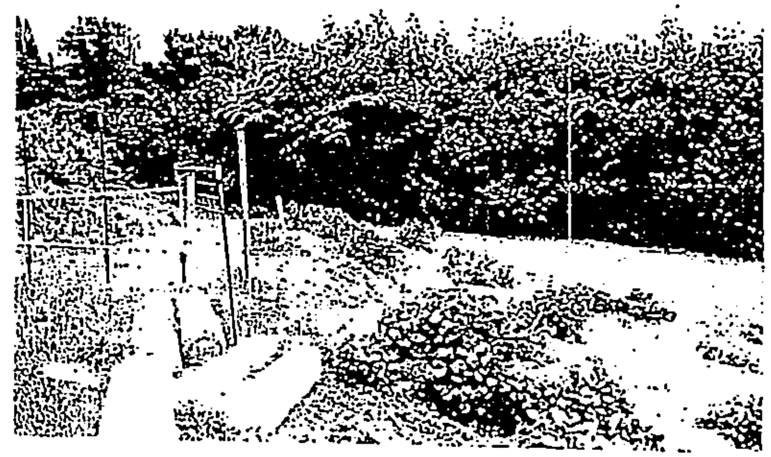

Figure 5 Shot Southwest of Potential Parking Area At the Access Road Switchback at the Southern End of the Kawai Nui Dike Road

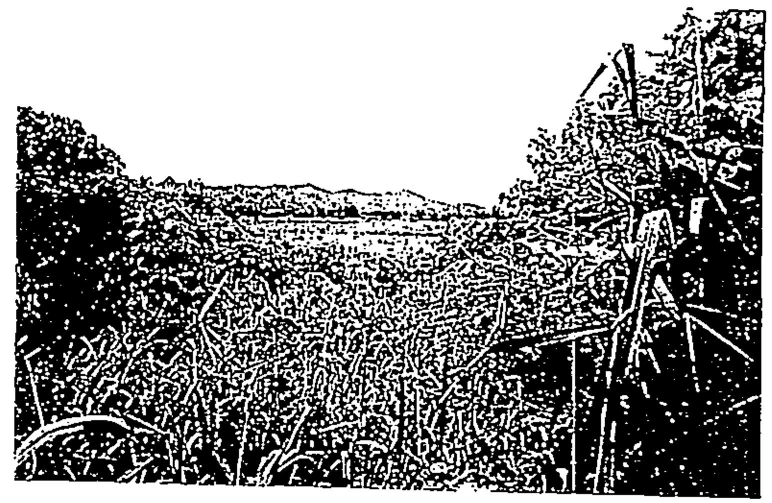

Figure 6 View North from Component 1 of Segment 1 Showing Marsh and Kawai Nui Dike Road

In this grass and *koa haole* portion of Component 1, there are some remnants of past land use, including stone alignments, ceramic fragments, bottles, and what appears to be a portion of a historic roadway or trail. These remains are indistinct and most likely all date to the historic period. They are not particularly valuable for public interpretation and would be undetectable to the vast majority of persons using the trail. These historic remains are located up-slope of the proposed trail alignment and, because of their location and indistinctness, should not be affected by trail construction and use.

Near the intermittent drainage that separates St. John's Lutheran Church from the Kawai Nui Vista Subdivision terrain becomes more boulder strewn with exposed basalt outcrops nearer to the intermittant drainage. Trail construction around these boulders will take some negotiating. A bridge may be required to cross the drainage itself.

During the field inspection of the Segment 1 trail alignment, colored flagging tape and surveyors stakes were noted in the house lots of the Kawai Nui Vista Subdivision that border the marsh. Based on the layout of these flags and pins, the property boundaries of these lots appear to extend down to the standing water of the marsh itself--see Figure 7. If this is the case there will be no solid ground, outside of the subdivision lots, for the trail along the marsh edge. The property boundaries of these lots should be checked. It is possible the future home owners will allow the trail to go through their property if need be, although this is unlikely. Perhaps a boardwalk could be constructed in this portion of Segment 1, bringing the trail alignment out, away from the Kawai Nui Vista lots and into the marsh. This boardwalk could also be used to bypass the rough terrain around the intermittent drainage that separates St. John's Lutheran Church from the Kawai Nui Vista Subdivision.

Component 2 of Segment 1 extends from the northwest corner of the Kawai Nui Vista Subdivision to the vicinity of sites 50-80-04-3958 and -2022. Component 2 is the most rugged section of Segment 1, with vertical basalt outcrops and steep, boulder-strewn slopes--see Figure 8. Vegetation consists predominantly of a dense tangle of *hau*, with occasional mango and banyan trees. Along the up-slope areas, nearest to the churches and other structures along Kailua Road, there is some relatively level grass and low-vegetation open space. There are also some currently cultivated areas containing wetland taro and banana. These cultivated sections are part of site 50-80-04-2022.

The existing trail alignment on the Helber, Hastert, and Fee Map shows the trail running along the edge of the marsh in this portion of Segment 1. In reality this would be at the base of the basalt outcrop, through the tangle of dense *hau*, in low land that may be seasonally underwater. No view of the marsh would be possible. Because of the rough terrain, the simplest means of creating a trail alignment through this area would be to elevate the trail on the up-slope side of the basalt outcrops. This would mean the trail would have to hug the property boundaries of the church and school properties fronting Kailua Road. Good vistas of the marsh would be possible. Also the trail could take advantage of the relatively unvegetated and boulder free terrain on the up-slope side of the outcrop. One of the problems with elevating the trail on top of the basalt outcrop is accessing the top of the basalt bluff. The bluff meets with the properties of the Kawai Nui

Figure 7 Shot West from the Kawai Nui Vista Subdivision Showing the Lots Extending Down to the Margin of the Marsh

Figure 8 Shot South from the Base of the Vertical Basalt Outcrop (Approximately 20 Feet High) in the Vicinity of State Site 50-80-15-2027

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Vista Subdivision and there is little room for switch-backs to ascend the approximately 20-foot high bluff. Perhaps stairs would be possible.

Of course it would be possible to establish the trail down at the level of the marsh, down slope of the basalt boulders and outcrops. This would require some boardwalk construction and a great deal of *hau* vegetation clearance. This trail alignment would be a "*hau* tunnel" with no view of the marsh. It would also be subject to seasonal inundation during heavy rains.

The first archaeological site that is encountered along Component 2 of Segment 1 is State Site 50-80-11-2027. This site was originally recorded by Clark (1980:51-52) and appears to have been affected by bulldozer activity in the intervening 20 years. The site covers an area that measures approximately 250 ft. east/west by 125 ft. north/south. The six features that comprise the site were interpreted by Clarke as both historic and prehistoric features related to habitation and possibly agriculture. Stacked basalt wall segments, terraces, and enclosures, and basalt adz fragment were recorded--see Figure 9, which is Clark's map of the site. Feature 3, a single basalt boulder rectangular enclosure was the single feature that could be accurately re-identified during the current field inspection for the trail alignment. Features 4, 5, and 6 were also likely identified, but appear to have been affected by bulldozing in the vicinity. The Pohakapu Sewage Treatment Plant, shown of Figure 9, is no longer extant, having been dismantled in the last few years and replaced by the lots of the Kawai Nui Vista Subdivision.

The features of Site 50-80-11-2027 are somewhat indistinct and not particularly suited for public interpretation. If the trail is to be placed on the up-slope side of the basalt outcrop, then it should be placed up slope of the features, *i.e.* between the archaeological features and the properties along Kailua Road. As the features are not particularly obvious to untrained eyes (see Figure 10), care should be taken to point out the location of the features before the trail is constructed. Depending on how close the trail is to pass to these features, some form of signage might be required to protect the sites, especially Feature 3, from damage by trail users. If the trail is to be placed down slope from the basalt outcrop, the features will not be affected.

Continuing southeast along Component 2 of Segment 1, past Site 50-80-11-2027, the terrain remains fairly rugged, with dense vegetation and basalt outcrops closer to the marsh, and fairly open vegetation and a more level land surface along the up-slope areas closest to the properties that front Kailua Road. This terrain continues until the vicinity of Site 50-80-11-2022. Again the path of least resistance would place the trail up-slope, near the lower boundary of the properties that front Kailua road. Of course there is the option of building the trial down slope closer to the marsh, but this would require ample *hau* clearance and the maintenance of the resulting "*hau* tunnel". Figure 11 is photograph of the dense *hau* vegetation.

In the vicinity of Site 50-80-11-2022 the hill slope down to the marsh becomes less steep and the vegetation is less dense. Basalt boulders and outcrops are still common and a trail alignment that traverses the slope will have to negotiate this irregular terrain. In the

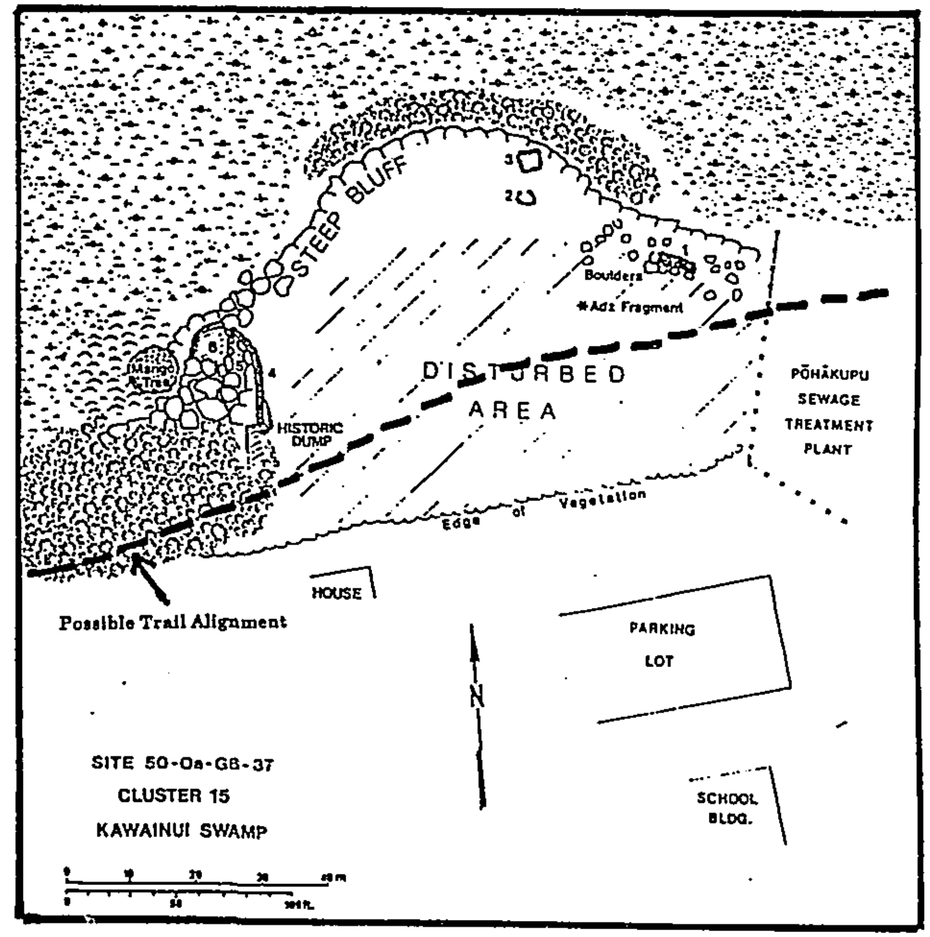

Figure 9 Clark's (1980:52, Figure 19) map of Site 50-80-15-2027--Showing Archaeological Features.

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Figure 10 Shot Southwest of Site -2027 Feature 3, Covered with Vegetation

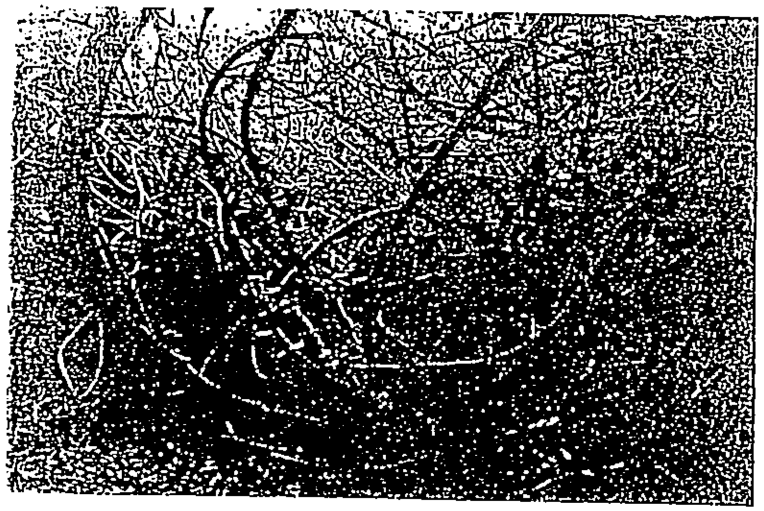

Figure 11 Shot Southwest of Dense *Hau* Vegetation Near the Marsh Edge Between Sites -2027 and -2022

area between Sites 50-80-11-2027 and 50-80-11-2022 it is recommended that the trail remain elevated near the boundaries of the properties that front Kailua Road. This will avoid the dense vegetation and rough terrain. Closer to Site 50-80-11-2022 the slope, vegetation, and boulder outcrops are less substantial obstacles and the trail can descend closer to the marsh. In this portion of the Segment 1, closer to Site 50-80-11-2022, there is no longer a relatively level area between the properties that front Kailua Road and the hill slope that leads to the marsh. The trail will need to traverse the hill slope or run along its base at the margin of the marsh.

The features of Site 50-80-11-2022 consist largely of stacked basalt boulder retaining walls for agricultural terraces--see Figure 12, which is Clark's (1980: Sheet 1) map of the site. The terraces form rectangular *lo'i*, or wetland taro pond fields. These features were likely constructed prehistorically and their use continued through the 19th century. Several of the terraces are spring fed and are actively under cultivation with taro and banana. These active terraces are located immediately in back of the Hawaiian-language immersion school (in back of the Kailua Methodist Church). The immersion school may be responsible for the active cultivation. With the maintained terrace walls, spring-fed water trickling down slope from pond field to pond field, and the taro and banana plants themselves, this is a beautiful spot and will be one of the high-points of the Segment 1 alignment--see Figure 13. The trail will most likely have to cross this area of active cultivation--unless it skirts it, either up-slope close to the Kailua Road properties, or down slope near the margin of the marsh. A board walk would be the easiest means of crossing this area, as the exposed soils are mucky and their is standing water in the pond fields themselves. The dry masonry, stacked basalt boulder terrace walls are not substantial and are not sufficiently stable to support pedestrian traffic.

The southern most features of Site 50-80-11-2022 shown on Clark's map in the vicinity of the large banyan tree, are the foundations of a historic piggery. The foundations are low enclosures of cemented basalt boulders. Smaller internal features included what appear to be water or food troughs made of cement.

The recommended, path of least resistance, alignment of the proposed trail through Site 50-80-11-2022 is shown on Figure 12. This proposed alignment passes among the features of the site. Appropriate signage is recommended along the trail alignment to interpret the agricultural features of the site. If for some reason it were deemed undesirable to have the trail alignment pass directly through the features of Site 50-80-11-2022, the features could be skirted either up or down slope of the site. Up slope the terrain is steep and vegetation is fairly thick, but the trail could pass through. Downslope the terrain is more level, but the vegetation is thick.

The proposed trail alignment of the Helber, Hastert, and Fee map shows the trail passing along the margin of the marsh, down slope of Site 50-80-11-2022. The location labeled "Interpretive Shelter" is in the vicinity of the large banyan tree on top of the prominent basalt outcrop shown on Clark's map of Site 50-80-11-2022 (Figure 12). This basalt outcrop is rugged terrain. In the area downslope of this large outcrop the vegetation is relatively open, but the terrain consists of jumbled large basalt boulders. On the

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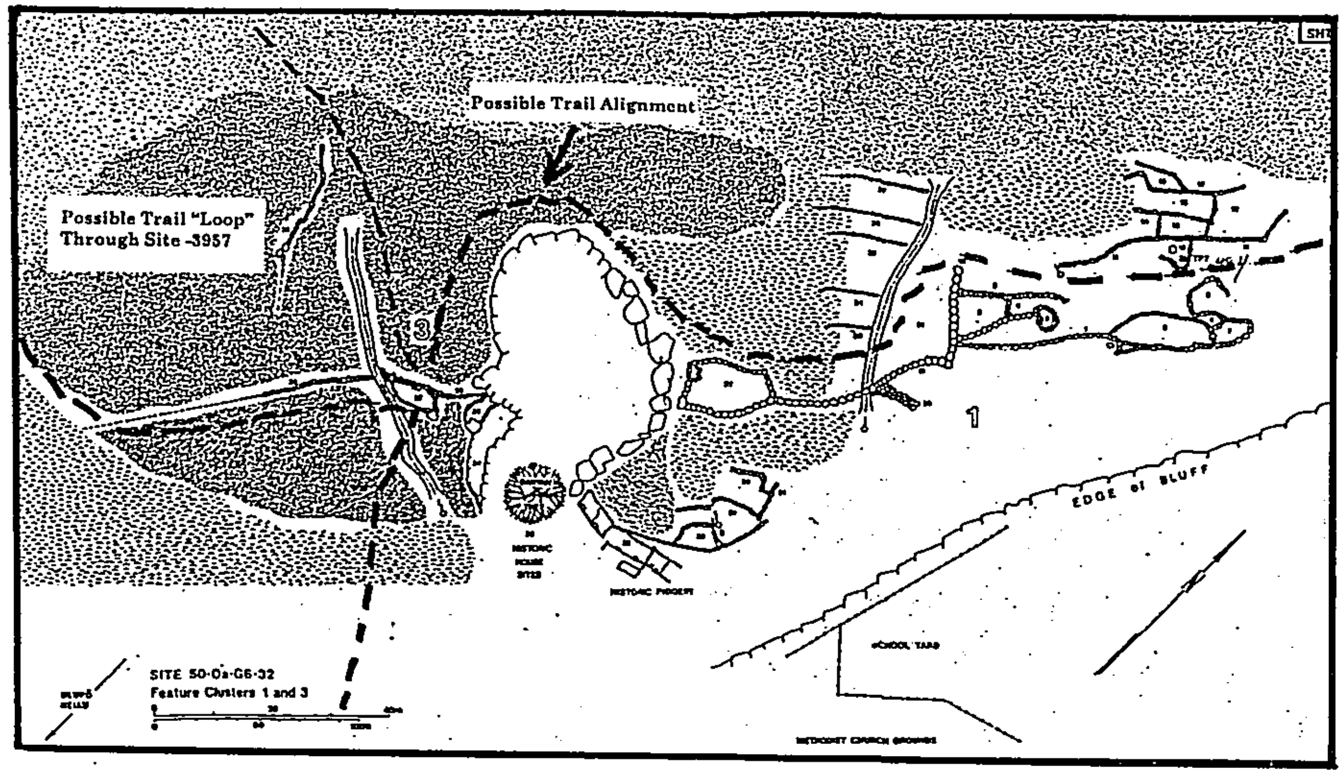

Figure 12 Clark's (1980: Sheet 1) Map of Sites 50-80-11-2022 (Labeled on Clark's Map as Cluster 1) and 50-80-11-3957 (Labeled on Clark's Map as Cluster 3)-- Showing Recommended Segment 1 Trail Alignment.

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Figure 13 Shot North of the Terraces of Site -2022 Under Active Cultivation with Taro and Banana

Figure 14 Shot South of Ulupo *Heiau*

west-southwest side of the boulder outcrop (also shown on Figure 12) are the features of State Site 50-80-11-3958. These stacked basalt boulder walls and alignments are likely prehistoric features that were modified by subsequent historic land use. Clark's map depicts a spring amid the features of Site 50-80-11-3958. During the field inspection, a drainage channel from the spring was observed, but it was dry at the time.

Component 3 of the Segment 1 Trail alignment is the area west of Sites 50-80-11-2022 and 50-80-11-3958. As one progresses further west beyond this large outcrop and the features of Site 50-80-11-3958, the terrain becomes less boulder covered and more level. The vegetation however, is dense *hau*. The trail alignment will form another "*hau* tunnel" in this area. Beyond Site 50-80-11-3958 the trail alignment heads west towards Site 50-80-11-3957. The trail alignment could run along the wall segment that connects Site 50-80-11-3958 with Site 50-80-11-3957. This wall segment is labeled feature 36 on Clark's map of Site 50-80-11-3958 (Figure 12). There are many other possible alignments for the trail in this area between Sites 50-80-11-3958 and 50-80-11-3957.

Just beyond Site 50-80-11-3958 there are many possible alignments for Segment 1. The trail should access the vicinity of Site 50-80-11-3957, Ulupo heiau, and Kailua Road. This can be accomplished through trail branches, a trail loop, or by winding the trail alignment. A trail loop is recommended, see Figure 4. The trail branches shown on the Helber, Hastert, and Fee map are feasible. Again in this portion of Segment 1 vegetation is dense, but would not hinder the trail construction.

Site 50-80-11-3957 would be the furthest western extent of Segment 1. This site consists of numerous stacked stone features including clearing mounds, enclosures, wall alignments, a historic house site, and irrigation features such as *'auwai*--see Figure 15, 16, and 17. The features are both prehistoric and historic. Conrad Erkelens (1993) did extensive investigation of this site. It is one of the most studied and best understood sites along the margin of Kawai Nui Marsh. It is recommended that the Segment 1 alignment proceed as far as Feature 109, a historic residence. Research by Erkelens identified Feature 109 as the *Māhele* Land Commission Award (L.C.A.) of the *Konohiki* (land manager) named Kahele. Excavation at the feature and its vicinity uncovered traditional Hawaiian artifacts as well as historic artifacts, including a fire-arm and a U. S. coin dating to the 1840s. Site 50-80-11-3957 offers good opportunities for public interpretation as the features that make up the site are fairly representative of the changes in land use that took place from the prehistoric period into the 20th century. These features would be good for interpretation with signage along the trail route.

The Segment 1 trail alignment can meander among the other features of Site 50-80-11-3957 to reach Feature 109. Feature 109 is on the margin of the marsh not far from one of the areas of open water--See Figure 16. With some *hau* clearance a trail segment could extend from the vicinity of Feature 109 out to the open water along a constructed boardwalk.

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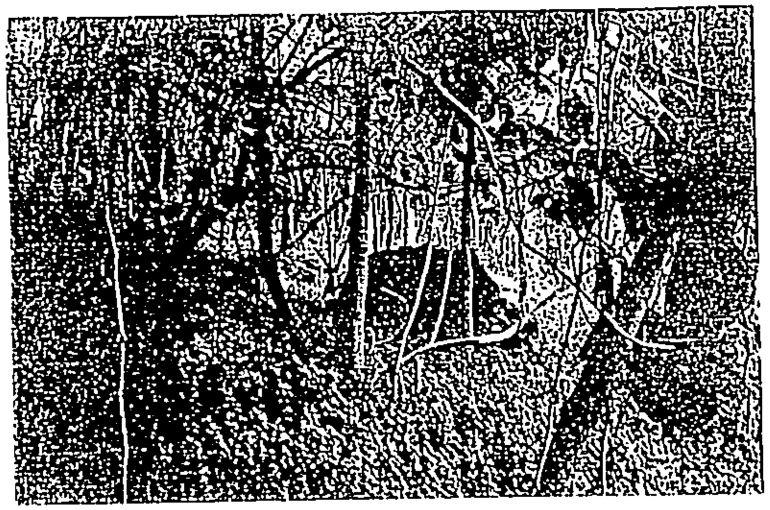

Figure 15 Shot Southwest of a Typical Dry-masonry, Stacked-Boulder Clearing Mound of Site -3957

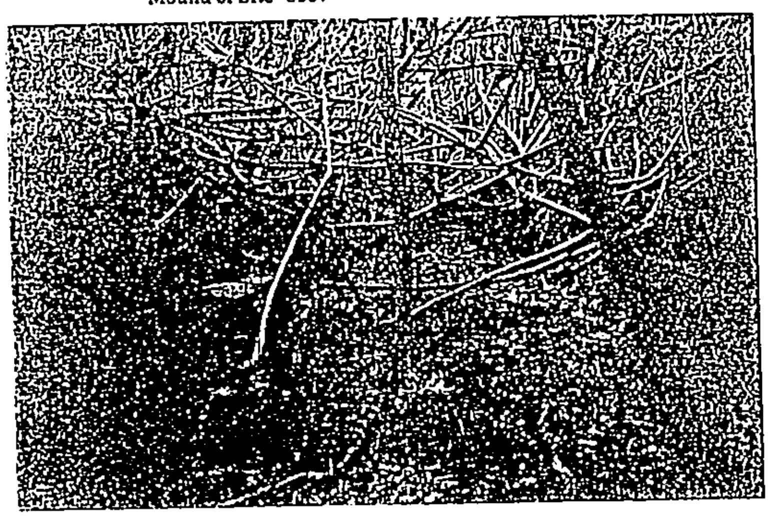

Figure 16 Shot Southwest of Site -3957, Feature 109 Habitation, Beneath Dense *Hau* Vegetation

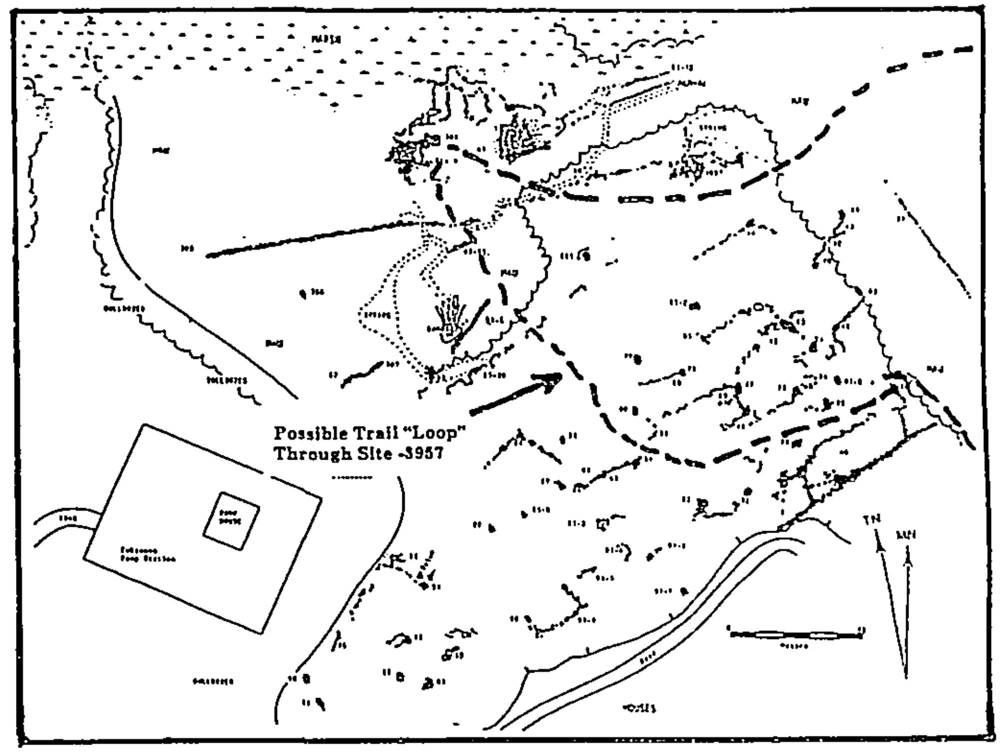

Figure 17 Erkelens' (1993:56) Map of Site 50-80-11-3957--Showing Recommended Segment 1 Trail Alignment.

The vicinity of Feature 109 (Site 50-80-11-3957) would be the furthest extent of Segment 1--see Figure 17. From here the trail would either loop back on itself to connect with Ulupo *Heiau* and Kailua Road, or trail-users would backtrack the way they had come. Once Segment 2 is constructed the trail can continue past Feature 109.

Ulupo *Heiau* is one of the most visually impressive traditional Hawaiian religious structures on the island of O'ahu. Trail-users on Segment 1 will approach the *heiau* from below the stacked boulder terrace--see Figure 14. This approach is dramatic and highlights the labor invested in the *heiau* construction. From the marsh side of the *heiau*, the trail alignment can circle around to the upper side of the platform where existing signage is displayed. From Ulupo Heiau Kailua Road is easily accessed along an asphalt pathway that previously provided vehicular access to the Y. M. C. A. parking lot.

V. ASSESSMENT OF SEGMENT 2

The discussion of Segment 2 will proceed from Ulupo *Heiau* west to the vicinity of Castle Medical Center. From the vicinity of Ulupo *Heiau* and Sites 50-80-11-3958 and 50-80-11-3957, as was noted previously, the vegetation is a dense mix of introduced species and *hau*. This area is relatively level and has less of the large basalt boulder outcrops that characterize the adjacent portions of Segment 1. Beyond the Kukanono pumping facility the vegetation changes from predominantly dense mixes of *hau* thickets and introduced species, to a more open canopy of predominantly *koa haole* with African tulip, monkey pod, Christmas berry, and banyan,. There is a low understory of grasses and shrubs, however, walking is much easier through this area, see Figure 18. This vegetation change is most likely related to the access of cattle to this portion of the Kukanono slope, immediately behind the Kukanono subdivision. The cattle of Martin Knott have kept the vegetation from taking over as it has in most portions of Segment 1. Mr. Knott's lease hold land extends along the Kukanono slope to the area of the Kukanono Pumping Facility. Trail construction and maintenance along Segment 2 will be much less difficult in relation to Segment 1 because of the more open vegetation and the lack of pronounced basalt boulders and outcrops.

Segment 2 should proceed from the western most extent of Segment 1, the end of the "loop" section that connects Ulupo *Heiau* to Feature 109 (historic house foundation and related features) of Site 50-80-11-3967, see discussion in the Segment 1 Assessment, above. The trail segment should proceed west from Feature 109, through the dense vegetation, to the vicinity of Site 50-80-11-3961 on the marsh side of the Kukanono pumping facility. The six features of Site 50-80-11-3961 are most likely historic agricultural features. These features will not be adversely affected by the trail segment. These features are not well suited for public interpretation and the trail segment should be aligned to by-pass them. This is best accomplished by having the trail alignment past between Site 50-80-11-3961 and the Kukanono pumping facility.

Further west, beyond Site 50-80-11-3961 and the Kukanono pumping facility, better views of the marsh are available and vegetation is more open. In the vicinity of Site 50-80-11-3959 the vegetation is open under a canopy of *koa haole* (Figure 18). At the base of the Kukanono slope are broad vistas of the marsh (Figure 19). It is recommended that an interpretive plaque, or series of plaques be installed along the trail in the vicinity of Site 50-80-11-3959. Public interpretation should highlight the results of archaeological research in vicinity at Sites 50-80-11-2029, 50-80-11-2031, 50-80-11-3959, and 50-80-11-3960 including the documentation of historic and prehistoric stacked stone features, prehistoric grinding stones for adz manufacture, and the documentation of buried prehistoric and historic agricultural field walls out in the level surface of the marsh itself (Site 50-80-11-2029--Allen-Wheeler 1981; Cordy 1977). The trail alignment can follow a direct route through the stacked stone features of Sites 50-80-11-3959, 50-80-11-3960, and 50-80-11-2031. With the exception of the adz grinding stones, these are modest stacked stone features and individually they are not particularly suited for public interpretation. The buried agricultural walls of Site 50-80-11-2029 are not visible on the marsh surface (see

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Figure 18 Shot West of Typical Vegetation Along Kukanono Slope, Segment 2, in the Vicinity of Sites 50-80-11-2031 and 50-80-11-3959

Figure 19 Shot NW from the Base of Kukanono Slope in the Vicinity of Site 50-80-11-3959 Showing the Open Vista of the Marsh

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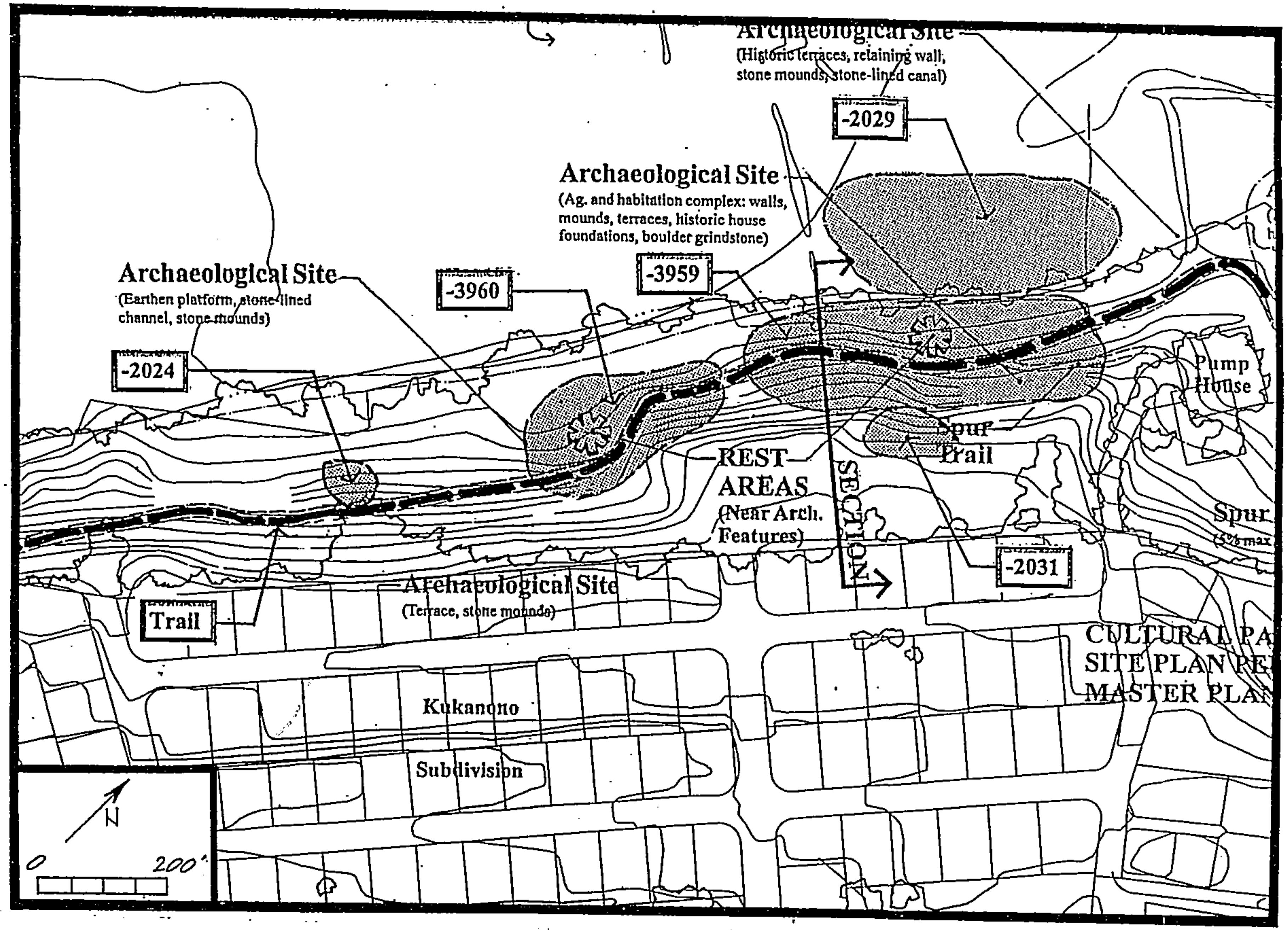

Figure 20 Clark's (1980) Map of Site 50-80-11-3959. Adz Grinding Stones are Located at Features 147 and at the Northern End of Feature 115.

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Figure 19). But as a whole the cultural landscape is representative of hundreds of years of land use along the margins of Kawai Nui Marsh. The adz grinding stones are more noteworthy features, and perhaps the signage would be best situated near these features. The stacked stone walls, terraces, and mounds of Sites 50-80-11-3959 and 50-80-11-2031 are unlikely to be adversely affected by the increased public access associated with the trail. Although small portable artifacts have been collected by past investigations at these sites, the danger of looting at these sites in not particularly great. Certainly the danger does not outweigh the benefit of public interpretation of the sites. Clark's (1980) map of site 50-80-11-3959 (Clark's cluster 4) is shown as Figure 20.

Further west the recorded sites along the Kukanono Slope are smaller, less distinct features on the landscape. Site 50-80-11-2024 consists of five small features, a terrace and a mound. This small site was not relocated during the assessment field work, however, it is likely that the mounds and terrace features are not particularly suited for public interpretation. They will most likely not be affected by increased pedestrian access in the vicinity related to the trail construction and use. The trail alignment should avoid this site. The vegetation in the vicinity is open and trail construction should not be hindered, see Figure 21. Many areas on the higher Kukanono Slope were clearly bulldozed as part of the grading related to the development of the Kukanono Subdivision. There are bulldozer push piles and mounds related to this earth moving activity.

The Kukanono Slope further west, beyond Site 50-80-11-2024 and continuing around in back of Castle Medical Center is steeper and more overgrown. Several large, irregular, linear alignments of boulders over 1 meter in diameter were noted, see Figure 22. These are the result of bulldozer clearance of the slope area. This bulldozer activity may be related to historic agriculture or ranching. Closer to the margin of the marsh, the land is cleared and fenced, with corrals and sheds. This is part of Mr. Martin Knott's ranching infrastructure. Three smaller historic properties, Sites 50-80-11-2028, 50-80-11-3962, and 50-80-11-3963, are located in the this vicinity. These sites could not be relocated during the assessment field inspection. It is unlikely, however, that these sites will be affected by the trail construction and use as the trail will not extend through this area. Instead the trail will connect with Ulukahiki Street to avoid the Knott ranch. Ulukahiki Street is one of the proposed entrances and exits to the trail system.

Figure 21 Shot West of Typical Vegetation Along Kukanono Slope, Segment 2, in the Vicinity of Sites 50-80-11-2024

Figure 22 Shot NW from Near the Base of Kukanono Slope in the Vicinity of Ulukahiki Street, Showing One of the Massive Boulder Alignments from Bulldozer Clearance in the Area.

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VI. ASSESSMENTS OF SEGMENTS 3 AND 4

There are no recorded historic properties within either Segments 3 or 4. Segment 3 extends from the end of Ulukahiki Street to Kahanaiki Stream near the corner of Kalanianaole Highway and Kapa'a Quarry Road. This segment of the trail will provide access to the Mokulana "Peninsula" area and cross both Maunawili and Kahanaiki Streams. The historic wooden structure at the end of Ulukahiki Street is the only known potential historic property within Segment 3. This structure is very rotted and termite infested. It may be beyond salvage. However, it is clearly over 50 years old and may be a significant historic property. If the trail system will impact this structure, through increased pedestrian use of the area, the State Historic Preservation Division should be consulted regarding the need for further documentation. Possible documentation might involve the drawing of elevations and floor plans and photographing the structure by an architectural historian. It may be that the site requires no further historic preservation documentation.

Vegetation and topography within Segment 3 should not hinder trail construction. Vegetation is grasses and dispersed trees for the most part. On Mokulana Peninsula itself there is a tall canopy of introduced trees. Beneath this canopy is limited undergrowth due to the cattle and horse grazing (see Figure 23). Where Segment 3 and 4 meet, adjacent to Kahanaiki Stream, the vegetation becomes more dense with stands of *hau*, introduced trees, and taller grass.

Mokulana Peninsula was used by the military during World War II (Chuck Burrows, personal communication, 2000). The area is used today by the Knott Ranch for cattle and horse pasturage (see Figure 23). Although no cultural deposits are known from the area, considering the location, it is likely that the area was used prehistorically and historically for both habitation and agriculture. It is as yet unclear if subsurface remnants of this past land use remain. It is unlikely, however, that the proposed trail construction will be of sufficient impact to damage as yet undetected subsurface cultural layers. However, if trail construction will involve substantial grubbing and grading of the trial route, it may be that further historic preservation work will be required. This could include an archaeological inventory survey and/or archaeological monitoring during trail construction.

Great vistas of the marsh are available from the Mokulana Peninsula area. Figure 24 is the view to the west from Mokulana towards Segments 4 and 5.

Vegetation is thicker in the vicinity of Segment 4. The relief is greater as well. The relatively short Segment 4 is the proposed site for the Kawai Nui Educational Center as outlined in the Kawai Nui Master Plan (1994). An educational structure and parking for 60 to 70 cars is proposed. Although there are no recorded historic properties within the proposed construction areas, it is likely that an archaeological inventory survey will be required as part of the permitting process for the educational center development. Again, consultation with SHPD/DLNR will resolve this matter.

Figure 23 Shot South Beneath the High Canopy on Mokulana Peninsula, Showing Vegetation and Current Land Use (Horse Grazing).

Figure 24 Shot West from Mokulana Peninsula Towards Segments 4 and 5, Showing Vegetation and One of the Marsh Vistas from the Peninsula

VII. ASSESSMENT OF SEGMENT 5

Segment 5 extends along Kapa'a Quarry Road, from it's intersection with Kalanianaole Highway, to the vicinity of the Honolulu City and County's Model Airplane Park. Current trail planing calls for the Circle Kawai Nui Trail to utilize the marsh-side shoulder of the Kapa'a Quarry Road as the primary alignment of Segment 5. The dense vegetation between the Quarry Road and the marsh will preclude marsh vistas. Accordingly, Segment 5 will be the most removed contextually from the marsh of all the proposed trail segments. To minimize this contextual disassociation, two branch trail segments are proposed for Segment 5 from Quarry road down to the marsh edge. These spur-trails will incorporate high spots in the natural topography, thereby providing broad marsh vistas. They will also meander along the slope down from Quarry Road to reach the marsh, providing access to the natural and cultural environment of the marsh itself as well as it's periphery.

There is only a single known historic property along the proposed alignment of Segment 5 with its associated spur-trails (Site 50-80-11-2023 *Na Pohaku o Hauwahine*--see discussion below). Several other sites are located in the vicinity that are of archaeological interest and that could be trail destinations for public interpretation related to Segment 5. The five historic properties along the Segment 5 route, from south to north are: 50-80-11-2026 (agricultural terrace); 50-80-11-3965 (small presumably agricultural terrace); 50-80-11-3739/360 Holomakani *Heiau*; 50-80-11-50-80-11-2023 *Na Pohaku o Hauwahine*; and 50-80-11-359 Pahukiki *Heiau* (see Figure 3).

Sites 50-80-11-2026 (Clark 1980) and 50-80-11-3965 (Ewart and Tuggle 1977), both stacked stone terraces, were not relocated during the field inspection along the marsh margins. The general location of these apparent agricultural terraces are shown on Figure 3. These features are unlikely to be affected by the relatively slight increase of pedestrian traffic along this margin of the marsh that will come with use of Segment 5. Vegetation between Kapa'a Quarry road and the marsh in this southern portion of the Segment 5 is a dense mix of introduced species including Banyan, Monkey Pod, Octopus Tree, Christmas Berry, and *Hau*. Topography is even and slopes gradually towards the marsh from Quarry Road. There are several intermittent drainages that descend this slope perpendicular to Quarry road, however, for the most part construction of spur-trails in this are would not be greatly hampered by either vegetation or topography.

The southern most of the two proposed spur trails will ascend to one of the highest points along the marsh side of Quarry road and descend to the marsh below. This high point will provide good views of the marsh once the predominantly Christmas Berry vegetation has been cleared. From this high point the proposed spur-trial will descend with many switch-backs to the marsh below. No previously located historic properties are known for this area. During the field inspection several older barbed wire fences from cattle ranching were noted. There is also an old road cut that extends perpendicular to the slope. This road cut is located in the vicinity of the spur trail, mid-way between Quarry Road and the marsh edge. It descends across the slope toward the marsh and has recently

been cleared of vegetation. As this former road cut has already been crudely graded, it could easily be incorporated into at least a part of the route of the spur-trail. Nearer to the marsh edge, where the road cut descends to the marsh edge, are several areas of old mango trees that would be good locations for rest areas and picnic tables. Board walks out into the marsh could be built from these areas for wildlife viewing. Topography and vegetation should not hamper the construction of this southern spur-trial.

The proposed northern spur-trail along Segment 5 will utilize the already existing trail system that connects Site 50-80-11-2023 *(Na Pohaku o Hauwahine)* to the Quarry road. The existing trail system at Site 50-80-11-2023 was constructed and is maintained by Mr. Chuck Burrows and the volunteers that work with him from Kamehameha School and the Kawai Nui Heritage Foundation. As the site description in the previous archaeology section, above, points out, there are good views of the marsh from this site; see Figure 25. The natural rock outcrop is a dramatic setting to appreciate the natural environment of the marsh. There are several legends about *Hauwahine* and Kawai Nui marsh that could be the subject of signage along the spur trail and at the *Na Pohaku* overlook; see the historic background section above.

There are also archaeological features, including stacked-stone retaining walls, modified outcrops, and a adze grinding stone (Figure 26). The archeological remains at the site are fairly modest and, with the exception of the grinding stone, are not particularly suited for public interpretation. It is unlikely that the archaeological remains at Site 50-80-11-2023 will be negatively affected by increased pedestrian traffic in the area following the implementation of Segment 5.

The *Na Pohaku* Site is a good location for general Kawai Nui Marsh interpretation. With the broad vistas, the area is well suit for discussions of the marsh's geology and formation chronology, natural environment, legends and oral traditions, and history and prehistory. A series of interpretive signs could be situated along the outcrop, each related to a different topic. It is recommended that Mr. Chuck Burrows of the Kawai Nui Heritage Foundation be consulted before any trail development proceeds in the vicinity of the *Na Pohaku* Site.

Two *heiau* are located in the general vicinity of Segment 5, Site 50-80-11-3739/360 Holomakani *Heiau* and Site 50-80-11-359 Pahukiki *Heiau*. Each is located a considerable distance up-slope from the Quarry Road and the proposed alignment of Segment 5; see Figure 3. However, there is potential for spur-trials that connect these two significant prehistoric sites with the Segment 5 alignment. Both *heiau* sites are good locations for public interpretation through signage.

Holomakani *Heiau* (Site 50-80-11-3739/360) is currently accessible from Kapa'a Quarry Road by a steep earthen pathway that is primarily the result of off-road vehicle use of the hill-slope above Quarry Road. Holomakani *Heiau* is located on private land, but perhaps an arrangement could be worked out with the land owner to allow public access to the site. A graded spur trail with switch backs could be made that would mitigate the otherwise steep slope.

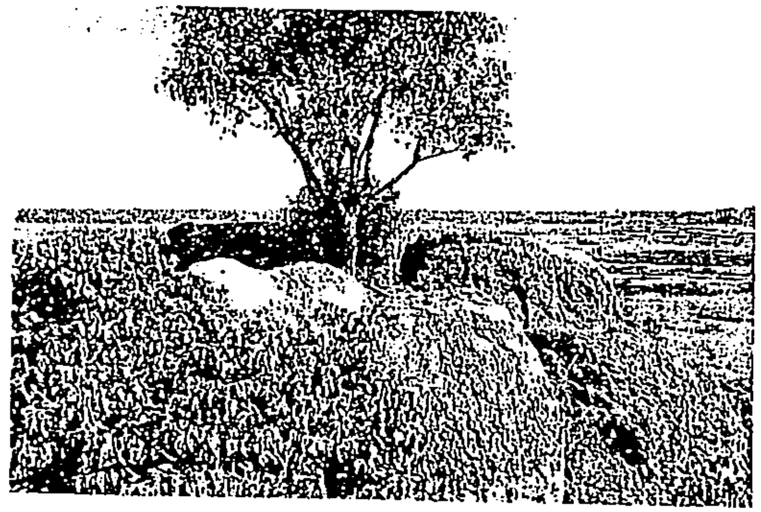

Figure 25 View to the East from Site 50-80-11-2023 (*Na Pohaku o Hauwahine*)

Figure 26 Reported Adze Grinding Stone at Site 50-80-11-2023 (*Na Pohaku o Hauwahine*)

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Pahukiki *Heiau* (Site -50-80-11-359) is located within the Kapa'a Land Fill and is most easily accessed by the roadways in the land-fill. It is possible that a trail segment could be constructed that connects Pahukini and Holomakani. However, this route would cover some fairly steep slopes and rough terrain. It would be difficult to make this route suitable for wheel-chairs.

VIII. ASSESSMENT OF SEGMENT 6

The Segment 6 alignment offers the least potential for cultural/historical public interpretation of all the Circle-Kawai Nui Trail segments. Segment 6 extends from the Honolulu City and County's model airplane park to the Oneawa Canal and the northern end of the Kawai Nui Dike Road in the northeast corner of Kawai Nui Marsh. The exact configuration of Segment 6 has yet to be determined. However, the route under consideration will utilize portions of the shoulder of the Kapa'a Quarry Road as well as spur trails that extend through portions of the marsh and inland of the marsh on the adjacent slopes. This portion of the Kapa'a Quarry Road, and its immediate vicinity, have been heavily affected by modern land alteration. This includes the excavation of drainage canals along both sides of Quarry Road, and the cutting and filling of large land areas related to the construction of the adjacent H-3 Freeway; see discussion in Kelly and Nakamura (1981). It is very unlikely that any significant historic properties will be affected by the construction and use of the Segment 6 Trail alignment, whether it stays on the shoulder of Kapa'a Quarry Road, extends through the marsh on boardwalks to the east of the road, or extends along a prepared pathway through the disturbed land areas on the west and north side of Quarry Road.

The field inspection of the southern portion of the proposed alignment of Segment 6, from the model airplane park to the eastern bend in Kapa'a Quarry Road, found no indication that historic properties might be affected by the construction and utilization of the trail. Drainage canals have been excavated along both sides of Quarry Road. West of Quarry Road the land surface has been bulldozed extensively. East of Quarry Road beyond the drainage canal, there is only open marsh. Vegetation consists of introduced, disturbance-loving, species.

Field inspection along the northern portion of Segment 6 from the eastern bend in Quarry Road to the Oneawa Canal, found no indication of significant historic properties. The area to the north of Quarry road consists of undulating slopes that were affected by land alteration related to the construction of the adjacent H-3 Freeway. Vegetation consists of *Hau*, Christmas Berry, Monkey Pod, *Koa Haole*, and grasses and vines. Several intermittent drainages, derived from drainage culverts off of the H-3 Freeway, cut down through this slope. The south side of Quarry road consists of fill land that was reclaimed from the marsh with excavated material from the construction of the H-3 Freeway (Kelly and Nakamura 1981). This area was formerly the site of an auto-wrecking yard. Car parts, and oil stains are still visible on the land surface. Vegetation is predominantly *Koa Haole* and Monkey-pod trees. There is an abrupt boundary with the marsh vegetation and standing water to the south of this portion of Segment 6.

There is only a single recorded historic property in the vicinity of Segment 6, Site 50-80-11-3964, the Kaeleuli House site (Ewart and Tuggle 1977). This site is not shown on Figure 3, but its location is indicated on the U.S.G.S. map that is the basis for Figure 3. Ewart and Tuggle (1977) describe the site as two house remnants, which, because of their associated modern materials, appeared to have been inhabited until recently (the survey

work of Ewart and Tuggle was done in the mid to late 1970s). On the U.S.G.S. (See Figure 3), in the northwest corner of "Kawainui Swamp", adjacent to the eastern bend in Kapa'a Quarry Road, are two square dots representing houses or structures. These two structures match the location of the two house remnants that make up Site 50-80-11-3964 as reported by Ewart and Tuggle (1977). During the field inspection this area was investigated. No remnants of Site 50-80-11-3964 were found, however, it was noted that the area had been greatly disturbed by bulldozing and dumping of construction materials. It is likely that these house remnants have been removed since the work of Ewart and Tuggle in the 1970s.

Chuck Burrows, of the Kawai Nui Heritage Foundation, related that there had once been a historic rice-mill in the vicinity of Site 50-80-11-3964 (Chuck Burrows, personal communication, 2000). During the field inspection of this area, no remnants of a rice mill were located. As with Site 50-80-11-3964, it is likely that the historic rice mill remnants were removed or covered by recent land disturbance.

IX. RECOMMENDATIONS

The archaeology and history of the Kawai Nui Marsh area have been well documented in numerous previous studies. Many of the marsh's historic properties have good public interpretive potential. They represent the physical record of centuries of changing land-use around the margin of Kawai Nui Marsh. There are prehistoric and historic habitation, agricultural, and irrigation features. There are prehistoric grinding stones for adz manufacture. There are also historic features related to large-scale commercial rice and sugar cultivation. An interpretive trail through these historic properties would be a history lesson on Kawai Nui specifically and Kailua in general.

A. State Historic Preservation Review Process

According to State of Hawaii historic preservation guidelines, before trail construction can begin the project should pass through the State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) historic preservation review process. The usual first step in the SHPD review process in an undertaking such as this trail construction would be an archaeological inventory survey of the proposed trail route. Typically, archaeological inventory survey would include:

1) Systematic inspection of the project area and the documentation of all historic properties located with scale maps, written descriptions, and limited test excavations;

2) Evaluation of feature function and age based on available archaeological, ethnohistoric, and historic evidence;

3) Significance evaluations of the recorded sites based on the significance criteria of the State and National Registers of Historic Places; and finally,

4) Recommendations regarding how to mitigate the impact of trail construction and use on the historic properties in the vicinity of the trail.

Following review and approval by SHPD of the project area's archaeological inventory survey, it is possible that a data recovery phase of archaeological/historical investigation would be required. Data recovery is a form of mitigation. It negates or lessens the impacts of project development by collecting available information before historic properties are affected.

Whether or not data recovery investigation is required, if significant historic properties are located within the project area, a preservation plan for the project must be prepared. The plan would detail the construction methods, the proposed mitigation of impact on historic properties, and both the long and short term preservation measures for the project area's historic properties. The plan would also specify how the historic properties would be interpreted and protected.

B. Special Circumstances for the Kawai Nui Trail Alignment

Outlined above are the steps of the historic preservation review process that are typical for development projects. The Kawai Nui Trail development project is out of the ordinary in the amount of previous archaeological and historical work that has been undertaken in the vicinity of the marsh. Although this work was not done as an inventory survey, it has resulted in the systematic pedestrian inspection of large portions of the marsh periphery, the documentation of sites and features with scale maps and written descriptions, and the subsurface testing of many archaeological features (items 1 and 2 from above). As this document demonstrates, there is a substantial amount of information regarding the sites on the periphery of the marsh. This information includes site maps, excavation results, sedimentological analysis, and ^{14}C dating results. What are lacking for these sites are significance evaluations and mitigation recommendations (items 3 and 4 from above).

It is recommended that SHPD be consulted regarding the proposed trail construction and the requirements to fulfill the historic preservation review process. During initial consultation regarding this project, SHPD was sympathetic and well aware of the time and monetary constraints associated with archaeological inventory survey of the entire marsh periphery. In consultation with SHPD it may be possible to work out a scope of work for the inventory survey of a specific trail alignment. As the pedestrian inspection and site recording for much of the marsh periphery has already been accomplished, this scope of work could focus on supplying the missing significance evaluations and mitigation recommendations for the sites along the trail alignment. With these evaluations and recommendations SHPD would have the information to evaluate the impacts of the trail alignment on historic properties. SHPD would also have the information needed to evaluate the required trail preservation plan. It may even be possible, in consultation with SHPD, to create a single document that includes the site significance evaluations, mitigation recommendations, and the trail preservation and interpretive plan.

Cultural Surveys Hawaii, Inc. cannot speak for SHPD. The specifics of the historic preservation review process will have to be worked out in consultation with Dr. Sara Collins, the O'ahu Island SHPD archaeologist. Although the proposed trail alignments and information summaries presented in this document will be useful during consultation with SHPD, it would be best to have a specific trail alignment. This facilitates decisions regarding what sites will be affected directly by trail construction and what sites will be affected by increased pedestrian traffic associated with the trail.

C. Recommendation for Route Selection

For selection of the specific trail alignment, it is recommended that the proposed routes be walked, evaluated, and discussed by the consulting archaeologist, land surveyor, trail construction company representative, trail architect, and any other parties whose input will be important to the specific trail alignment. Once the route is agreed upon, it should be recorded and marked with survey stakes by land surveyors. These survey points can then be used as locator points to complete the historic preservation scope of work that is worked out with SHPD.

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Appendix E

Cultural Impact Evaluation

Cultural Surveys Hawaii, Inc.

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Technical and Organizational Sustainability Consultants

Honolulu, Hawaii

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