

DRAFT ENVIRONMENTAL ASSESSMENT

for

CONNECTIONS NEW CENTURY PUBLIC CHARTER SCHOOL



Kaumana, South Hilo, Hawaii
Tax Map Key: (3) 2-5-006:141

Prepared For:

Connections Public Charter School
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ACRONYMS

AMSL	Above mean sea level
BMP	Best Management Practice
Cfs	Cubic feet per second
DOH	Department of Health
DWS	Department of Water Supply
EA	Environmental Assessment
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GPD	Gallons Per Day
HAR	Hawaii Administrative Rules
HRS	Hawaii Revised Statutes
IWS	Individual Wastewater System
KWHR	Kilowatt Hours
kV	Kilo Volts
LEEDs	Leadership in Energy and Environmental Design
LOS	Level-of-Service
NPDES	National Pollution Discharge Elimination System
SHPD	State Historic Preservation Division
TIAR	Traffic Impact Analysis Impact Report
TMP	Traffic Management Plan
UBC	Uniform Building Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Society

1.0 INTRODUCTION AND PROJECT SUMMARY

1.1 Introduction

Connections New Century Public Charter School (hereafter referred to as “Connections”) was chartered by the State Board of Education in 2000, and authorized under signature of the Governor of the State of Hawaii, the President of the State Board of Education, and the State Superintendent of Schools. Connections opened in August 2000, with 184 students in grades K-6. By August 2001, the school had expanded to a K-12 program with a total of 360 students. The need and desire for this unique charter school is evidenced by an enrollment waiting list and is further illustrated by the broad-based community representation in the operation of the school.

The school’s faculty have been recognized for their innovative work, which has resulted in the school being designated as a “Demonstration Site” for the University of Hawaii, Manoa Curriculum Research and Development Group (CRDG). This designation has resulted in Connections becoming a major clearinghouse for emerging curriculum, as well as a center for teacher development.

Connections is based in the Hilo area. Currently, the elementary and middle school are located in the Kress Building on Kamehameha Avenue in downtown Hilo. The Kress building is owned by the school’s affiliated non-profit organization. The high school is presently located in leased facilities at the Nani Mau Gardens just outside of Hilo Town. The high school may need to relocate as early as academic year 2010-2011 and will have to find a temporary location until Connections can construct new facilities to permanently house the high school. Presently, Connections does not have a pre-Kindergarten program, but may choose to implement one in the future based on the availability of adequate facilities. Therefore, Connections proposes to construct a new campus that would co-locate its elementary, middle, and high schools on a single property. Connections is presently in the process of acquiring a long-term lease agreement with the State of Hawaii Department of Land and Natural Resources (DLNR) to a suitable parcel of land (described below in Section 2.1.1).

1.2 Scope and Authority

This Environmental Assessment (EA) has been prepared pursuant to the Hawaii Revised Statutes (HRS), Chapter 343 (the EIS law) and associated Title 11, Chapter 200, Hawaii Administrative Rules (HAR), Department of Health, State of Hawaii. The use of State lands for the proposed action triggers the environmental review process under HRS Chapter 343. The intent of this EA is

to ensure that comprehensive and systematic consideration is given to potential impacts of the proposed action upon the natural and man-made environment. Completion of the environmental review process pursuant to HRS Chapter 343 has been specified by DLNR as a condition to be met under the long-term lease agreement referenced above.

This EA is intended to serve as an environmental disclosure document which identifies the purpose and need of the proposed action, reasonable implementation alternatives, existing environmental conditions, potential environmental impacts, and mitigation measures to avoid or minimize such impacts. The findings presented in this EA will provide the basis to determine whether an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI) is appropriate.

1.3 Project Purpose and Need

The purpose of the proposed action is to relocate and establish a new school campus that will provide a long-term base of operations for the Connections School and improve the quality of education the school can provide its students.

The action is needed because the school must vacate facilities it is currently renting within a short timeframe and must make plans to establish permanent long-term facilities. Existing facilities are inadequate to accommodate the schools' present and future needs. Therefore, Connections proposes to co-locate all of its existing and proposed academic programs and facilities (i.e., pre-K, elementary, intermediate, and high school) onto one campus.

Construction of a new campus with co-located school facilities would meet the following needs:

- Eliminate the high rental costs for the high school
- Meet student enrollment demands
- Provide space for a dormitory
- Facilitate interaction amongst students at all grade levels
- Provide the land area necessary to establish an agricultural program as part of the curriculum
- Integrate the surrounding natural environment into the curriculum

Building a new campus from the ground up would provide the opportunity to develop academic facilities that are tailored to Connections' specific educational philosophy and approach to teaching and learning, and would provide a unique learning environment for this multi-cultural, globally-oriented charter school.

1.4 Project Profile

Project Name:	Connection Public Charter School,
Applicant:	Connections Public Charter School 174 Kamehameha Ave Hilo, Hawaii 96720 John L. Thatcher II, CEO
Approving Agency:	State of Hawaii Department of Land and Natural Resources (DLNR)
EA Consultant:	Wil Chee - Planning & Environmental, Inc. 1018 Palm Drive Honolulu, Hawaii 96814 Contact: Celia Shen or Richard Stook
Tax Map Key:	(3) 2-5-6:141
Land Area:	72.43 acres, more or less
Location:	Pohahawai, Kaumana, Kukuau 2 nd , South Hilo
Land Owner:	State of Hawaii (DLNR)
Existing Uses:	Vacant
Proposed Uses	Pre-K through - Grade12 Charter School
Land Use Classifications:	
State Land Use:	Agricultural
Hawaii County General Plan:	Urban Expansion
Zoning:	Agricultural 1-acre (A-1a)
Special Management Area:	Project is not within the SMA
Permits Required:	Special Permit NPDES Permit Permit to Construct Wastewater System Building Permit Grading Permit

1.5 Determination

Based on the information gathered during preparation of this draft EA, it is anticipated that the direct, indirect, and cumulative effects of the proposed action will not have a significant adverse effect on the environment. Consequently, it is anticipated that a FONSI will be issued by the approving agency and an EIS would not be required. Findings and determinations are discussed in further detail in Section 5.0.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action (Preferred Alternative)

2.1.1 Project Location

The proposed project site is located in Kaumana, South Hilo on the Island of Hawaii. The town of Hilo is located on the eastern side of the Island of Hawaii. The area's topography is mostly sloping from the tops of Mauna Kea and Mauna Loa to the sea. Hilo is less than 30 miles from Kilauea one of the most active volcanoes on earth. The project site is located on a vacant, undeveloped, state-owned parcel of land identified as Tax Map Key (TMK) (3)2-5-006:141. The subject parcel is approximately 1,844,313 square feet (72.34 acres) in size and is situated on Mauna Loa's lower slopes above Hilo south of Kaumana Drive (Figures 2-1 and 2-2).

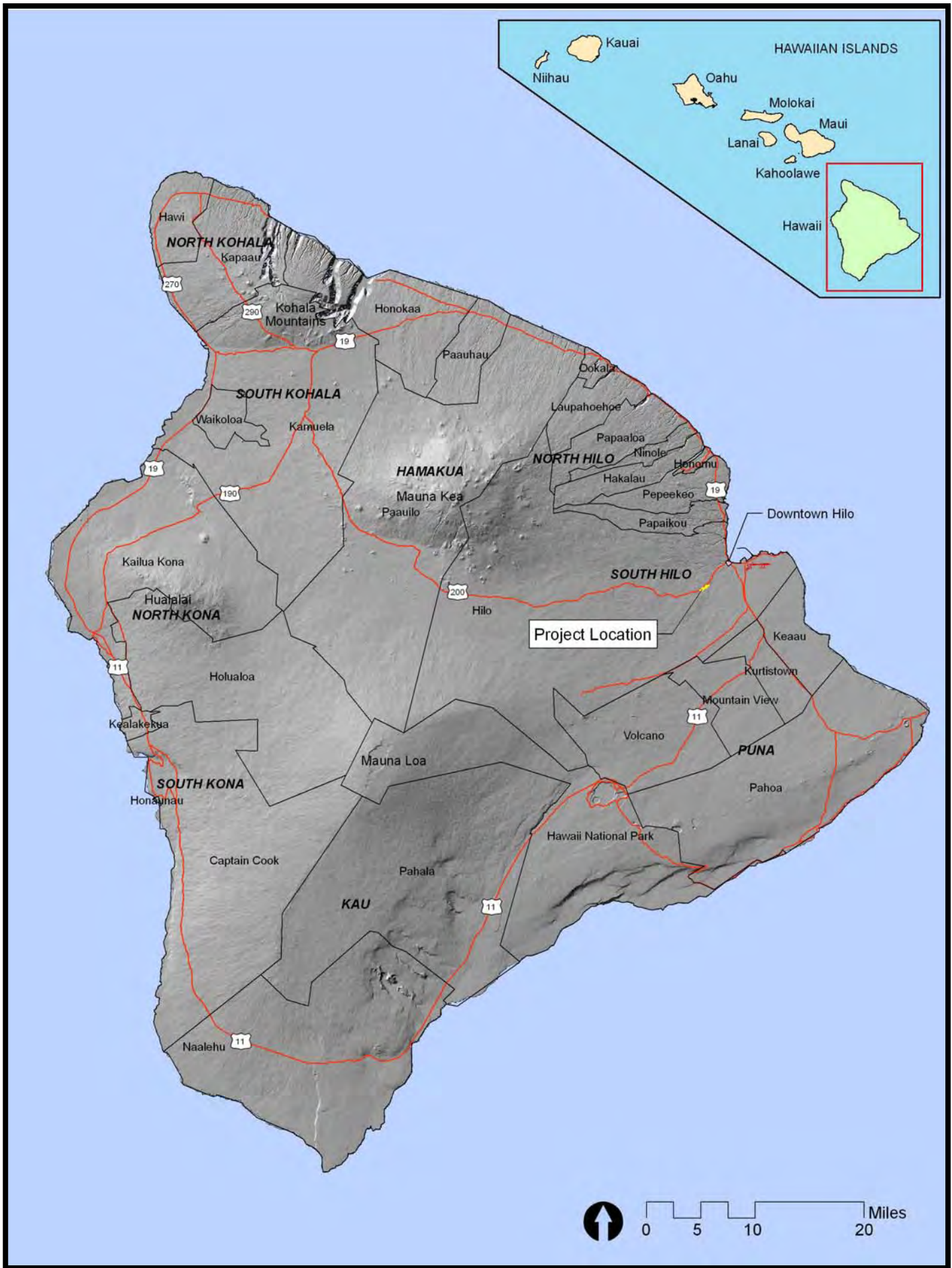
The majority of the property is situated within the ahupua'a of Ponahawai, with a very small sliver along its southern edge falling within the ahupua'a of Kukuau 2. The parcel is bounded along much of its perimeter by residences on Kaumana Drive, Edita Street and Melemanu Street. Just west of the property, on the far side of Kaumana Drive, is the main entrance to the Kaumana lava tube complex, which has been designated as Kaumana Caves County Park.

2.1.2 Project Features

The proposed action consists of the construction and operation of a new academic campus for the Connections New Century Public Charter School. The proposed campus will consist of a pre-Kindergarten (pre-K), elementary, intermediate, and high schools, and common facilities to support these schools.

The project site is currently undeveloped and separated into two sections, at its narrowest point, by Edita Street. The section to the east of Edita Street is designated the Lower Campus and the section to the west is designated the Upper Campus. The Upper Campus comprises approximately 37 acres, and the Lower Campus 35 acres. The Lower Campus is characterized by non-native trees and weeds and the Upper Campus by native ohia forest with an understory of uluhe (Pacific false staghorn fern).

From an overall design concept, the proposed project is intended to be a school in a forest. Planning and architectural design concepts take advantage of the site's natural elements and aim to reduce disturbance to the natural surroundings. Buildings will be small in scale and scattered along the sloping terrain. Clusters of single-story, small buildings rather than a few large structures



PROJECT LOCATION

FIGURE 2 - 1





PROJECT VICINITY

FIGURE 2 - 2



would create a more village-like atmosphere. Due to the presence of native forest vegetation, development within the Upper Campus would be of low-impact design to result in minimal disturbance to the existing forest.

Minimal landscaping is proposed as the existing forest will serve as the landscape. The linear layout creates large natural buffers between the school facilities and adjacent residences and would provide opportunities for viewing vistas of the native forest. Buffer areas would remain as native forest or would be cultivated as part of the school's agricultural program. The school also plans to implement a reforestation program, particularly within the Upper Campus, to reintroduce koa and tree ferns (hapu), which historically grew in the area.

Connections plans to construct a green school and envisions their new campus to become a model of sustainable development and design. At a minimum, the school will achieve a Silver rating under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, but will strive for a higher LEED certification if the opportunities present themselves and if economically feasible. The facility's design will incorporate ways to reduce the school's carbon footprint. Alternative energy sources such as wind and solar power, as well as sustainable energy and water strategies/technologies will be integrated wherever feasible. Examples of sustainable energy and water strategies/technologies being considered in the preliminary conceptual design plans include:

- Temperature Control – Building orientation will help to regulate internal temperatures. The majority of buildings will be oriented along the east-west axis to minimize morning and evening heat gain. South facades will be properly shaded using such strategies as large eaves, overhangs, landscaping, light shelves, and horizontal louvers. Roofs will be insulated and light in color to minimize heat absorption.
- Air Movement – Buildings will be constructed to maximize opportunities for cross ventilation utilizing strategies such as providing slightly larger air outlets than inlets, employing stack ventilation strategies utilizing clerestory windows, cupola (barn), thermal chimneys, ridge vents, and ceiling fans.
- Lighting – North light will be maximized through the use of clerestory windows and minimizing glare through the use of shading devices and large overhangs. Translucent structural roofing will also be used to provide additional natural light penetration.
- Energy Production – Use of high-efficiency, unobtrusive, photovoltaic laminates (solar panels) will be used, and southern roof exposure angles would be oriented for maximum solar gain.
- Rainwater Collection – The campus will include a rainwater collection system designed to capture rainwater from building rooftops for use in toilets, janitorial purposes, and use in the agricultural program.

- Waterless Urinals and Composting/Low Flush Toilets – Use of waterless urinals and composting/low flush toilets that would utilize captured rainwater and reduce the demand for potable water.

Proposed facilities on the Upper and Lower Campus' are described in further detail in the sections below, and conceptual campus layouts and site sections are shown in Figures 2-3 through 2-7.

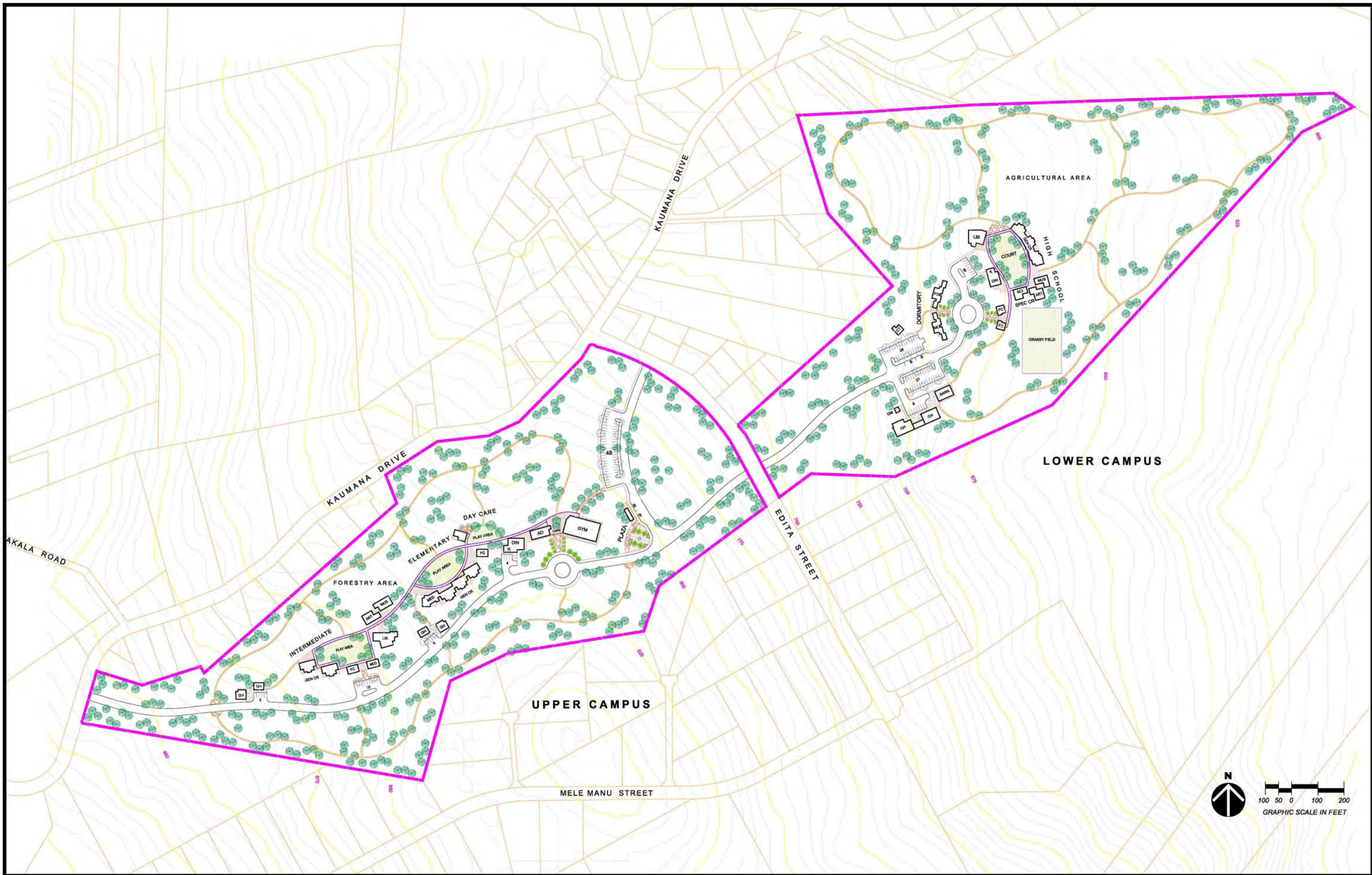
Upper Campus

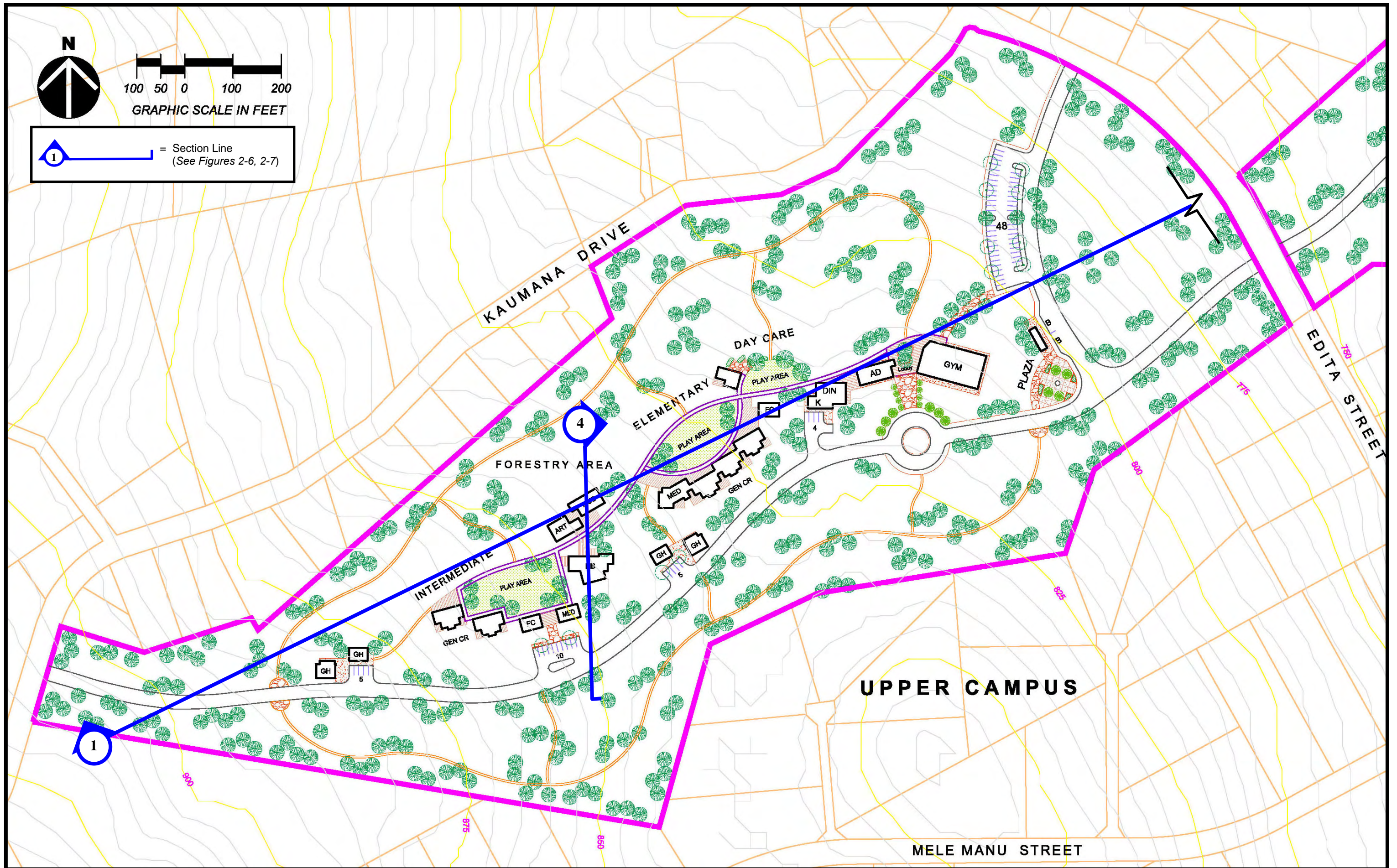
The Upper Campus will house the elementary and intermediate schools, the pre-K program, the main administration building, the main cafeteria and kitchen, and a gymnasium/multi-purpose building. The pre-K program will accommodate approximately 25 students, the elementary program 167 students, and the intermediate program 107 students. Of the 37 acres which comprise the Upper Campus, approximately 7 acres would be built-up including roadways, parking and buildings.

As shown in Figure 2-4, facilities on the Upper Campus would be laid out linearly, stretching across the length of the property. Buildings will be situated along a pedestrian spine with the main administrative center, the gymnasium and the cafeteria/kitchen closest to the main parking lot and Edita Street. Further up the property will be the pre-Kindergarten facilities, followed by the elementary school facilities and the intermediate school facilities at the top of the Upper Campus.

The Upper Campus will have two driveways on Edita Street. These driveways would provide the primary vehicular access to the Upper campus and would service the main parking lot. For pedestrian safety, a painted crosswalk walk area, including signage, will be delineated on Edita Street where the two driveways connecting the Upper and Lower Campus' meet. A secondary access is proposed off of Kaumana Drive at the upper tip of the property. This access would be limited (i.e., gated) and used primarily during the before and after school rush to accommodate traffic to/from the Puainako Extension and upper Kaumana Drive. It would also be used as secondary access/egress for emergency purposes. In addition to the main parking lot, four small parking lots would be provided to facilitate deliveries and service to the buildings located at the higher end of the Upper Campus.

A 60-foot radius roundabout will be located in front of the Upper Campus' main entry. The roundabout enhances the campus' grand entry and provides a drop-off area for students. A paved walkway connects the drop-off area to the school's entry space. On the western side of the entry space will be the main administrative center, which will function as the gateway to the school.

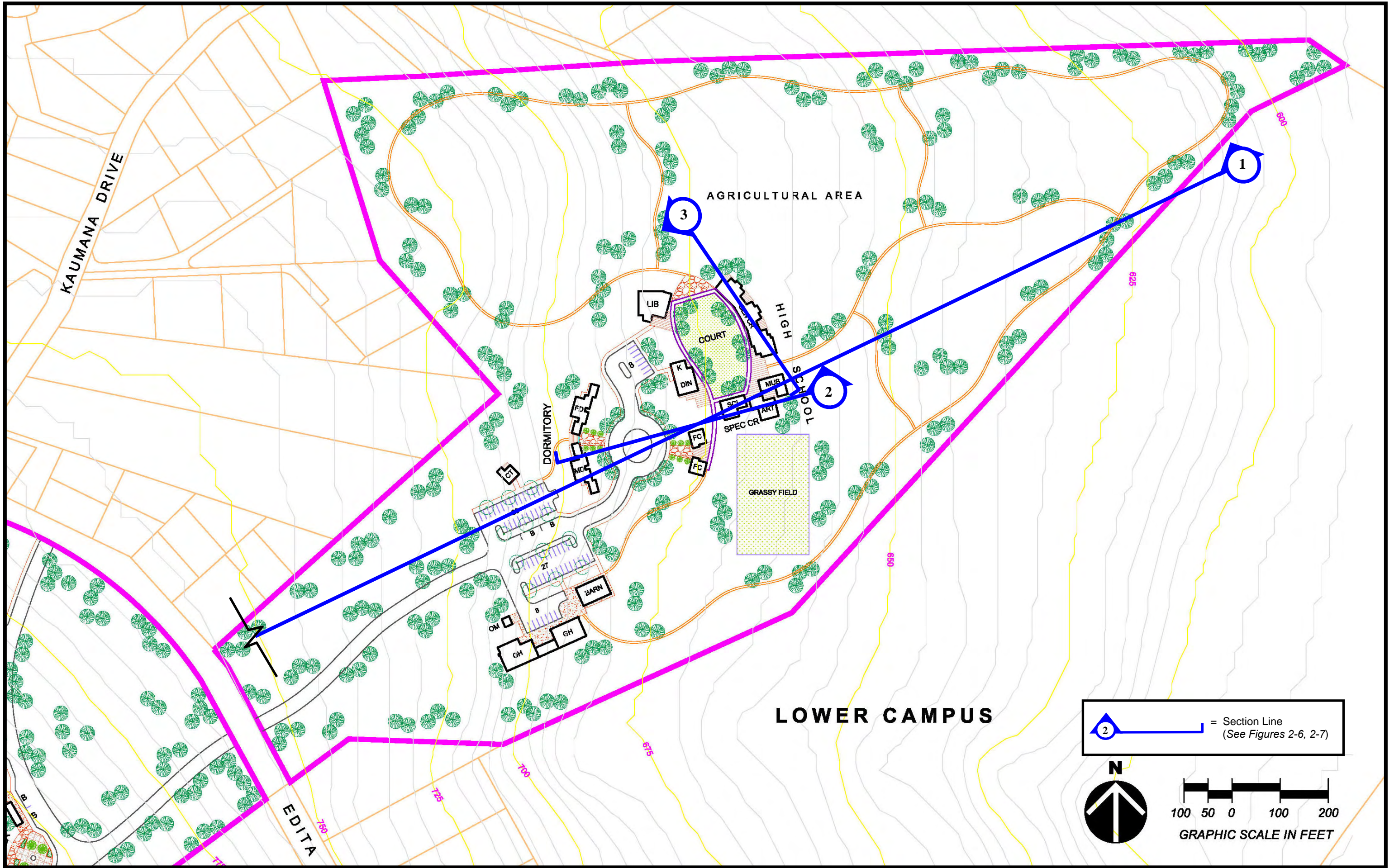




PROJECT SITE PLAN (UPPER CAMPUS)

FIGURE 2 - 4





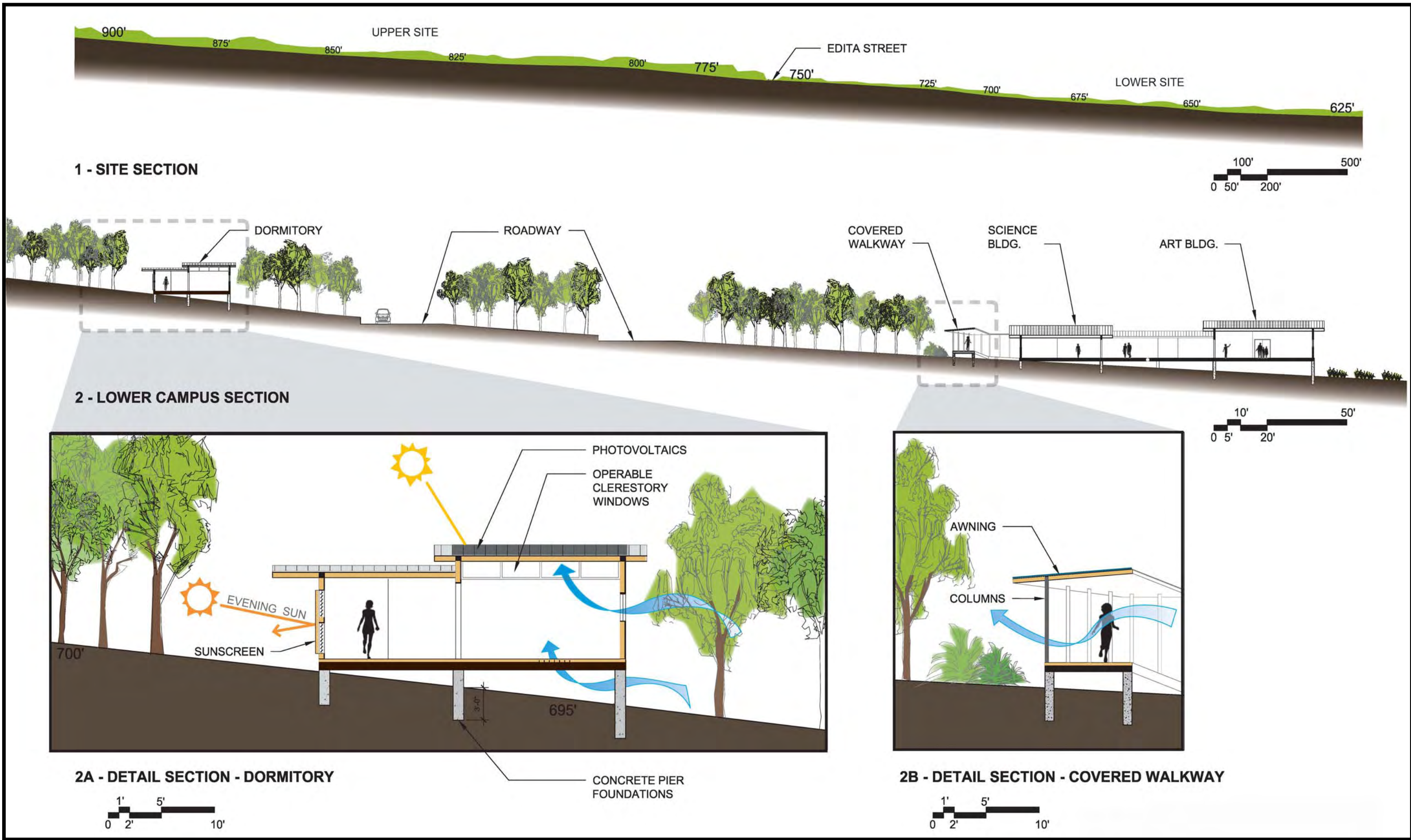
PROJECT SITE PLAN (LOWER CAMPUS)

Draft Environmental Assessment - Connections New Century Public Charter School

FIGURE 2 - 5

Kaumana, South Hilo, Hawaii





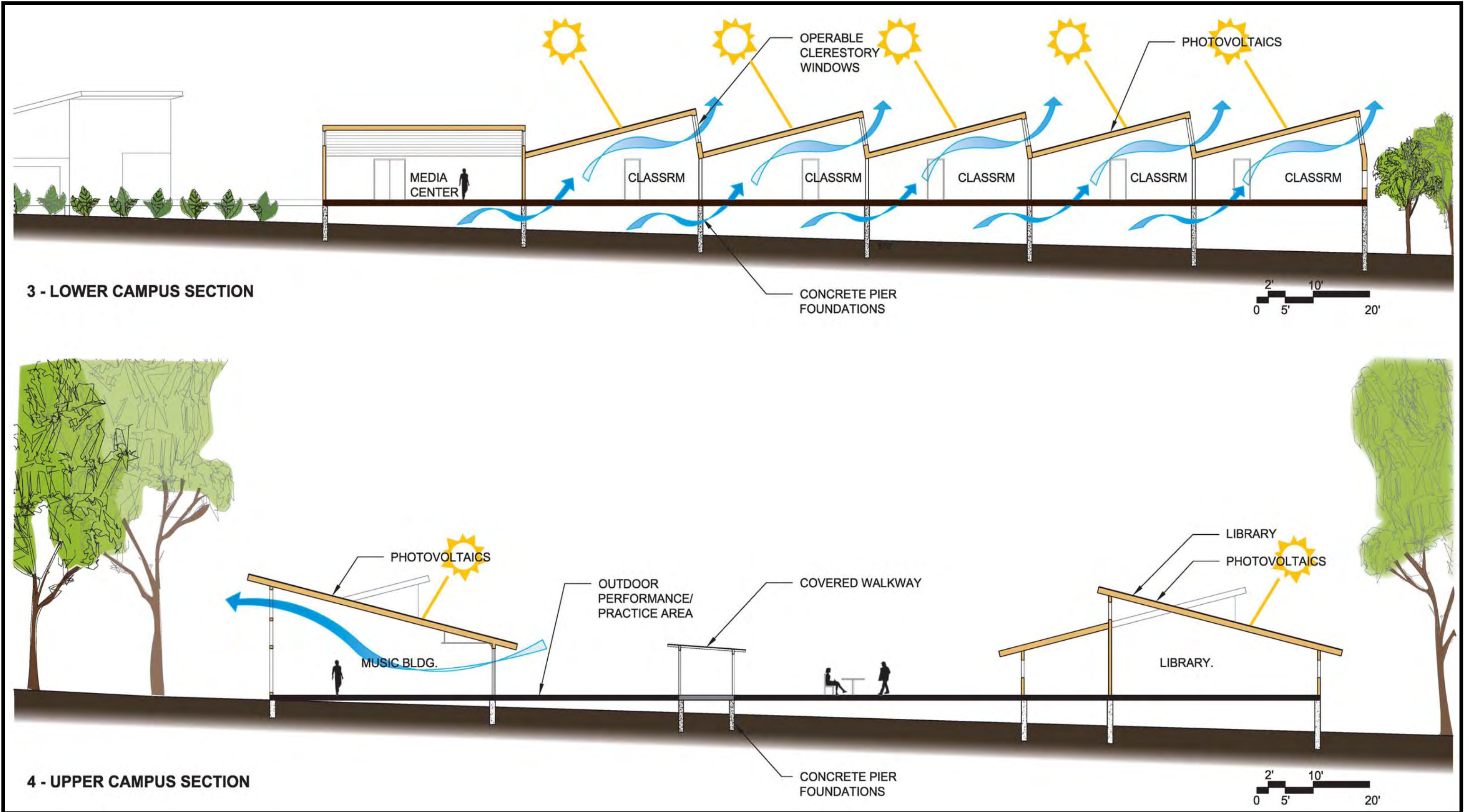
PROJECT SITE SECTIONS (1 and 2)

Draft Environmental Assessment - Connections New Century Public Charter School

FIGURE 2 - 6

Kaumana, South Hilo, Hawaii





PROJECT SITE SECTIONS (3 and 4)

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FIGURE 2 - 7

Kaumana, South Hilo, Hawaii



Opposite the administrative center will be the gymnasium/multi-purpose building, which will also be accessible from the main parking lot. Adjacent to the main administrative center will be the cafeteria and kitchen. The kitchen will serve as the main preparation kitchen for the entire school. Meals will be prepared in the main kitchen and delivered to the warm-up kitchen on the Lower Campus, which will serve the high school and the dormitory.

The pre-Kindergarten school encompasses approximately 9,000 square feet of built-up area and would have its own indoor and outdoor areas. Further beyond the pre-Kindergarten facility is the elementary school, which will comprise approximately 42,000 square feet of total built-up area. Facilities to serve the elementary school include seven general classrooms, a computer/multi-media lab, a faculty center, two greenhouses and an outdoor play area. The school will be organized around the outdoor play area, which is defined by the classroom spaces and the pedestrian spine. Two greenhouses are located slightly away from the elementary school and close to the main internal driveway. A small parking is proposed for loading and service vehicles.

Located at the top of the Upper Campus will be the intermediate school comprising a total built-up area of approximately 30,000 square feet. The school consists of four general classrooms, a computer/multi-media lab, a faculty center, two greenhouses, and an outdoor play area. A small parking lot and a separate entry will also be provided for the intermediate school.

The area between the elementary school and intermediate school will be the location of the library/resource center, art and music classrooms, which are facilities to be shared by the two schools. Large lanai spaces would function as outdoor study areas and informal gathering spaces for students. These shared facilities and lanais comprise approximately 12,000 square feet of built-up area

Lower Campus

The Lower Campus will house the high school, dormitory, agricultural program facilities, caretaker's residence, and a maintenance shop. The total built-up area, which includes roadway, parking, buildings and grass field encompasses approximately 5.5 acres.

The Lower Campus will accommodate the proposed agricultural program which will be an integral component of the new school's curriculum. The agricultural program will provide students hands-on experience in sustainable agricultural practices and will emphasize small sustainable agricultural techniques and include some livestock (e.g., chickens, goats, pigs, and horses).

An area of approximately 20 acres or half of the size of the Lower Campus is allocated for the agricultural/cultivation area. Agricultural program facilities will

include greenhouses, a horse barn, and cultivated gardens. Cultivated gardens would be limited to the lower section of the property, which is populated largely by non-native trees and weeds and may include vegetables, taro, fruit trees, native plants, and ornamental plants.

Facilities to serve the agricultural program include a 6-horse barn, two greenhouses, a shower/locker facility and an equipment building. In total, these facilities comprise roughly 20,000 square feet of built-up area and are grouped at the southwestern corner of the Lower Campus, close to the main vehicular entry. In addition to the agricultural facilities, the maintenance shop to serve the entire pre-K through 12 schools would be located in this area

The high school is intended to provide space for approximately 107 students. Buildings are planned to be small in scale to blend in with the site and surroundings. A small dormitory is planned, which would accommodate up to 30 students. The dormitory would share dining and kitchen facilities with the high school program. Laced throughout campus will be walking and equestrian trails. A live-in caretaker will provide 24-hour on-call maintenance and security.

While the Upper Campus utilizes a linear layout, the Lower Campus is based on a centralized layout. A central courtyard scheme is used as the key site planning element and provides the focal area for outdoor activities and gathering. This pattern promotes campus security as the courtyard creates an enclosed and easily supervised space, where access can be controlled and activities monitored.

A dormitory will be located on the western side of the Lower Campus, to the north of the parking lot and agricultural facilities. Dormitory facilities will consist of two main buildings, a caretaker's cottage, and a parking lot. The dormitory facilities will encompass approximately 24,000 square feet of built-up area.

The high school will be constructed within the central area of the Lower Campus, across from the dormitory. Facilities to serve the high school include 5 general classrooms, 4 specialized classrooms (i.e., a computer/multi-media lab, an art lab, a music lab, and a science lab), a library/resource center, a cafeteria/multi-purpose facility, a warm-up kitchen, and a satellite administration/faculty center. Three specialized classrooms (i.e., science, art, and music labs) enclose the southern end of the courtyard. A cluster of 5 general classrooms and the computer/multi-media lab will be located on the eastern side of the courtyard. This layout will allow students to not only access the courtyard but also enjoy vistas of the agricultural fields downslope of the classrooms.

As shown in Figure 2-5, the administrative/faculty center would be situated proximal to the drop-off area, to function as a gateway to the school. The

cafeteria, kitchen, and library/resource center will be situated on the western side of the central courtyard and are accessible from the driveway and service parking.

The Lower Campus will have a single vehicular access from Edita Street. A roundabout will be situated in the center of the campus to accommodate traffic flow and enhance the sense of entry to both the dormitory and the high school. Two main parking lots are proposed: one for the dormitory and another one for the high school. Two smaller parking areas will be provided: to serve the agricultural program's facilities, and the cafeteria/kitchen facility and the library/resource center.

In addition to the built facilities described above, the Lower Campus will include a grass play field to support the high school program.

2.1.3 Project Phasing and Construction

Full build out of the new school is projected to be completed by the year 2021. However, the timetable for development is difficult to determine as it is highly dependent on the ability of the school to obtain the necessary financial resources. Given the amount of money required to develop the entire property and construct all of the school's facilities, Connections proposes to develop the proposed project in phases with each phase being initiated as funds become available. The sequence of each phase was based on a set of priorities developed by the school required to meet its curriculum and operational needs.

The proposed project phases and development schedule are presented below.

- Phase 1 – Construction of agricultural facilities (mid-2010)
- Phase 2 – Construction of dormitory and caretakers residence (2011)
- Phase 3 – Construction of high school facilities (2012).
- Phase 4 – Construction of elementary/intermediate school facilities (2016-17).
- Phase 5 – Construction of gymnasium (2018)
- Phase 6 – Construction of pre-Kindergarten facilities (2020).

2.2 Alternatives Considered

In addition to the proposed action, No Action and two alternative design options were evaluated in the context of meeting the project's purpose and need. The alternative design options are based on the same space program as the Proposed Action, but incorporate different site utilization/layout configurations. Both alternative designs utilize a centralized layout with buildings arranged around large open courtyards and are described in further detail in the sections below.

2.2.1 Alternative 1 (Consolidated Campus Design)

Alternative 1 adopts a more compact layout with the majority of the school's facilities consolidated within the Upper Campus. The total developed area of the campus would be approximately 23 acres consisting of a 20-acre Upper Campus and 3-acre Lower Campus (Figure 2-8).

Alternative 1 utilizes a central courtyard scheme. With the exception of the gymnasium, all facilities serve to delineate and enclose the central courtyard. This large courtyard provides a focal point for outdoor activities and a protected gathering space. The administrative/faculty center is located on the northeastern side of the courtyard, close to the drop-off and main parking lot, so it can function as the school's access point. The elementary and intermediate schools, along with their shared specialized classrooms, form the northwestern edge of the courtyard. The library is placed on the western side of the courtyard. The high school classrooms are clustered along the southern side of the courtyard, while the dormitory facilities are located on the southeastern side. The cafeteria and kitchen are located on the eastern side of the courtyard between the dormitory and gymnasium.

All main functions including the elementary school, intermediate school, high school and dormitory are grouped together and located within the Upper Campus, while the agricultural program would be separated and placed within the Lower Campus. Like the proposed action, the agricultural program was situated in the Lower Campus because it is covered with less desirable non-native plants and therefore is preferable for cultivation, which would require clearing large swaths of existing vegetation.

The Upper Campus has one main vehicular access from the Edita Street. Two main parking lots front the school and traffic flow is facilitated by a roundabout, which also provides a drop-off area. A service roadway branches off from the lower parking lot and runs along the parcel's southern boundary. This roadway and small parking lots provide service to the cafeteria, kitchen, dormitory, high school, and library/resource center.

The layout of the Lower campus is quite simple, with only a single structure and greenhouses to serve the agricultural program. The structure is located on the western end of the Lower Campus and is accessed by a roadway from Edita Street. A small parking lot is provided to service the agricultural program. The rest of the property is allocated for cultivation.

An advantage of the consolidated site layout is that it allows for more efficient development and would facilitate security and monitoring as the entire school would be accessed via a single entry point. However, a major disadvantage of this alternative is that the non-linear layout does not maximize the use of the existing natural landscape and would require more intensive landscaping. The



ALTERNATIVE 1 (Consolidated Campus Layout)
 Draft Environmental Assessment - Connections New Century Public Charter School

FIGURE 2 - 8 
 Kaumana, South Hilo, Hawaii

non-linear layout also would not provide a natural/forested buffer area resulting in the school's buildings and facilities being situated much closer to adjacent private residential properties and public roadways.

2.2.2 Alternative 2 (Split Campus Design)

Similar to the Proposed Action, Alternative 2 utilizes a split campus layout with the pre-K, elementary and intermediate programs located on the Upper Campus and the high school located on the Lower Campus. The total developed area of the campus would be approximately 33 acres consisting of an 18-acre Upper Campus and 15-acre Lower Campus (Figure 2-9).

Development on the Upper Campus is situated close to Edita Street and comprises approximately 18 developed acres. The Upper campus would have two driveways on Edita Street. Driveways would lead to the main parking area fronting the gymnasium and administration buildings. A service road that branches off from the eastern driveway and follows the property's southeastern boundary would provide service access to the kitchen, the intermediate school's facilities, the library, as well as two smaller parking areas.

The Upper Campus would accommodate the pre-K, the elementary and the intermediate schools. The main administrative office and faculty center would be located close to the drop-off area and main parking lot. This location also allows faculty and staff to monitor school access. Another main facility located at the entrance to the Upper Campus is the gymnasium. The cafeteria and main kitchen are located near the gymnasium connected by a large shared lanai. Close to the cafeteria are the intermediate school classrooms. Opposite the intermediate school, across the courtyard, are the elementary and pre-K classrooms. Located on the western side of the central courtyard are specialized classrooms and library/media resource center. These facilities are shared by the elementary and intermediate programs.

The Lower Campus would have a single driveway off of Edita Street, with two main parking lots fronting the school. A roundabout is provided to facilitate traffic flow and enhance the school's sense of entry. A service roadway branches off from the main vehicular access and runs along the parcel's northwestern boundary. This service/emergency roadway would serve the kitchen, dormitory, caretaker cottage, and maintenance building.

The Lower Campus would accommodate the high school, dormitory, and agricultural program. The satellite administrative/faculty center is placed at the western side of the courtyard, fronting the drop-off and main parking. The classrooms are located on the southern side of the courtyard, while the library is situated on the eastern end. The cafeteria/kitchen and dormitory are placed on the northern side of the courtyard. The large land area east of the high school facilities is allocated for the agricultural program.



ALTERNATIVE 2 (Split Campus Layout)

FIGURE 2 - 9



Under Alternative 2, all of the school facilities in both the Upper and Lower Campus' enclose central courtyards, which would function as the gathering space for outdoor activities and as the focal point for the high school. Advantages of such a centralized layout are that it can enhance security as access points can be controlled and outdoor activities can be easily monitored. However, similar to Alternative 1, a major disadvantage of this non-linear layout is that it would not maximize the use of the exiting natural landscape. Alternative 2 would require more intensive landscaping and would not provide a buffer area between the school and its adjacent properties.

2.2.3 Alternative 3 (No Action Alternative)

Under the No Action Alternative Connections would continue operate and house its elementary and intermediate schools out of the inadequate Kress Building facilities. The school would also need to find a new building to lease for its high school operations which must vacate its current site at the at the Nani Mau Gardens. Once a new lease location is found Connections would be faced with continued high rental costs to house its high school. Additionally, the temporary nature and uncertainties associated with the leasing of a property could potentially result in the interruption of the school's service to its students and their families. Therefore, the No Action Alternative is not considered acceptable as it would not meet the long term operational and curriculum needs of the Connections School.

2.2.4 Alternatives Considered and Eliminated from Further Analysis

Alternative Site Locations

The applicant does not own another suitable site and the land costs involved in acquiring a suitable site could be very high considering the current market. Therefore, this alternative would require that Connections find and develop another property of sufficient size to lease. Connections conducted an extensive search of possible properties on which to develop a new school campus and found that the proposed project site was the only acceptable site within the school's service area that would meet all of its needs. Based upon the operational and curriculum requirements of the school, there were no alternative sites that could accommodate all of the schools existing and future operational and curriculum requirements.

Deferred Action

This alternative would delay the process of identifying, securing, and developing a site for the construction of a new campus. This would delay the lease agreement process and in turn, delay the transfer of the proposed project site to the Applicant. In addition, there would likely be an increase in planning, design, and construction costs in the future that would be financially burdensome for the

applicant and could potentially preclude construction of a new campus altogether.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Natural Environment

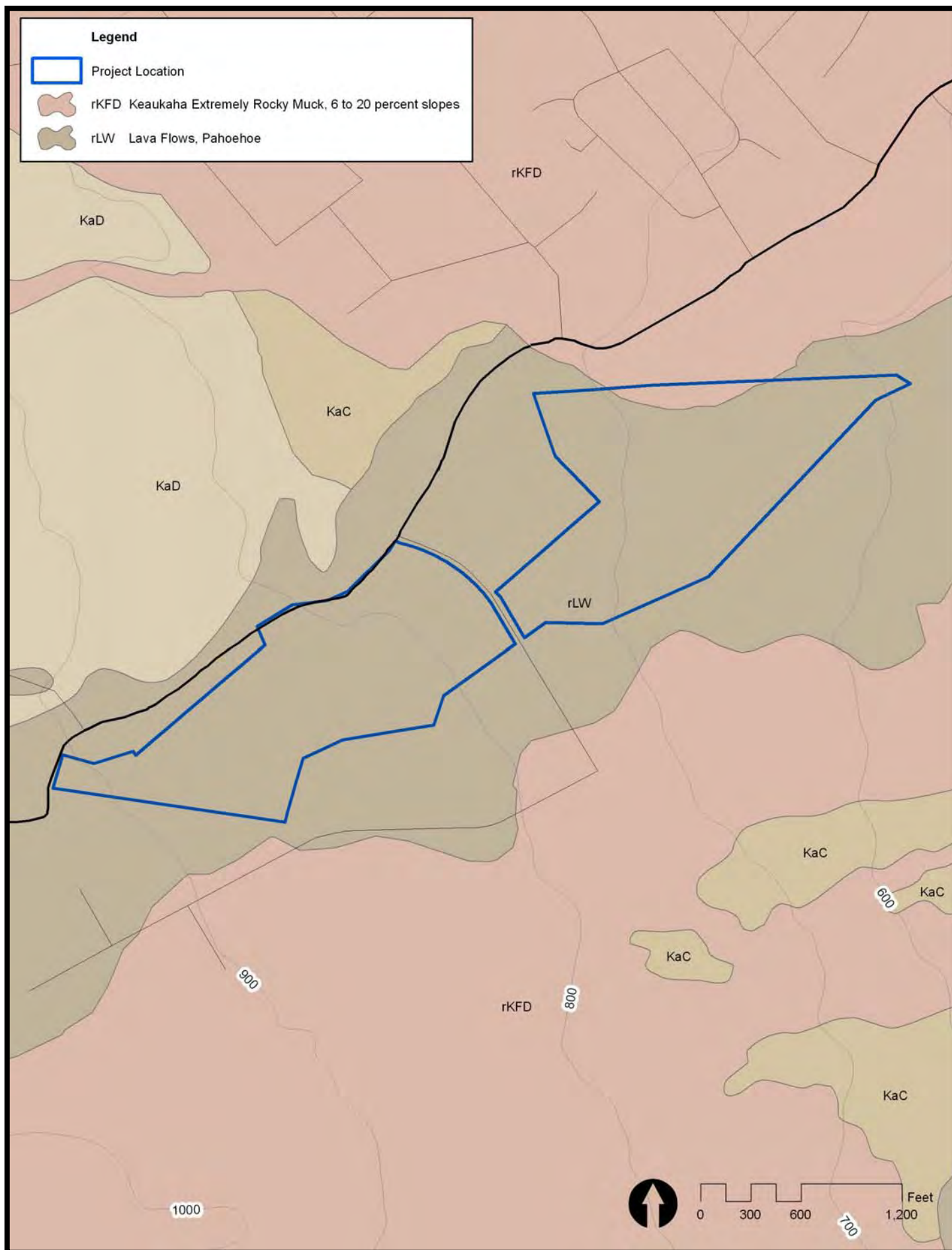
3.1.1 Topography, Geology and Soils

Elevations within the project site range from 600 to 750 feet above mean sea level (AMSL) in the eastern (lower) half and 750 to 900 feet AMSL in the western (upper) half.

The geology of the project site is distinct from that of the lands located immediately to the north and south, as the site is situated entirely within the course of the 1880-1881 lava flow. This narrow tongue of pahoehoe lava originated on the slopes of Mauna Loa and flowed down slope toward Hilo, halting just two miles short of the town. The lavas of the 1880-1881 flow are Kau Basalts and consist of relatively smooth surfaced pahoehoe that has been distorted by uplifts and pressure fractures (Wolfe and Morris 1996:11-12). Portions of the project site are underlain by lava tubes that make up Kaumana Cave system. The entrance to Kaumana Caves is located at a small county park near the western-most tip of the property, across Kaumana Drive (Hazlett & Hyndman, 1996). The lava tubes were formed in the core of the lava flow that covered the area in 1881-1882 with the roofs of the tubes being 20 to 25 feet thick in most places (McDonald et al, 1983).

Soils underlying the project site are thin to non existent due to the fact that the area was covered by fresh magma in the 1880's. The majority of soil within the project area is classified as Pahoehoe Lava Flow (rLW) with only a small area in the northernmost part of the site being comprised of Keaukaha Rocky Muck (rKFD) (Sato 1973:34).

Generally, Pahoehoe has a billowy, glassy surface that is relatively smooth. Pahoehoe typically has little or no soil covering and is bare of vegetation except for mosses, and lichens. Pahoehoe tends to be rather porous and water quickly percolates underground and there is very little soil formation until a thin layer of vegetation and lava debris collects to form pockets of soil. In areas where there is more precipitation it can be densely vegetated with trees, ohelo berry, aalii and Pacific false stag horn or uluhe. The Keaukaha Rocky Muck soils in the northern portion of the site are well-drained, thin organic soils that overlay the pahoehoe lava bedrock. These soils are a dark brown muck about 8 inches thick, acidic, and are rapidly permeable. Runoff is medium and the erosion hazard is slight (Ibid). The topography and soils within the project area are shown in Figure 3-1.



TOPOGRAPHY AND SOILS

FIGURE 3 - 1



3.1.1.1 Potential Impacts

PROPOSED ACTION

The topography and soils within the project area would experience temporary disruption as a result of construction activities such as clearing, grading, and excavations for utility and drainage improvements. Exposed soils are susceptible to erosion, especially if it rains heavily during site work periods. Wind erosion may result in some unavoidable and negligible loss of soil. Silt runoff could also result. However, these disturbances would be localized, short-term, and temporary

In addition, disruption of soils and topography would be kept to a minimum as a result of the school's building design concept. As previously mentioned the project will incorporate and maximize the use of the existing natural landscape into the campus design leaving much of the site undisturbed. From a conceptual approach this natural design involves the construction of small-scale structures on top of concrete pile foundations creating the impression that the school is "floating" within a forest (See Figures 2-6 and 2-7). Use of the concrete pile foundations would keep structure floor elevations above the existing grade and will greatly minimize disturbance to soils and topography. Therefore, no significant impacts to topography or soils are anticipated as a result of the proposed action.

ALTERNATIVES

Under Alternatives 1 and 2 the potential impacts to topography and soils would be similar to the proposed action. Under the no action alternative topography and soils would not be affected.

3.1.1.2 Mitigation Measures

Grading and clearing will be kept to a minimum and structures will be designed to be off the ground and the footprint will be kept to a minimum. In addition, the construction contractor will develop and implement a site-specific best management practices (BMP) plan that would identify the most effective erosion, sedimentation, and runoff control measures to reduce the amount of soil and sediment transport off-site as a result of construction activities.

3.1.2 Hydrology and Surface Water

Rainfall is abundant in the Hilo area with the project area receiving between 160 – 200 inches of rain annually. However, few perennial surface water bodies are found in the project vicinity. The closest perennial stream is

Waipahoehoe Stream which flows north of the project site and feeds into Wailoa River. There are also a few intermittent stream beds that drain towards Alenaio Stream. There are no streams or indications of surface water present on the proposed project site.

3.1.2.1 Potential Impacts

PROPOSED ACTION

There are no perennial streams on the site, and the proposed action is not expected to adversely affect surface or ground water resources. The general existing drainage pattern will be kept during construction and following site improvements.

As a result of the proposed action, some open areas would be covered with impermeable surfaces, thereby increasing the potential for stormwater runoff. Potential storm drainage impacts are addressed in Section 3.2.2.

ALTERNATIVES

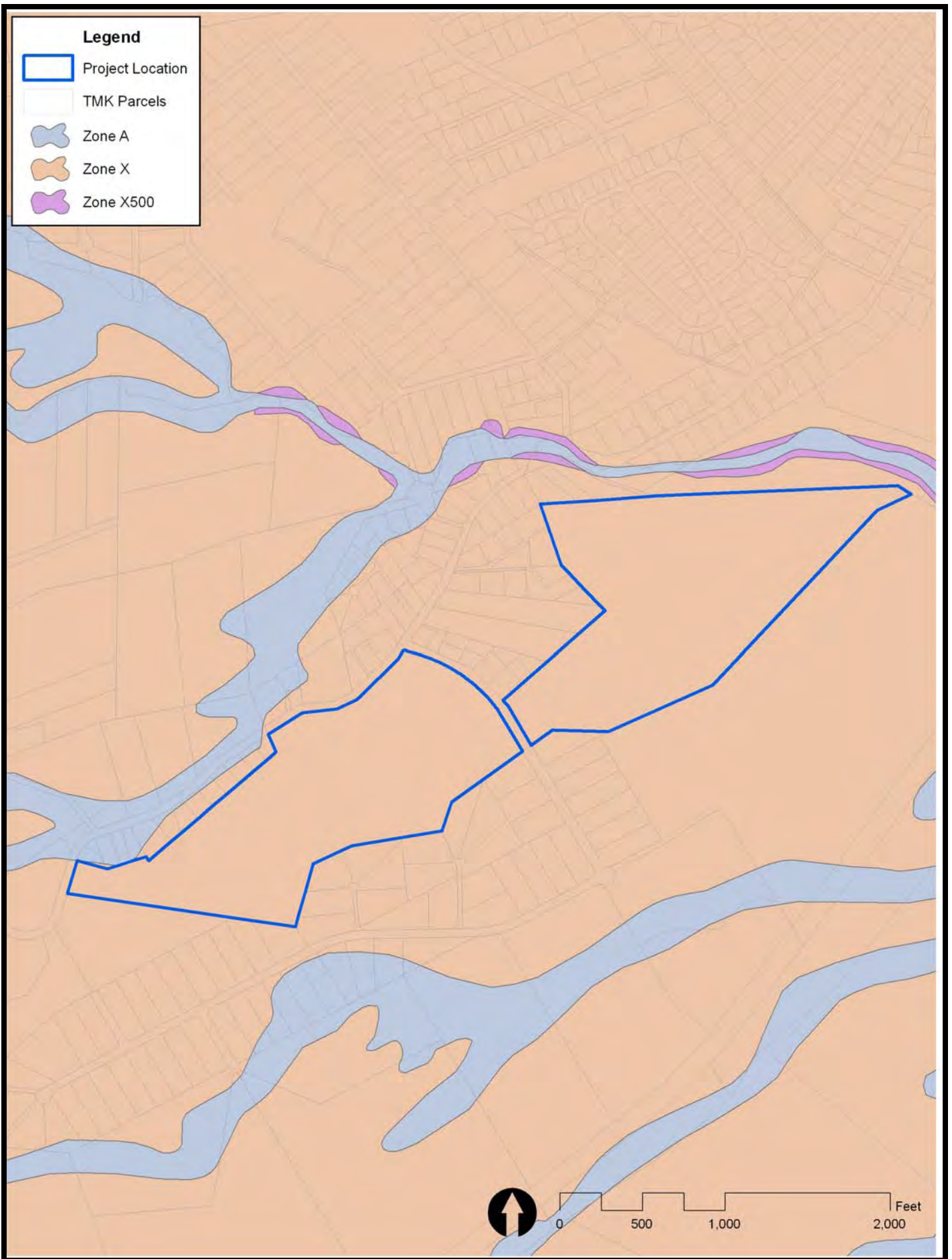
Similar to the proposed action, Alternatives 1 and 2 would not adversely affect surface or groundwater resources. The no action alternative would result in no affect on the existing ground or surface waters in the area.

3.1.2.2 Mitigation Measures

The construction contractor will develop and implement a site-specific BMP plan to minimize impacts to ground and surface water sources, which will include preventing pollutants, such as sediments, from reaching area surface waters. A grading permit from the County of Hawaii will be required and obtained by the construction contractor. A National Pollution Discharge Elimination System (NPDES) Permit for construction-related storm water discharge will also be applied for and obtained by the construction contractor.

3.1.3 Natural Hazards

Flood Hazards - Flood events on the Island of Hawaii are generally associated with severe rainstorms, storm surge, and tsunami inundation. The island is geologically very young and has not had a chance for the formation of defined water courses in many areas. These poorly defined watercourses often flow and overflow during rain storm events South Hilo district is particularly impacted by this problem due to high amounts of rainfall. The Federal Emergency Management Agency (FEMA) has classified the lands within the project site as Zone X, lands with no recognized flood potential that are located outside both the 100-year and 500-year floodplain (Figure 3-2).



FLOOD HAZARD MAP

FIGURE 3 - 2



Volcanic Hazards – The Island of Hawaii has two active volcanoes, Mauna Loa and Kilauea. Hilo is located on the eastern slopes of Mauna Loa and is situated less than 30 miles north of Kilauea. Six lava-flow hazard zones have been delineated on the slopes of Mauna Loa. These zones are based on Mauna Loa’s historical eruption patterns and geologic mapping of the volcano’s surface. According to the U.S. Geological Survey (USGS) much of South Hilo, including the entire project site, is contained in Lava Flow Hazard Zone 3 which are areas that have had 15-75% of their surface covered by lava in the last 750 years, and 1-5% of their surface covered by lava since 1800. On a scale of ascending risk, Zone 3 lands are less hazardous than Zone 2 lands, which designate areas directly adjacent to and downslope of active rift zones (USGS, 1991, Heliker 1990:23).

Seismic Hazards - The Island of Hawaii experiences thousands of earthquakes a year, most are undetectable; however, some are strong enough to be felt or cause damage. Most of the earthquakes in Hawaii are harmonic tremors associated with volcanic activity and magma moving beneath the surface. These tremors tend to be concentrated beneath the island’s two active volcanoes, Kilauea and Mauna Loa. Seismic tremors on the Big Island have caused ground cracks, landslides, ground settlement, tsunami and mudflows. Seismic activity can damage or destroy buildings and other structures, as well as utility and infrastructure lines, which often result in disruption of service.

Earthquakes over 6.0 on the Richter scale can result in significant damage to man made structures. Since 1868 there have been 15 earthquakes greater than magnitude 6.0 with most of them occurring on the south flank of Kilauea or Mauna Loa. The dates, locations, and magnitudes of these earthquakes are summarized in Table 3-1 below.

Table 3 - 1
Earthquakes Magnitude 6.0 or Greater since 1868
on the Island of Hawaii

Year	Date	Location	Magnitude
1868	March 28	Mauna Loa South Flank	7.0
1868	April 2	Mauna Loa South Flank	7.9
1929	October 5	Hualalai	6.5
1941	September 29	Kaoiki between Kilauea and Moana Loa	6.0
1950	May 29	Mauna Loa SW rift Zone	6.2
1951	April 22	Kilauea	6.9
1951	August 21	Kona	6.3
1952	May 23	Kona	6.9
1954	March 30	Kilauea south flank	6.0
1962	June 27	Kaoiki	6.5
1973	April 26	Honomu	6.1
1975	November 29	Kilauea south flank	7.2
1983	November 16	Kaoiki	6.5

1989	June 25	Kilauea south Flank	6.1
2006	October 15	Kiholo Bay	6.7

Source: USG2006

3.1.3.1 Potential Impacts

PROPOSED ACTION

Flood Hazards – The project is not located within a designated flood zone and the proposed improvements are not anticipated to exacerbate conditions that would contribute to flooding.

Volcanic Hazards - Any development within this area of South Hilo are subject to the hazard of lava flows and there are no practical measures to avoid this impact. Identification of areas that will be inundated by molten lava cannot be determined until the next eruptive phase begins.

Seismic Hazards – Any development on the Island of Hawaii is at risk of experiencing seismic activity based on the island's geologic characteristics. However, since there will be minimal onsite grading and buildings will not require permanent foundations the risk of seismic-related subsidence or erosion is reduced.

ALTERNATIVES

Potential impacts related to the natural hazards discussed above would be the same for Alternatives 1 and 2 as those described for the proposed action. The risk of natural hazards would remain unchanged under the no action alternative

3.1.3.2 Mitigation Measures

Flood Hazards - Onsite flood control is accomplished by designing drainage systems to contain runoff within natural or man-made water courses and standing bodies of water. Prior to initiation of construction, the County would review proposed grading and construction (including drainage) plans for consistency with County requirements and good engineering practices. After County approval, all plans would be monitored during periodic building inspections. Onsite drainage controls are addressed in detail in Section 3.2.2

Volcanic Hazards - To date there are no adequate mitigation measures for lava flows. Numerous attempts have been made to control volcanic flows. Methods include bombing, hydraulic chilling, and constructing walls to deflect flows. These methods have had mixed success. They can not be expected to modify large or fast moving flows, and their effectiveness with smaller flows requires further evaluation (Keller, 1999).

However, monitoring efforts to identify areas that may be threatened by lava in the first few hours of the next eruption phase are critical. Actual areas that will be covered by lava flows, and the warning time that can be given before lava reaches any given area are dependent up on key factors. These are location of active vent, rate of lava production, duration of the eruption, and local topography.

Seismic Hazards - Engineers, seismologists, architects and planners have carefully evaluated seismic hazards related to building construction. They have devised a system of classifying seismic hazards based on the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. The results are incorporated into the Uniform Building Code (UBC) Seismic Provisions. The County of Hawaii was determined to be in seismic zone 4 based upon the probabilities of specified levels of ground motion occurring within a specified time period. All structures shall be designed and constructed in conformance with all required UBC specifications applicable to structures being constructed within seismic zone 4.

3.1.4 Biological Resources

A biological survey of the proposed project site was conducted in support of this EA. The information presented in this section are based, in large part, on the findings of the biological survey which is attached as Appendix B.

Flora

As previously noted, the project site is located on the Mauna Loa lava flow of 1881. Therefore, the vegetation on the site “started over” as it were after 1881. The site has been disturbed more recently, but the much of the land remains undisturbed and the vegetation reflects the largely native plant community that developed after 1881, gradually reclaiming the bare lava flow. As the surrounding properties came to be developed and the saddle road built, opportunities opened for non-native species to invade the native plant community. This process has been slow, but has been accelerated where the native community has been disturbed, either by clearing, grubbing, or, in the case of Edita Street, cutting the property into two parcels with complete removal of a swath of the native plants.

Despite the lack of soil, the relatively high rainfall in the project area has resulted in dense vegetation blanketing the property. Vegetation in the lower parcel (east of Edita Street) consists mainly of non-native trees and weeds. In contrast, the upper parcel (west of Edita Street) can be classified as native Lowland Wet Forest consisting primarily of ohia trees (*Metrosideros polymorpha*) with a dense understory of Pacific false staghorn fern or “uluhe” (*Dicranopteris linearis*). The dense uluhe fern is effective at keeping most other species out and

the density of the ohī'a trees varies considerably from place to place, but typically approaches a closed canopy where undisturbed.

The botanical survey of the proposed project site was undertaken on December 10-11, 2008. During the survey a total of 65 plant species were identified, 11 of which are classified as native, or occurring naturally, to the Hawaiian Islands. No protected plant species were observed during the survey and a complete listing of plant species found on the proposed project site can be found in Appendix B.

Fauna

Invertebrate, mammalian, and avian field surveys of the project site were conducted between November 2008 and January 2009. During the surveys, a total of 20 invertebrate, 15 avian, and 1 mammalian species were documented to be present within the project site. A complete listing of faunal species encountered can be found in Appendix B.

Invertebrate faunal and plant populations are interdependent. Consequently, host plant presence is an indicator of the health of invertebrate populations. The recent 1880-1881 lava flow and the relatively young native forest it supports, has resulted in a limited diversity of Hawaiian host plants, and consequently a limited number and diversity of native invertebrates. Additionally, the low elevation has provided easier access to and resulted in higher numbers of introduced predators, such as ants which contribute to the low native invertebrate populations on site.

Avian diversity and densities were consistent with the habitat present within the project area. Of the 15 different avian species recorded during this survey, all but two are alien to the Hawaiian Islands. One migratory species, the Pacific Golden-Plover (*Pluvialis fulva*) was encountered during the survey. The Pacific Golden-Plover is a commonly occurring migratory shorebird species that nests in the High Arctic returning to Hawai'i and the Tropical Pacific during the late summer. They spend the fall and winter months in the central and southern Pacific, and return to the Arctic in late April and early May. Additionally, a single Hawaiian Hawk (*Buteo solitarius*) or "io" was detected as an incidental observation while transiting between two count stations. The Hawaiian Hawk is an endemic endangered species currently protected under both federal and state of Hawai'i endangered species statutes. This species was first listed as endangered in 1967 (Federal Register 1967), proposed for down listing from endangered to threatened in 1993 (Federal Register 1993), and has recently been proposed for delisting altogether (Federal Register 2008).

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or ope'ape'a, all terrestrial mammals currently found on the Island of Hawai'i are alien species. Only one mammalian species was detected

during the course of this survey, the domestic dog (*Canis f. familiaris*). During the survey tracks, scat and sign of dog were encountered and several dogs were heard barking from the adjacent residential lots.

Although, Hawaiian hoary bats were not recorded during this biological survey, bats have been recorded on numerous recent surveys conducted within the general Hilo area. Key findings include the opinion that at least on the Island of Hawaii, the bat is ubiquitous in areas that still have forest or dense cover and it can be expected that Hawaiian hoary bats use resources within the general project vicinity on a seasonal basis.

3.1.4.1 Potential Impacts

PROPOSED ACTION

Flora

The lower parcel of the project site consists mostly of alien trees and weed species, and the native Lowland Wet Forest comprising the upper parcel is not unique and is abundant in and around the Hilo area. Impacts would also be minimized as the proposed action will leave much of the existing native forest untouched, incorporating it into the campus design to function as a green belt buffer zone. Furthermore, Connections proposes to implement native reforestation practices throughout the entire campus, and within the upper parcel area in particular. Finally, there are no protected, rare, or endangered plant species are present on the project site and no significant adverse impacts to plant resources are anticipated.

Fauna

There is a small potential that construction-related activities or habitat modification associated with the proposed action may result in impacting the following four species, which are all protected under both federal and State of Hawaii endangered species statutes.

Hawaiian Hoary Bat - Hawaiian hoary bats were not detected during this survey, but they have been recorded within the general project area on numerous occasions. With the current scientific information available, it is not known if bats ever roost within the project site. Whether the clearing and the modification of portions of the remaining vegetated areas within this site will result in deleterious impacts to this species is difficult to ascertain. The principal potential impact that clearing and grubbing of the vegetated portions of the site poses to bats is disturbance to roosting female bats during the pupping season. Females tending their young are less able to rapidly vacate a roost tree or bush as it is being felled, or cleared.

Hawaiian Hawk - The principal potential impact that development of this project poses to Hawaiian Hawks is during the clearing and grubbing operations. There is also a small chance that noise associated with the actual construction of the project could disturb birds nesting in the general project area. If disturbed while sitting on eggs or caring for young, adult birds may abandon the nest putting their eggs, and or young, at grave risk of harm or mortality.

Hawaiian Petrel and Newell's Shearwater - The principal potential impact that developing this site poses to Hawaiian Petrels and Newell's Shearwaters is the increased threat that birds will be downed after becoming disoriented by exterior lighting that may be required in conjunction with construction activities, and, or the servicing of construction equipment at night, and following build-out by street lights and building lights associated with the school facilities.

In summary, the project site is not located in current or proposed critical habitat, and there are no jurisdictional wetlands, perennial streams occurring within the project site. Thus, the clearing, grubbing, and construction of the proposed action would not result in any impacts to federally- designated critical habitat. There is nothing unique about the project site and there is abundant like habitat in, and around Hilo. It is not expected that the construction or operation of the proposed school will result in significant long-term impacts to native avian or mammalian resources present within the general project area.

ALTERNATIVES

Under Alternatives 1 and 2 adverse impacts to flora would be greater than those of the proposed action, because both require more clearing of existing vegetation. Alternative 1 in particular, would require the permanent clearing and loss of large areas of native Lowland Wet Forest found in the upper parcel of the project site. Potential impacts to faunal resources under Alternatives 1 and 2 would be similar to those of the proposed action. The no action alternative would result in no effects on biological resources.

3.1.4.2 Mitigation Measures

Early consultation with the U.S. Department of Fish and Wildlife Service (USFWS) resulted in their conclusion that there is no federally designated critical habitat on or near the proposed project site. However, based upon recommendations made by the USFWS and the findings of the biological survey conducted, the following recommendations to minimize any potential impacts to the Hawaiian hoary bat, Hawaiian hawk, Hawaiian Petrel, and Newell's Shearwater should be implemented.

- To reduce the potential for interactions between clearing, grubbing and

construction activity and Hawaiian hoary bats, it is recommended that clearing and grubbing not be undertaken during the period that bats are caring for young; namely between the months of May and late July

- To avoid disturbance to nesting Hawaiian Hawks audio playback nesting activity surveys should be conducted by a qualified ornithologist on the site where large trees will need to be removed prior to the onset of clearing and grubbing activities. This is to ensure that the construction activities will not disturb nesting Hawaiian Hawks. If nesting activity is detected, consultation with the USFWS will be required prior to conducting further clearing activity within 500 meters of the nest tree. The currently approved protocols for conducting such a survey are based on those developed by John Klavitter during his multi-year island wide survey of Hawaiian Hawks (Klavitter, 2000). This recommendation may be mute if the current petition to delist the Hawaiian Hawk is enacted.
- To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, it is recommended that any external lighting planned to be used during construction be shielded (Reed et al. 1985, Telfer et al. 1987). This mitigation would serve the dual purpose of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time complying with the Hawaii County Code § 14 – 50 et seq. which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

3.1.5 Air Quality

Generally the air quality in Hilo is very good due to the prevailing trade winds which provide for good air circulation and clean fresh air. During times when there are southerly or “kona” winds the air quality can change when there are light winds from the south or stagnant atmospheric conditions. This can result in the build up of both manmade and volcanic emissions. When the volcanoes are active these conditions produce a volcanic haze called (vog). Sunlight triggers a reaction to the gases and transforms the sulfur gases, and water molecules to sulfuric acid that makes up the volcanic haze. Man-made emissions that consist of carbon-based gases are also converted by sunlight to toxic carbon monoxide.

3.1.5.1 Potential Impacts

PROPOSED ACTION

The proposed action will not result in significant impacts to air quality in the project area. The school is being designed to have a small carbon footprint

and make use of alternative energy sources and structural techniques that will keep cooling and lighting to a minimum. The project will not increase the discharge of carbon-based gases or change the amounts of volcanic gases released into the atmosphere.

Short-term impacts to localized air quality would likely be generated by construction activities at the project site. Construction vehicular activity would increase automotive pollutant concentrations at the project sites and adjacent streets. Construction activities would also generate fugitive dust emissions resulting in an increase of particulate matter levels in the project area. However, these sources of pollutants are temporary in nature and would not result in long term adverse impacts on the ambient air quality.

ALTERNATIVES

Similar to the proposed action, Alternatives 1 and 2 would not adversely affect air quality resources. The no action alternative would result in no affect on ambient air quality.

3.1.5.2 Mitigation Measures

During the construction period, fugitive dust control measures would be implemented to reduce the amount of particulate matter emissions at the site. The erection of dust screens around the construction site and the frequent watering of unpaved roadways and exposed soil areas can help with on-site dust control. Dust can be further minimized by paving and/or landscaping bare earth areas as soon as practicable.

3.1.6 Noise Environment

Noise in the area is low and derived mainly from motor vehicles, with occasional noise from road use and residential maintenance activities. Other noises are from the wind, birds, coqui frogs, domesticated animals and other sounds typical of a semi-rural neighborhood.

3.1.6.1 Potential Impacts

PROPOSED ACTION

Short-term noise impacts generated from construction-related activities at the project site would result from the proposed action. Noise generated by such activities (e.g. earth moving equipment, construction vehicles, etc.) can generate intermittently high noise levels, particularly during close-in construction work. However, these impacts would be short-term and temporary in nature and would not result in long-term adverse impacts to the surrounding noise environment.

As previously discussed the proposed action will include a forested vegetative green belt surrounding the campus creating a physical barrier between the school and the surrounding residential areas. This vegetative barrier will provide a buffer for operational noise generated by school activities. As such, school operations are not expected to adversely impact ambient noise levels.

ALTERNATIVES

In contrast to the proposed action, the non-linear design of both Alternatives 1 and 2 would result in the closer proximity of school facilities to adjacent residential areas and public roadways. In some areas, school facilities would be situated less than 100 feet from adjacent residential areas. This would undoubtedly result in a greater adverse impact on the ambient noise levels in these residential areas. The no action alternative would result in no effect on the surrounding noise environment.

3.1.6.2 Mitigation Measures

Construction activities that generate noise will be conducted during reasonable hours. In cases where construction noise will exceed the Department of Health's (DOH) "maximum permissible" property line noise levels, contractors would obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH will then review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restrictions of equipment type, maintenance requirements, restricted hours, and portable noise barriers. As the site is partially isolated it is likely that there may be no need for special mitigation measures. Daytime school activities as well as intermittent after school and evening events will be monitored to insure that ambient noise levels are not exceeded.

3.2 Human Environment

3.2.1 Land Use

The proposed project site is located in the community of Kaumana in South Hilo on the Island of Hawaii. Since the 1880-1881 lava flow, the project site soils have been too thin to support pasturing of animals or agricultural cultivation. Presently, the project site is overgrown, vacant, and undeveloped. Lands surrounding the project site were primarily used for intensive agricultural cultivation. Presently most of the areas surrounding the project site have been subdivided for single family residences.

Although, many of the parcels are still vacant the site is bounded along much of its perimeter by existing residences on Kaumana Drive, Edita Street, and Melemanu Street. West of the property, on the far side of Kaumana Drive, is the main entrance to the Kaumana lava tube complex, which has been designated as Kaumana Caves County Park. Downtown Hilo is located approximately 2 miles northeast of the project site.

The project site is within the State Land Use Agriculture District. Land immediately to the north and south of the project site are designated as Urban and Agriculture, respectively. State land use designations of the project site and surrounding vicinity are shown in Figure 3-3.

Lands underlying the project site are zoned A-1a (General Agricultural) by the County of Hawaii. Lands immediately south of the project site are also zoned for General Agricultural use, and lands to the north are zoned predominantly for Single Family Residential use. County zoning designations of the project site and surrounding vicinity are shown in Figure 3-4.

3.2.1.1 Potential Impacts

PROPOSED ACTION

From a regional planning perspective, the proposed construction and operation of the proposed public charter school would not result in adverse impacts as it would occur within an area with compatible land uses, as well as proximal to infrastructure and services capable of serving the development. Conversely, the proposed project would beneficially impact area land use by providing permanent public educational facilities to support the growing residential community of Kaumana.

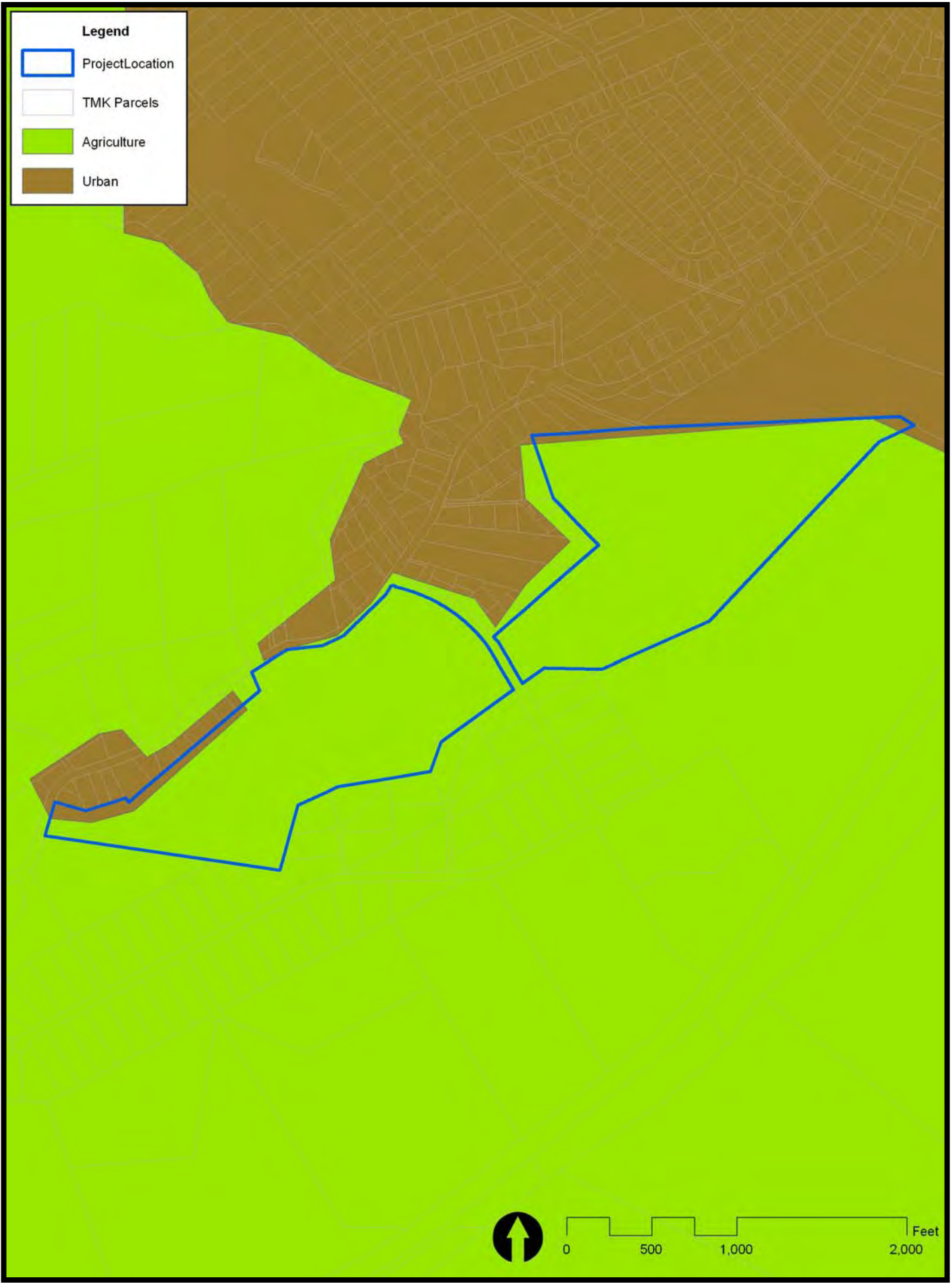
No significant adverse impacts are anticipated as a result of the proposed project. On-site construction-related impacts (e.g.. excavation, hauling, drilling, heavy equipment usage, etc.), would be minor, and would only temporarily affect the integrity of surrounding land uses in the area.

ALTERNATIVES

Alternatives 1 and 2 would result in similar land use impacts as the proposed action. The no action alternative would result in no effect on existing land use.

3.2.1.2 Mitigation Measures

No mitigation measures are required.



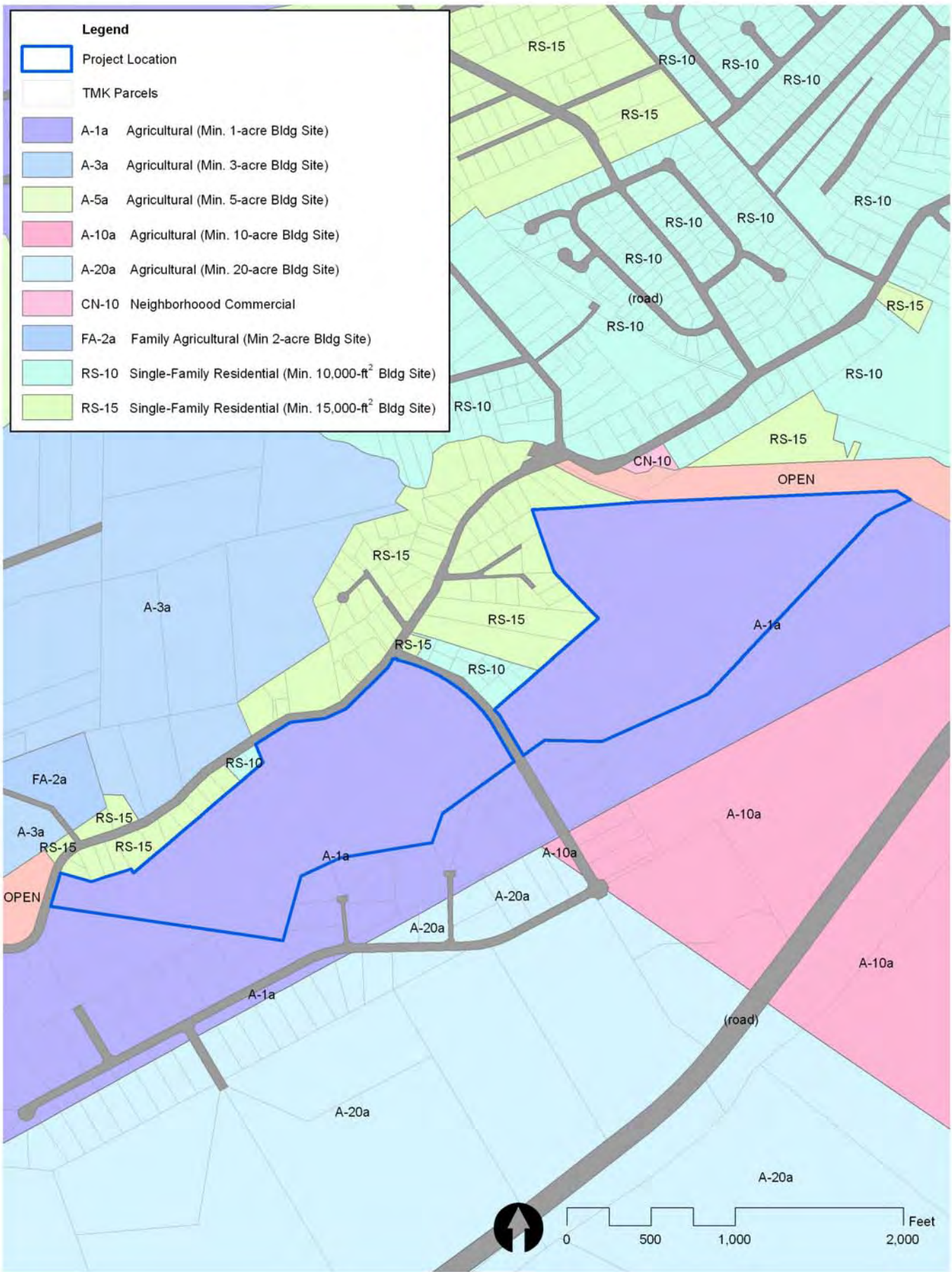
LAND USE DESIGNATIONS

Draft Environmental Assessment - Connections New Century Public Charter School

FIGURE 3 - 3

Kaumana, South Hilo, Hawaii





ZONING DESIGNATIONS

FIGURE 3 - 4



3.2.2 Utilities

Energy and Communications

Electrical services in the project vicinity are provided by the Hawaii Electric Light Company (HELCO) and communications by fiber optic backbone connections provided by Hawaiian Telcom. The proposed project would obtain energy and communication services from these utility providers as well. Appropriate coordination with both HELCO and Hawaiian Telcom would be conducted during the design and construction phase of the proposed improvements.

Water Supply

The Hawaii County Department of Water Supply (DWS) provides water to the area via an existing 8-inch waterline within Kaumana Drive and from an existing 8-inch waterline within Edita Street both fronting the project site. The current water availability which is subject to change, is limited to a maximum of seven units of water per pre-existing lot of record. Each unit of water is equal to a maximum usage of 600 gallons per day (GPD); therefore, a maximum of 4,200 GPD is available for the proposed project.

The proposed project will connect to the existing County water supply infrastructure for its potable water needs. However, as previously discussed the proposed project will augment its non-potable water supply needs by including an extensive rainwater collection system consisting of rainwater catchment tanks, storage reservoirs, and a network of interconnected water lines to distribute the collected rainwater throughout the campus. Rainwater will be collected from school building roof tops and transmitted to two catchment tanks in the eastern portions of each campus. Rainwater would then pass through catchment water treatment systems and pumped up to two reservoir tanks in the western portions of each campus. From these reservoir tanks water would be pumped throughout the campus' for non-potable water uses. Proposed water supply improvements are shown in Figure 3-5.

Wastewater

Currently, there is no municipal wastewater system serving the project area, and the proposed school, like the surrounding area residences, will have to provide its own septic system(s) to meet its wastewater treatment needs. In accordance with the Hawaii State Department of Health (DOH) guidelines, the proposed project would utilize a maximum 1,000 gallon septic tank for an individual wastewater system (IWS), or the equivalent of a residential house with 5 bedrooms. For buildings on larger sites, with larger flows (i.e., dormitory)

multiple IWS are proposed as DOH allows one IWS per 10,000 square feet of land area. Wastewater improvements, showing proposed gravity fed IWS, including sewage conveyance lines, and septic tanks are shown in Figure 3-5.

Drainage

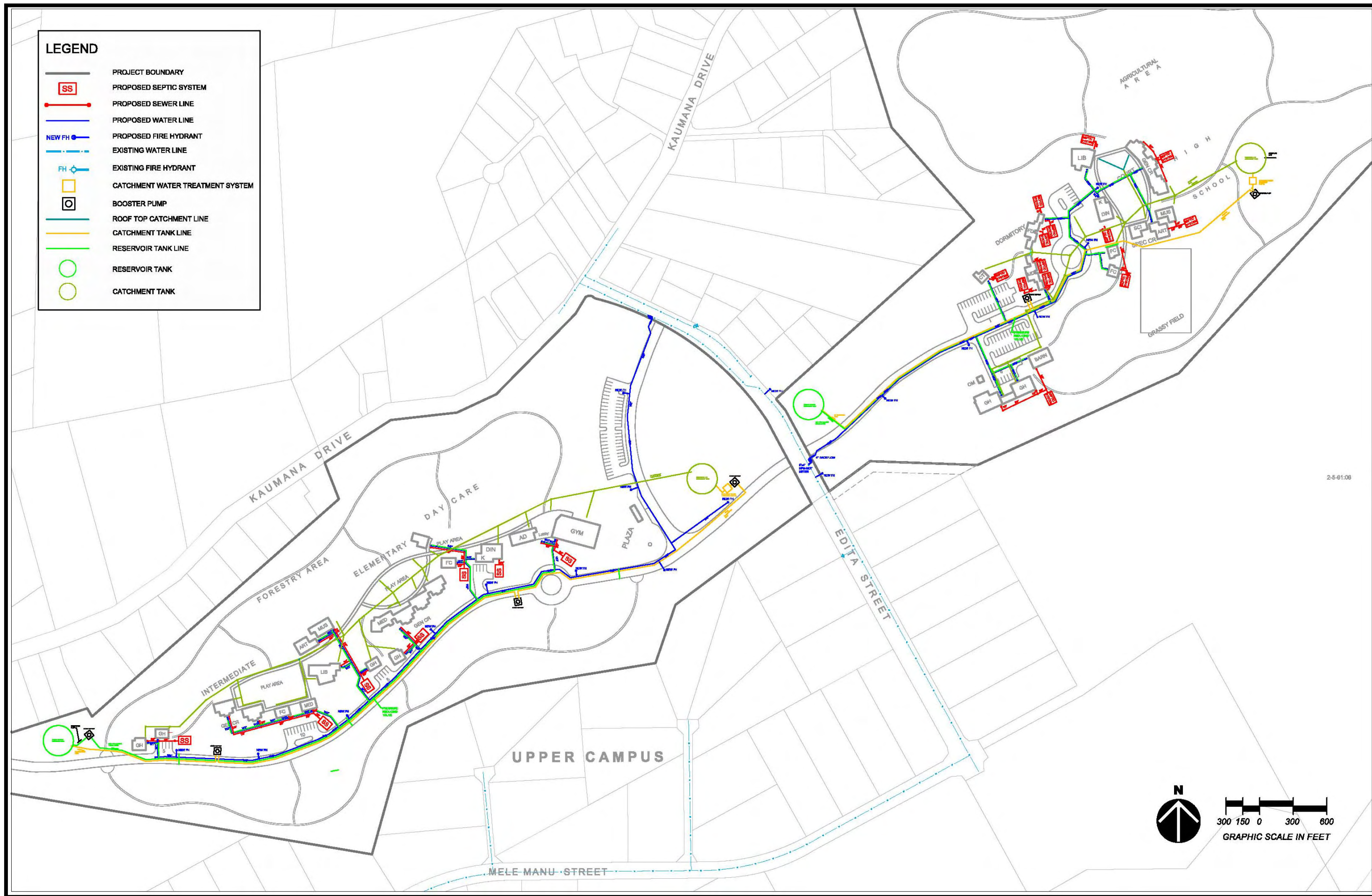
In the Kaumana area, the storm drainage system consists of roadside ditches, culverts and narrow channels. Most of the area's storm water runoff is discharged through Waipahoehoe or Alenaio Stream. Beneath the project site, the porous pahoehoe flow is underlain by lava tubes. This results in a terrain in which the majority of rainfall rapidly percolates into the substrate and flows underground or through the lava tube on the upper portion of the property to an outlet at Edita Street. Once the flow reaches Edita Street it is diverted into an existing concrete ditch which runs along the west side of the Street. From the concrete ditch, storm water flows under the roadway and discharges into an intermittent stream that borders the lower portion of the property.

Under the proposed action, drainage patterns would generally be kept the same. Storm water would continue to flow in a north-easterly direction, and vegetation would retard surface runoff as it flows through the site. In addition, drainage improvements would be constructed to accommodate surface runoff. Drainage improvements would include a network of inlets and drainage lines to direct runoff through the campus, and a series of detention basins.

The detention basins will be designed to accommodate on-site runoff by containing the bulk of the flow and allowing it to percolate into the ground slowly and/or evaporate, preventing excessive volumes of stormwater runoff from flowing into the existing drainage ditch and discharging into the intermittent streambed. Five detention basins, encompassing a total area of 3.64 acres and accommodating a total of runoff capacity of 26.21 cubic feet per second (cfs) are proposed for the Upper Campus, and three detention basins encompassing a total area of 2.16 acres and accommodating a total of runoff capacity of 15.57 cfs are proposed for the Lower Campus. Proposed drainage improvements for the proposed action are shown in Figure 3-6.

Solid Waste

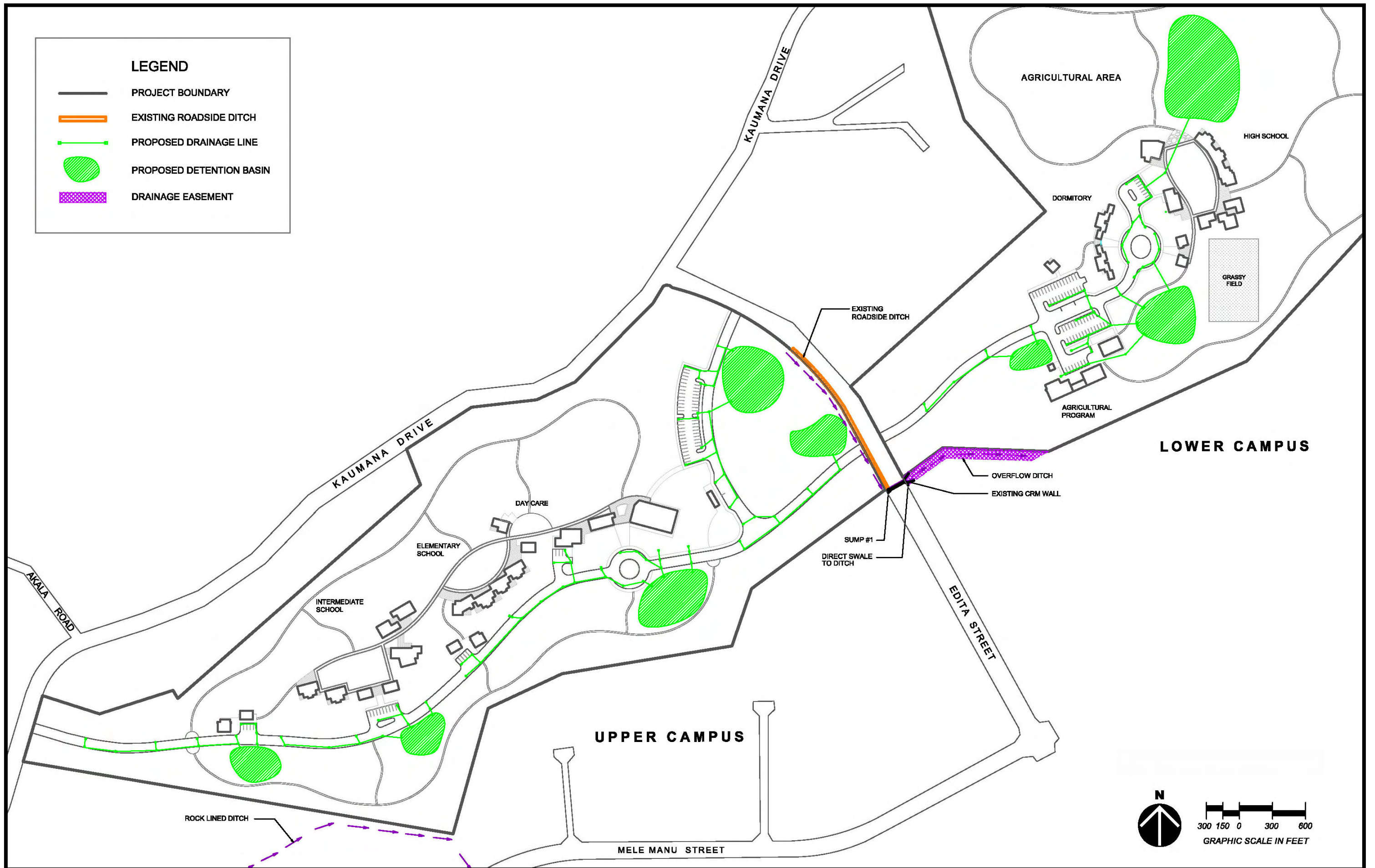
Solid waste management on the Island of Hawaii has undergone significant changes in the past few decades. Currently, residences take their solid waste to any one of 21 transfer stations around the island. The solid waste is then hauled to either the Hilo or Puuanahulu landfills. In some areas, private haulers are paid to pick-up refuse from residences for disposal at a landfill. Currently, Connections has a contract with a private refuse collection service that picks up the solid waste and takes it to the dump. Connections intends to extend their existing contract and have the same private service continue to collect and dispose of solid waste generated at its new campus.



WATER AND SEWER SYSTEMS

FIGURE 3 - 5





DRAINAGE SYSTEM

FIGURE 3 - 6



3.2.2.1 Potential Impacts

PROPOSED ACTION

Energy and Communications

The proposed action is not anticipated to have any adverse impacts on either energy or communications utilities. The proposed action would have little to negligible impacts on the existing electrical distribution and communications networks of the area. There would be no disruption or significant increased demand for either utility, and existing systems are able to accommodate the demands of the proposed project. Additionally, project energy demands from HELCO will be substantially reduced as a result of the proposed project's energy saving features previously discussed in Section 2.1.2.

Water Supply

The proposed action would not adversely impact the existing water supply system servicing the project area and surrounding vicinity. The project will be designed in compliance with DWS requirements so that potable water demands for the project remain below the DWS permitted maximum volume of 4,200 GPD. DWS will request maximum daily water usage calculations prepared by a professional engineer licensed in the State of Hawaii, quantifying the estimated water demand for the proposed project. In addition, project water demands from the DWS will be substantially reduced as a result of the proposed project's rainwater collection system described above.

Wastewater

The proposed action would not result in wastewater-related adverse impacts. Wastewater systems will be designed to be in compliance with all applicable DOH Rules (HAR, 11-62, "Wastewater Systems") by licensed professionals in the State of Hawaii, and will be installed by licensed contractors. Once operational the septic systems will require maintenance and monitoring to insure that there are no accidental releases of raw sewage.

Drainage

As a result of the proposed action, some existing vegetated areas would be covered with impermeable surfaces, thereby reducing percolation and increasing surface runoff volumes. However, as discussed in the previous section, storm water runoff would flow into a drainage system of sufficient capacity to accommodate generated volumes. Therefore, implementation of the

proposed action would not significantly increase the flow of storm water on, and adversely impact existing storm drainage facilities serving the area.

Solid Waste

The proposed project would not be a major generator of, and would not result in significant increases in the accumulation or disposal of solid waste. In addition, Connections intends to promote ecologically sound principals and run a “green” school. The school will implement a comprehensive recycling program that will be a part of daily campus operations. Onsite separation bins for plastic, glass, metal cardboard, aluminum and paper will be located in food preparation and serving areas as well as in other appropriate locations throughout the campus.

ALTERNATIVES

Under Alternatives 1 and 2 impacts to existing utility systems would be similar to the proposed action. The no action alternative would result in no effect on existing utilities and infrastructure.

3.2.2.2 Mitigation Measures

The proposed action will not result in significant adverse impacts to existing utilities and infrastructure, and no mitigation measures are required. Furthermore, Connections will be designing their new campus to be a “green” school. Inherent in its design will be numerous environmentally sustainable technologies and strategies that will serve to further minimize the negligible impacts the proposed project would have on existing utility and infrastructure systems.

3.2.3 Historic and Cultural Resources

Historical Perspective - At the time of the Mahele `Aina (land division, also known as the Great Mahele) in the 1840's when private ownership of land was first established in the Hawaiian Islands, two parcels adjacent to the project area were awarded to native claimants. During the years 1880 and 1881, a lava flow that originated on the slopes of Mauna Loa passed down through the ahupua`a of Ponahawai burying everything in its path. As this flow approached and threatened Hilo, the people of the town called upon Princess Ruth Ke`elikolani Keanolani Kanoahoahoa for help (Pacific Legacy, 2008).

Princess Ruth was well known and loved for her adherence to traditional Hawaiian ways. The residents of the threatened community requested that she intercede on their behalf with the volcano goddess Pele, whose fiery flow was threatening their homes. Hawaiian language newspapers of the time reported that Princess Ruth journeyed to the lower edge of the flow where she chanted

and made offerings to the goddess. That evening she lay down to sleep in the path of the lava. The next morning the flow had stopped in front of the sleeping princess. Though it spared Hilo, the 1880-1881 flow did inundate the Kuamana area, including the entire project site (Ibid).

Existing Conditions - The entire project area is situated completely on the 1880-1881 lava flow and is presently overgrown, vacant, and undeveloped. The 1880-1881 lava flow consists of a narrow tongue of pahoehoe lava that originated on the slopes of Mauna Loa and flowed down slope toward Hilo and stopped just two miles from town. As a result of the recent lava flow, any archaeological or historic sites within the project area would have been destroyed. Consequently, the project site contains very little evidence for any human activity during the pre-contact period.

As previously noted, since the 1880-1881 lava flow, the project site soils are too thin to support pasturing of animals or agricultural cultivation. Lands surrounding the project site have been primarily used for intensive agricultural cultivation, but today many of the areas surrounding the project site have been subdivided for single family residences. Based upon the natural and surrounding land use history, traditional cultural practices are not known to take place within the proposed project area.

Additionally, one of the alternative routes proposed for the Puainako Street Extension and Widening project ran directly through the proposed project site. Based upon recent archaeological and cultural assessment work performed in support of that project's environmental impact statement no evidence of traditional cultural practices were identified to occur within the proposed project site (Spear and McGerty, 1999).

3.2.3.1 Potential Impacts

PROPOSED ACTION

During the pre-assessment consultation process, the DLNR State Historic Preservation Division (SHPD) was consulted regarding the proposed project. In their response letter dated February 17, 2009 SHPD stated that no historic properties will be affected by the proposed project because the site lies entirely within the 1881-1881 lava flow. A copy of the SHPD letter can be found in Appendix A.

ALTERNATIVES

Alternatives 1 and 2 would result in similar impacts as the proposed action, and the no action alternative would result in no effect on historic or archaeological resources.

3.2.3.2 Mitigation Measures

It is unlikely that historical or cultural artifacts would be unearthed during construction activities. However, the following precautionary measures shall be taken per the direction of the SHPD. In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are encountered during construction activities, all work would cease in the immediate vicinity of the find. The find would remain untouched and protected from additional disturbance, and the SHPD Hawaii Island Section would be immediately notified.

3.2.4 Visual and Aesthetic Resources

The natural beauty of the south Hilo district is dominated by Mauna Kea and Mauna Loa. From various locations in the area, there are views of the mountains. Throughout the district there are numerous views and view sites. The project area is located on the lower slopes of Mauna Loa, inland of the town of Hilo. There are some locations within the project site that may have views of the Hilo bay or Mauna Kea if the vegetation was thinned or entirely removed. The site is not readily visible from Hilo Bay and it would be difficult to locate and spot from this area.

3.2.4.1 Potential Impacts

PROPOSED ACTION

As previously noted, the proposed action is being designed to incorporate the existing environment into its landscape. Conceptually, the intent will be to simulate a school campus “floating” within a forest.

Design of the proposed action’s would minimize clearing, retaining much of the existing forest vegetation. Furthermore, small, single-story buildings will be laid out in a linear fashion along the center of the property. This layout will provide a forested vegetative green belt surrounding the campus. The forested area will help to blend the campus with the surrounding rural landscape and serve as a visual buffer between the school and the surrounding residential areas. As such, the location and operation of the new campus is not expected to adversely impact visual resources in the area.

ALTERNATIVES

In contrast to the proposed action, the non-linear design layout of Alternatives 1 and 2 would involve more clearing of forested area and would situate school facilities much closer to adjacent residential areas. The lack of a forested buffer would increase the visibility of the campus from nearby

residences and the surrounding area. Under Alternatives 1 and 2 existing viewplanes of some residential areas south of the project site would be altered.

The no action alternative would result in no effects on visual and aesthetic resources.

3.2.4.2 Mitigation Measures

The proposed action would not alter or damage any important scenic landforms or other visual resources in the surrounding area, and no mitigation is required

3.2.5 Circulation and Traffic

Existing and Project Conditions – Existing traffic volumes in the project area are low and there are no signalized intersections in the immediate vicinity of the project site. The two primary circulation routes within the immediate vicinity of the project site are Kaumana Drive located north-west of the site, and Edita Street which bisects the site dividing it into its upper (western) and lower (eastern) halves. Kaumana Drive (Rte 200) is a two-way road, with an east-west orientation. It is the main roadway serving the Kaumana area, connecting it to Hilo town to the east, and Saddle Road to the west. The County of Hawaii public transportation bus service (*Hele On*) runs along Kaumana Drive. Edita Street is a two-way road which intersects with Kaumana Drive, extending in a north-south orientation through the middle of the project site.

Primary access to and egress from the proposed project will be via the intersection of Kaumana Drive at Edita Street. Access to and egress from the Lower Campus will be provided by a new driveway referred to as Road “A.” Access to and egress from the Upper Campus will be provided by two new driveways. The first driveway, referred to as Road “C,” is located approximately 150 feet east of Kaumana Drive. The second driveway, referred to as Road “B” is located opposite from, and forms an intersection with Road “A”, which serves the Lower Campus. Road “B” is approximately 800 feet east of Kaumana Drive. As Road “C”, the driveway nearest Kaumana Drive, overlaps with the existing westbound left turn lane, use of this driveway would be restricted to right turns in and right turns out only.

In addition, there will be a fourth driveway along Kaumana Drive at the upper end of the project. As previously noted, access to this driveway would be limited (i.e., gated) and used primarily during the before and after school rush to accommodate traffic to/from the Puainako Extension and upper Kaumana Drive. It would also be used as secondary access/egress for emergency purposes. Existing public roadways and the proposed internal driveway network are shown in Figure 2-3.

Level-of-Service Concept - Level of Service (LOS) is a qualitative measure to describe the flow or operational characteristics of traffic as perceived by the level of congestion or delays experienced by motorists. There are six grades of LOS measured from “A” to “F”. In general, LOS A is considered best, representing free-flow conditions with no congestion. LOS F is considered worst, representing severe congestion with stop-and-go conditions. For peak hour traffic conditions in urban areas the minimum acceptable LOS is D. LOS grades A through F are summarized in Table 3-2.

**Table 3 - 2
 Levels-of Service Descriptions and Time Delays⁽¹⁾**

Level-of-Service	Description	Time Delay (in seconds)
A	Little or no delay	< 10
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	Extreme traffic delays ⁽²⁾	> 50.1

Source: Institute of Highway Engineers, 2000

Notes:

(1) For unsignalized intersections

(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. LOS F conditions usually warrant improvement of the intersection.

Existing traffic volumes in the project area are low and the adjacent roadways currently operate at LOS A or B. This implies good operating conditions, minimal delays, and high levels-of service. The existing levels-of-service for project area roadways is presented in Table 3-3.

**Table 3 - 3
 Existing Levels-of Service**

Intersection, Approach and Movement	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
<i>Kaumana Drive at Edita Street</i>						
Southbound Left & Thru	7.8	A	7.6	A	7.5	A
Westbound Left	10.9	B	10.4	B	10.7	B
Westbound Right	9.8	A	9.2	A	8.9	A

Notes:

(1) LOS calculated for unsignalized intersections

(2) Delay is in seconds per vehicle

3.2.5.1 Potential Impacts

A Traffic Impact Analysis Report (TIAR) was prepared in support of this EA. The TIAR assessed future impacts of the proposed project on the local traffic and circulation patterns. The TIAR study methodology consisted of conducting an analysis of existing traffic conditions, determination of future background traffic projections, and future project-related traffic impacts based on the proposed project phasing presented in Section 2.1.3. The impact analysis presented in this section is based on the findings of the TIAR which has been attached as Appendix D.

PROPOSED ACTION

Traffic-related impacts of the proposed project involved the determination of project-generated traffic during the morning (AM), midday (end of school day), and afternoon (PM) weekday commuter peak period and the determination of the levels-of-service at affected roadway intersections subsequent to implementation of the project. The proposed project will generate 108 inbound and 79 outbound trips during the morning peak hour, 52 inbound and 72 outbound trips during the midday peak hour and 31 inbound and 30 outbound trips during the afternoon peak hour. The total number of peak hour vehicle trips generated by the completed project during a weekday would be 621, of which 187 would be generated during the AM peak hour, 124 during the Midday peak hour, and 61 during the PM peak period (Rowell, 2009). Projected trip generation rates for the proposed action, broken down by development phase, are presented in Table 3-4 below.

**Table 3 - 4
 Trip Generation Rates
 for the Proposed Action**

Time Period	Direction	Number of Trips Generated						Total Project Trips
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	
Weekday	Total	8	10	183	388	0	32	621
AM Peak Hour	Total	4	1	44	127	0	11	187
	In	2	0	30	70	0	6	108
	Out	2	1	14	57	0	5	79
Midday Peak Hour	Total	4	0	34	79	0	7	124
	In	2	0	12	35	0	3	52
	Out	2	0	22	44	0	4	72
PM Peak Hour	Total	0	1	15	41	0	4	61
	In	0	1	7	21	0	2	31
	Out	0	0	8	20	0	2	30

Based on the traffic generation data, a Level-of-Service analysis was performed. The LOS analysis concluded that the majority of vehicular approach and movement patterns on adjacent public roadway intersections and proposed internal campus driveways would experience little or no delays after full buildout of the proposed action in the year 2021. The LOS analysis projects that traffic movements in the project area would continue to operate at LOS A and B, with over 77% of all movements operating at LOS A and 23% of movements operating at LOS B (Rowell, 2009)

Based on the findings of the TIAR, construction and operation of the proposed action would not generate large increases in traffic volumes and would not result in adverse impacts to traffic and circulation patterns in the project area. A summary of the peak hour level-of-service for the proposed action and alternatives are presented in Table 3-5

ALTERNATIVES

Similar to the proposed action, Alternatives 1 and 2 would not generate large volumes of traffic and traffic movements would operate at LOS A or B (Table 3-5). Therefore, Alternatives 1 and 2 would not result in adverse impacts to traffic and circulation patterns in the project area. The no action alternative would result in no significant impacts on the existing or future circulation and traffic patterns.

3.2.5.2 Mitigation Measures

The proposed action would not result in adverse impacts to traffic and circulation. However, to further minimize potential impacts to traffic and circulation in the project area Connections would implement additional traffic controls which may include, but are not limited to the following:

- Since trip generation rates for the area may change over the next decade, additional traffic surveys would be performed upon completion and occupancy of Phase 3, Phase 4 and Phase 6 to confirm the trip generation analysis and that the study intersections are operating as predicted. If these surveys determine that additional mitigation measures are needed, the appropriate improvements would be identified and implemented.
- A Traffic Management Plan (TMP) will be developed to promote ride sharing strategies such as carpools by students and employees, and use of alternative modes of transportation such as buses. As part of the TMP, coordination with the Hele On bus system will be initiated to pursue possible public bus service to and from the new campus.

**Table 3 - 5
 Future Peak Hour Levels-of-Service
 (Year 2021)**

AM Peak Hour ⁽¹⁾										
Approach and Movement	Existing (2009)		2021 Background		2021 Alternative 1		2021 Alternative 2		2021 Preferred Alternative	
	Delay ⁽²⁾	LOS ⁽³⁾	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.8	A	7.8	A	8.2	A	8.2	A	8.1	A
Westbound Left	10.9	B	11.2	B	14.2	B	14.2	B	14.0	B
Westbound	9.8	A	10.0	B	10.7	B	10.7	B	10.5	B
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right					7.4	A	7.4	A	7.4	A
Westbound Left, Thru & Right	See Note 4		See Note 4		7.5	A	7.3	A	7.3	A
Northbound Left, Thru & Right					10.0	B	10.3	B	10.2	B
Southbound Left, Thru & Right					8.6	A	8.7	A	8.7	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.8	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		10.3	B
Midday Peak Hour										
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.6	A	7.6	A	7.8	A	7.8	A	7.7	A
Westbound Left	10.4	B	10.6	B	11.8	B	11.8	B	11.7	B
Westbound	9.2	A	9.3	A	9.7	A	9.7	A	9.6	A
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right					7.3	A	7.4	A	7.3	A
Westbound Left, Thru & Right	See Note 4		See Note 4		7.5	A	7.5	A	7.3	A
Northbound Left, Thru & Right					9.8	A	10.2	B	9.9	A
Southbound Left, Thru & Right					8.5	A	8.6	A	8.6	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.7	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		9.4	A
PM Peak Hour										
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.5	A	7.6	A	7.6	A	7.6	A	7.6	A
Westbound Left	10.7	B	10.9	B	11.6	B	11.6	B	11.5	B
Westbound	8.9	A	9.0	A	9.2	A	9.2	A	9.1	A
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right					7.3	A	7.3	A	7.3	A
Westbound Left, Thru & Right	See Note 4		See Note 4		7.4	A	7.3	A	7.3	A
Northbound Left, Thru & Right					9.3	A	9.3	A	9.3	A
Southbound Left, Thru & Right					8.5	A	8.5	A	8.5	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.7	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		9.0	A

NOTES:

1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the project.
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.
4. This intersection will be constructed as part of the project.

- Alternative modes of transportation for internal trips within the project site would be encouraged, including the use of bicycles, golf carts, etc. Adequate parking facilities for these alternative modes of transportation would be provided.

3.2.6 Socio-Economic Considerations

The county of Hawaii and the city of Hilo have a rather diverse ethnic background with no clearly discernable racial majority or minority. Hilo and Hawaii County, in general, have a diverse population and is among the 100 fastest growing counties in the U.S. The median family income is less than 65% of that of the Country as a whole. With over 15% of individuals with income levels below the federal poverty level (U.S. Bureau of the Census, 2001). The socio-economic characteristics for Hawaii Island and for Hilo are summarized below in Table 3-6.

**Table 3 - 6
 Socio-Economic Characteristics**

Characteristic	Island of Hawaii	Hilo
Total Population	148,677	40,759
Percent Caucasian	31.5	17.1
Percent Asian	26.7	38.3
Percent Hawaiian	26.7	13.1
Percent Mixed (two or more races)	28.4	29.7
Median Age (Years)	38.6	38.6
Percent Under 18 Years	26.1	24.7
Percent Households with Children	23.1	36.1
Median Family Income	\$39,805	\$35,506
Percentage of Population Below 100% of Federal Poverty Level	15.7	11.7
Percent Housing Vacant	15.5	9.0

Source: U.S. bureau of the Census. 2001. Profiles of Demographic Characteristics, 2000 Census of Population and Housing, Hawaii (U.S. Census Bureau Web Page)

The student population at the Connections school generally reflects the ethnic and racial diversity of the general population. As a public charter school Connections will continue to provide an educational opportunity for students from all economic levels.

3.2.6.1 Potential Impacts

PROPOSED ACTION

The proposed action is not expected to increase the County's resident or visitor populations. Positive short-term socio-economic impacts would be generated during the project construction phase including jobs, local purchases of goods and services, and procurement expenditures associated with supplying

and maintaining the new facility. The proposed action is not expected to result in a major increase in permanent employment.

The proposed project would result in beneficial impacts by improving educational services and opportunities for area residents by enhancing access to educational opportunities and providing a culturally and environmentally sensitive learning environment. Construction of a new campus would allow Connections to continue teaching at its high educational standard and their proposed agricultural program would provide local children with marketable skills for working in and developing small sustainable agricultural operations in the area.

ALTERNATIVES

Alternatives 1 and 2 would result in similar beneficial socio-economic impacts as the proposed action, and the no action alternative would result in no effect on the existing socio-economic conditions.

3.2.6.2 Mitigation Measures

No mitigation is required as the potential benefits of the proposed action would far outweigh any potential adverse impacts to the social and economic characteristics of the area.

3.3 Cumulative Impacts

Cumulative impacts on environmental resources result from the incremental effects of given development when evaluated in conjunction with other past, present and reasonably foreseeable public and/or private future actions. A given action may have minimal impacts when considered individually, but when considered in combination with other actions it could result in adverse environmental impacts. Most past, present, and future actions in the surrounding area involve the development of sites for single family residences. However, the timing and even the certainty of many of these projects is unknown, therefore potential cumulative impacts are difficult to assess.

The proposed action involves the relocation of a school that is currently serving the Hilo/Puna community, and it is not anticipated to result in major secondary or cumulative impacts. From a regional perspective, impacts are limited to the planned growth of the school -- including a new pre-school program. From a local perspective the proposed action would have noticeable, but negligible, cumulative effects on the existing residential areas, largely due to the operation of a new school campus on a presently undeveloped site, and the associated increase in vehicular traffic volume. However, as discussed in Section 3.2.5, cumulative traffic growth was considered in the TIAR analysis and the findings indicated that the proposed project would not result in significant adverse traffic impacts.

The project will provide short-term construction jobs that will be filled by local residents but would not induce in-migration. The proposed action will likely have beneficial effects on socio-economic resources by improving educational services and opportunities for area residents and by enhancing access to educational opportunities and providing a culturally and environmentally sensitive learning environment.

4.0 CONSISTENCY WITH GOVERNMENT PLANS, POLICIES AND CONTROLS

4.1 State Land Use Law

All lands within the State of Hawaii are classified into one of four land use districts – Urban, Rural, Agriculture, or Conservation – by the State Land Use Commission pursuant to Chapter 205, HRS. The proposed project site lies within the State Land Use Agriculture District and will require Land Use Commission approval of a Special Permit for a new non-conforming use.

4.2 State of Hawaii Environmental Policy

Chapter 344, HRS, the State Environmental Policy, encourages productive and enjoyable harmony between people and their environment. The policy promotes efforts which will prevent or eliminate damage to the environment and biosphere, stimulate the health and welfare of humanity, and enrich the people of Hawaii's understanding of ecological systems and natural resources. The Environmental Policy seeks to conserve natural resources and enhance the quality of life for residents of Hawai'i. Expanding citizen participation in the decision-making process is one of the guidelines specified in Chapter 344, HRS. During the EA's pre-assessment consultation process, comments were solicited from federal, state, and county agencies; public utilities; private interests; and other potentially interested parties (presented in Appendix A).

4.3 Hawaii State Plan

Adopted in 1978 and revised in 1991 (HRS Chapter 266 as amended) the Hawaii State Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-term growth and development activities. The three themes that express the basic purpose of the Hawaii State Plan are individual family self-sufficiency, social and economic mobility, and community or social well-being. The proposed project will promote these goals by enhancing elementary middle and high school educational facilities in the Hilo and Kaumana area thus enhancing the quality-of-life, community and social well being of the region.

4.4 Hawaii County General Plan

The General Plan for the County of Hawaii is a policy document that expresses the broad goals and policies for the long-range development of the Island of Hawaii. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawaii County Department of Planning). It is divided into thirteen elements with policies, objectives, standards, and principles applicable to each element. Goals,

Policies, and Courses of Action identified in the General Plan that are pertinent to the proposed action include:

Education Goals

- Each Charter school is responsible for selecting their own sites.
- Utilize publically owned lands in the best public interest and to the maximum benefit.

Education Policies

- Encourage continuous joint pre-planning of schools with the Department of Education.
- Ensure coordination with roads, water and other support facilities and considerations such as traffic safety, and access for vehicle, bicycle and pedestrians.
- Encourage master planning of present and proposed public and private institutions.
- Encourage combining school yards with county parks and allow school facilities for afterschool use for recreational, cultural and other compatible uses.

Education Courses of Action

- Encourage the establishment of additional schools as the need arises.
- Encourage continual improvements to existing educational facilities

4.5 County Zoning

The project site is zoned A-1a (General Agricultural) by the County of Hawaii. In accordance with the County Zoning Code, schools are an allowable use within the A-1a district with an approved County Use Permit. However, as noted in Section 4.1 above, the project site is also located within the State Land Use Agricultural District; therefore a Special Permit, pursuant to HRS 205, rather than a Use Permit will be required to implement the proposed project.

5.0 FINDINGS AND DETERMINATION

A finding of no significant impact (FONSI) is anticipated and therefore an environmental impact statement will not be required for the proposed action. This negative determination has been made in accordance with the following significance criteria specified in Section 11-200-12 of the Department of Health rules relating to Environmental Impact Statements:

1. *The proposed project will not involve an irrevocable commitment, loss or destruction of any natural or cultural resources.* No natural or cultural resources will be committed or lost. The surrounding area is slowly being developed for residential use and new facilities for a charter school will provide superior educational opportunities to children in the surrounding housing areas.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment. This is particularly true when considering the proposed sustainable agriculture program that Connections is proposing to implement upon securing the long-term lease to the property.
3. *The proposed project will not conflict with the state's long-term environmental policies.* The state's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of the policy are to conserve natural resources and enhance the quality of life. This project fulfills aspects of these policies by providing the local community with modern educational facilities, thus enhancing the community's quality of life. As a "green" project, development of the new Connections campus will satisfy the intent of these policies by reducing the need for potable water through the use of a rainwater catchment system and designing the facilities to minimize disruption to the native forest, among other things.
4. *The proposed project will not substantially affect the economic or social welfare of the community or state.* Over time this project will benefit the social welfare of the community.
5. *The proposed project does not substantially affect the public health in any detrimental way.* The project will benefit the public health by providing a Charter School that utilizes and supports sustainable green technologies.
6. *The proposed project will not involve substantial secondary impacts such as population changes or effects on public facilities.* No secondary effects are anticipated to result from the proposed action, which will improve educational facilities. The proposed action would not induce significant in-migration or adversely affect public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality.* The project is environmentally benign and will not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* There is nothing unique about the project site or its vegetation. There is abundant like habitat in, and around Hilo. It is not expected that the construction or operation of the proposed school will result in deleterious impacts to native plant or animal species present within the general project area.
9. *The proposed project is not one which is individually limited but cumulatively may have considerable effects upon the environment or involves a commitment for larger actions.* The project is not related to additional activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions. Cumulative traffic impacts have been accounted for in the analysis and recommendations of the traffic Impact Analysis Report.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources will occur. Mitigation of construction phase impacts will preserve water, air and noise quality. Disturbance during the construction phase will be temporary and limited to reasonable daytime hours. The potential for long-term impacts will be mitigated by leaving a forested buffer surrounding the schools to muffle school noises. Runoff will be controlled to prevent any water quality issues.
11. *The project does not affect or would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous lane, estuary, fresh water, or coastal area.* The project is located in an area with volcanic and seismic risk, the entire Island of Hawaii shares this risk, and the project will construct and employ design and construction standards appropriate for the seismic zone. Currently there are no mitigation measures for volcanic hazards that have proven to be effective.
12. *The project will not substantially affect scenic vistas and view planes identified in the county or state plans or studies.* No scenic view planes identified in the Hawaii County Plan will be adversely affected by the project. The buildings will be single story and the surrounding forest left in situ as a vegetative sound buffer and will also serve as a visual buffer.
13. *The project will not require substantial energy consumption.* Initial construction of the facility will require additional consumption of energy. In the long-term, once the schools are built, sustainable design features would reduce energy consumption during operation of the school facilities. Additionally, alternative energy sources such as wind and solar generators will be considered and installed if economically feasible. There will be no long-term adverse effects on the existing energy utilities servicing the area.

6.0 CONSULTATION AND COORDINATION

In an effort to solicit comments on the Proposed Action, pre-assessment informational letters were sent to the government agencies and private organizations listed below. Substantive comments received have been addressed in the draft EA. A total of 10 agencies responded in writing (identified by an asterisk [*] below), and the pre-assessment letters and corresponding responses are attached as Appendix A.

- *U.S. Fish and Wildlife Service
- State of Hawaii, Office of Environmental Quality Control
- State of Hawaii, Department of Land and Natural Resources
 - *Land Division
 - *Engineering Division
 - *State Historic Preservation Division
 - *Commission on Water Resources Management
 - Division of Forestry and Wildlife
- *State of Hawaii, Department of Education
- State of Hawaii Office of Hawaiian Affairs
- State of Hawaii Department of Hawaiian Homelands
- *County of Hawaii, Department of Environmental Management
- *County of Hawaii, Department of Water Supply
- *County of Hawaii, Police Department
- *County of Hawaii, Fire Department
- County of Hawaii, Department of Parks and Recreation
- County of Hawaii, Department of Planning and Permitting
- County of Hawaii, Department of Public Works
- Hawaii Electric Light Company, Inc. (HELCO)
- Hawaiian Telcom
- Oceanic Time Warner Cable

7.0 REFERENCES

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8.0 APPENDICES

- Appendix A – Pre-Assessment Consultation Correspondence
- Appendix B – Biological Resources Survey
- Appendix C – Archaeological Assessment Survey
- Appendix D – Traffic Impact Assessment Report

APPENDIX A

Pre-Assessment Consultation Correspondence



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Charlene E. Unoki
State of Hawai`i
Department of Land and Natural Resources, Land Division
1154 Punchbowl Street, Room 220
Honolulu, HI 96813

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Ms. Unoki,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai`i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai`i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

Providing Services Since 1976

Land Use Planners and Environmental Consultants

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

February 26, 2009

Wil Chee – Planning & Environmental
1018 Palm Drive
Honolulu, Hawaii 96814

Attention: Ms. Judy Mariant

Ladies and Gentlemen:

Subject: Early consultation on Draft Environmental Assessment for Connections
New Century Public Charter School

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 Land Division-Hawaii District, Division of Forestry & Wildlife, Division of State Parks, Engineering Division, 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,

A handwritten signature in blue ink that reads "Morris M. Atta".

Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII



LAURA H. THIELEN
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

COMMISSION ON WATER
RESOURCE MANAGEMENT

February 4, 2009

MEMORANDUM

TO: **DLNR Agencies:**
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Commission on Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division -Hawaii District

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LAND DIVISION
2009 FEB 19 P 3:22
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

FROM: *for* Morris M. Attala *Chaulone*
SUBJECT: Early consultation for draft environmental assessment for Connections New Century Public Charter School
LOCATION: Hilo, Hawaii, TMK: (3) 2-5-6:141
APPLICANT: Wil Chee - Planning & Environmental

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 25, 2009.

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: *Ken C. Yoneda*
Date: FEB 9 2009

LINDA LINGLE
GOVERNOR OF HAWAII



LAURA H. THIELEN
CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIKE, M.D., J.D.
KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

February 19, 2009

REF: Connections New Century School.Pre-DEA

TO: Morris Atta, Administrator
Land Division

FROM: Ken C. Kawahara, P.E., Deputy Director
Commission on Water Resource Management

SUBJECT: Early Consultation for Draft Environmental Assessment for Connections New Century Public Charter School, Hilo, Hawaii

FILE NO.: NA
TMK NO.: (3) 2-5-6:141

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/cwrmm>.

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/cwr/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 information document indicates that water will be provided through the Department of Water Supply municipal system. We recommend that the Draft Environmental Assessment (DEA) quantify the potable and non-potable needs for the project, and whether there are any available alternative sources of non-potable water. Waipahoehoe Stream is in the vicinity of the project, and any potential impacts to this stream should be disclosed.

If there are any questions, please contact Lenore Ohye at 587-0216.

52886

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
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HONOLULU, HAWAII 96809

February 4, 2009

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MEMORANDUM

TO: **DLNR Agencies:**
 Div. of Aquatic Resources
 Div. of Boating & Ocean Recreation
 Engineering Division
 Div. of Forestry & Wildlife
 Div. of State Parks
 Commission on Water Resource Management
 Office of Conservation & Coastal Lands
 Land Division -Hawaii District

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2009 FEB 17 P 3:43
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STATE OF HAWAII

FROM: *for* Morris M. Atta *Chaulone*
SUBJECT: Early consultation for draft environmental assessment for Connections New Century Public Charter School
LOCATION: Hilo, Hawaii, TMK: (3) 2-5-6:141
APPLICANT: Wil Chee - Planning & Environmental

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 25, 2009.

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: 2/13/09



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LAND DIVISION
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HONOLULU, HAWAII 96809

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

February 4, 2009

MEMORANDUM

- TO: **DLNR Agencies:**
- Div. of Aquatic Resources
 - Div. of Boating & Ocean Recreation
 - Engineering Division
 - Div. of Forestry & Wildlife**
 - Div. of State Parks
 - Commission on Water Resource Management
 - Office of Conservation & Coastal Lands
 - Land Division –Hawaii District

FROM: *for* Morris M. Attala *Chaulone*

SUBJECT: Early consultation for draft environmental assessment for Connections New Century Public Charter School

LOCATION: Hilo, Hawaii, TMK: (3) 2-5-6:141

APPLICANT: Wil Chee – Planning & Environmental

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Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *Paul J. Conry*
Date: _____

**PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE**

FEB 11 2009

LINDA LINGLE
GOVERNOR OF HAWAII



LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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STATE OF HAWAII

February 4, 2009

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
 Office of Conservation & Coastal Lands
 x Land Division – Hawaii District

FROM: *for* Morris M. Attala *Maule*
SUBJECT: Early consultation for draft environmental assessment for Connections New Century Public Charter School
LOCATION: Hilo, Hawaii, TMK: (3) 2-5-6:141
APPLICANT: Wil Chee – Planning & Environmental

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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: 2/10/09



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

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MEMORANDUM

TO: **DLNR Agencies:**
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 Div. of Boating & Ocean Recreation
 x **Engineering Division**
 x Div. of Forestry & Wildlife
 x Div. of State Parks
 x Commission on Water Resource Management
 Office of Conservation & Coastal Lands
 x Land Division –Hawaii District

FROM: *for* Morris M. Attala *Thielen*
SUBJECT: Early consultation for draft environmental assessment for Connections New Century Public Charter School
LOCATION: Hilo, Hawaii, TMK: (3) 2-5-6:141
APPLICANT: Wil Chee – Planning & Environmental

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 25, 2009.

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: *C. Thielen*
Date: 2/10/09

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

**LM/MorrisAtta
REF.:EarlyConsultDEANewCenturyCharterSchool
Hawaii.422**

COMMENTS

- (X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program does not have any regulations for developments within Zone X.**
- () 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 ____.
- () 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:

- () 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. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
 - () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
 - () Mr. Mario Antonio at (808) 241-6620 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.
 - (X) 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 S. Agraan of the Planning Branch at 587-0258.

Signed: 
ERIC T. HIRANO, CHIEF ENGINEER

Date: 2/10/09



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Hawaii Electric Light Co., Inc. (HELCO)
1200 Kilauea Avenue
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Sir/Madame,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai'i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

Providing Services Since 1976

Land Use Planners and Environmental Consultants



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Hawaiian Telcom
161 Kinoole Street
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Sir/Madame,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Oceanic Time Warner Cable
1257 Kilauea Avenue
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Sir/Madame,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Patricia Hanamoto, Superintendent
State of Hawai`i
Department of Education
1390 Miller Street
Honolulu, HI 96813

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Ms. Hanamoto,

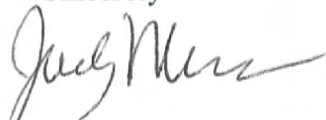
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STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

February 13, 2009

Ms. Judy Mariant
Wil Chee - Planning & Environmental
1018 Palm Drive
Honolulu, Hawai'i 96814

Dear Ms. Mariant:

Subject: Early Consultation on Connections Charter School Campus

The Department of Education has no early comment or concern with the proposed new campus for the Connections Charter School. We do note that all of the maps do not indicate the campus site in relation to downtown Hilo as a common point of reference. We will review the Environmental Assessment with interest.

If you have any questions, please call Heidi Meeker of the Facilities Development Branch at 377-8301.

Very truly yours,

A handwritten signature in cursive script, reading "Patricia Hamamoto".

Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Assistant Superintendent, OSFSS



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Division of Forestry and Wildlife
State of Hawai`i
Department of Land and Natural Resources
19 E Kawili Street
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Sir/Madame,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai`i.

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Sincerely

Judy Mariant

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Robert A. Fitzgerald, Director
Hawai`i County
Department of Park and Recreation
101 Pauahi Street, Suite 6
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Mr. Fitzgerald,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai`i.

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Sincerely

Judy Mariant

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

State Historic Preservation Division
Hawai'i Island Office
40 Po'okela Street
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Sir/Madame,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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Judy Mariant

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LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

February 17, 2009

Judy Mariant
Will Chee Planning & Environmental
1018 Palm Drive
Honolulu, Hawaii 96814

LOG NO: 2009.0099
DOC NO: 0902MD23
Archaeology

Dear Ms. Mariant:

**SUBJECT: Chapter 6E-8 Historic Preservation Review –
Request for Comment on Various Permits Associated with the New
Construction/Establishment of the Connections New Century Public Charter School
Kaumana & Kukuau 2nd Ahupua`a, South Hilo District, Island of Hawaii
TMK: (3) 2-5-006:141**

Thank you for the opportunity to comment on the aforementioned project, which we received on February 3, 2009. The entire property is within the 1880-1881 lave flow. A branch of the Kaumana lava tube complex runs underneath a portion of this site; care should be taken when planning construction in this area as there are known burials within other portions of this system and there is the potential of historic properties being located within the lava tube under this property.

We determine that **no historic properties will be affected** by this project because:

- Intensive cultivation has altered the land
- Residential development/urbanization has altered the land
- Previous grubbing/grading has altered the land
- An accepted archaeological inventory survey (AIS) found no historic properties
- SHPD previously reviewed this project and mitigation has been completed
- Other: *This parcel is entirely within the 1880-1881 lava flow.*

In the event that historic resources, including human skeletal remains, cultural materials, lava tubes, and lava blisters/bubbles are identified during the construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Hawaii Island Section, needs to be contacted immediately at (808) 933-7653. If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

Aloha,

A handwritten signature in cursive script that reads "Nancy A. McMahon".

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Daryn Arai, Department Head
County of Hawai'i
Department of Planning
101 Pauahi Street, Suite 3
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Arai,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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Sincerely

Judy Mariant

Attachment

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Warren H. W. Lee, Director
County of Hawai'i
Department of Public Works
101 Pauahi Street, Suite 7
Hilo, HI 96720-4224

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Lee,

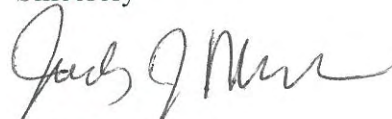
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Sincerely



Judy Mariant

Attachment

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Lono Tyson, Director
County of Hawai'i
Department of Environmental Management
25 Aupuni Street
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Tyson,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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Sincerely

Judy Mariant

Attachment

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William P. Kenoi
Mayor



Lono A. Tyson
Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720

(808) 961-8083 • Fax (808) 961-8086

http://co.hawaii.hi.us/directory/dir_envmng.htm

February 18, 2009

Ms. Judy Mariant
Wil Chee Planning & Environmental
1018 Palm Drive
Honolulu, HI 96814

RE: Connections New Century Public Charter School
Mamalahoa Highway
South Hilo, Hawai'i

Dear Ms. Mariant,

We offer the following comments:

Solid Waste Division

If components of a Solid Waste Management Plan are included in the Environmental Assessment, it will not be necessary to submit one at a later date.

Wastewater

There are no county sewers in area of this project.

Please add our department to your list of agencies to be consulted during the preparation of the Draft Environmental Assessment. Thank you for allowing us to review and comment on this project.

Sincerely,

A handwritten signature in blue ink that reads "Lono A. Tyson".

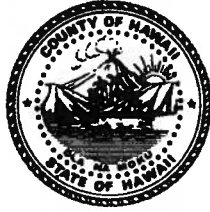
Lono A. Tyson
DIRECTOR

enclosure: Solid Waste Management Plan Guidelines

cc: SWD
WWD

11510A

William P. Kenoi
Mayor



Lono A. Tyson
Director

Ivan Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720

(808) 961-8083 • Fax (808) 961-8086

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February 12, 2009

SOLID WASTE MANAGEMENT PLAN

Guidelines

INTENT AND PURPOSE

This is to establish guidelines for reviewing solid waste management plans, for which special conditions are placed on developments. The solid waste management plan will be used to: (1) promotes and implement recycling and recycling programs, (2) predict the waste generated by the proposed development to anticipate the loading on County solid waste management facilities, and (3) predict the additional vehicular traffic being generated because of waste and recycling transfers. A qualified consultant shall prepare a suitable solid waste management plan for review by the Department of Environmental Management.

REPORT

The Solid Waste Management Plan will contain the following:

1. Description of the project and the potential waste it may be generating: i.e. analysis of anticipated waste volume and composition. This includes waste generated during the construction and operational or maintenance phases. Waste types shall include (but not be limited to):
 - A. Organics (including food waste and green wastes);
 - B. Construction and Demolition;
 - C. Paper (including cardboard);
 - D. Metal (including ferrous and non-ferrous metals);
 - E. Plastic;
 - F. Special (including ash, sludge, treated medical, bulky items, tires);
 - G. Household Hazardous (including paint, vehicle fluids, oil, batteries); and
 - H. Glass.
2. Indicate onsite source separation facilities by waste type; i.e. source separation bins of glass, metal, plastic, cardboard, aluminum, etc. Provide ample and equal space for rubbish and recycling.
3. Identification and location of the proposed waste reduction, waste re-use, recycling facility or disposal site and associated transportation methods for the various components of the development's waste management system, including the number of

vehicle movements and associated routes that will be used to transport the waste and recycled materials.


4. The report will include identification of any impacts to County-operated waste management facilities, and the appropriate mitigation measures that will be implemented by the development to minimize these impacts.
5. Analysis will be based on the highest potential use or zoning of the development.

REQUIREMENTS AND CONDITIONS

1. A solid waste management plan will be prepared for all commercial developments, as defined under the policies of the Department of Environmental Management, Solid Waste Division.
2. The Department of Environmental Management will require the developer to provide or resolve all recommendations and mitigation measures as outlined in the solid waste management plan; besides any conditions placed on the applicant herein.
3. A State of Hawaii licensed engineer will draft and certify in writing the solid waste management plan as complying with applicable Federal, State and County of Hawai'i solid waste laws, regulations, and administrative rules.

Should you require additional information, please contact Michael Dworsky, P.E., Solid Waste Division Chief at 808-961-8515.

CONCUR:



Lono A. Tyson
DIRECTOR



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Milton Pavo, Department Head
County of Hawai'i
Department of Water Supply
345 Kekuaanoa Street, Suite 20
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Pavo,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

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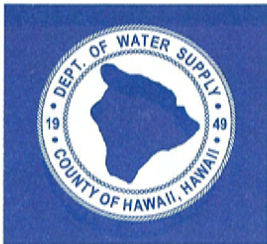
Sincerely

Judy Mariant

Attachment

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DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAII 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

March 18, 2009

Ms. Judy Mariant
Wil Chee – Planning & Environmental
1018 Palm Drive
Honolulu, HI 96814

**PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
CONNECTIONS NEW CENTURY PUBLIC CHARTER SCHOOL
TAX MAP KEY 2-5-006:141**

This is in response to your February 2, 2009 Pre-Environmental Consultation letter.

Water is available from an existing 8-inch waterline within Kaumana Drive and from an existing 8-inch waterline within Edita Street, both fronting the subject parcel.

Please be informed that the current water availability conditions in the area, which are subject to change, are limited to a maximum of seven (7) units of water per pre-existing lot of record. Each unit of water is equal to a maximum usage of 600 gallons per day (GPD); therefore, a maximum of 4,200 GPD is available for the proposed project.

The Department will request maximum daily water usage calculations, prepared by a professional engineer licensed in the State of Hawai'i, showing the estimated water demand for the proposed project. If the estimated maximum daily water usage for the proposed elementary, intermediate, and high schools exceeds 4,200 GPD, the Department's existing water system cannot support the project and extensive improvements would be required. The improvements may include, but not be limited to, additional source and storage facilities.

Further, any meter(s) serving the subject parcel shall have a reduced pressure type backflow prevention assembly installed within five (5) feet of the meter on private property before water service can be activated.

The existing 8-inch waterline within Edita Street is looped and therefore adequate to provide the required 2,000 gallons per minute fire flow, as per the Department's Water System Standards for schools.

Should there be any questions, you may contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

... Water brings progress...



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Fire Chief Darryl J. Oliveria
Hawai`i Fire Department
25 Aupuni Street, Suite 103
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Chief Oliveria,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai`i.

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Providing Services Since 1976

Land Use Planners and Environmental Consultants

William P. Kenoi
Mayor



Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i

FIRE DEPARTMENT

25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720

(808) 981-8394 • Fax (808) 981-2037

February 15, 2009

Ms. Judy Mariant
Will Chee-Planning & Environmental
1018 Palm Drive
Honolulu, HI 96814

Dear Ms. Mariant,

SUBJECT: CONNECTIONS NEW CENTURY PUBLIC CHARTER SCHOOL
SOUTH HILO, HAWAII

In regards to the above-mentioned environmental assessment, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"Fire Apparatus Access Roads

"Sec. 10.207. (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.



"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.


DARRYL OLIVEIRA
Fire Chief



WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

U. S. Fish & Wildlife Service
Pacific Islands Office
300 Ala Moana Boulevard, Box 50088
Honolulu, HI 96850

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Sir/Madame,

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Sincerely

Judy Mariant

Attachment

Providing Services Since 1976

Land Use Planners and Environmental Consultants

Ms. Judy Mariant

2

breeding season, we recommend conducting biological surveys to determine if hawk nests are present.

Thank you for the opportunity to assist you with your proposed project. If you have any questions regarding this letter, please contact Dr. Jeff Zimpfer, Fish and Wildlife Biologist, Consultation and Technical Assistance Program (phone: 808-792-9431; email: jeff_zimpfer@fws.gov).

Sincerely,

A handwritten signature in black ink that reads "Chris Russell". The signature is written in a cursive, slightly slanted style.

for Patrick Leonard
Field Supervisor



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:
2009-TA-0130

Ms. Judy Mariant
Wil Chee – Planning and Environmental
1018 Palm Drive
Honolulu, Hawaii, 96814

MAR 06 2009

Subject: Early Consultation Request for a Proposed New Century Public Charter School,
South Hilo, Hawaii

Dear Ms. Mariant:

This letter is in response to your request for early consultation on a proposed project to build a New Century Public Charter School in Kaumana, in the District of South Hilo on the island of Hawaii. We received your letter on February 4, 2009. The proposed project will consist of leasing 72 acres of land and building three schools: an elementary, intermediate and a High School.

Based on information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program, and the Hawaii GAP Program, the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) and the endangered Hawaiian hawk (*Buteo solitarius*) may occur in the project vicinity. There is no federally designated critical habitat near the project site.

In preparing your draft Environmental Assessment, we recommend you address potential project impacts to the Hawaiian hoary bat and the Hawaiian hawk and we offer the following measures to assist you in avoiding and minimizing potential impacts to these species:

- Hawaiian hoary bats roost and give birth in both exotic and native woody vegetation. However, use of the project area by Hawaiian hoary bats is currently unknown. To avoid potential impacts to this species, no woody plants suitable for bat roosting should be removed or trimmed during the bat birthing and pup rearing season (July through September). If you must clear the property during the Hawaiian hoary bat pupping season, we recommend conducting biological surveys to determine if bats are present. Please contact our office regarding survey methodology.
- Hawaiian hawks nest in both exotic and native woody vegetation. To avoid impacts to Hawaiian hawks we recommend avoiding tree clearing during the breeding season from March through September. If you must clear the property during the Hawaiian hawk

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 2, 2009

Chief of Police Lawrence K. Mahuna
Hawai`i Police Department
349 Kapiolani Street
Hilo, HI 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai`i

Dear Chief Mahuna,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai`i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai`i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

Providing Services Since 1976

Land Use Planners and Environmental Consultants

William P. Kenoi
Mayor



Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2389

February 9, 2009

Ms. Judy Mariant
Wil Chee Planning & Environmental
1018 Palm Drive
Honolulu, Hawaii 96814

Dear Ms. Mariant:

Subject: Connections New Century Public Charter School, South Hilo, HI

Staff, upon reviewing the limited information provided relative to this project, has recommended to me that the Hawaii Police Department declines comment regarding this project's potential impacts to traffic and/or other public safety concerns at this time.

Please provide us additional information at your earliest convenience so that we may meet your request for comment.

If you have any questions, please contact Captain Kenneth Vieira, Commander of the South Hilo Patrol Division, at (808) 961-2214.

Sincerely,

A handwritten signature in black ink, appearing to read "Derek D. Pacheco", with a long horizontal line extending to the right.

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS



WIL CHEE - PLANNING & ENVIRONMENTAL

February 9, 2009

Mr. Brennon T. Morioka, Ph.D., P.E., Director of Transportation
Department of Transportation,
869 Punchbowl Street, Room 105
Honolulu, Hawaii 96813

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Morioka,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai'i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

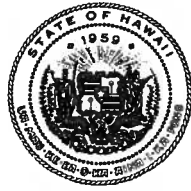
Judy Mariant

Attachment

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LINDA LINGLE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.3148

March 2, 2009

Mr. Wil Chee
Planning and Environmental
1018 Palm Drive
Honolulu, Hawaii 96814

Attention: Judy Mariant

Dear Mr. Chee:

Subject: Connections New Century Public Charter School
Early Consultation (EC)

Thank you for providing the subject project for the State Department of Transportation's (DOT) review and comments.

DOT understands that the proposed project involves the consolidation and construction of three schools at the same location and that access to the site is from Kaumana Drive.

DOT Highways Division recommends that a Traffic Impact Assessment Report (TIAR) be done for the subject project to determine the impacts of the 381-student school. The TIAR should also recommend appropriate measures to mitigate project generated impacts.

If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at (808) 587-2356.

Very truly yours,

Francis Paul Keeno

for BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation



WIL CHEE - PLANNING & ENVIRONMENTAL

February 9, 2009

Bill Davis, Homestead District Supervisor
East Hawai'i District Office
Department of Hawaiian Homelands
160 Baker Avenue
Hilo, Hawai'i 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Mr. Davis,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai'i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

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WIL CHEE - PLANNING & ENVIRONMENTAL

February 9, 2009

Lukela Ruddle, Community Resource Coordinator
East Hawai'i (Hilo)
Office of Hawaiian Affairs
162-A Baker Avenue
Hilo, Hawai'i 96720

Subject: Connections New Century Public Charter School
South Hilo, Hawai'i

Dear Ms.Ruddle,

Wil Chee - Planning & Environmental is preparing an Environmental Assessment (EA) that will be submitted in conjunction with an application to lease State government land and Special Use Permit from the County of Hawai'i.

The project will consist of leasing 72 acres and building three schools: an elementary school, intermediate school and a high school on the site. This will provide a permanent home for Connections New Century Public Charter School.

In compliance with §11-200-9 Hawai'i Administrative Rules Department of Health, Title 11 Chapter 200, *Environmental Impact Statement Rules*, this letter is intended to initiate early consultation with agencies and groups having jurisdiction or expertise related to the project. We have enclosed a project information sheet with maps and a description of the proposed project. We would appreciate receiving any comments or concerns which might influence the subject EA.

If you have any questions or need more information on this project, please call Judy Mariant at (808) 596-4688. Thank you for your time and interest.

Sincerely

Judy Mariant

Attachment

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APPENDIX B

Biological Resources Survey

Biological surveys for the Kaūmana Charter School Parcel, Hilo, Hawai‘i

February 23, 2009

E. Guinther, S. Montgomery¹, and R. David²
AECOS Consultants
45-309 Akimala Pl.
Kāne‘ohe, Hawai‘i 96744

INTRODUCTION

This report summarizes the findings of the botanical, invertebrate, avian and mammalian surveys conducted within the proposed project property. The primary purpose of the surveys was to determine if there were any botanical, invertebrate, avian or mammalian species currently listed as endangered, threatened, or proposed for listing under either the federal or the State of Hawai‘i’s endangered species programs on, or within in the immediate vicinity of the site. We were also asked to evaluate the potential impacts that the development of the Kaūmana School campus might pose to any sensitive or protected native botanical, invertebrate, avian or mammalian species, and to propose appropriate minimization and or mitigative measures that could be implemented to reduce or eliminate any such impacts. Federal and State of Hawai‘i listed species status follows species identified in the following referenced documents (Division of Land and Natural Resources (DLNR) 1998, Federal Register 2005, U. S. Fish & Wildlife Service (USFWS) 2005, 2008a). Fieldwork was conducted in December 2008.

The subject parcel is actually two parcels divided by Edita Road (Fig. 1). Most or all of the property lies between the 920 m and 600 m elevation, on a Mauna Loa *pahoehoe* lava flow dated 1881. Consequently, the long term history of disturbances to the natural environment begins in 1881 when lava destroyed a relatively narrow swath (varies, but on the order of 500 m or 1600 ft) of native forest, and does not include clearing for agricultural uses as typifies surrounding lands. Soils on the relatively recent lava flow are too thin to support pasturing of animals or sugar cane cultivation.

¹ Montane Matters, Waipahu

² Rana Productions Ltd., Kailua-Kona

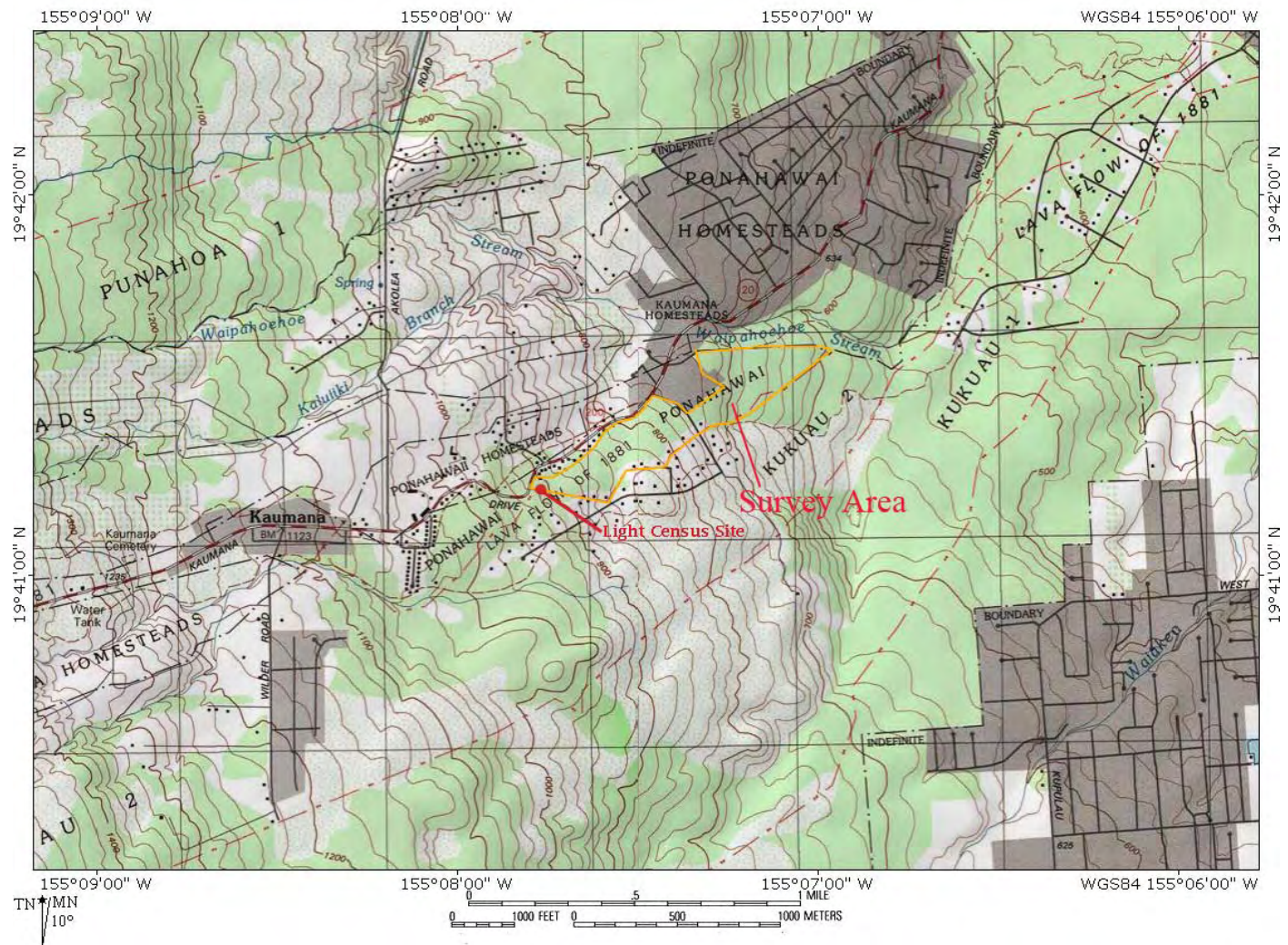


Figure 1. Kaūmana Charter School property and survey location (outlined in orange).

METHODS

Place names follow *Place Names of Hawaii* (Pukui et al. 1974). Although the team spent one day together on site, each member followed up with additional survey effort as appropriate to complete the individual responsibilities.

Botanical Survey Methods

The botanical survey was undertaken on December 10-11, 2008 by Eric Guinther. The survey methodology utilized a wandering transect, whereby the botanist walked around the property visiting representative areas of the vegetation, and noting the occurrence of all species of ferns and flowering plants encountered. Relative abundance (for this location) of each species was recorded. This method (as opposed to say, utilizing fixed transects) provides better cover and likelihood of recording uncommon and rare species, but is less precise with respect to actual abundance of each species. Species requiring additional identification were photographed and specimens taken for workup in the laboratory.

Conditions during the survey were ideal. Although the site is located in a wet area and the survey undertaken during the wet season, the weather was generally sunny and mild. Plant names follow *Hawai'i's Ferns and Fern Allies* (Palmer, 2003) for ferns, *Manual of the Flowering Plants of Hawai'i* (Wagner et al., 1990, 1999) for native and naturalized flowering plants, and *A Tropical Garden Flora* (Staples and Herbst, 2005) for crop and ornamental plants.

Invertebrate Survey Methods

Invertebrates are certainly the numerically dominant fauna in natural Hawaiian environments. The primary emphasis of this survey conducted by Dr. Steven Montgomery was on terrestrial invertebrates, particularly those that are endemic, indigenous, or listed species (having legal status under either, or both federal and state endangered species statutes [DLNR, 1996, 1997; USFWS, 2005a, 2006]).

Field surveys were conducted November 2008-January 2009 at the Kaūmana site. A general assessment of the terrain and habitats was conducted at the start of the survey. Surveying efforts were conducted at various times of day and night, a technique which is vital for a thorough survey of invertebrates, many of which are crepuscular or nocturnal. The native floral resources were an important focus of searches for native insects.

Dr. Montgomery has taken part in field projects at other locations in similar environments on Hawai'i and throughout the island chain since 1969. Those

experiences and the results of those surveys provide the basis for the study design and analysis of results used here. The following survey methods for terrestrial invertebrates were used as appropriate to the terrain, botanical resources, and target species. Species names follow Hawaii Biological Survey (2002), Nishida (2002), Zimmerman (1948-80), and Zimmerman (2001).

Invertebrates fieldwork schedule

Nov 7, 2008	Site examination, general orientation; day survey
Dec 10-11, 2008	Day survey
Jan 18, 2009	Day survey; night survey with light

Host plant searches — Potential host plants, both native and introduced, were searched for arthropods that feed or rest on plants. The Kaūmana School property was traversed in a wandering manner, crisscrossing areas to access potential host plants.



Figure 2. Light attracts arthropods

Light survey — A survey of insects active at night is vital to a complete record of the arthropod fauna. Many insects are only active at night to evade birds, avoid desiccation and high temperatures, or to use night food sources, such as night blooming flowers. Light sampling uses a bright light source in front of a white cloth sheet (Figure 3). Nocturnal insects seem to mistake the collecting light for the light of the moon, which they use to orient themselves. In attempting to navigate by the scientist's light, confused insects are drawn around the light and land on the cloth in confusion. This type of survey is most successful during the dark phase of the moon or under clouds blocking starlight.

Vegetation usually blocks light from being seen over long distances, and most moths and other night fliers are not capable of very distant flight. Consequently, light surveying does not call in many insects from outside the survey area.

The monitoring location was chosen based on experience, host plant proximity, and terrain (Figure 1). The light source was an ultra violet (UV) or black light bulb, a light wave length known to be attractive to night active insects. Light surveying began on Jan 18, 2009, at dark (approximately 6:30 p.m.) and was conducted throughout the night. Although the moon was a waning crescent with 42% of the visible disk illuminated, it did not rise until 1:41 a.m. on Jan 19, 2009, leaving many moon-free hours for monitoring (USNO). Additionally, some arthropods were attracted to the light even after moon-rise.

Sweep nets — This method assists in surveying many flying and perching insects. A fine mesh net is swept across plants, leaf litter, rocks, etc. to census any flying, perching or crawling insects.

Visual observation — vigilance is maintained for visual or aural evidence of arthropods. Visual observations provide valuable information and are a cross check that extends the reach of survey techniques. Visual observation also includes turning over rocks, dead wood, and other debris.

Survey limitations/conditions — The survey schedule and duration were adequate to assess potential impacts of the proposed project on invertebrate resources. The survey was representative and targeted to locate and examine host plants which might be utilized by native invertebrates. Nevertheless, my ability to form advisory opinions regarding the invertebrates present is limited by several factors.

1. **Common alien species:** No attempt was made to document the many common alien arthropod species present in the area. With introduced plants dominating much of the property, the number of alien invertebrates encountered was high.
2. **Physical limitations:** The size of the project area allowed a fairly comprehensive survey. *Uluhe* fern mats made chasing arthropods in flight difficult. Nevertheless, in most situations, it was possible to obtain access to host plants of interest. The light survey compensated well for some reduced access.
3. **Survey conditions:** Monitoring at a different time of the year, or for a longer period of time, might produce a longer or different arthropod list. Weather and seasonal vegetation play an especially important role in any survey of invertebrates. Many arthropods habitually emerge and breed to overlap or follow seasonal weather or to coincide with growth spurts or fruiting of an important plant food. The absence of host plants, however, was a stronger factor affecting the invertebrate species noted than seasonal changes, weather, or other causes.

Weather was favorable for surveying during each day of fieldwork. This study was conducted during the winter season, ensuring that the few native host plants were in a stage adequate for surveying. As the survey was conducted over several months, varying conditions were encountered. Thanks are extended to Roland Reeve for arranging first transects, and to Eric Guinther for maps and assistance with access to the site. Anita Manning contributed to preparation of this report. Steven Lee Montgomery conducted all surveying and is responsible for all conclusions.

Avian Survey Methods

Eight bird count stations were sited along a linear transect running the length of the property. Count stations were placed at approximately 200-meter intervals equally spaced along the transect. Eight-minute point counts were made at each of the eight count stations. Each station was counted once. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated in the early morning hours, traditionally the peak of daily bird activity. Time not spent counting was used to search the remainder of the project site for species and habitats that were not detected during count sessions.

The avian phylogenetic order and nomenclature used in this report follows *The American Ornithologists' Union Checklist of North American Birds 7th Edition* (American Ornithologists' Union, 1998), and the 42nd through the 49th supplements to *Check-list of North American Birds* (American Ornithologists' Union, 2000; Banks et al., 2002, 2003, 2004, 2005, 2006, 2007, 2008).

Mammalian Survey Methods

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ape'a as it is known locally, all terrestrial mammals currently found on the Island of Hawai'i are alien species. Most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed, heard or detected by other means within the project area. Mammal scientific names follow *Mammals in Hawaii* (Tomich, 1986).

RESULTS

Botanical Survey Results

The results of the botanical survey include a listing of the plants encountered (the flora) and a description of the vegetation. Scientific and common names of the plants observed on the project site are given in Table 1, grouped by higher taxa. The total number of vascular plants (ferns, fern allies, conifers, and flowering plants) encountered was 65. The “Status” column indicates whether a species is non-native (“nat” for naturalized) or native (“ind” for indigenous and “end” for endemic; see notes at end of Table 1). Of the 65 species identified on the Kaūmana Charter School property, 11 are native (indigenous or endemic) to the Hawaiian Islands. The total number of species is not very high considering the size of the parcels, however, the nature of the assemblage (that is, mostly undisturbed and dominated by a few native species) accounts for this result. Abundance estimates in the listing are averaged approximations for the project area.

Table 1. Flora listing for the Kaūmana Charter School Parcel, December 2008.

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Abundance</i>	<i>Notes</i>
<i>FERNS and FERN ALLIES</i>				
GLEICHENIACEAE				
<i>Dicranopteris linearis</i> (Burm. f.) Underw.	<i>uluhe</i>	Ind	AA	
LYCOPODIACEAE				
<i>Lycopodiella cernua</i> (L.) Pic. Serm.	<i>wāwae'iole</i>	Ind	U	
NEPHROLEPIDACEAE				
<i>Nephrolepis multiflora</i> (Roxb.) F.M. Jarrette ex C. V. Morton	---	Nat	O3	
POLYPODIACEAE				
<i>Lepisorus thunbergianus</i> (Kaulf.) Ching	<i>pākahakaha</i>	Ind	R	
<i>Phymatosorus grossus</i> (Langsd. & Fisch.) Brownlie	<i>laua'e</i>	Nat	R1	
PSILOTACEAE				
<i>Psilotum nudum</i> (L.) P. Beauv.	<i>moa</i>	Ind	U	
PTERIDACEAE				
<i>Pityrogramma calomelanos</i> (L.) Link	silver fern	Nat	R	(1)
<i>FLOWERING PLANTS</i>				
<i>Dicotyledons</i>				
ACANTHACEAE				
unidentified, ? <i>Asystasia</i> sp.		Nat	R	

Table 1 (continued).

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Abundance</i>	<i>Notes</i>
ANACARDIACEAE				
<i>Rhus sandwicensis</i> A. Gray	<i>neleau</i>	End	U	
APIACEAE				
<i>Centella asiatica</i> (L.) Urb.	Asiatic pennywort	Nat	R	
APOCYNACEAE				
<i>Allamanda cathartica</i> L.	allamanda	Orn	O	
ASTERACEAE (COMPOSITAE)				
<i>Ageratum conyzoides</i> L.	<i>maile hohono</i>	Nat	R	
<i>Conyza</i> sp.	horseweed	Nat	R	(1,2)
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	---	Nat	R	
<i>Emilia fosbergii</i> Nicolson	Flora's paintbrush	Nat	R	(1)
<i>Erechtites valerianifolia</i> (Wolf) DC	fireweed	Nat	R	
<i>Pluchia carolinensis</i> (Jacq.) G. Don	sourbush	Nat	U	(1)
<i>Sphagneticola trilobata</i> (L.) Pruski	wedelia	Nat	R2	(1)
BUDDLEJACEAE				
<i>Buddleja asiatica</i> Lour.	dog tail	Nat	R	(1)
CLUSIACEAE				
<i>Clusia rosea</i> Jacq.	autograph tree	Nat	U	
ERICACEAE				
<i>Leptecophylla tameiamaeia</i> (Cham. & Schlechtend.) Weiller	pūkiawe	Ind	R1	
FABACEAE				
<i>Acaia koa</i>	<i>koa</i>	End	R	
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	Nat	R	
<i>Crotalaria pallida</i> Aiton	smooth rattlepod	Nat	U	(1)
<i>Desmodium incanum</i> DC	Spanish clover	Nat	U	
<i>Desmodium triflorum</i> (L.) DC	---	Nat	R	(1)
<i>Falcataria moluccana</i> (Miq.) Barneby & Grimes	albizia (juv)	Nat	U	
<i>Mimosa pudica</i> L.	sensitive plant	Nat	R	(1)
LAMIACEAE				
<i>Hyptis pectinata</i> (L.) Poit.	comb hyptis	Nat	U	(1)
MALVACEAE				
<i>Hibiscus rosa-sinensis</i> L.	Chinese hibiscus	Orn	R	
MELASTOMATACEAE				
<i>Arthrostemma ciliatum</i> Pav. ex D. Don	---	Nat	U	(1)
<i>Clidemia hirta</i> (L.) D. Don	Koster's curse	Nat	U	
<i>Heterocentron subtriplinervium</i> (Link & Otto) A. Braun & C. Bouché	---	Nat	R	
<i>Melastomia candidum</i> D. Don	---	Nat	C	

Table 1 (continued).

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Abundance</i>	<i>Notes</i>
MELASTOMATACEAE (continued)				
<i>Tibouchina herbacea</i> (DC) Cogn.	---	Nat	R	(1)
MYRSINACEAE				
<i>Ardisia elliptica</i> Thunb.	shoebutton ardisia	Nat	O	
MYRTACEAE				
<i>Eucalyptus robusta</i> Sm.	swamp mahogany	Nat	R	
<i>Metrosideros polymorpha</i> Gaud.	'ōhi'a	End	A	
<i>Psidium cattleianum</i> Sabine	strawberry guava	Nat	C	
<i>Syzygium jambos</i> (L.) Alston	rose apple	Nat	R2	
POLYGALACEAE				
<i>Polygala paniculata</i> L.	---	Nat	U	
RUBIACEAE				
<i>Spermacoce assurgens</i> Ruiz & Pav.	buttonweed	Nat	U	
STERCULIACEAE				
<i>Melochia umbellata</i> (Houtt.) Stapf	---	Nat	O	
ULMACEAE				
<i>Trema orientalis</i> (L.) Blume	gunpowder tree	Nat	R	
VERBENACEAE				
<i>Stachytarpheta australis</i> Moldenke	---	Nat	R	(1)
FLOWERING PLANTS				
Monocotyledons				
AGAVACEAE				
<i>Cordyline fruticosa</i> (L.) A. Chev..	ti, ki	Pol	U	
<i>Dracaena fragrans</i> (L.) Ker-Gawl.	fragrant dracaena	Orn	R1	
ARACEAE				
<i>Anthurium x ferrierense</i> Masters & Moore	anthurium	Orn	R	
ARECACEAE				
<i>Archontophoenix alexandrae</i> (F. v. Mueller) Wendl. & Drude	Alexandria palm	Nat	R	
<i>Philodendron cf. scandens</i> Koch & Sello	heart-leaf philodendron	Orn	R2	
CYPERACEAE				
<i>Cyperus halpan</i> L.	sharp-edge sedge	Nat		
<i>Cyperus polystachyos</i>	---	Ind	U	(1)
<i>Fimbristylis dichotoma</i> (L.) Vahl	---	Ind	R	(1)
<i>Machaerina mariscoides</i> (Gaud.) J. Kern	'ahanui	Ind	C	
<i>Rhynchospora caduca</i> Elliott	anglestem beakrush	Nat.	O	(1)
ORCHIDACEAE				
<i>Arundina graminifolia</i> (D. Don) Hochr.	bamboo orchid	Nat	O	
<i>Phaius tankarvilleae</i> (Banks ex L'Her) Bl.	Chinese ground orchid	Nat	R	

Table 1 (continued).

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Abundance</i>	<i>Notes</i>
ORCHIDACEAE (continued)				
unidentified	orchid	Orn	R	(2)
POACEAE				
<i>Andropogon virginicus</i> L.	broomsedge	Nat	C	
<i>Digitaria</i> sp.	---	Nat	R	
<i>Melinis minutiflora</i> P. Beauv.	molasses grass	Nat	O2	(1)
<i>Paspalum cf. dilatatum</i> Poir.	Dallis grass	Nat	R	
<i>Pennisetum purpureum</i> Schumach.	elephant grass	Nat	U2	
<i>Sacciolepis indica</i> (L.) Chase	Glenwood grass	Nat	O	
<i>Schizostachyum glaucifolium</i> (Rupr.) Munro	'ohe	Pol	R	
ZINGIBERACEAE				
<i>Hedychium flavescens</i> N. Carey ex Roscoe	yellow ginger	Nat	U	

Legend to Table 1.

STATUS = distributional status for the Hawaiian Islands:

- end.** = endemic; native to Hawaii and found naturally nowhere else.
- ind.** = indigenous; native to Hawaii, but not unique to the Hawaiian Islands.
- nat.** = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
- orn.** = exotic, ornamental or cultivated; plant not naturalized (not well-established outside of cultivation).
- pol.** = Polynesian introduction before 1778.

ABUNDANCE = occurrence ratings for plants by area:

- R - Rare seen in only one or perhaps two locations.
- U - Uncommon- seen at most in several locations
- O - Occasional seen with some regularity
- C - Common observed numerous times during the survey
- A - Abundant found in large numbers; may be locally dominant.
- AA - Very abundant abundant and dominant; defining vegetation type.

Numbers following an occurrence rating indicate clusters within the survey area. The ratings above provide an estimate of the likelihood of encountering a species within the survey area; numbers modify this if abundance, where encountered, tends to be greater than the occurrence rating:

- 1 - several plants present
- 2 - many plants present
- 3 - abundant over a localized area

NOTES:

- (1) - Species mostly or entirely associated with recently disturbed areas on the property.
- (2) - Observed plant lacking fruit or flowers.

A common lichen in the survey area is British soldier lichen (*Cladonia* sp.). At least two species of mosses (unidentified) are present as well.

Vegetation — All or nearly all of the property is located on the Mauna Loa lava flow of 1881. Thus, we know the vegetation at this site “started over” as it were after 1881. The site has been disturbed more recently, but the majority of the land remains undisturbed and the vegetation reflects the largely native plant community that developed after 1881,

gradually reclaiming the bare lava flow. In the 128 intervening years, a native forest dominated by 'ōhi'a (*Metrosideros polymorpha*) trees with a dense understory of uluhe (*Dicranopteris linearis*) fern came to be established here; this is a Lowland Wet Forest (Gagne and Cuddihy, 1990) of type termed: 'Ōhi'a/Uluhe (*Metrosideros/Dicranopteris*). The dense uluhe fern is effective at keeping most other species out and the density of the 'ōhi'a trees varies considerably from place to place, but typically approaches a closed canopy where undisturbed. Soils are thin on the recent *pahoehoe* lava flow (Sato, et al., 1973).

As the surrounding properties came to be developed and the saddle road built, opportunities opened for non-native species to invade the native plant community. This process has been slow, but has been accelerated where the native community is disturbed, either by clearing, grubbing, or, in the case of Road, cutting the property into two parcels with complete removal of a swath of the native plants.

It is interesting to note that during the plant survey, the southern end of the parcel was reached after a relatively long, meandering trek down slope. Lacking knowledge of exact location, a point was reached where there was seen to be a dramatic shift in the nature of the vegetation, with many species appearing that had not been previously recorded (the property was initially surveyed from southwest to northeast). A forest dominated by strawberry guava (*Psidium cattleianum*) and an absence of 'ōhi'a and uluhe was entered, and many other non-native species were being recorded, including large albizia (*Falcataria moluccana*) trees. Finally, the transect reached the dry streambed of Waipahoehoe Stream and it then became evident that the survey track had left the the 1881 lava flow and the eastern end of the Kaūmana Charter School property. The species recorded in this area are not included in our report, but suffice it to say, the difference in vegetation between that associated with the 1881 lava flow, and that not on the lava flow is striking. At least two important factors are operating here: deeper soils and (as a consequence) a past history of agricultural land use after clearing of the native forest.

Invertebrate Survey Results

Native Hawaiian plant, vertebrate, and invertebrate populations are often interdependent. Certain insects are obligatorily attached to specific host plants, using only that plant as their food. These insect relationships with hosts are ancient and often intertwined. The health of native Hawaiian invertebrate populations depends upon habitat quality and absence or low levels of predators introduced from the continents. Sufficient food sources, host plant availability, and the absence or low levels of introduced, continental predators and parasites comprise a classic native, healthy ecosystem. Consequently, where appropriate in the survey discussion, host plants and some introduced arthropods are also noted.

The results of day and night invertebrate surveys are presented in Table 2. Native species observed on the property are discussed below and information is provided on several alien species frequently observed by the public that may be misidentified or confused with native species. Alien species that affect the survival of native species and species that impact human health also are discussed.

Table 2. List of Invertebrates, Kaūmana Charter School Property, Hilo, Hawai'i.

Species	Common name	Status	General abund.	Site of recovery
ARTHROPODA				
INSECTA				
COLLEMBOLA				
Entomobryidae				
<i>Salina celebensis</i> (Schaeffer, 1898)	leaf springtail	Adv	C	on leaves
DIPTERA				
Culicidae				
<i>Aedes albopictus</i> (Skuse, 1894)	flies and mosquitoes	Adv	C	throughout
<i>Culex quinquefasciatus</i> Say, 1823	mosquito	Adv	C	throughout
Ceratopogonidae				
<i>Forcipomyia hardyi</i> Wirth & Howarth, 1982	midge	End	C	throughout
Tipulidae				
<i>Limonia perkinsi</i> (Grimshaw, 1901)	crane fly	Adv	A	light
HOMOPTERA				
Psyllidae				
<i>Trioza ohiacola</i> Crawford, 1918	jumping plant lice	End	C	light, on leaves
HYMENOPTERA				
Apidae				
<i>Apis mellifera</i> Linnaeus, 1758	wasps, bees, ants	Pur	O	in flight
Formicidae				
<i>Anoplolepis gracilipes</i>	ants	Adv	U	on soil
<i>Camponotus variegatus</i> (F. Smith, 1858)	long-legged ant	Adv	U	at light
<i>Pheidole megacephala</i>	carpenter ant	Adv	U	at light
	big-headed ant	Adv	C	on soil

Table 2 (continued).

Species	Common name	Status	General abund.	Site of recovery
Vespidae	wasps			
<i>Polistes exclamans</i> Viereck, 1906	common paper wasp	Adv	U	
LEPIDOPTERA				
Cosmopterigidae	case bearers			
<i>Hyposmocoma</i> sp.	broad case	End	R	on stones
Crambidae	micro-moths			
<i>Eudonia</i> sp.	moss moth	End	R	
Noctuidae	miller moths			
<i>Ascalapha odorata</i> (Linnaeus, 1758)	black witch moth	Adv	U	on host plant
<i>Schrankia altivolans</i> (Butler)		End	R	on ohia root
Nymphalidae				
<i>Agraulis vanillae</i> (Linnaeus, 1758)	passion vine butterfly	Adv	R	in flight
Sphingidae	hawk moths			
<i>Agrius cingulata</i> (Fabricius, 1775)	sweetpotato hornworm	Adv	R	on host plant
ODONATA				
Aeshnidae	dragonflies and damselflies			
<i>Anax junius</i> (Drury, 1770)	common green darner	Adv	R	in flight
Libellulidae	skimmers			
<i>Pantala flavescens</i> (Fabricius, 1798)	globe skimmer	Ind	R	in flight
ORTHOPTERA				
Gryllidae	praying mantis, grasshoppers, crickets, katydids			
<i>Trigonidium</i> sp.	cricket	End	R	green nymph on ferns
Tettigoniidae				
<i>Euconocephalus nasutus</i> (Thunberg), 1815	aggravating grasshopper	Adv		vocal

Status:

End endemic to Hawaiian Islands
 Ind indigenous to Hawaiian Islands

Table 2 (continued).

Adv	adventive
Pur	purposefully introduced
?	unknown
Abundance = occurrence ratings:	
R	Rare: seen in only one or perhaps two locations
U	Uncommon: seen at most in several locations
O	Occasional: seen with some regularity
C	Common: observed numerous times during the survey
A	Abundant: found in large numbers
AA	Very abundant: abundant and dominant

Native Arthropods

INSECTA: LEPIDOPTERA

Cosmopterigidae: *Hyposmocoma*

One species of *Hyposmocoma*, as caterpillars, was found on the rocky surfaces. Properly called “case bearers,” the caterpillars are sometimes misleadingly called “bagworms.” Very young caterpillars of case bearers find safety in a hiding place like a leaf curl. When growth forces them out of that protection, they intricately weave a portable shell of their own silk from a lip spinneret. For camouflage, they add bits of their surroundings to the case using their silk: snips of dry grass or leaves, flakes of bark, maybe a little soil. The case is then easily mistaken by a predator as another part of the landscape. These bunkers are fitted with a hinged lid (operculum), pulled shut by mini-mandibles to defend them from enemies like beetles and micro wasps. Their relationship to the case is similar to that of a hermit crab to his shell. Although not physically connected to the case as a snail or turtle, they are dependent on it, and die if removed—even if protected from predators and given food. They don’t move far, but feed while partly emerged from the case, dragging along their protective armor by their six true legs. (Manning/Montgomery in Liittschwager & Middleton 2001) With over 500 kinds, *Hyposmocoma* micromoths are the greatest assemblage of Hawaiian Island moths, showing astonishing diversity. After writing 630 pages on them, Dr. Elwood Zimmerman lamented the inadequacy of his study. He noted an enormous cluster of species with explosive speciation and diverging radiation (Zimmerman 1978). Much remains to be learned about the life ways of this interesting group of insects now under study by University of Hawaii’s Dr. Daniel Rubinoff and colleagues (Rubinoff et al. 2008).

Crambidae: *Eudonia* sp.

This endemic, narrow winged, speckled moth is represented by more than 30 species known from Hawai’i Island of the 60 species in the island chain. One specimen came to the night light during the survey. A typical *Eudonia* feeds on mosses.

Noctuidae: *Shrankia altivolans*

The small native moth, *Shrankia altivolans*, is wide-spread throughout the Hawaiian Islands. The caterpillar of this endemic moth feeds on 'ōhi'a aerial rootlets. The cocoon is protected by camouflage created with bits of root (Fig. 3).

Figure 3 (right).
Shrankia habitat with
inset showing cocoon
(in front of shadow).



Libellulidae: *Pantala flavescens* Globe skimmer

The indigenous dragonfly *Pantala flavescens* (Fig. 4) is among the most easily observed of the native insects. They are large, easily approached by people, and graceful in flight. Any small amount of fresh water will attract them and they often colonize human maintained water sources such as golf course water hazards or home fish ponds. The adults lay eggs in the water where they develop into young called naiads. Mosquito larvae are among the foods of the naiads. The proposed habitat change may reduce their

numbers, but they are likely to recolonize almost any water source. The native dragonflies are widely distributed throughout the Hawaiian Islands, from Kure to Hawai'i Island (HBS, 2002; Nishida, 2002).

Alien Species: Arthropods

INSECTA: LEPIDOPTERA

Noctuidae: *Ascalapha odorata* ~ Black witch moth

The black witch moth has been widely distributed in the island chain since the 1920s. The classic food plant of the caterpillars, monkeypod (*Samanea saman*), was noted in the area. Near homes the moth is seen resting under the eaves of roofs during the day. In rural areas it rests under foliage and against tree trunks. It is most frequently seen at dawn or dusk. When seen in flight in such low light, this large moth is occasionally mistaken for a bat.

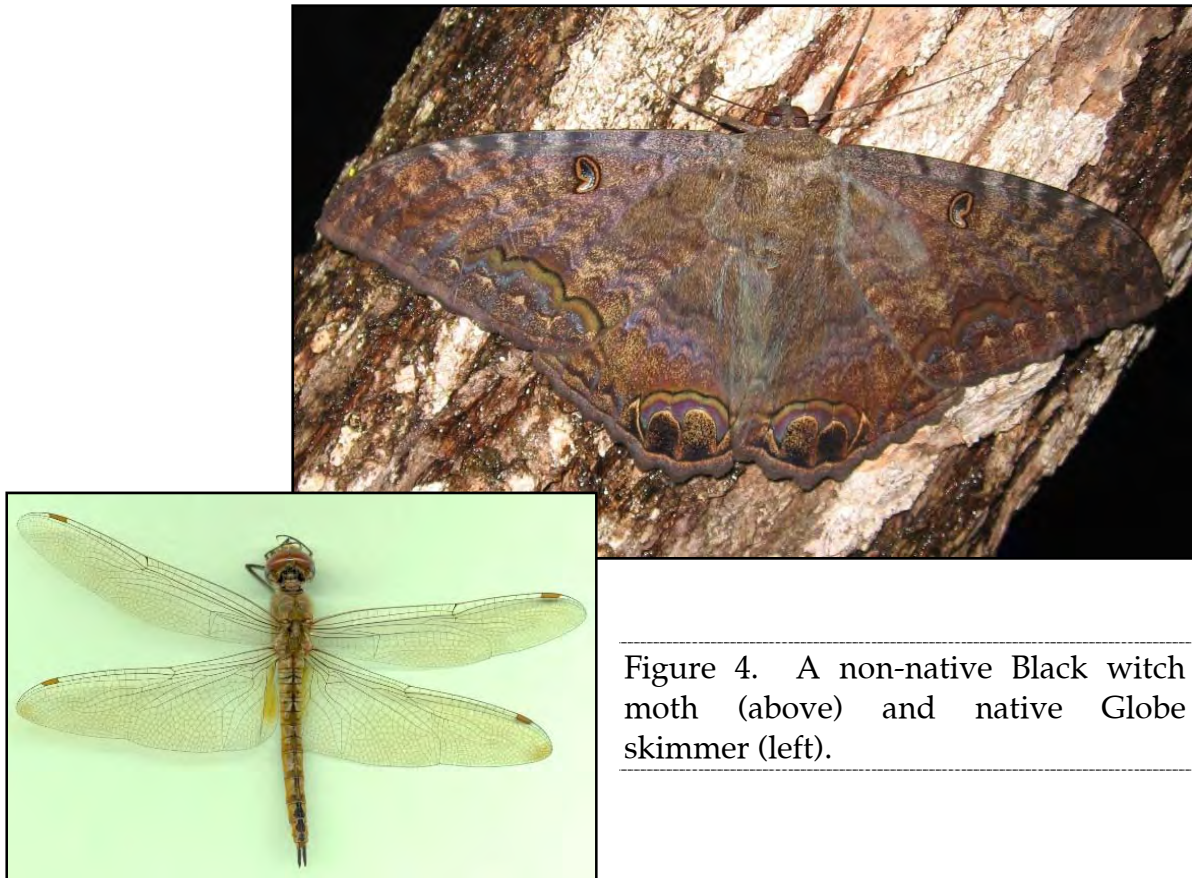


Figure 4. A non-native Black witch moth (above) and native Globe skimmer (left).

Nymphalidae: *Agraulis vanillae*

The passion vine butterfly (Fig. 5), with its bright orange wings, in quick flight might be mistaken by members of the public for the Kamehameha butterfly (*Vanessa tameamea*).



At rest, the silver markings on the underside of the wings easily distinguish it from the Kamehameha butterfly.

Figure 5 (left).

Sphingidae: *Agrius cingulata* ~ Sweet potato hornworm

This large and often seen moth is most easily confused by the public with the Blackburn's sphinx moth (*Manduca blackburni*) described below on page 22. The adult *A. cingulata* has pink markings (Fig. 6) along both sides, whereas *Manduca* has orange markings. When the moth is at rest with wings folded, these color markings are hidden. The caterpillars feed on sweet potato, morning glory, and related plants. The species is widely distributed around the Hawaiian Islands. (HBS 2002a, Nishida 2002).

Figure 6. Sweet potato hornworm (right) and Aggravating grasshopper (below).



ODONATA (Dragonflies and Damselflies)

Aeshnidae: *Anax junius* ~ Common green darner

The common green darner (*Anax junius* (Drury), 1770) also was seen. This non-native species is widely distributed, being known in North and South America, Europe and parts of Asia. It is sometimes confused with native species.

ORTHOPTERA (Praying Mantis, Grasshoppers, Crickets, Katydid)

Tettigoniidae: *Euconocephalus nasutus* ~ Aggravating grasshopper

The distinctive call of the aggravating grasshopper (Fig. 7, above), is heard at dusk and early dark. The sound, a bit like a transformer gone bad, is the call of the male. People often hear the sound, but cannot associate it with the creator.

Medically Important Arthropod Species

Invertebrate species likely to be found in the project area and having negative human health impacts include **centipedes**, and likely **brown widow spiders**. These species are often disturbed when dead brush or trash is cleared.

DIPTERA

Mosquitoes were observed during the survey and most likely breed where water is allowed to stand in discarded containers, and natural depressions. As winter rains intensify, mosquitoes will increase. In recent years, mosquito transmitted illnesses, such as dengue fever, have been a greater concern for the state's Department of Health. When work begins on the property and habitat is altered, the mosquito levels should abate.

HYMENOPTERA

The ants noted in the survey, long-legged ant (*Anoplolepis gracilipes*), carpenter ant (*Camponotus variegatus*) and the big-headed ant (*Pheidole megacephala*), are not known to bite or sting humans. Caution should be used, however, anywhere nests or large numbers of ants are found.

Honey bee (*Apis mellifera*) stings are known to cause **severe allergic reactions** in sensitive individuals. Unlike honey bees, wasps can sting repeatedly. Paper wasps (*Polistes exclamans*) were seen in several locations. Mud wasps were not seen, but they can be encountered anywhere in the islands. Not seeing them during the short term of this survey does not mean they are not on the property.

Avian Survey Results

Two hundred and fifteen individual birds of 14-different species, representing 13-separate families were recorded during station counts (Table 3). One additional species, Hawaiian Hawk (*Buteo solitarius*) was detected as an

incidental observation while transiting between count stations. Hawaiian Hawk is an endemic endangered species currently protected under both federal and state of Hawaii endangered species statutes. One species detected, Pacific Golden-Plover (*Pluvialis fulva*), is an indigenous migratory species. The remaining 14-species recorded are all considered to be alien to the Hawaiian Islands.

Avian diversity and densities were in keeping with the habitat present within the project area. Three species; Japanese White-eye (*Zosterops japonicus*), House Finch (*Carpodacus mexicanus*), and Nutmeg Mannikin (*Lonchura punctulata*), accounted for slightly more than 56% of the total number of all birds recorded during station counts. The most common avian species recorded was Japanese White-eye, which accounted for slightly more than 31.5% of the total number of individual birds recorded. An average of 27 individual birds were recorded per station count.

Table 3. Avian Species Detected, Kaūmana Charter School Site

<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
GALLIFORMES			
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Red Junglefowl	<i>Gallus gallus</i>	D	1.50
FALCONIFORMES			
ACCIPITRIDAE - Hawks, Kites, Eagles & Allies			
Accipitrinae - Kites, Eagles & Hawks			
Hawaiian Hawk	<i>Buteo solitarius</i>	EE	I-1
CHARADRIIFORMES			
CHARADRIIDAE - Lapwings & Plovers			
Charadriinae - Plovers			
Pacific Golden-Plover	<i>Pluvialis fulva</i>	IM	0.13
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Rock Pigeon	<i>Columba livia</i>	A	0.63
Spotted Dove	<i>Streptopelia chinensis</i>	A	0.88
Zebra Dove	<i>Geopelia striata</i>	A	2.00

Table 3 (continued).

<i>Common Name</i>		<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
PASSERIFORMES				
SYLVIIDAE - Old World Warblers & Gnatcatchers				
Sylviinae - Old World Warblers				
Japanese Warbler	Bush-	<i>Cettia diphone</i>	A	0.25
TIMALIIDAE - Babblers				
Hwamei		<i>Garrulax canorus</i>	A	0.25
ZOSTEROPIDAE - White-eyes				
Japanese White-eye		<i>Zosterops japonicus</i>	A	8.50
STURNIDAE - Starlings				
Common Myna		<i>Acridotheres tristis</i>	A	1.50
CARDINALIDAE - Cardinals Saltators & Allies				
Northern Cardinal		<i>Cardinalis cardinalis</i>	A	0.88
FRINGILLIDAE - Fringilline and Carduline Finches & Allies				
Carduelinae - Carduline Finches				
House Finch		<i>Carpodacus mexicanus</i>	A	3.50
PASSERIDAE - Old World Sparrows				
House Sparrow		<i>Passer domesticus</i>	A	0.75
ESTRILDIDAE - Estrildid Finches				
Estrildinae - Estrildine Finches				
Nutmeg Mannikin		<i>Lonchura punctulata</i>	A	3.13
Java Sparrow		<i>Padda oryzivora</i>	A	3.00

Key To Table 3

ST	Status
A	Alien Species
D	Domesticated species – not known to be established in the wild on Hawai'i
EE	Endangered Endemic Species – native and unique to the Island of Hawai'i and endangered
IM	Indigenous Migrant Species – native to Hawai'i but also found elsewhere naturally, migratory
RA	Relative Abundance - number of birds detected divided by the number of count stations (8)
I	Incidental observation – recorded while transiting the site, followed by the number seen

Mammalian Survey Results

One mammalian species was detected during the course of this survey. We encountered tracks, scat and sign of dog (*Canis f. familiaris*), and heard several dogs barking from within homelots adjacent to the subject property.

DISCUSSION

Botanical Resources

Other recent surveys of botanical resources on the 1881 lava flow in the Kaumana area include Gerrish (1995) and Palmer & Associates Consulting (1998). The Gerrish survey encompassed that part of the 1881 flow in the Kaumana Homesteads between 1140 and 1500 ft (350 to 460 m). A total of 26 species were observed from a somewhat smaller area of the flow. The Palmer & Assoc. survey included only a very small part of the 1881 lava flow, around the 1500-ft (460-m) elevation. This flow was described as supporting a forest “in early successional stages with small, widely spaced trees...” The list of characteristic species, both native and non-native, agrees well with the results of our survey, with the exception that two native species, ‘ama’u (*Sadleria cyatheoides*) and ‘ohelo la’au (*Vaccinium calycium*), listed as characteristic were not seen on the Kaumana Charter School property.

Garish (1995) recorded three varieties of ‘ōhi’a in the lava flow forest: *M. p.* var. *incana*, var. *glaberrima*, and var. *macrophylla*. In addition, he found a number of other native plants to be present—*kopiko* (*Psychotria hawaiiense*), *pilo* (*Coprosma rhynchocharpa*), *hapu’u* (*Cibotium* spp.)—not recorded for the Kaumanmsa Charter School site. Further, ground cover was dominated by swordferns (*Nephrolepis* spp.) and kahili ginger (*Hedychium gardinerianum*), rather than *uluhe* fern. This fern dominated the area surveyed by Palmer & Assoc.

Although certainly not unique for the area, the property does support a largely native ecosystem with respect to the vegetation.

Invertebrate Resources

Plant and invertebrate populations are interdependent. Consequently, host plant presence is one way to describe the health of invertebrate populations. The youth of the area lava flow and native forest it supports, and consequently the very limited diversity of Hawaiian host plants, limited the number and diversity of native invertebrates. The dominance of *uluhe* fern, which is largely uninteresting to arthropods, also contributes to keeping the biomass and biodiversity low. Additionally, the low elevation means a higher number of introduced predators, such as ants, have easy access to the native fauna.

Alien predatory ants are a major cause for the scarcity of native arthropods. The long-legged ant (*Anoplolepis gracilipes*) and the big-headed ant (*Pheidole megacephala*), which prey on other insects (Zimmerman 1948-80) are present on the property. These ants are

well documented as a primary cause of low levels of native arthropods at elevations up to 2000 ft (610 m; Perkins, 1913).

Arthropods Not Present

Although lava tubes are known in the near vicinity, most notably at Kaūmana Cave, our survey revealed no caves on the project property. No native mollusks were noted during this survey.

ARTHROPODA: INSECTA

DIPTERA

Drosophilidae: *Drosophila*

No native *Drosophila* were observed on the property. The location does not provide appropriate host plants for any of the 12 native *Drosophila* species recently listed as endangered or threatened by USFWS (2006).

LEPIDOPTERA

Sphingidae: *Manduca blackburni*

Blackburn's sphinx moth (*Manduca blackburni*), an endangered species (Federal Register, 1999-2000) was not found in this survey. The *Final Rule* (USFWS, 2003) for this large sphinx moth designated Hawai'i Island habitat only at Pu'uwa'awa'a.

Neither the moth's solanaceous native host plant, 'aiea (*Nothocestrum* sp.), nor the best alien host, tree tobacco (*Nicotiana glauca*) were observed in our survey.

Figure 7 (right). Blackburn's sphinx moth (*Manduca blackburni*).



Recommendations Relative to Arthropods

Workers (surveyors, environmental assessment teams, construction crews) should be alert for all these species when working on the property as they may pose a serious risk to some individuals. Supervisors should be aware of any special allergy by employees. Some individuals can experience anaphylactic reactions to venom (e.g., bee stings). When moving trash, stones, or piled brush, the use of gloves and long sleeves in addition to covered shoes & long pants will greatly reduce the risk of accidental contact and bites or stings. Pulling socks up over (outside of) pant cuffs reduces the chance of a

stinging invertebrate crawling up a workers leg (e.g., centipede). See *What Bit Me?* for photos and discussion of Hawaii's long-standing pests (Nishida and Tenorio, 1993).

Avian Resources

Avian diversity and densities were in keeping with the habitat present within the project area, and with the results of at least two surveys conducted on properties close to the subject property in the recent past (David, 2007; David and Polhemus, 2008), and with the findings of numerous other surveys conducted in the South Hilo District during recent years (David, 2001, 2002a, 2002c, 2003a, 2005, 2006a, 2006b; David et al., 2004).

Of the 15-different avian species recorded during this survey all but two are alien to the Hawaiian Islands (Table 3, above). One species, Pacific Golden-Plover is a commonly occurring migratory shorebird species that nests in the High Arctic returning to Hawai'i and the Tropical Pacific during the late summer. They spend the fall and winter months in the central and southern Pacific, and return to the Arctic in late April and early May.

One species detected as an incidental observation while transiting between two count stations, Hawaiian Hawk is an endemic endangered species currently protected under both federal and state of Hawai'i endangered species statutes. This species was first listed as endangered in 1967 (Federal Register 1967), proposed for down listing from endangered to threatened in 1993 (Federal Register 1993), and has recently been proposed for delisting all together (Federal Register 2008).

One dark phase bird was seen soaring high over the canopy on the northern portion of the site. Hawaiian Hawks are currently found in nearly all habitats that still have some large tree components on the island. They are regularly seen foraging in the South Hilo area. Hawk densities are highest in mature, native species dominated forests, with grassy under-stories. This habitat, with high amounts of forest edge, supports large populations of game birds and the four species of introduced rodents known from the island, all of which are prey items for the hawk. Additionally, this type of habitat also provides numerous perches and nesting sites suitable for this species (Klavitter 2000).

The Hawaiian Hawk, or '*io*', is the only extant *falconiforme* in Hawai'i. It is currently endemic to the Island of Hawai'i. Sub-fossil remains indicate that it was also formerly found on Moloka'i and Kaua'i (Olson & James 1997). Several incidental unconfirmed sightings of this species exist from Kaua'i (Dole 1879, Beaglehole, 1967) and Maui (Banko 1980c). This species was first mentioned in the western literature by Cook and King in 1784 and was scientifically described by Peale in 1848 from a specimen collected in "Kealakekua" (Medway 1981, Peale 1848).

The most current population estimates based on John Klavitter's research extrapolates that there were 1,457 Hawaiian Hawks present on the island in 2000, and that, in his

estimation, represents a population that is equal to or higher than what was present in pre-contact times (Klavitter 2000). The Hawaiian Hawk breeding season starts in late March, chicks hatch in May, and begin fledge in July (Griffin et al. 1998). Although hawks use resources in most forest habitats they usually pick 'ōhi'a trees (*Metrosideros polymorpha*) in which to nest. Of 112 nests found during the 1998 and 1999 nesting seasons, 82% of the nests were located in 'ōhi'a trees (Klavitter 2000).

Although not detected during this survey, it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or *ua'u*, and the threatened Newell's Shearwater (*Puffinus auricularis newelli*), or 'a'o, over-fly the project area between the months of May and November (Banko 1980a, 1980b, Day et al. 2003a, Harrison 1990).

Hawaiian Petrels were formerly common on the Island of Hawai'i (Wilson and Evans 1890–1899). This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea (Henshaw 1902), as well as at the mid-to-high elevations of Mount Hualālai. Within recent historic times, Hawaiian petrels have been reduced to relict breeding colonies located at high elevations on Mauna Loa, and possibly, Mount Hualālai (Banko 1980a, Banko et al. 2001, Cooper and David 1995, Cooper et al. 1995, Day et al. 2003a, Harrison 1990, Hue et al. 2001, Simons and Hodges 1998).

Newell's Shearwaters were formerly common on the Island of Hawai'i (Wilson and Evans 1890–1899). This species breeds on Kaua'i, Hawai'i, and Moloka'i in extremely small numbers. Newell's Shearwater populations have dropped precipitously since the 1880s (Banko 1980b, Day et al., 2003b). This pelagic species nests high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris linearis*) fern.

The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983, Simons and Hodges 1998, Ainley et al. 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961, Telfer 1979, Sincock 1981, Reed et al. 1985, Telfer et al. 1987, Cooper and Day 1998, Podolsky et al. 1998, Ainley et al. 2001). There is no suitable nesting habitat within or close to the project area for either of these pelagic seabird species.

Mammalian Resources

The findings of the mammalian survey are in keeping with the habitat present within the project area, and with the results of at least two surveys conducted on properties close to the subject property in the recent past (David 2007, David and Polhemus 2008), and with the findings of numerous other surveys conducted in the South Hilo District during recent years (David 2001, 2002b, 2003a, 2003b, 2005, 2006a, 2006b, David et al. 2004).

Although, Hawaiian hoary bats were not recorded during this survey, bats have been recorded on numerous recent surveys conducted within the general Hilo area (Bonaccorso et al. 2005, 2007, David 2001, 2002b, 2003a, 2003b, 2005). It can be expected that Hawaiian hoary bats use resources within the general project area on a seasonal basis.

The Hawaiian hoary bat is a typical lasurine bat, and as such, they primarily lead a solitary existence, described as “over-dispersed”. They generally roost cryptically in foliage, which makes them difficult to study (Findley and Tomich 1983, Jacobs 1994, Carter *et al.* 2000). Fundamental research into this species distribution and life cycle has just begun (Bonaccorso et al. 2005, 2007). Data gathered as part of a three year project to study this species, its distribution, densities and life history is just being prepared for publication. Key findings include the opinion that at least on the Island of Hawai‘i, the bat is ubiquitous in areas that still have forest or dense cover. They have also concluded that the species is a human commensal species and has adapted to roost in, and prey upon alien species (Bonaccorso et al. 2005, 2007).

Potential Impacts to Protected Species

Flora

No protected plant species were recorded from the property. In areas further from development (see Palmer and Associates Consulting, 1998), several listed species occur in habitat which differs primarily in occurring on ancient lava flows rather than an historical lava flow.

Invertebrates

No federally or state listed endangered or threatened species (USFWS, 2006) were noted in this survey. No anticipated actions related to the proposed project activity in the surveyed locations are expected to threaten entire species or entire populations. There is no federally designated Critical Habitat for any invertebrate species on or adjacent to the subject property.

Vertebrates

There is a small potential that construction activities or habitat modification associated with this project may result in impacting the following four species, which are all protected under both federal and State of Hawai'i endangered species statutes.

Hawaiian Hoary Bat

Hawaiian hoary bats were not detected during this survey, but they have been recorded within the general project area on numerous occasions. With the current scientific information available, it is not known if bats ever roost within the project site. Whether the clearing and the modification of portions of the remaining vegetated areas within this site will result in deleterious impacts to this species is difficult to ascertain. The principal potential impact that clearing and grubbing of the vegetated portions of the site poses to bats is disturbance to roosting female bats during the pupping season, when the females are tending to their young, and are less likely to be able to rapidly vacate a roost tree or bush as it is being felled, or cleared.

Hawaiian Hawk

The principal potential impact that development of this project poses to Hawaiian Hawks is during the clearing and grubbing operations. There is also a small chance that noise associated with the actual construction of the project could disturb birds nesting in the general project area. If disturbed while sitting on eggs or caring for young, adult birds may abandon the nest putting their eggs, and or young, at grave risk of harm or mortality.

Hawaiian Petrel and Newell's Shearwater

The principal potential impact that developing this site poses to Hawaiian Petrels and Newell's Shearwaters is the increased threat that birds will be downed after becoming disoriented by exterior lighting that may be required in conjunction with construction activities, and, or the servicing of construction equipment at night, and following build-out by street lights and building lights associated with the school facilities.

Potential Impacts to Critical Habitat

There is no federally delineated Critical Habitat within or close to the project site, thus the clearing, grubbing and construction of the proposed school and associated appurtenances will not result in any impacts to federally designated Critical Habitat.

Conclusions

There is nothing unique about the project site or its vegetation. There is abundant like habitat in, and around Hilo. It is not expected that the construction or operation of the

proposed school will result in deleterious impacts to native avian or mammalian resources present within the general project area.

1. To reduce the potential for interactions between clearing grubbing and construction activity and Hawaiian hoary bats, it is recommended that clearing and grubbing not be undertaken during the period that bats are caring for young; namely between the months of May and late July (Menard 2001, Bonaccorso et al., 2005)
2. To avoid disturbance to nesting Hawaiian Hawks audio playback nesting activity surveys should be conducted by a qualified ornithologist on the site where large trees will need to be removed prior to the onset of clearing and grubbing activities. This is to ensure that the construction activities will not disturb nesting Hawaiian Hawks. If nesting activity is detected, consultation with the U. S. Fish & Wildlife Service will be required prior to conducting further clearing activity within 500 meters of the nest tree. The currently approved protocols for conducting such a survey are based on those developed by John Klavitter during his multi-year island wide survey of Hawaiian Hawks (Klavitter, 2000). This recommendation may be mute if the current petition to delist the Hawaiian Hawk is enacted.
3. To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, it is recommended that any external lighting planned to be used during construction be shielded (Reed et al. 1985, Telfer et al. 1987). This mitigation would serve the dual purpose of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, while at the same time complying with the Hawaii County Code § 14 – 50 *et seq.* which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

GLOSSARY³

Adventive: organisms introduced to an area but not purposefully.

Alien: occurring in the locality it occupies ONLY with human assistance, accidental or purposeful; not native. Both Polynesian introductions (e.g., coconut) and post-1778 introductions (e.g., guava, goats, and sheep) are aliens.

Anaphylactic: hypersensitivity resulting in a sudden severe and potentially fatal allergic reaction, marked by a drop in blood pressure, difficulty in breathing, itching, and swelling

Arthropod: insects and related invertebrates (e.g., spiders) having an external skeleton and jointed legs.

Endemic: naturally occurring, without human transport, ONLY in the locality occupied. Hawaii has a high percentage of endemic plants and animals, some in very small microenvironments.

Entomology: the study of insects and other arthropods

Indigenous: naturally occurring without human assistance in the locality it occupies; may also occur elsewhere, including outside the Hawaiian Islands. (e.g., Naupaka kahakai (*Scaevola sericea*) is the same plant in Hawai'i and throughout the Pacific).

Insects: arthropods with six legs, and bodies in 3 sections

Invertebrates: animals without backbones (insects, spiders, snails / slugs, shrimp)

Larva/larval: an immature stage of development in offspring of many types of animals.

Mollusk: invertebrates in the phylum Mollusca. Common representatives are snails, slugs, mussels, clams, oysters, squids, and octopuses.

Native: organism that originated in area where it lives without human assistance. May be indigenous or endemic.

Nocturnal: active or most apparent at night.

Purposefully introduced: an organism brought into an area for a specific purpose, for example, as a biological control agent.

Rare: threatened by extinction and low numbers.

Species: all individuals and populations of a particular type of organism, maintained by biological mechanisms that result in their breeding mostly with their kind.

³ Glossary based largely on definitions in *Biological Science: An Ecological Approach*, 7th ed., Kendall/Hunt Publishing Co., Dubuque, a high school text; on the glossary in *Manual of Flowering Plants of Hawai'i*, Vol.2, Wagner, et al., 1999, Bishop Museum Press, and other sources.

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APPENDIX C

Archaeological Assessment Survey

Pacific Legacy

Incorporated

CULTURAL
RESOURCES
CONSULTANTS

ARCHAEOLOGICAL ASSESSMENT SURVEY
OF THE
CONNECTIONS CHARTER SCHOOL
KAŪMANA PROPERTY
SOUTH HILO DISTRICT
ISLAND OF HAWAI'I



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Pacific Legacy: Exploring the past, informing the present, enriching the future.

ARCHAEOLOGICAL ASSESSMENT SURVEY
OF THE
CONNECTIONS CHARTER SCHOOL
KAŪMANA PROPERTY
SOUTH HILO DISTRICT
ISLAND OF HAWAI'I

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December 2008

ABSTRACT

At the request of Wil Chee-Planning and Environmental, Inc., Pacific Legacy Inc., conducted an archaeological assessment survey of a 72.34 acre property (TMK (3) 2-2-006:141) located within the *ahupua'a* of Ponahawai, District of South Hilo, on the island of Hawai'i. The property is intended to serve as the future campus of the Connections Charter School. No previous archaeological investigations had been conducted in this area. Prior to the field survey, an examination of geologic maps revealed that the project area rests completely within the land covered by the 1880-1881 Mauna Loa lava flow. This historic *pāhoehoe* flow would have destroyed any pre-existing archaeological structures which might have been located within the project area. For this reason, few archaeological remains were anticipated to be found. In order to determine whether any archaeological sites did exist on the property, Pacific Legacy archaeologists conducted a pedestrian survey of the project area. The dense nature of the area's vegetation made survey conditions difficult. In all, a total of 12 transects were walked. These transects were spaced throughout the project property, providing a representative sample of all areas. No archaeological sites were noted along any of the transects. This suggests that human activity within the area since the time of the 1880-1881 flow has been minimal, probably being limited to the passage of the occasional pig hunter. Given the relatively recent nature of the area's geology and the fact that no structural features were noted during the survey, it is felt that the development of the Kaūmana parcel will not impact any archaeological resources. Underground lava tubes are, however, known to exist within the area of the 1881 flow. The main entrance to the Kaūmana Cave complex is located just west of the property on the opposite side of the road. One lava tube, known to run beneath the western half of the property, and another located just outside the property boundary were investigated and found to be subject to periodic flooding during times of heavy rainfall. Such flooding would have washed away any cultural remains or human burials previously extant within the caves. Due to the dense nature of the vegetation presently covering the property, there exists the possibility that as of yet undiscovered lava tubes may exist within the project area. It is suggested therefore that an archaeological monitor be on call during construction activities in order to inspect any previously undiscovered lava tubes that may be encountered.

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Frontispiece: The dense vegetation encountered within the project area (View South).

1.0 INTRODUCTION

At the request of Wil Chee-Planning and Environmental, Inc., Pacific Legacy Inc., conducted an archaeological assessment survey of a 72.34 acre property (TMK (3) 2-2-006:141) located within the *ahupua'a* of Ponahawai, District of South Hilo, on the island of Hawai'i. The property is intended to serve as the future campus of the Connections Charter School.

1.1 PROJECT AREA

The project area is located on the lower slopes of the shield dome volcano of Mauna Loa, inland of the town of Hilo (Figure 1). While the bulk of the property is situated within the *ahupua'a* of Ponahawai, a very small sliver along its southern edge falls within the *ahupua'a* of Kukuau 2 (Figure 2). The project area is situated east of the settlement of Kaūmana and immediately south of Kaūmana Drive. The property is divided into almost equal halves by Edita Street, which runs southeast from Kaūmana Drive cutting down through the center of the project area (Figure 3). As can be seen in aerial photographs, the parcel is edged along much of its perimeter by residential homes (Figure 4). The majority of these houses are of relatively recent construction, having been built within the last 10 to 15 years. Just west of the property, on the far side of Kaūmana Drive, is the main entrance to the Kaūmana lava tube complex, which has been designated as Kaūmana Caves County Park. A branch of this lava tube complex runs under the western half of the project area, ending at an opening along the western edge of Edita Street.

The property is situated between approximately 600 and 900 feet in elevation. Its western (upper) half extends from about the 750 to 900 foot contours, while its eastern (lower) half extends from about the 600 to 750 foot level. The terrain is gently sloping from west to east. The underlying geology of the project area is distinct from that of the lands lying immediately north and south of it, for it rests completely within the course of the 1880-1881 lava flow (Figure 5). This narrow tongue of *pāhoehoe* lava originated on the slopes of Mauna Loa and flowed down slope toward Hilo, halting just two miles short of the town. The lavas of the 1880-1881 flow are Kau Basalts and consist of relatively smooth surfaced *pāhoehoe* that has been distorted by uplifts and pressure fractures (Wolfe and Morris 1996:11-12). Very little soil has developed atop the flow, and the official soil designation for the area is simply "lava flows, *pāhoehoe*" (rLW) (Sato 1973:34).

The closest source of potable water is the Waipāhoehoe Stream, which flows north of the project area, passes close to its eastern corner, and eventually feeds into the Wailoa River. Wai-pāhoehoe can be translated as "*pāhoehoe* (smooth lava) water" (Pukui et al. 1974:227). The rainfall within the area is between 4000 millimeters (c. 160 inches) and 5000 millimeters (c. 200 inches) annually. Despite the lack of soil, this relatively high rainfall has resulted in the area being blanketed in dense vegetation.

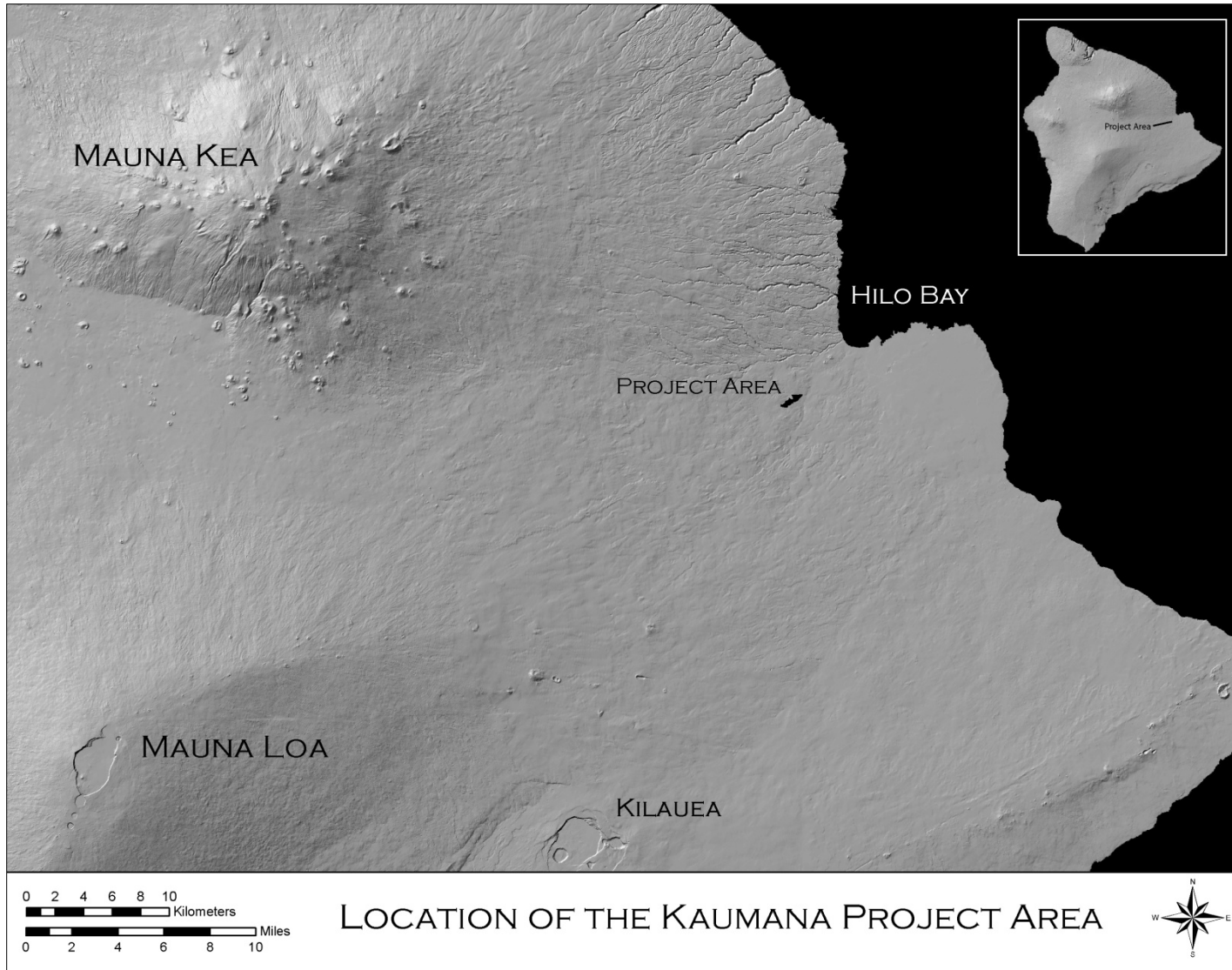


Figure 1. Location of the Kaūmana assessment survey area.

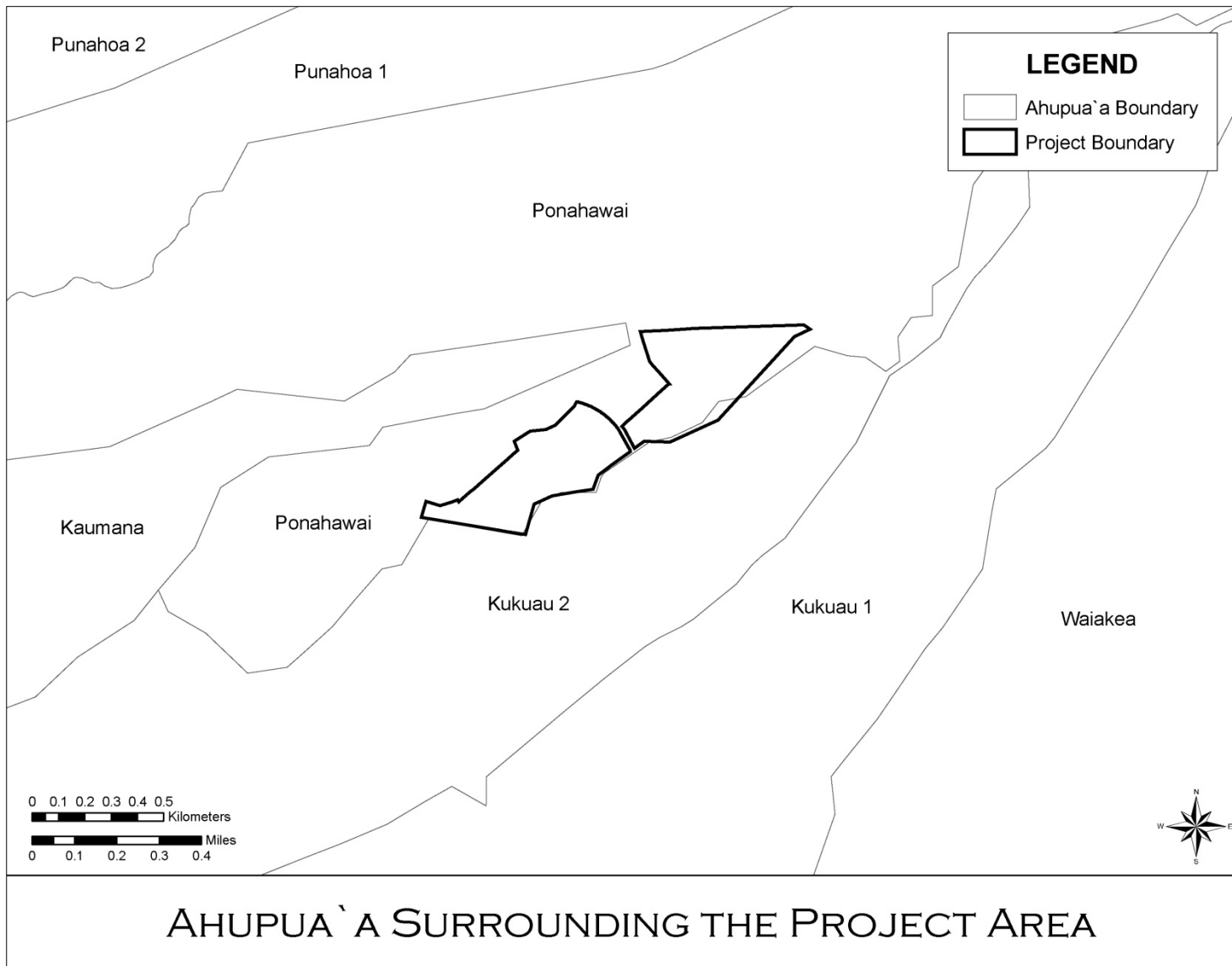


Figure 2. The land divisions surrounding the Kaūmana assessment survey area.

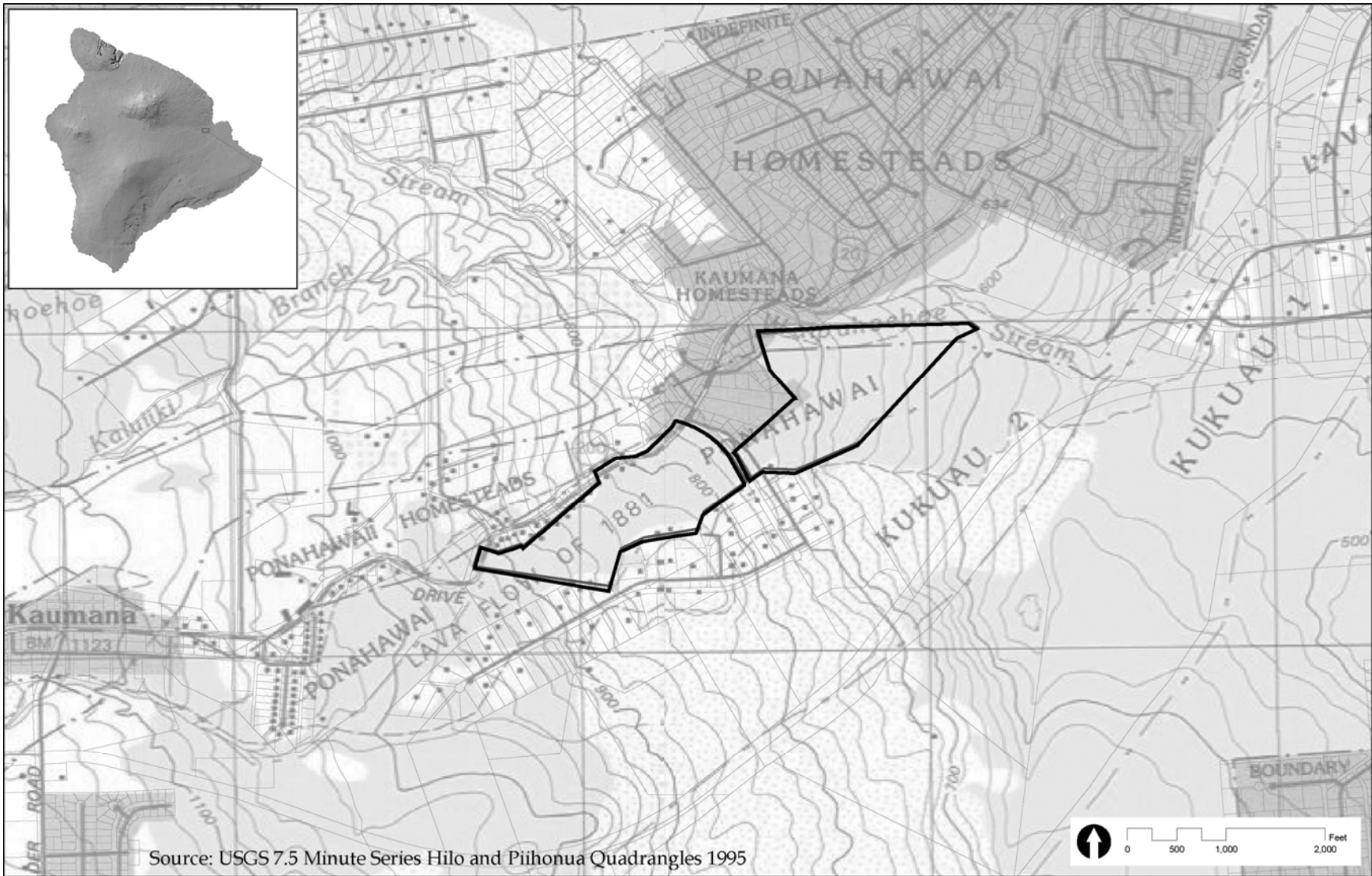


Figure 3. The Kaūmana assessment survey area.

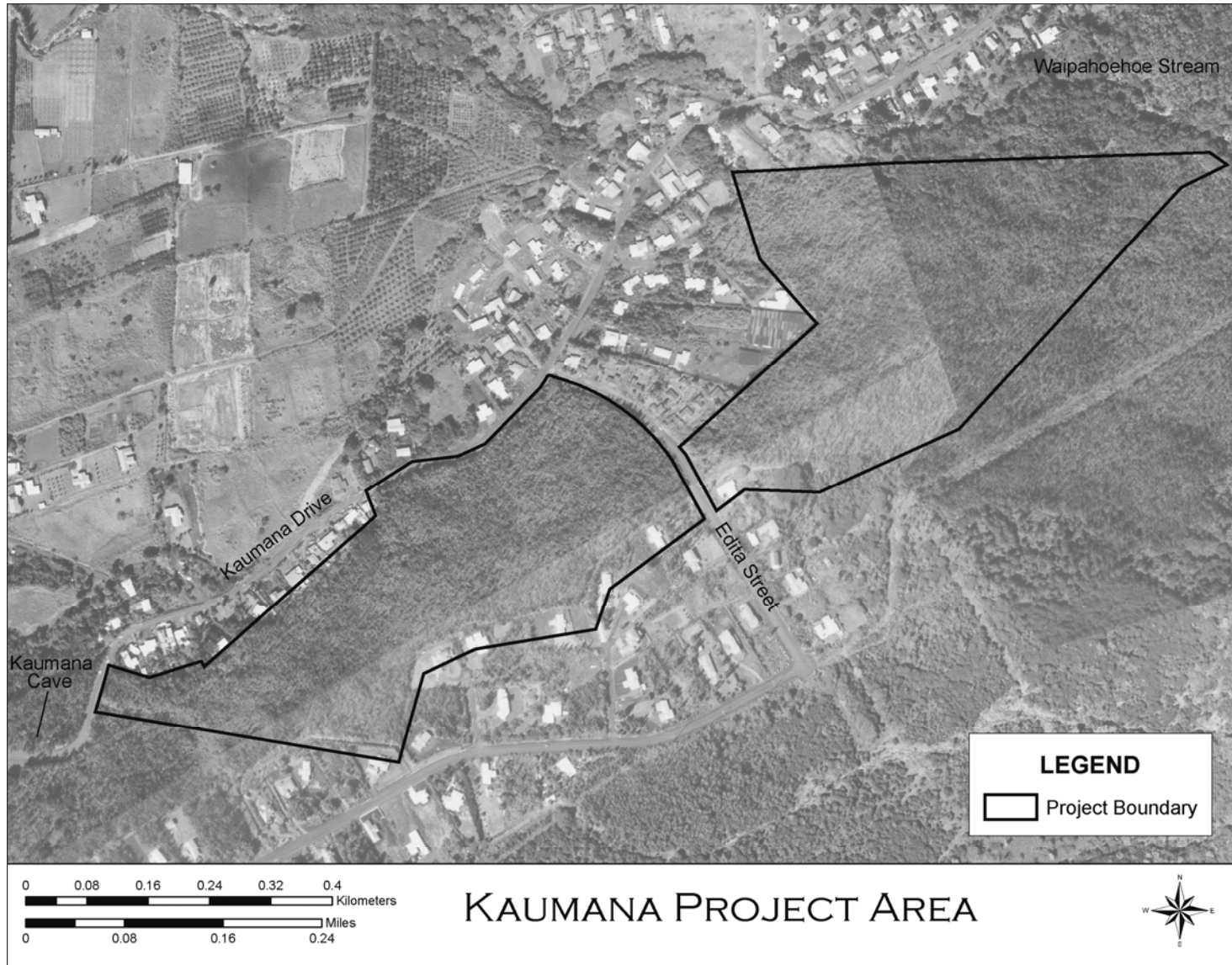


Figure 4. Aerial photograph of the Kaūmana assessment survey area.

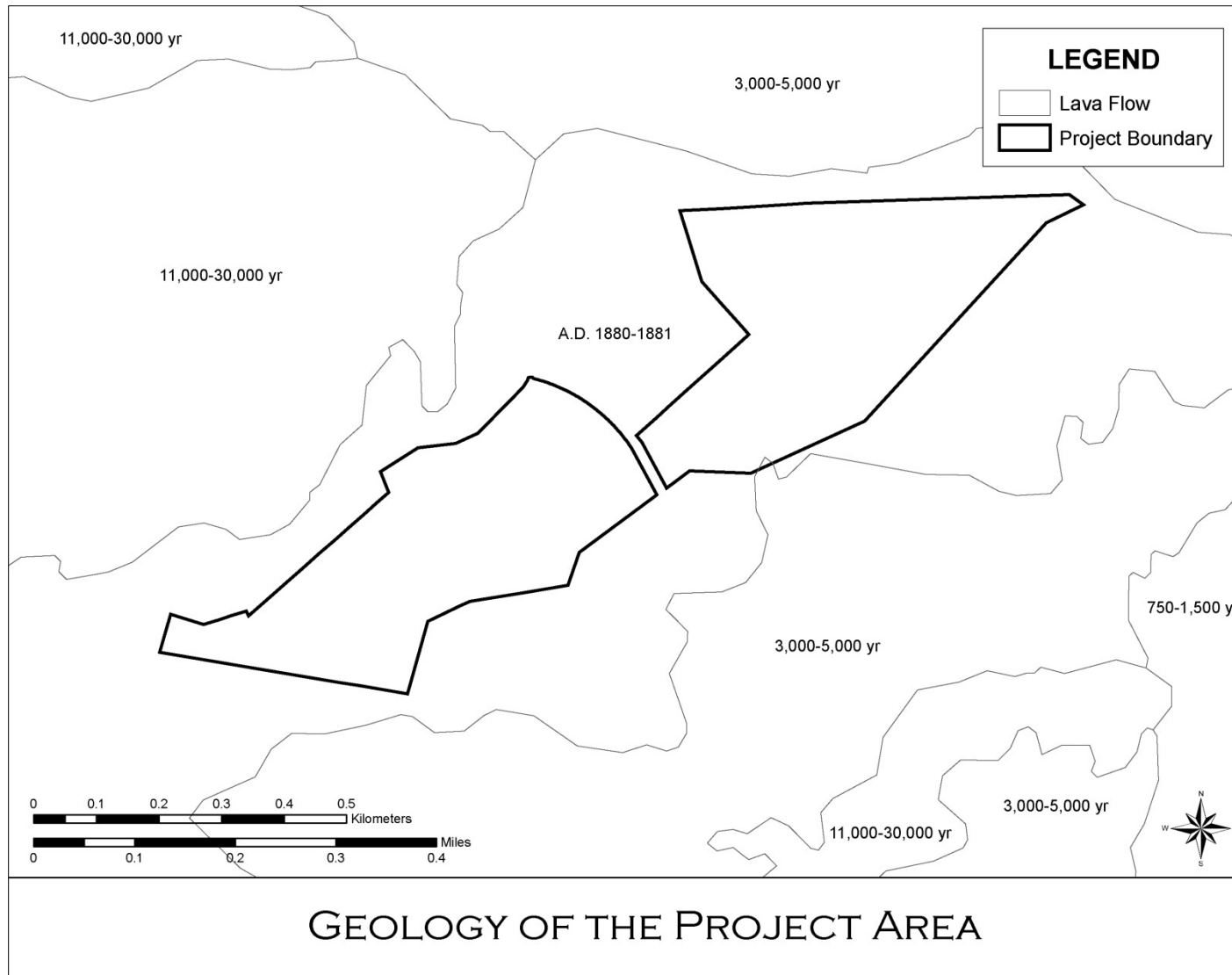


Figure 5. Geology of the Kāūmana assessment survey area.

The composition of the vegetation covering the project area, though relatively similar, differs slightly between the western and eastern halves of the property. The western (upland) half of the project area is covered almost exclusively in native vegetation. This consists of an open canopy forest of scattered 'ohia (*Metrosideros sp.*) trees with an understory of uluhe (*Dicranopteris linearis*) fern (Figure 6). The uluhe ferns form a dense tangle of intertwining fronds. This mat of vegetation, which in places stands up to 8 or more feet in height, makes passage through the area difficult. It also makes it virtually impossible to examine the ground surface more than a meter on either side of the cut trail.

In the eastern (lower) half of the project area, the vegetation is slightly thinner in places, with a mix of native and non-native species. The non-natives are more common along the outer edges of the property. The dominant non-native species is strawberry guava (*Psidium cattleianum*), which grows in dense stands along the southern boundary of the project area.



Figure 6. Vegetation in the upper project area as seen from Edita Drive (View West).

2.0 HISTORIC BACKGROUND

2.1 PRE-CONTACT PERIOD

There is very little evidence for any human activity within the project area during the pre-Contact period. Boundary Commission testimony indicates that bird hunting was carried out in the forests further inland at a place known as Kalapalapanui (“the boundary between Waiakea and Kaūmana runs *mauka* to Kalapalapanui, an *oioina* and place where we used to catch birds” Boundary Commission Books 2:1). It is probable that the forested area around what is now Kaūmana settlement

2.2 HISTORIC PERIOD

At the time of the Māhele `Āina (land division, also known as the Great Māhele) in the 1840s, when the private ownership of land was first established in the Hawaiian Islands, two parcels adjacent to the project area were awarded to native claimants.

Land Court Award parcel 8521-B was awarded to George Hu`eu Davis, the son of Isaac Davis, an advisor to Kamehameha I. From his father, George Hu`eu Davis (sometimes referred to in land court and other early documents as G. D. Hu`eu or George Hu`eu) inherited claim to the *ahupua`a* of Kukuau 2 in the district of Hilo, Waikoloa in South Kohala and Ki`ilae in South Kona. Unlike many Land Court Award claims, which contain information on the use of the property at the time of the claim (what was grown on it, whether there was a house there, etc.) George Hu`eu Davis' claim covers such a wide area that the document contains no direct information on the Kukuau parcel.

The Land Court Award parcel (number 4983) is located immediately north the project area. It was claimed by an individual named Kukuleau, indicating that there was at least some human activity around the project area in the early historic period.

During the years 1880 and 1881, a lava flow that originated on the slopes of Mauna Loa passed down through the *ahupua`a* of Ponahawai burying everything in its path (Figure 5). As this flow approached and threatened Hilo, the people of the town called upon Princess Ruth Ke`elikōlani Keanolani Kanōhoahoa for help. Princess Ruth was well known and loved for her adherence to traditional Hawaiian ways. The residents of the threatened community requested that she intercede on their behalf with the volcano goddess Pele, whose fiery flow was threatening their homes. Hawaiian language newspapers of the time reported that Princess Ruth journeyed to the lower edge of the flow where she chanted and made offerings to the goddess. That evening she lay down to sleep in the path of the lava. The next morning the flow had stopped in front of the sleeping princess (Silva n.d.:3). Though it spared Hilo, the 1880-1881 flow did inundate the present project property. This lava would have destroyed any evidence of previous human activity in the area.

3.0 FIELD INVESTIGATIONS

3.1 FIELD METHODS

Since no previous archaeological investigations had been conducted within the project area, a pedestrian field survey of the property was performed. This survey was undertaken by Pacific Legacy archaeologists Rowland B. Reeve and Jenny Schabell over the two day period of November 6th and November 7th, 2008. Justin Thatcher, a resident of Kaūmana who is familiar with the subject property, graciously volunteered to act as guide during the survey. The field crew was also accompanied by biologist Steven Montgomery who was conducting an entomological survey of the project area. Paul Cleghorn, Ph.D. served as the Principle Investigator for the project.

Given the geologic history of the project area, few archaeological remains were anticipated to be encountered during the survey. On various pig hunting forays into the project area, Mr. Thatcher had noted the presence of what appeared to be badly disturbed historic walls near the course of Waipāhoehoe Stream, just outside the property, and had found historic bottles associated with these walls. As a result, it was felt that the greatest potential for encountering sites was in eastern (lower) half of the project area, at its eastern corner and along its northern edge where the property lies closest to Waipāhoehoe Stream. Field survey was therefore begun in the eastern half of the project area. The first transect line started at the property's eastern corner and ran along its northern boundary. It soon became apparent that the dense nature of the area's vegetation and the resulting lack of visibility (Figures 7 and 8) would make it impossible to run an expanded sweep line with team members spread out every 10 to 20 meters. For safety reasons the survey team was kept in close proximity as it moved along each transect line.

In all, a total of 12 transects were walked. These transects were spaced throughout the project property, providing a representative sample of all areas. Four relatively lengthy transects were run through the eastern (lower) half of the project area, while 1 long and 7 shorter transects were run through the property's western (upper) half (Figure 9). Fortunately, the Connections Charter School had previously cut a roughly 2 to 3 meter wide trail down the center of the western half of the project property and it was possible not only to use this trail as a transect, but to cut transects perpendicular to it extending out to the edges of the property (Figures 10 and 11).



Figure 7. Vegetation in lower project area (View South).



Figure 8. Survey team cutting transect through dense *uluhe* fern (View West).

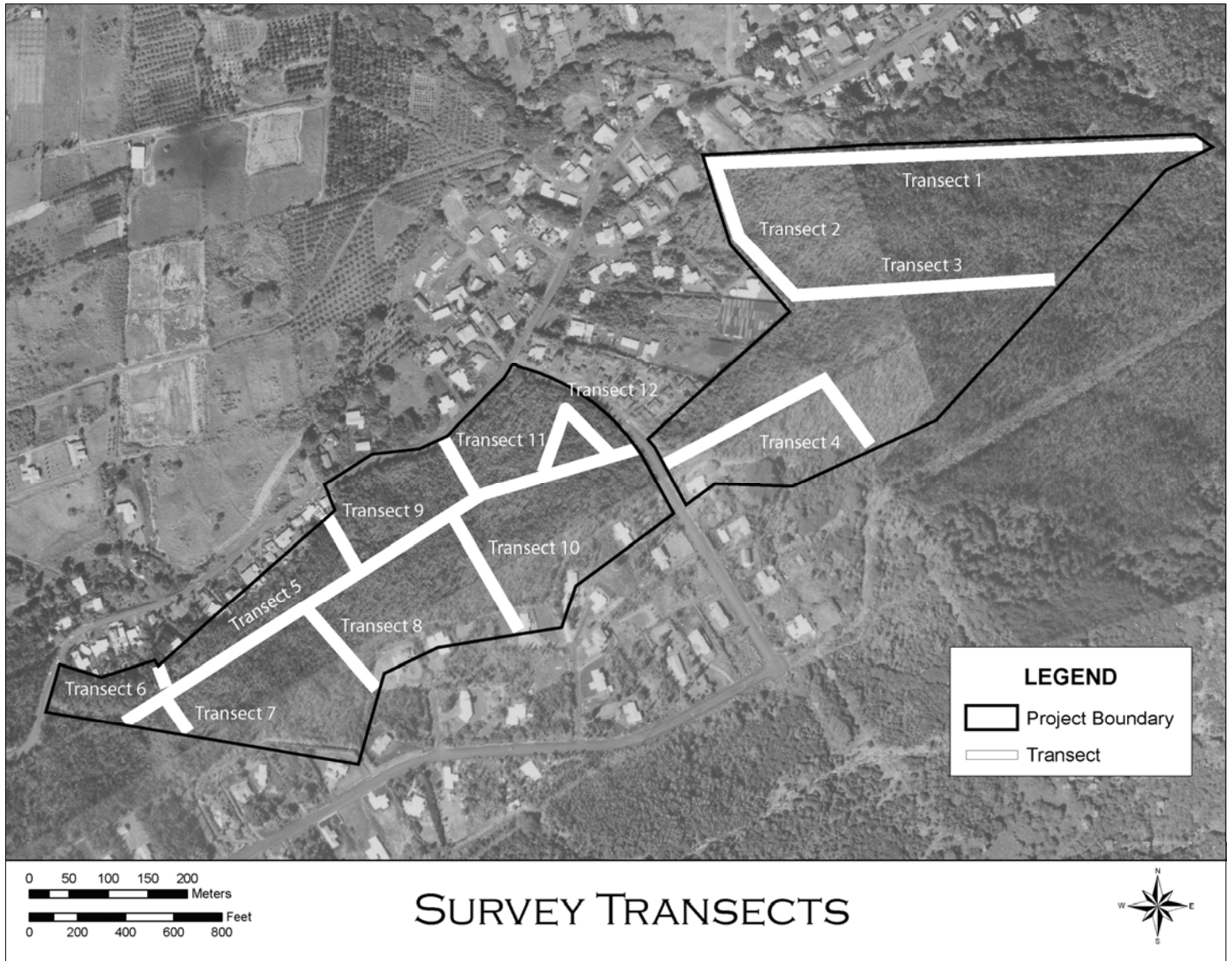


Figure 9. The location of survey transects within the project area.



Figure 10. Vegetation in upper project area (note figure in lower left).



Figure 11. Trail through upper project area (View East).

3.2 FINDINGS

No archaeological sites were encountered along any of the transects walked during the course of the survey. This was not surprising given the relatively recent nature of the area's geology. Even in those areas closest to Waipāhoehoe Stream there is not enough soil development to have encouraged agricultural activity within the area following the 1880-1881 lava flow. It appears that, following the flow, all permanent human use of the project area ceased. At present the area appears to be visited only by the occasional pig hunter.

It is impossible to tell what, if any, archaeological sites may have existed in the project area prior to 1880. Boundary commission records indicate that bird hunting was carried out in the forests further *mauka* (inland), and we know that the more *makai* (coastal) village of Hilo was a major pre-Contact settlement and agricultural area. As for Kaūmana itself, it may have held scattered homesteads, probably located along the course of Waipāhoehoe Stream. If such a homestead did exist within the project area, it would have been destroyed by the 1880-1881 lava flow.

Underground lava tubes are known to exist within the area of the 1880-1881 flow. The main entrance to the Kaūmana Cave complex rests just north of the property on the opposite side of the road. One lava tube runs beneath the western half of the property and the entrance to another is located just outside the property boundary. Both of these tubes were investigated during the present survey. They were found to be subject to periodic flooding during times of heavy rain. Such flooding would have washed away any cultural remains or human burials previously extant within the caves.

4.0 SUMMARY AND RECOMMENDATIONS

No archaeological surface features were encountered during the survey of the Kaūmana project parcel. Any sites that may have existed in the project area prior to the 1880-1881 lava flow would have been destroyed at that time. The absence of sites suggests that human activity within the property since 1880 has been minimal, probably being limited to the passage of an occasional pig hunter. Given this lack of observed structural features, and taking into consideration the relatively recent nature of the project area's geology, it is felt that the development of the Kaūmana parcel will not impact any archaeological resources.

Due to the dense nature of the vegetation presently covering the property, there exists the possibility that as of yet undiscovered lava tubes may exist within the project area. Such tubes have the potential to contain human remains. It is therefore suggested that an archaeological monitor be on call during any construction activities in order to inspect any previously undiscovered lava tubes that may be encountered.

5.0 REFERENCES

Boundary Commission Books

These five volumes of statements and testimony regarding land boundaries presented before the Board of Commissioners for Boundaries are preserved on microfilm in the Archives of the State of Hawaii.

Pukui, Mary Kawena, Samuel Elbert and Esther Mookini

1974 *Place Names of Hawaii*. University of Hawaii Press. Honolulu.

Sato, H. H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr.

1973 *Soil Survey of the Island of Hawaii, State of Hawaii*. United States Department of Agriculture, Soil Conservation Service, Washington.

Silva, Kalena

n.d. "Princess Ruth Ke'elikōlani, Hawaiian Ali'i" in *Biography Hawai'i: Five Lives, A Series of Public Remembrances*. Center for Biographical Research, University of Hawai'i at Mānoa, Honolulu
(<http://www.hawaii.edu/biograph/biohi/ruthguide.pdf>).

Wolfe, Edward W. and Jean Morris

1996 *Geologic Map of the Island of Hawai'i*. Map # 1-2524-A and accompanying pamphlet, published by the United States Department of the Interior, U. S. Geological Survey.

APPENDIX D

Traffic Impact Assessment Report

Preliminary Draft Report

Phillip Rowell and Associates

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July 7, 2009

Mr. Richard Stook
Wil Chee - Planning & Environmental, Inc.
1018 Palm Drive
Honolulu, HI 96814

Re: **Traffic Impact Analysis Report
Connections School
Hilo, Hawaii
TMK: (3) 2-5-6:141**

Dear Richard:

Phillip Rowell and Associates have completed the following Traffic Impact Assessment Report (TIAR) for the proposed Connections School in the Kaumana area of Hilo. The following report is presented in the following format:

- A. Project Location and Description
- B. Purpose and Objective of Study
- C. Methodology
- D. Description of Existing Streets and Intersection Controls
- E. Existing Peak Hour Traffic Volumes
- F. Level-of-Service Concept
- G. Existing Levels-of-Service
- H. Background Traffic Projections
- I. Project Trip Generation
- J. Background Plus Project Traffic Projections
- K. Traffic Impact Analysis
- L. Mitigation
- M. Other Traffic Related Issues
- N. Summary and Conclusions

A. Project Location and Description

The proposed project is located adjacent to the Kaumana area of Hilo. See [Attachment A](#). The site consists of a lower campus and an upper campus.

The proposed school will be developed in six phases with full development completed in 2021. The development phases are summarized in [Table 1](#).

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Table 1 Summary of Development Plan By Phase

Phase	Description	Start Construction	Completion Year ⁽¹⁾
1	Initiate Agricultural Program	2010	2010
2	Begin Dormitory, Caretaker's Residence, Barn and Greenhouses	2011	2012
3	Begin High School	2012	2013
4	Begin Elementary and Middle Schools	2016-2017	2018
5	Construct Gymnasium	2018	2019
6	Construct Pre-Kindergarten Facilities	2020	2021

Notes:

(1) As completion dates for the phases were not provided, it was assumed that construction would be completed in approximately 12 months after start of construction.

There are two alternative development plans and a preferred alternative. All three development plans divide the campus into a Lower Campus, south of Edita Street, and an Upper Campus, North of Edita Street.

Alternative 1

Alternative 1 is referred to as the "Consolidated Campus Layout" and a schematic drawing of the layout is provided as [Attachment B](#). Under Alternative 1, the Lower Campus consists of the caretaker's residence and agricultural program facilities. Primary access to and egress from the project will be via the intersection of Kaumana Drive at Edita Street. Access and egress for the Lower Campus is provided by a driveway along the north side of Edita Street. This driveway is referred to as Road 'A.' The Upper Campus consists of the educational facilities, which include the dorms, elementary, middle and high schools, pre-kindergarten and gymnasium. Access and egress is provided via a driveway along the south side of Edita Street, referred to as Drive 'B.' This driveway should be aligned with the driveway serving the Lower Campus.

Alternative 2

Alternative 2 is referred to as the "Split Campus Layout." A schematic drawing of this alternative is provided as [Attachment C](#). Under Alternative 2, the high school, dorms and agricultural facilities will be located on the Lower Campus and the elementary school, intermediate school and gymnasium will be located on the Upper Campus. Primary access to and egress from the project will be via the intersection of Kaumana Drive at Edita Street. Access to and egress from the Lower Campus will be provided by a new driveway referred to as Road "A." Access to and egress from the Lower Campus will be provided by a new driveway referred to as Road "C." Road "C" is a semi-circular driveway intersecting Edita Street approximately 150 feet east of Kaumana Drive and approximately 800 feet east of Kaumana Drive. The second intersection is aligned with Drive "A" that serves the Lower Campus. As the nearest intersection with Edita Street nearest Kaumana Drive overlaps with the existing westbound left turn lane, use of this driveway should be restricted to right turns in and right turns out only.

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Preferred Alternative

The Preferred Alternative is a variation of Alternative 2 as shown on [Attachment D](#). The Lower Campus and the Upper Campus consists of the components described as Alternative 2 and there are two driveways along Edita Street serving the Upper Campus. In addition, there is a fourth driveway along Kaumana Drive at the north end of the project. To minimize the impacts of this driveway on traffic along Kaumana Drive and to address sight distance issues, use of this driveway should be restricted to right turn in and right turns out only.

B. Purpose and Objective of Study

1. Quantify and describe the traffic related characteristics of the proposed project.
2. Identify potential deficiencies adjacent to the project that will impact traffic operations in the vicinity of the proposed project.

C. Methodology

1. *Define the Study Area*

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. Based on a review of studies for other projects in the area, it was determined that the study area should include the intersection of Kaumana Drive at Edita Street and the project driveways along Edita Street and Kaumana Drive. The study intersections for the two alternatives and the preferred alternative are summarized in [Table 2](#).

Table 2 Intersections Studies for Each Alternative

	Existing	Alternative 1	Alternative 2	Preferred Alternative
Kaumana Drive at Edita Street	X	X	X	X
Edita Street at Road "A"		X	X	X
Edita Street at Road "C"			X	X
Kaumana Drive at Road "C"				X

2. *Analyze Existing Traffic Conditions*

Existing traffic volumes at the study intersections were estimated from manual traffic counts performed Thursday, May 28, 2009. The intersection configuration and right-of-way controls were verified during a field reconnaissance of the study area during April, 2009. Existing traffic operating conditions of the study intersection were determined using the methodology described in the 2000 *Highway Capacity Manual (HCM)*¹.

¹ *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 2000

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3. *Estimate Horizon Year Background Traffic Projections*

Background traffic conditions are defined as future traffic conditions without the proposed project. The design horizon year does not necessarily represent the project completion date of that phase. It is a date for which future background traffic projections were estimated. For this project, we have used a design, or horizon, year of 2021. Horizon year background traffic conditions were estimated using a background traffic growth factor.

4. *Estimate Project-Related Traffic Characteristics*

The number of peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*² and data provided in *Trip Generation*³. These trips were distributed and assigned, based on the available approach and departure routes and trip distribution data from other recently completed traffic studies in the area.

5. *Analyze Project Related Traffic Impacts*

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing the changes in peak hour traffic volumes and changes in the levels-of-service at the study intersections. The purpose of this analysis was to identify potential operational deficiencies in the vicinity of the proposed project.

D. Description of Existing Streets and Intersection Controls

The existing lane configurations and right-of-way controls are summarized in [Attachment E](#).

E. Existing Peak Hour Traffic Volumes

Because schools have a midday peak hour in addition to the typical morning and afternoon peak hours, the midday peak period was also counted and analyzed. The existing morning, midday and afternoon peak hour traffic volumes for the existing intersection of Kaumana Drive at Edita Street are summarized in [Attachment F](#).

Traffic counts for the intersection of Kaumana Drive at Edita Street were performed Thursday, May 28, 2009. The number of vehicles making each movement at the intersections was recorded at 15-minute intervals. The counts include mopeds, buses, trucks and other large vehicles. Bicycles are not included.

As there are no intersections and only a few driveways between the intersection of Kaumana Drive at Edita Street, the peak hourly traffic volumes of the remaining intersections were calculated from the traffic volumes counted at the intersection of Kaumana Drive at Edita Street.

² *Trip Generation Handbook*, Institute of Transportation Engineers, Washington, D.C., 1998

³ *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 2003

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No pedestrian activity was noted during the traffic counts.

F. Level-of-Service Concept

"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 1](#). 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. LOS D is typically considered acceptable for peak hour conditions in urban areas.

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 1 Level-of-Service Definitions for Signalized Intersections⁽¹⁾

Level of Service	Interpretation	Volume-to-Capacity Ratio ⁽²⁾	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<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.

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

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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 2](#) summarizes the definitions for level-of-service and the corresponding delay.

Table 2 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.

G. Existing Levels-of-Service

The existing levels-of-service of the intersections are summarized in [Table 3](#). Since all the study intersections are unsignalized, only the delays and levels-of-service of the controlled movements at the study intersections are recorded. The HCM methodology does not calculate volume-to-capacity ratios for unsignalized intersections.

Table 3 Existing Levels-of-Service

Intersection, Approach and Movement	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS
<i>Kaumana Drive at Edita Street</i>						
Southbound Left & Thru	7.8	A	7.6	A	7.5	A
Westbound Left	10.9	B	10.4	B	10.7	B
Westbound Right	9.8	A	9.2	A	8.9	A

NOTES:

1. V/C ratio is 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.

The conclusion of the level-of-service analysis is that all movements operate at Level-of-Service A or B. This implies good operating conditions, minimal delays and high levels-of-service.

H. Background Traffic Projections

Background traffic projections are defined as future background traffic conditions 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 background growth rate will also compensate for any small development projects that are not identified as a related project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

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Background Growth

Based on reconnaissance of the study area and information provided by WCP, it was concluded that future traffic growth along Kaumana Drive is expected to be minimal. This is because the surrounding area is relatively built out and the pertinent section of Kaumana Drive is expected to be used by local traffic only. Regional traffic will most likely use Puainako Street Extension as it provides a much higher level-of-service and will therefore result in shorter travel times for motorists.

In order to consider minimal growth along Kaumana Drive in the vicinity of the project, a average annual growth rate of 1% per year was used to estimate future background traffic growth between 2009 and 2021. The growth factor was calculated to be 1.1268 using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor

i = Average annual growth rate, or 0.01

n = Growth period in years, or 12 years

The background traffic growth factor was applied to through traffic volumes along Kaumana Road. It was assumed that there would be no traffic growth of traffic along Edita Street.

Related Projects

The second component in estimating future background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are likely to be constructed within or adjacent to the study project and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements. No related projects were identified.

2021 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 2021 background peak hour traffic projections are shown as [Attachment G](#).

I. Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the methodology described in the *Trip Generation Handbook*⁴ and data provided in *Trip Generation*⁵. This method uses trip generation rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

The trip generation analysis for each phase of the project is discussed separately

Phase 1 - 2010

⁴ Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

⁵ Institute of Transportation Engineers, *Trip Generation, 7th Edition*, Washington, D.C., 2003

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Phase 1 is the agricultural facilities. It is understood that this consists of a barn and storage facilities only. Peak hour traffic is consider minimal.

Phase 2 - 2011

Phase 2 involves construction of the caretaker's residence and dormitories. It was assumed that the caretaker's residence would be a single-family residence. Based on trip generation data provided in Trip Generation, a single-family detached residence will generate one trip during the morning peak hour and one trip during the afternoon peak hour.

It is understood that students living in the dormitories be will bused between the project site and the existing school site in Hilo. Based on information provided by the Client, there will be eight trips per day, four trips during the morning and four trips during the midday. Half of these trips will be during the peak hour. It was also assumed that the buses will be staged and the proposed site in order to assess a worse-case scenario. This means that four buses will drive students to school in the morning and then return to the campus. During the midday peak hour, these buses will be driven into Hilo to pick up the students and then return to the campus.

Using these assumptions, there will be two inbound and two outbound trips during both the morning and afternoon peak hours.

Phase 3 - 2012

Phase 3 involves construction of the high school. High school enrollment will be 107 students. *Trip Generation*⁶ contains trip generation data for high schools. The rates and trip generation calculations are summarized in [Table 4](#). The trip generation rates are based on the number of students.

Table 4 Trip Generation Calculations for High School (Phase 3)

Time Period	Direction	Rate or % ⁽¹⁾		
		Rate or % ⁽¹⁾	Students	Trips
Weekday	Total	1.71	107	183
AM Peak Hour	Total	0.41		44
	In	69%		30
	Out	31%		14
Midday Peak Hour	Total	0.28		30
	In	32%		10
	Out	68%		20
PM Peak Hour	Total	0.14		15
	In	47%		7
	Out	53%		8

NOTES:

(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003.

⁶ Institute of Transportation Engineers, *Trip Generation 7th Edition*, Washington, D.C., 2003, pg. 920 thru 923

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Phase 4 - 2016-2017

Phase 4 involves construction of the elementary (K-6) and intermediate schools (7-8). There will be 167 students in the K thru 6 school 107 students in the intermediate school. *Trip Generation*⁷ contains trip generation data for K-6 school and intermediate schools. The rates and trip generation calculations are summarized in [Table 5](#). The trip generation rates are based on the number of students.

Table 5 Trip Generation Calculations Elementary & Intermediate Schools (Phase 4)

Time Period	Direction	Elementary School			Intermediate School			Totals
		Rate or % ⁽¹⁾	Students	Trips	Rate or % ⁽¹⁾	Students	Trips	
Weekday	Total	1.29	167	215	1.62	107	173	
AM Peak Hour	Total	0.42		70	0.53		57	127
	In	55%		39	55%		31	70
	Out	45%		31	45%		26	57
Midday Peak Hour	Total	0.28		47	0.30		32	79
	In	45%		21	45%		14	35
	Out	55%		26	55%		18	44
PM Peak Hour	Total	0.15		25	0.15		16	41
	In	52%		13	52%		8	21
	Out	48%		12	48%		8	20

NOTES:

(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003.

Phase 5 - 2018

Phase 5 is the construction of the gymnasium. The gymnasium will be used by Connections' students during the day. All events that will have spectators will be schedule during off-peak traffic periods. Therefore, there is no peak hour traffic associated with the gymnasium other that typical traffic associated with a middle or high school.

Phase 6 - 2018

Phase 6 is the pre-kindergarten facilities. There are no trip data provided for pre-kindergarten schools. Trip data for elementary schools were used. The resulting trip generation estimates are summarized in [Table 6](#).

⁷ Institute of Transportation Engineers, *Trip Generation 7th Edition*, Washington, D.C., 2003, pg. 901 thru 919

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Table 6 Trip Generation Calculations for Pre-Kindergarten Facility (Phase 6)

Time Period	Direction	Rate or % ⁽¹⁾		
		Students	Trips	
Weekday	Total	1.29	25	32
AM Peak Hour	Total	0.42		11
	In	55%		6
	Out	45%		5
Midday Peak Hour	Total	0.28		7
	In	45%		3
	Out	55%		4
PM Peak Hour	Total	0.15		4
	In	52%		2
	Out	48%		2

NOTES:

(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003.

Total Project

Table 7 is a summary of the trip generation estimates for the total project. As shown the proposed project will generate 108 inbound and 79 outbound trips during the morning peak hour, 52 inbound trips and 72 outbound trips during the midday peak hour and 31 inbound and 30 outbound trips during the afternoon peak hour.

Table 7 Trip Generation for Total Project

Time Period	Direction	Number of Trips Generated By						Total Project Trips
		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	
Weekday	Total	8	10	183	388	0	32	621
AM Peak Hour	Total	4	1	44	127	0	11	187
	In	2	0	30	70	0	6	108
	Out	2	1	14	57	0	5	79
Midday Peak Hour	Total	4	0	34	79	0	7	124
	In	2	0	12	35	0	3	52
	Out	2	0	22	44	0	4	72
PM Peak Hour	Total	0	1	15	41	0	4	61
	In	0	1	7	21	0	2	31
	Out	0	0	8	20	0	2	30

NOTES:

(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003.

The project generated traffic was distributed and assigned based on the assumption that 50 percent of the traffic would approach from and depart toward the south (toward Wilder Road) and that 50 percent would approach from and depart toward the north (Hilo). This distribution assumes that project generated traffic from area areas other than Hilo would use Puainako Street Extension and then backtrack in order to minimize travel times.

The project trip assignments are shown in [Attachment H](#) for Alternative 1, [Attachment I](#), for

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Alternative 2 and [Attachment J](#) for the Preferred Alternative.

J. Background Plus Project Projections

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition, as it assumes that the peak hours of all the intersection approaches and the peak hours of the study project all coincide. The resulting background plus project traffic projections are shown as [Attachments K thru M](#).

K. Traffic Impact Analysis

The impact of the project was assessed by analyzing the changes in the levels-of-service at the study intersections.

1. The *Highway Capacity Software* (HCS) package was used to perform level-of-service analyses. This package uses the *Highway Capacity Manual* methodology.
2. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.
3. The 2021 lane configurations used in the level-of-service analysis are shown as [Attachment N](#).

The results of the level-of-service analysis are summarized in [Attachment O](#). Shown are the average vehicle delays and levels-of-service. Existing delays and levels-of-service are also shown for comparison. The conclusions of the level-of-service analysis are that all the controlled movements at the study intersections will operate at Level-of-Service A or B, which implies high levels-of-service and very good operating conditions both without and with project generated traffic.

M. Mitigation

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. If project generated traffic causes the level-of-service to drop below Level-of-Service D, resulting in Level-of-Service E or F, then mitigation should be provided to improve the level-of-service to Level-of-Service D or better.

Based on this criteria, no mitigation is required at the study intersections as a result of project generated traffic. All controlled traffic movements are expected to operate at Level-of-Service A or B, which are the highest levels-of-service. This implies that delays should be minimal and operation should also be good.

N. Other Traffic Related Issues

Regional Traffic Impact

It is understood that students and employees of the proposed project will travel destinations over

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a wide area and will use major regional roadways, such as Puainako Street Extension and Kaumana Drive. Considering the heavy traffic volumes on these roadways and relatively small number of trips that the project will generate, the proposed project will have a minimal impact on the regional transportation system, especially at locations beyond the immediate vicinity of the project.

Public Transportation

Hele On has a bus route along Kaumana Drive. See [Attachment AA](#). Hele On should be contacted relative to providing a bus stop on the campus for both students and employees.

O. Summary and Conclusions

The conclusions of the traffic impact assessment are:

1. The proposed project will generate 108 inbound and 79 outbound trips during the morning peak hour, 52 inbound trips and 72 outbound trips during the midday peak hour and 31 inbound and 30 outbound trips during the afternoon peak hour.
2. Based on the results of the level-of-service, all controlled traffic movements are expected to operate at better than acceptable levels-of-service and no additional mitigation measures are recommended at this time.
3. It is very likely that some families will have more than one student at the school which means that more than one student may be dropped off and picked up by one vehicle. The Institute of Transportation Engineers trip generation rates do not provide data to estimate the number of these trips. Therefore, the number of trips estimated for the total development plan is probably over estimated. There is insufficient data to quantify this overestimate.
4. The trip generation analysis, and therefore, the level-of-service analysis, is based on trip generation data provided in *Trip Generation*, which is the accepted standard for traffic impact studies. The data may, or may not, reflect traffic conditions in the study area. Therefore, it is recommended that traffic surveys be performed upon completion and occupancy of Phase 3, Phase 4 and Phase 6 to confirm the trip generation analysis and that the study intersections are operating as predicted. If these surveys determine that additional mitigation measures are needed, the appropriate improvements should be identified and implemented.
5. The school should develop a traffic management plan and appoint a staff member as a transportation coordinator. The objective of the traffic management plan is to promote ride sharing and use of alternative modes of transportation such as buses and carpools by students and employees.
6. The level-of-service analysis concluded that the project driveways along Edita Street will operate at acceptable levels-of-service without separate left turn lanes.

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7. Alternative modes of transportation within the project should be encouraged. Alternative modes of transportation for internal trips include bicycles, golf carts, etc. Adequate parking facilities for these alternative modes should be provided.
8. Hele On should be contacted regarding the feasibility of providing bus service to and from the project.

Respectfully submitted,
PHILLIP ROWELL AND ASSOCIATES

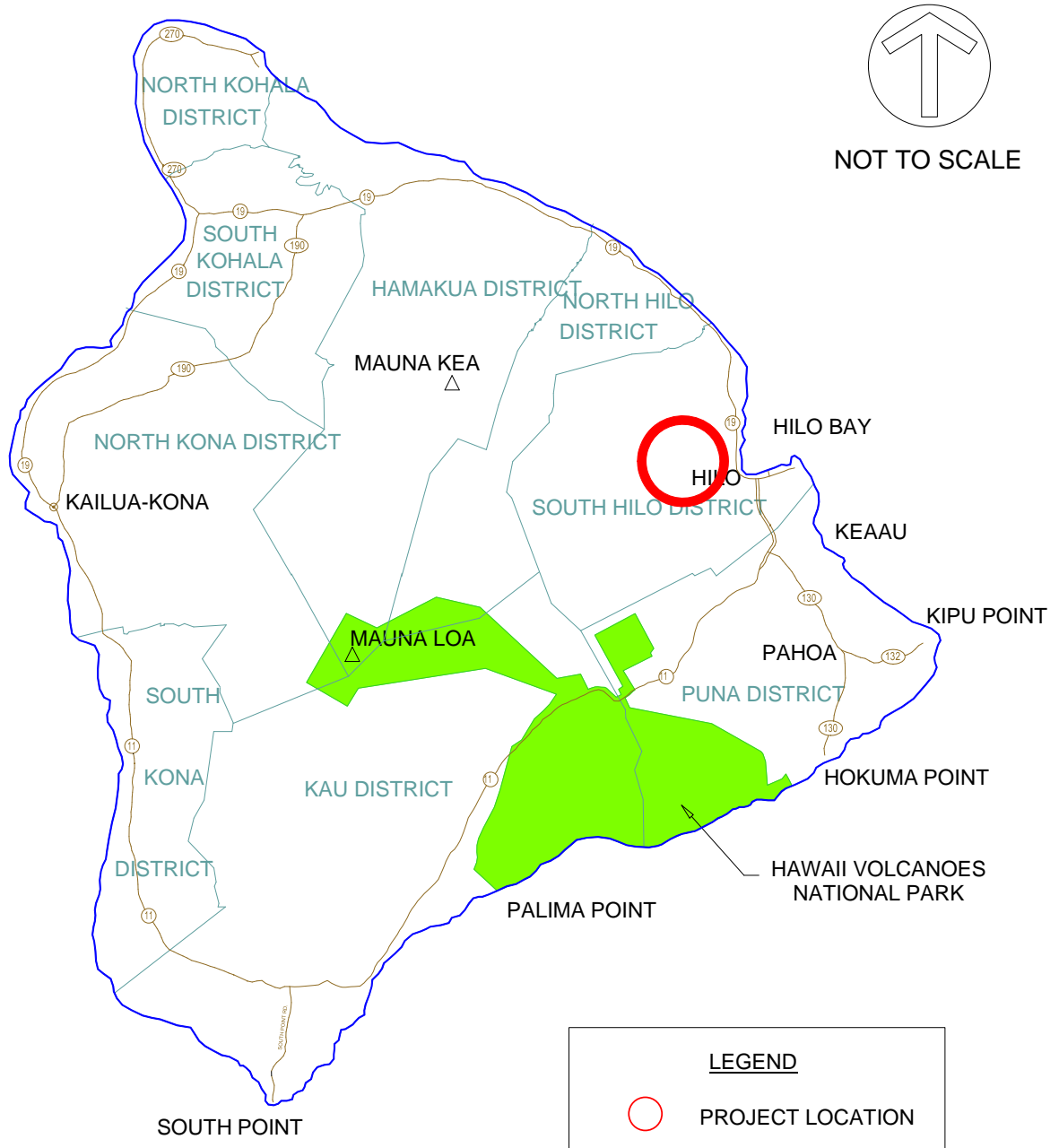
 P.E.
Principal

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List of Attachments

- A. Project Location Map
- B. Alternative 1
- C. Alternative 2
- D. Preferred Alternative
- E. Existing Lane Configurations and Right-of-Way Controls
- F. Existing Peak Hour Traffic Volumes
- G. 2021 Background Peak Hour Traffic Projections and Levels-of-Service
- H. Project Trip Assignments for Alternative 1
- I. Project Trip Assignments for Alternative 2
- J. Project Trip Assignments for Preferred Alternative
- K. 2021 Background Plus Project Peak Hour Traffic Projections Alternative 1
- L. 2021 Background Plus Project Peak Hour Traffic Projections Alternative 2
- M. 2021 Background Plus Project Peak Hour Traffic Projections Preferred Alternative
- N. 2021 Lane Configurations and Right-of-Way Controls
- O. 2021 Levels-of-Service
- P. Hele On Bus Service in Study Area

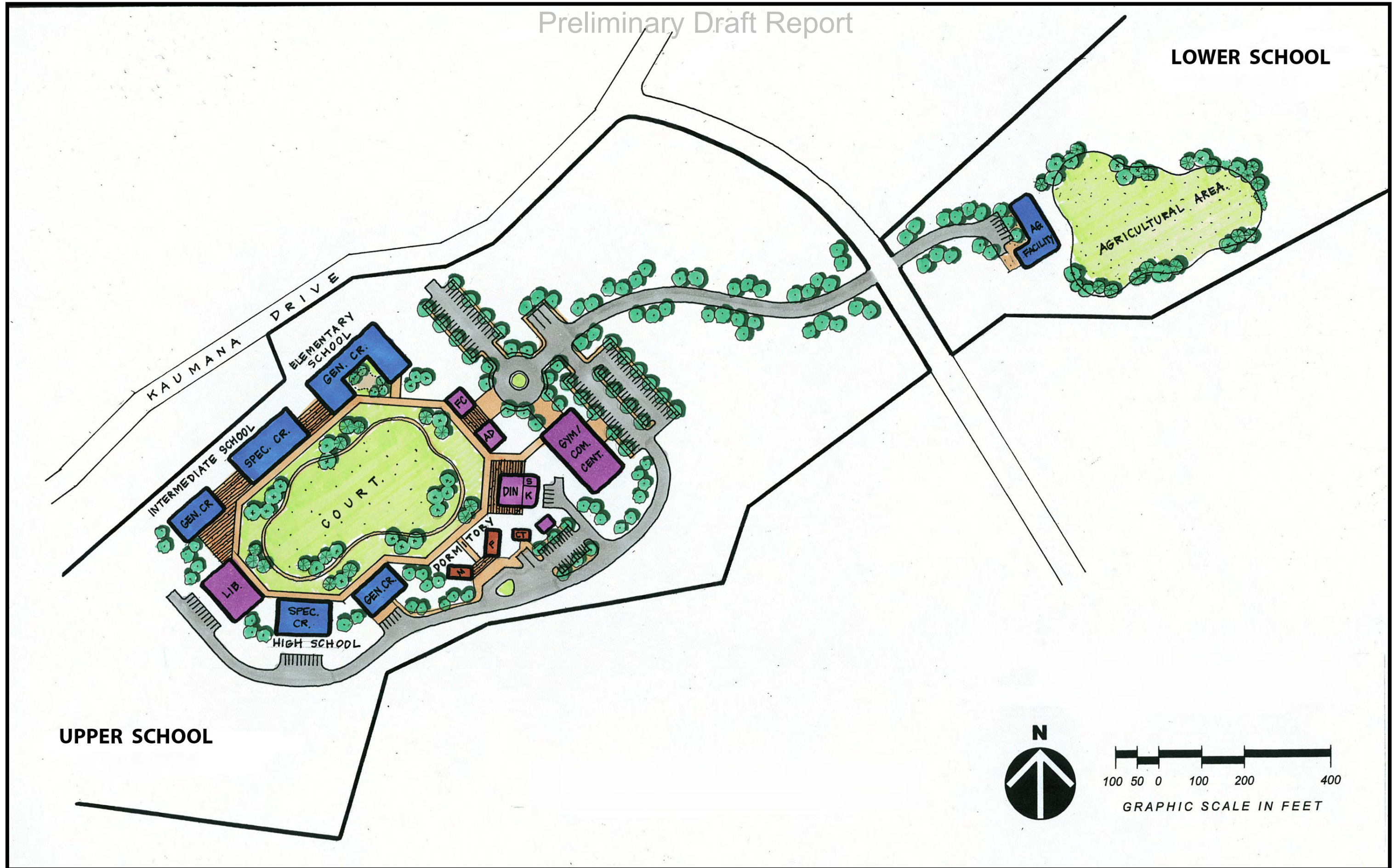
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Attachment A
PROJECT LOCATION ON HAWAII

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**Attachment B
ALTERNATIVE 1
(PROVIDED BY WIL-CHEE PLANNING)**



ALTERNATIVE 1 (Consolidated Campus Layout)
Draft Environmental Assessment - Cornfields New Century Public Charter School

FIGURE 2 - 1
Kaumana, South Hilo, Hawaii



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**Attachment C
ALTERNATIVE 2
(PROVIDED BY WIL-CHEE PLANNING)**



ALTERNATIVE 2 (Split Campus Layout)

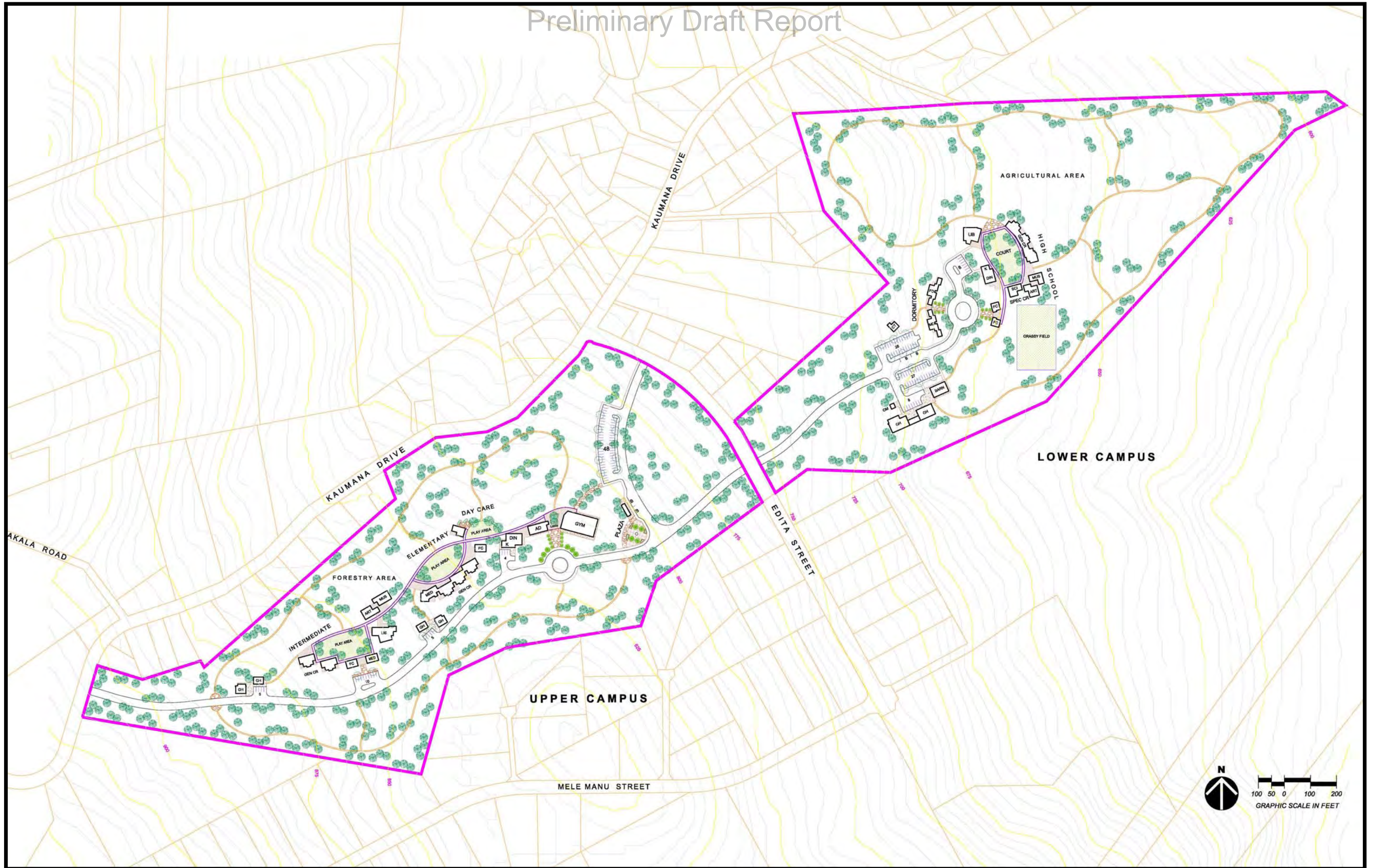
FIGURE 2 - 2



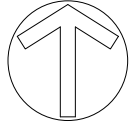
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**Attachment C
PREFERRED ALTERNATIVE
(PROVIDED BY WIL-CHEE PLANNING)**

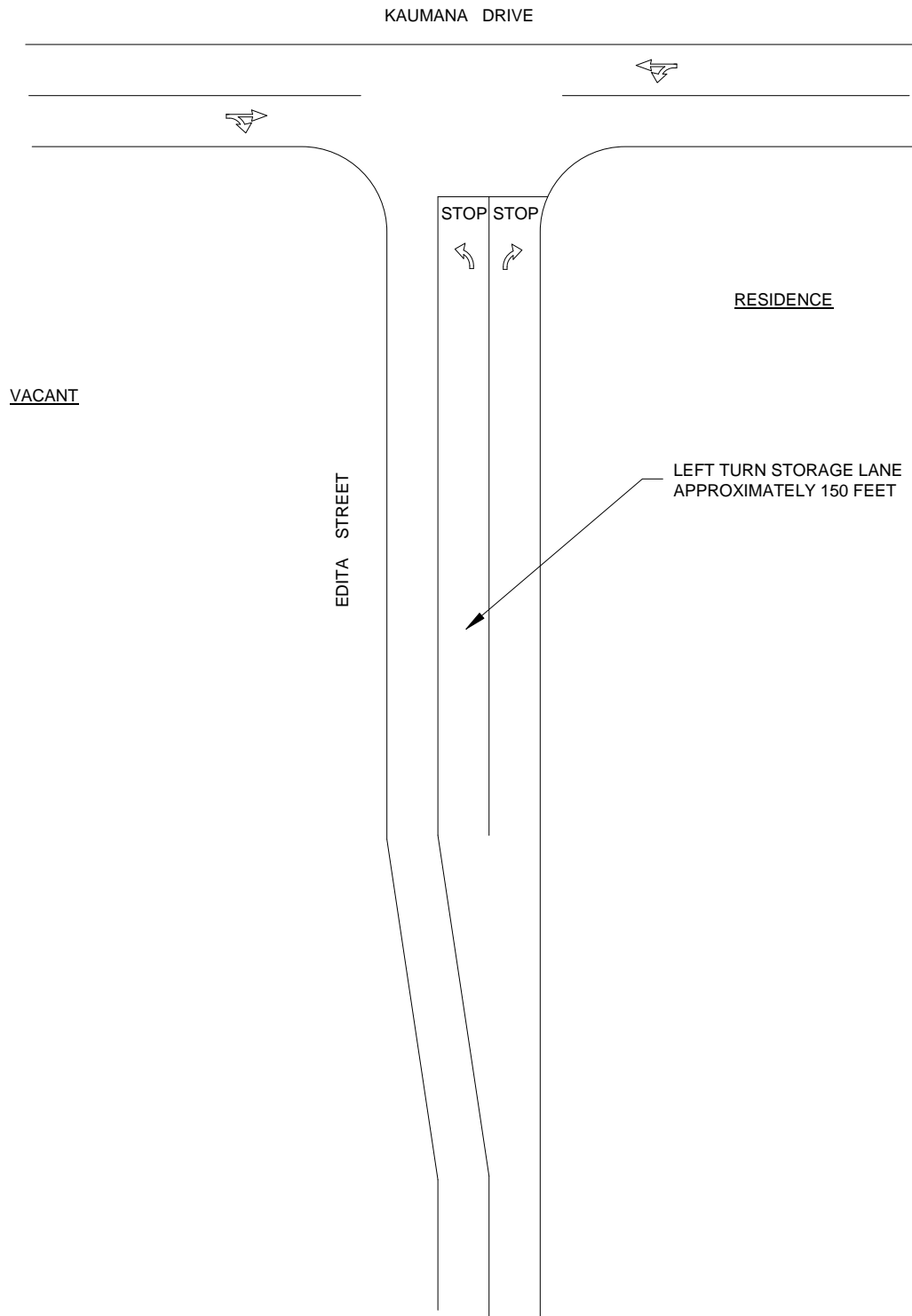
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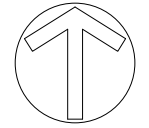
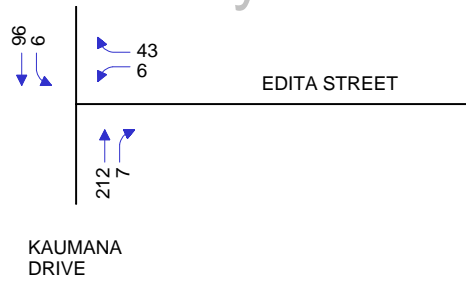
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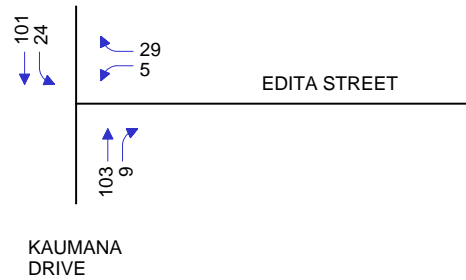
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WB R	9.8	A

NOTE:
TRAFFIC COUNTS WERE PERFORMED
THURSDAY, MAY 28, 2009.

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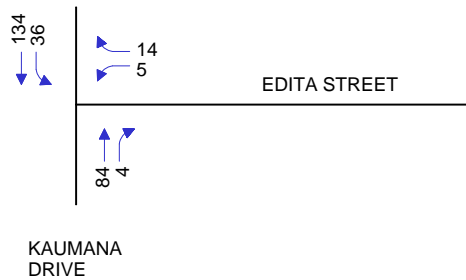
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(Approx. 2:00 PM to 3:00 PM)



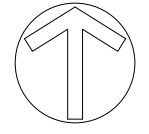
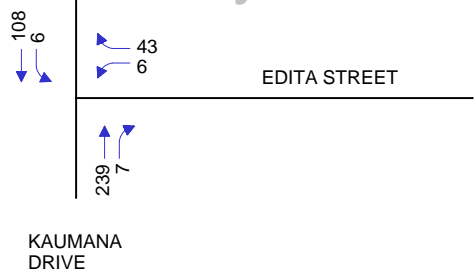
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WB R	8.9	A

EXISTING PM PEAK HOUR

(Approx. 4:30 PM to 5:30 PM)

Attachment F EXISTING PEAK HOUR TRAFFIC VOLUMES AND EXISTING LEVELS-OF-SERVICE

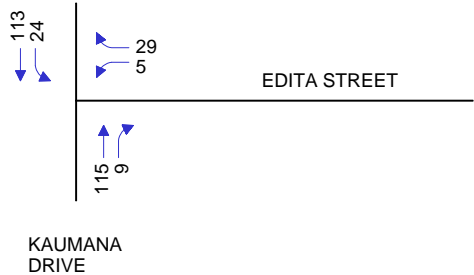
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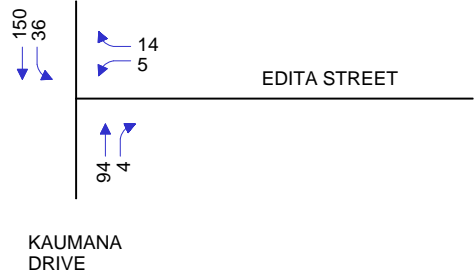
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2021 AM PEAK HOUR



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WB L	10.6	B
WB R	9.3	A

2021 MIDDAY PEAK HOUR

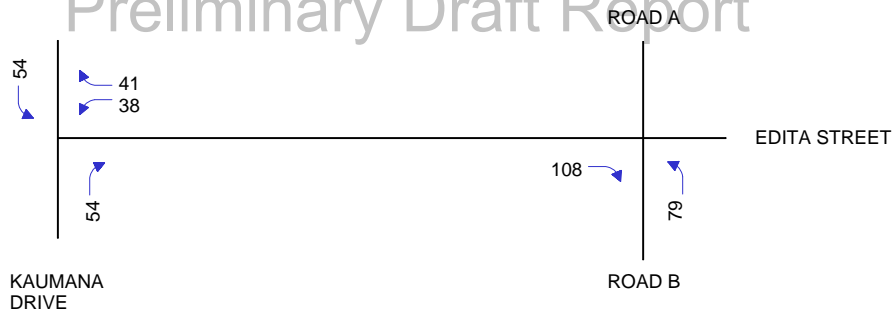
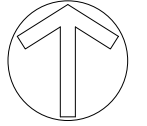


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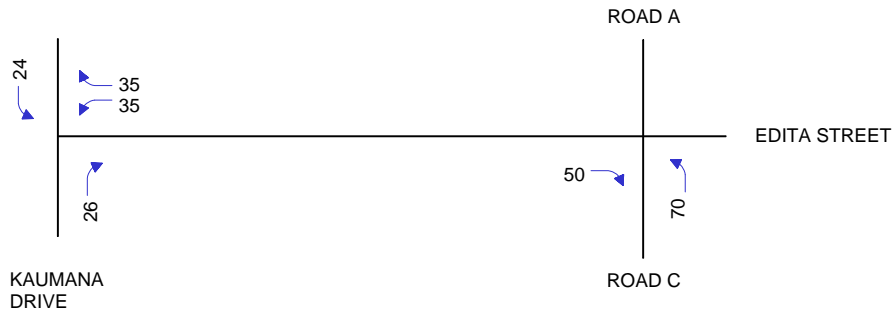
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Attachment G 2021 PEAK HOUR TRAFFIC VOLUMES AND LEVELS-OF-SERVICE

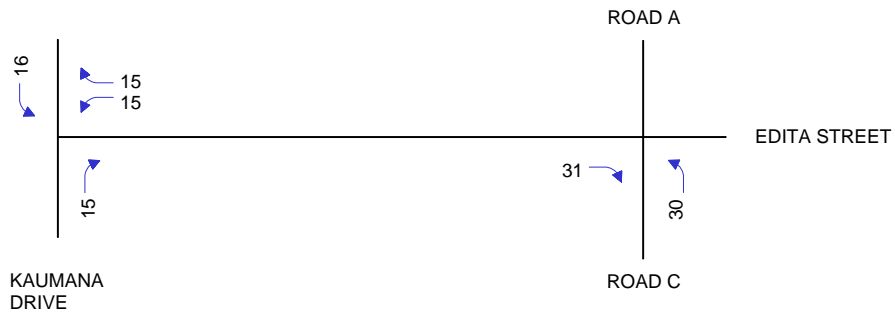
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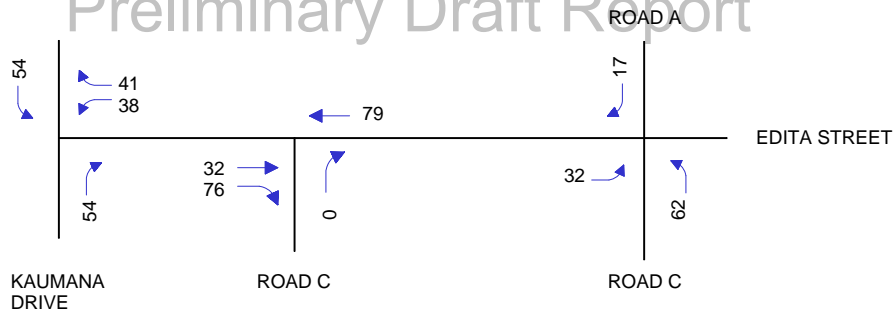
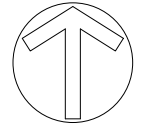


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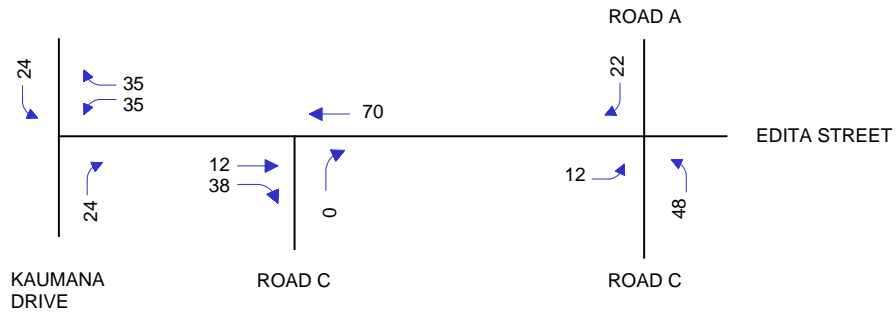


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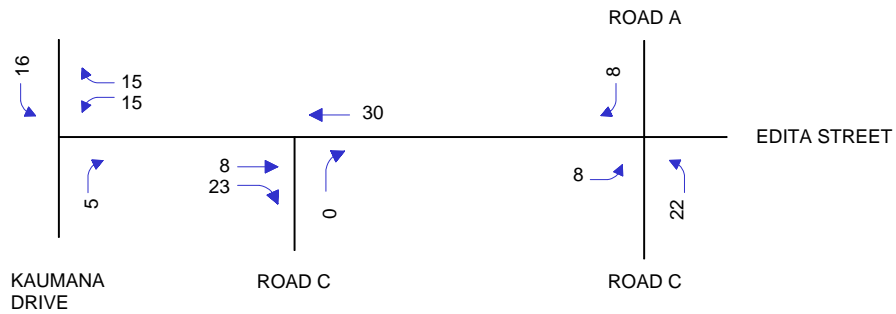
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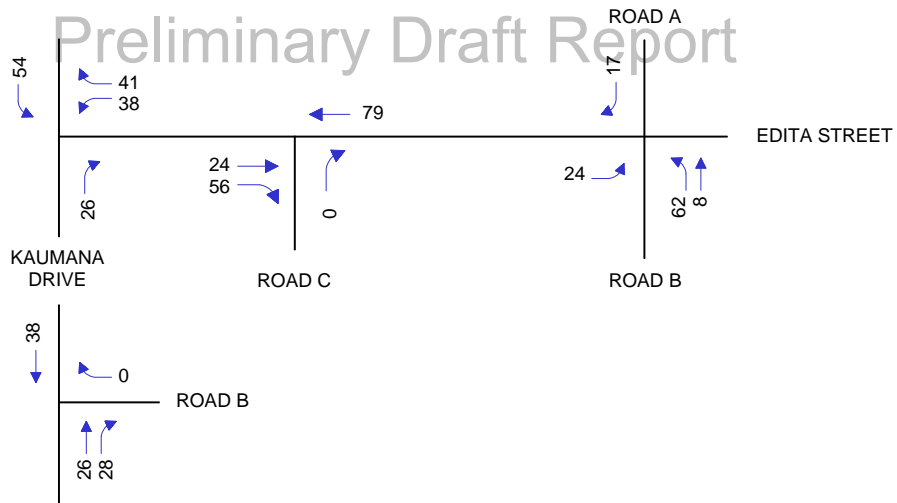
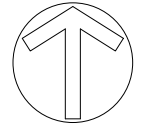


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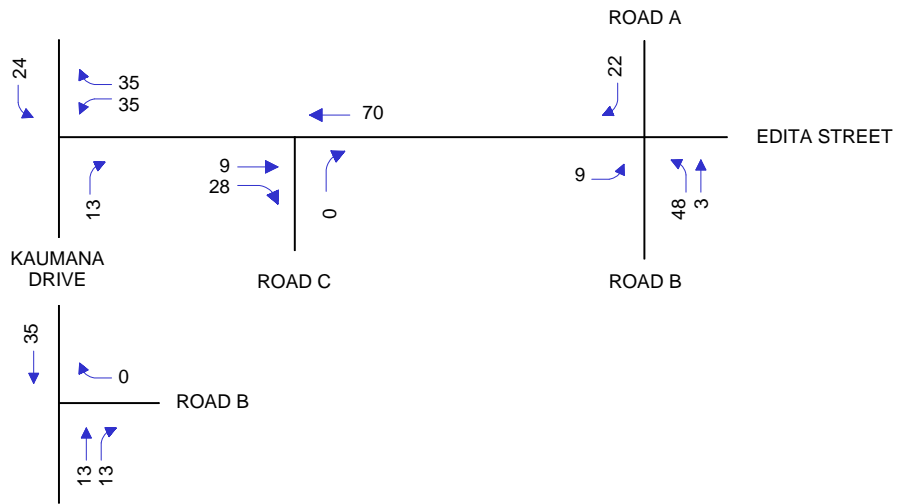


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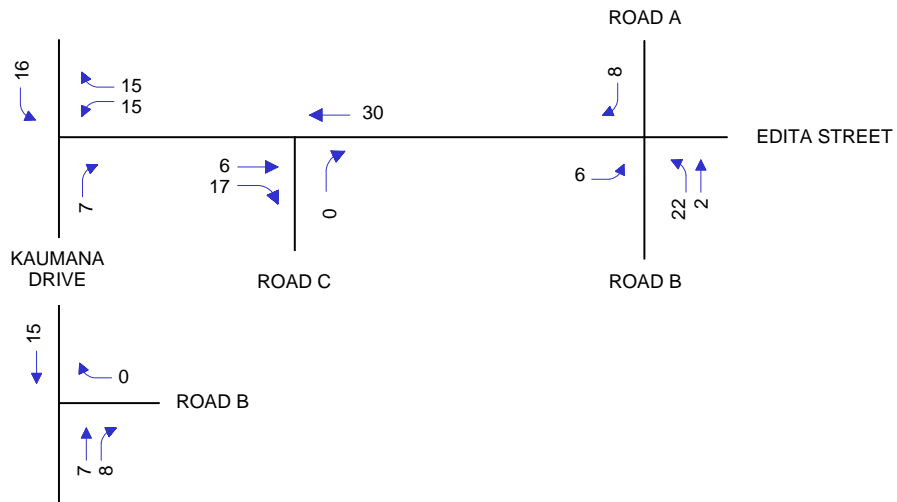
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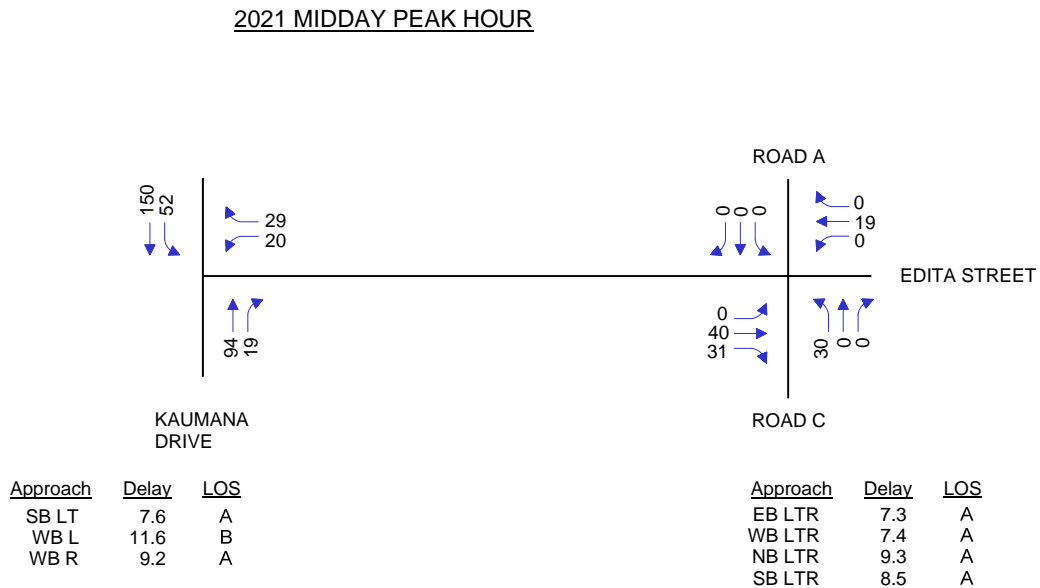
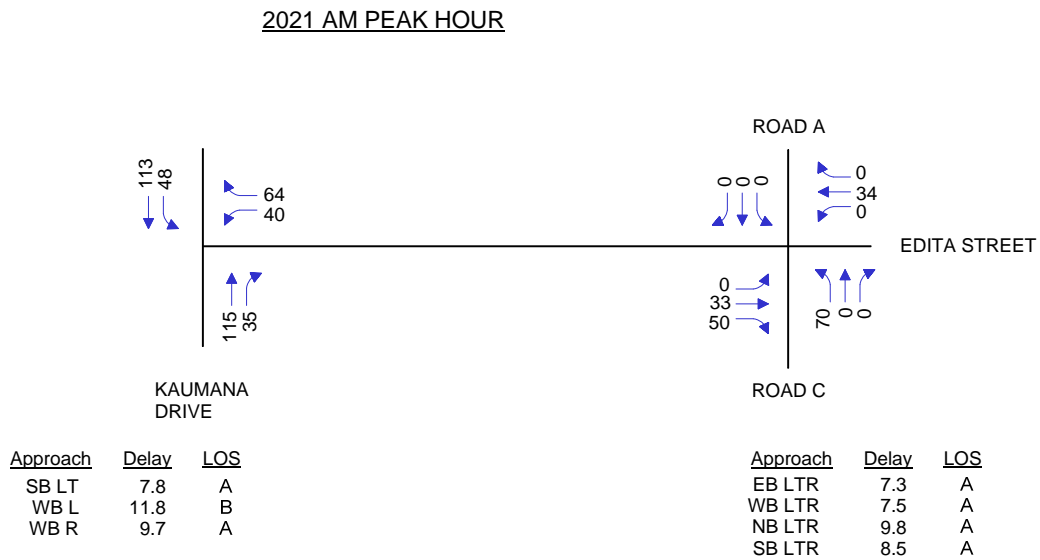
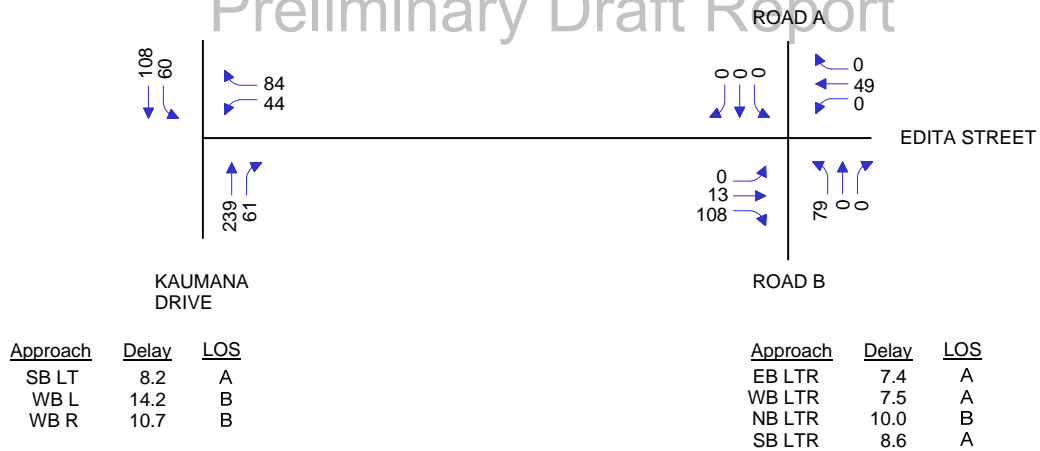
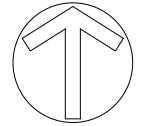


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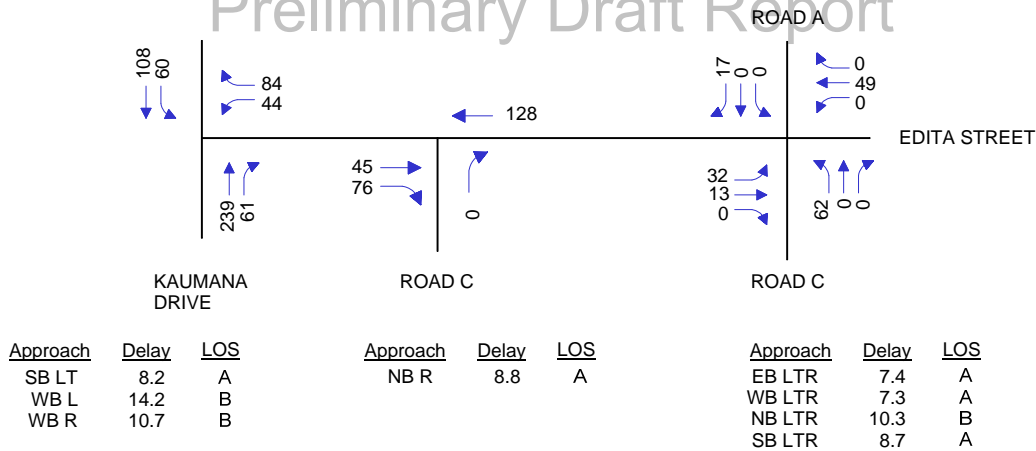
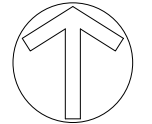


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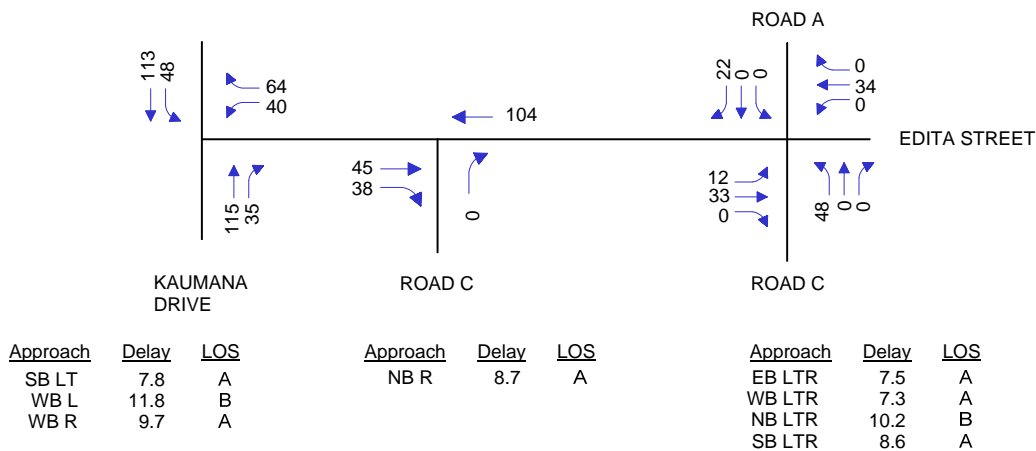
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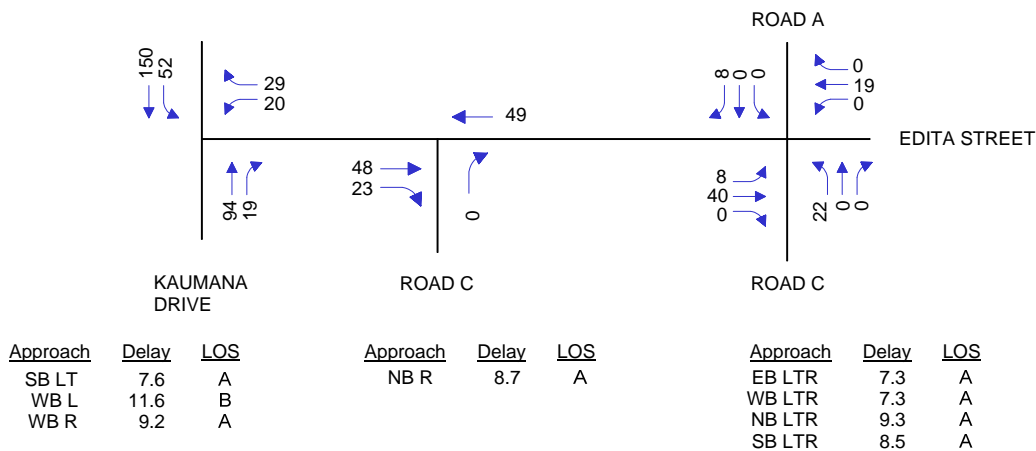
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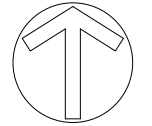


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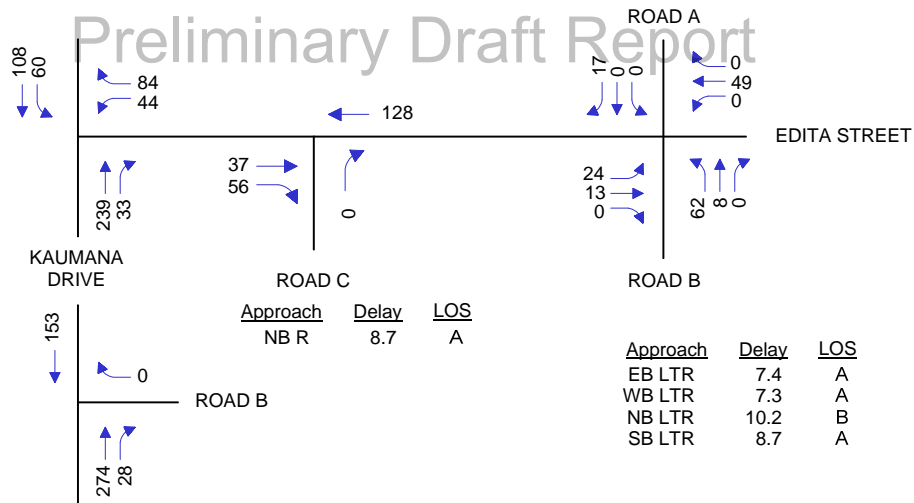
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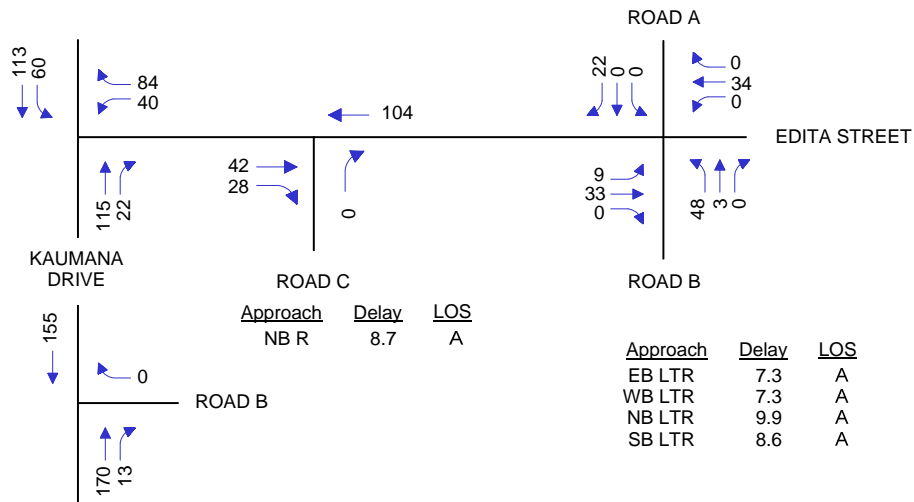
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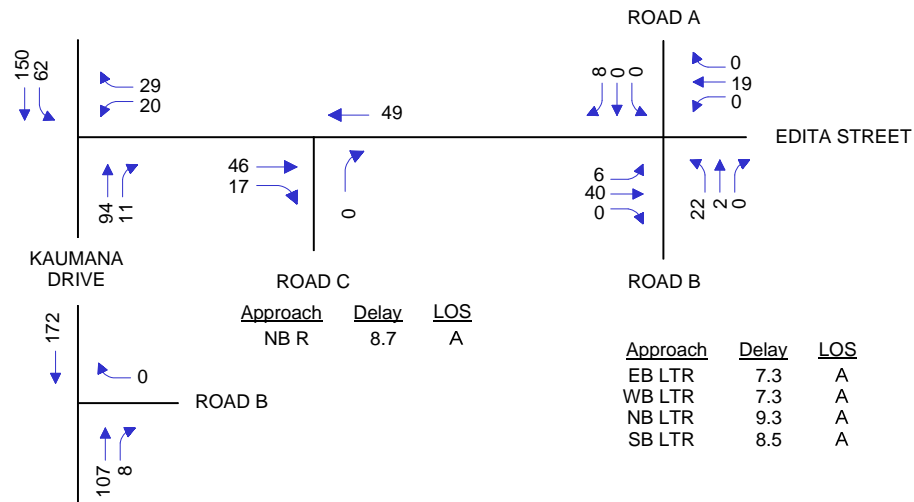
2021 AM PEAK HOUR

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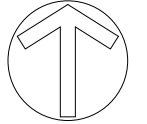
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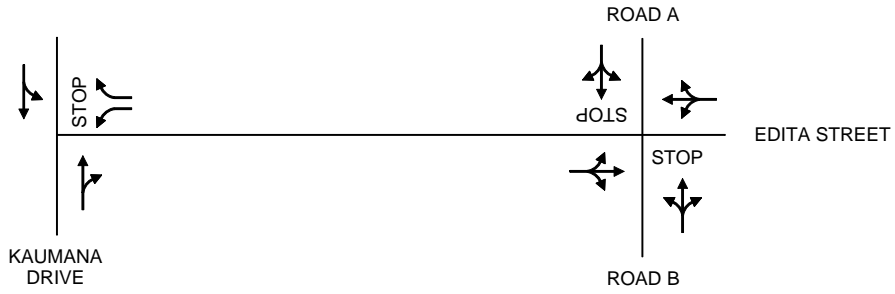


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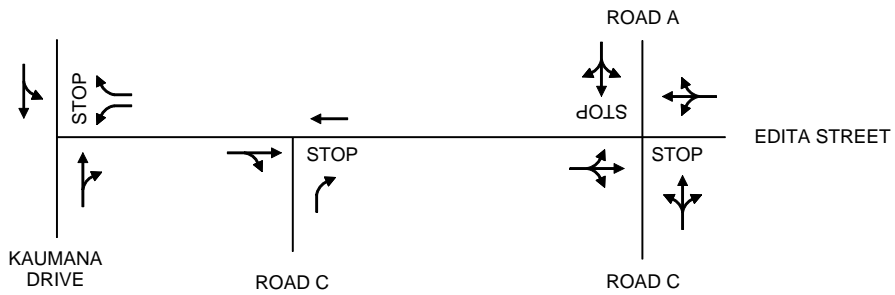
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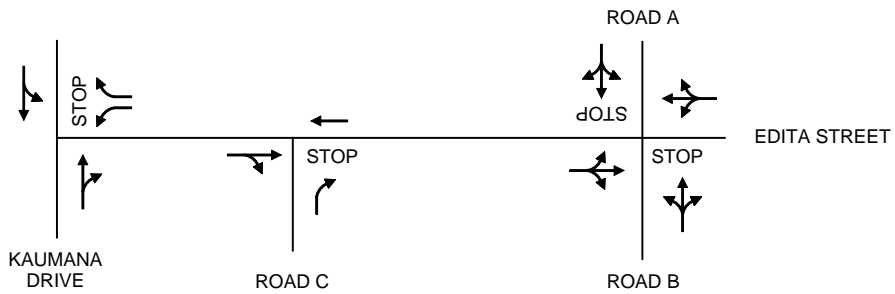
NOMINAL NORTH



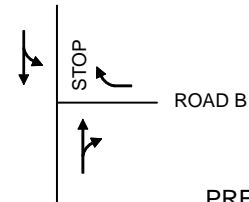
ALTERNATIVE 1



ALTERNATIVE 2



PREFERRED ALTERNATIVE



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Attachment O 2021 Peak Hour Levels-of-Service

AM Peak Hour ⁽¹⁾										
Approach and Movement	Existing (2009)		2021 Background		2021 Alternative 1		2021 Alternative 2		2021 Preferred Alternative	
	Delay ⁽²⁾	LOS ⁽³⁾	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.8	A	7.8	A	8.2	A	8.2	A	8.1	A
Westbound Left	10.9	B	11.2	B	14.2	B	14.2	B	14.0	B
Westbound	9.8	A	10.0	B	10.7	B	10.7	B	10.5	B
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right	See Note 4		See Note 4		7.4	A	7.4	A	7.4	A
Westbound Left, Thru & Right					7.5	A	7.3	A	7.3	A
Northbound Left, Thru & Right					10.0	B	10.3	B	10.2	B
Southbound Left, Thru & Right					8.6	A	8.7	A	8.7	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.8	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		10.3	B
Midday Peak Hour										
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.6	A	7.6	A	7.8	A	7.8	A	7.7	A
Westbound Left	10.4	B	10.6	B	11.8	B	11.8	B	11.7	B
Westbound	9.2	A	9.3	A	9.7	A	9.7	A	9.6	A
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right	See Note 4		See Note 4		7.3	A	7.4	A	7.3	A
Westbound Left, Thru & Right					7.5	A	7.5	A	7.3	A
Northbound Left, Thru & Right					9.8	A	10.2	B	9.9	A
Southbound Left, Thru & Right					8.5	A	8.6	A	8.6	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.7	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		9.4	A
PM Peak Hour										
<i>Kaumana Drive at Edita Street</i>										
Southbound Left & Thru	7.5	A	7.6	A	7.6	A	7.6	A	7.6	A
Westbound Left	10.7	B	10.9	B	11.6	B	11.6	B	11.5	B
Westbound	8.9	A	9.0	A	9.2	A	9.2	A	9.1	A
<i>Edita Street at Road A</i>										
Eastbound Left, Thru & Right	See Note 4		See Note 4		7.3	A	7.3	A	7.3	A
Westbound Left, Thru & Right					7.4	A	7.3	A	7.3	A
Northbound Left, Thru & Right					9.3	A	9.3	A	9.3	A
Southbound Left, Thru & Right					8.5	A	8.5	A	8.5	A
<i>Edita Street at Road C</i>										
Northbound Right	See Note 4		See Note 4		See Note 4		8.7	A	8.7	A
<i>Kaumana Drive at Road B</i>										
Westbound Right	See Note 4		See Note 4		See Note 4		See Note 4		9.0	A

NOTES:

1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the project.
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.
4. This intersection will be constructed as part of the project
5. See [Attachment S](#) for level-of-service worksheets.

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Attachment P HELE ON BUS SERVICE IN STUDY AREA

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INTRA-HILO BUS SCHEDULE

Operates Monday through Saturday

Effective 1/04/08

DOWNTOWN HILO TO AINAKO & KAUMANA (Bus is marked "4 DOWNTOWN HILO")

Prince Kuhio Plaza	Aupuni Center	Banyan Drive	Mooheau Bus Terminal	Kawaena Lapaau	Hilo Library	Hilo Medical Center	Ainako & Kaumana	Chong & Kaumana	Gentry Subdivision
7:15	7:25	---	7:35	---	7:40	7:45	7:50	---	---
---	---	8:30	8:35	---	8:40	8:45	8:50	---	---
9:40	---	10:00	10:05	---	10:10	10:15	10:25	---	---
11:15	---	11:30	11:35	---	11:40	11:45	11:50	---	---
---	2:15	---	2:20	---	2:25	2:30	2:35	2:40	2:45

AINAKO & KAUMANA TO DOWNTOWN HILO (Bus in marked "7 DOWNTOWN HILO")

Gentry Subdivision	Chong & Kaumana	Kaumana Terrace	Ainako	Hilo Library	Kawaena Lapaau	Mooheau Bus Terminal	Aupuni Center	Prince Kuhio Plaza	Banyan Drive
---	---	---	7:50	7:55	---	8:00	8:05	---	---
---	---	---	8:50	---	9:00	9:05	9:10	9:25	10:00
---	---	---	10:20	---	10:30	10:35	10:40	10:55	11:30
---	---	---	11:50	---	12:00	12:05	12:10	12:25	1:10
2:45	2:50	2:55	---	3:00	---	3:05	3:10	3:23	---

BOLD = MORNINGS