Waikele Elementary School

BENJAMIN J. CAYETANO
GOVERNOR

SAM CALLEJO
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119, HONOLULU, HAWAII 96810

LETTER NO. PM-1131.6

OCT 3 1996

Mr. Gary Gill
Director
Office of Environmental Quality Control
220 South King Street, Suite 400
Honolulu, Hawaii 96813

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Dear Mr. Gill:

Subject: Final Environmental Assessment
Finding of No Significant Impact for
Waikele Elementary School
Waikele, Oahu, Hawaii
D.A.G.S. Job No. 12-16-0887

The State Department of Accounting and General Services has reviewed the comments received during the 30-day public comment period which began on June 8, 1996. The agency has determined that this project will not have a significant environmental effect and has issued by this letter, a Finding of No Significant Impact (FONSI). We request publication of the Final EA FONSI in the October 23, 1996, OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four copies of the Final EA. Please do not hesitate to contact us if you have any questions.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
Encl.
cc: CDS International, Richard Balcom
R. M. Towill Corp., Brian Takeda

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1996-10-23-OA-FEA- Waikele Elementary School

FINAL
ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Waikele Elementary School

WAIKELE, EWA DISTRICT, OAHU
DAGS JOB NO. 12-16-0887

September 1996

PREPARED FOR:
Department of Accounting and General Services
Division of Public Works
State of Hawaii
P. O. Box 119
Honolulu, Hawaii 96813

RMTC
R.M. TOWILL CORPORATION
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941
Voice: (808) 842-1133
Facsimile: (808) 842-1937

FINAL
ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

WAIKELE ELEMENTARY SCHOOL

Waikele, Ewa District
Island of Oahu, Hawaii
DAGS Job No. 12-16-0887

September 1996

Prepared For:
Department of Accounting and General Services
Division of Public Works
State of Hawaii

Prepared By:
R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

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PROJECT SUMMARY

Project :	Waikele Elementary School
Applicant:	Department of Accounting and General Services Department of Public Works State of Hawaii P. O. Box 119 Honolulu, Hawaii 96813
Accepting Authority:	Department of Accounting and General Services Department of Public Works State of Hawaii P. O. Box 119 Honolulu, Hawaii 96813
Tax Map Key:	9-4-07-69
Location:	Waikele, Ewa District
Project Area:	6 acres (play fields are on approximately 4 acres adjacent to the campus site)
Owner:	State of Hawaii
Agent:	R. M. Towill Corporation 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817-4941 Contact: Brian Takeda (808) 842-1133
Existing Land Uses:	Vacant
State Land Use District:	Urban
County Zoning Designation:	R-5, Residential. An elementary school is a *Principal* permitted use and structure within this zoning designation.

SECTION 1
INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

The purpose of this project is to provide facilities to accommodate 1000 students in grades K-6 (kindergarten through 6th grade) in a year-round, multi-track learning center. The school is intended to be a "learner-centered" school that can serve the diverse learning needs of students, parents, community members, and business partners. The community developer, AMFAC, was required to provide a site for this school as part of the Waikele development. The area to be served by the Waikele Elementary School is the new, fast growing community of Waikele. This school will also serve to relieve the pressure of overcrowding at August Ahrens Elementary School in Waipahu. The school is designed to accommodate 750 students, but by operating as a year-round, multi-track facility, up to 1000 students can be accommodated.

The project will be constructed in two phases. Phase I will include one Classroom Building, the Cafetorium, the Administration Building, and site infrastructure. Phase II will include a second Classroom Building, the Library, and portable classrooms to be provided as needed.

1.2 PROJECT LOCATION

The project site is located on the Island of Oahu in the new rapidly growing suburban community of Waikele. Waikele is located across the H-1 Freeway from the old sugar cane plantation town of Waipahu (**Figure 1-1**). The site which is approximately a half mile mauka of the H-1 freeway is accessed by Kukula Street (**Figure 1-2**). The proposed project site, that is located on the extreme western edge of the Waikele development, is bordered by a military installation to the west, a vacant lot designated as a future church site to the north, single family residential townhouse development to the southwest and a four acre park/ playground to the south that is owned by Department of Education (DOE) (**Figure 1-3**).

1.3 PROJECT BACKGROUND AND COMPLIANCE WITH AREA MASTER PLAN

The proposed project is in connection with the overall development of the Waikele planned community. The Waikele Master Plan is based upon a development concept which is designed to

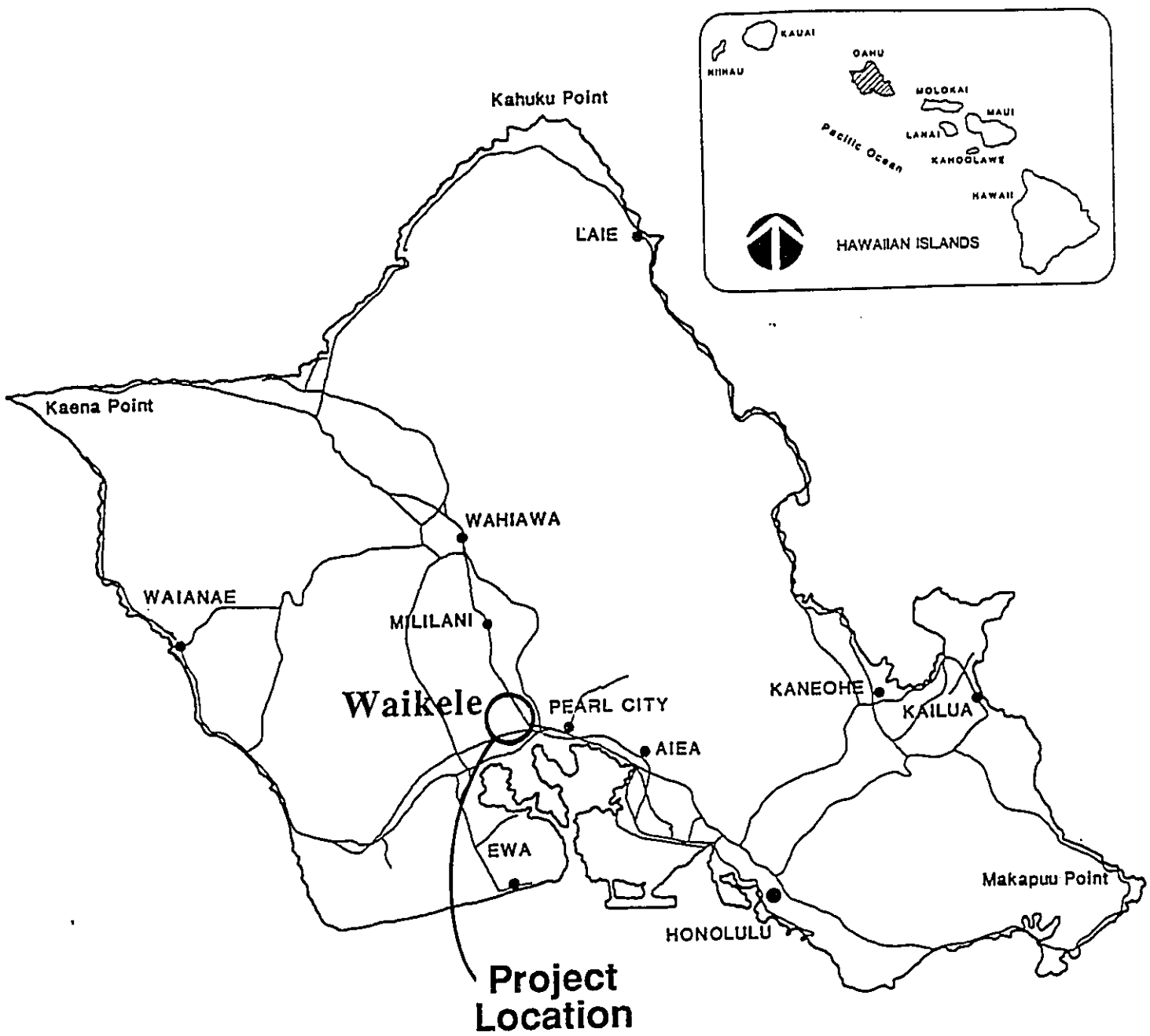

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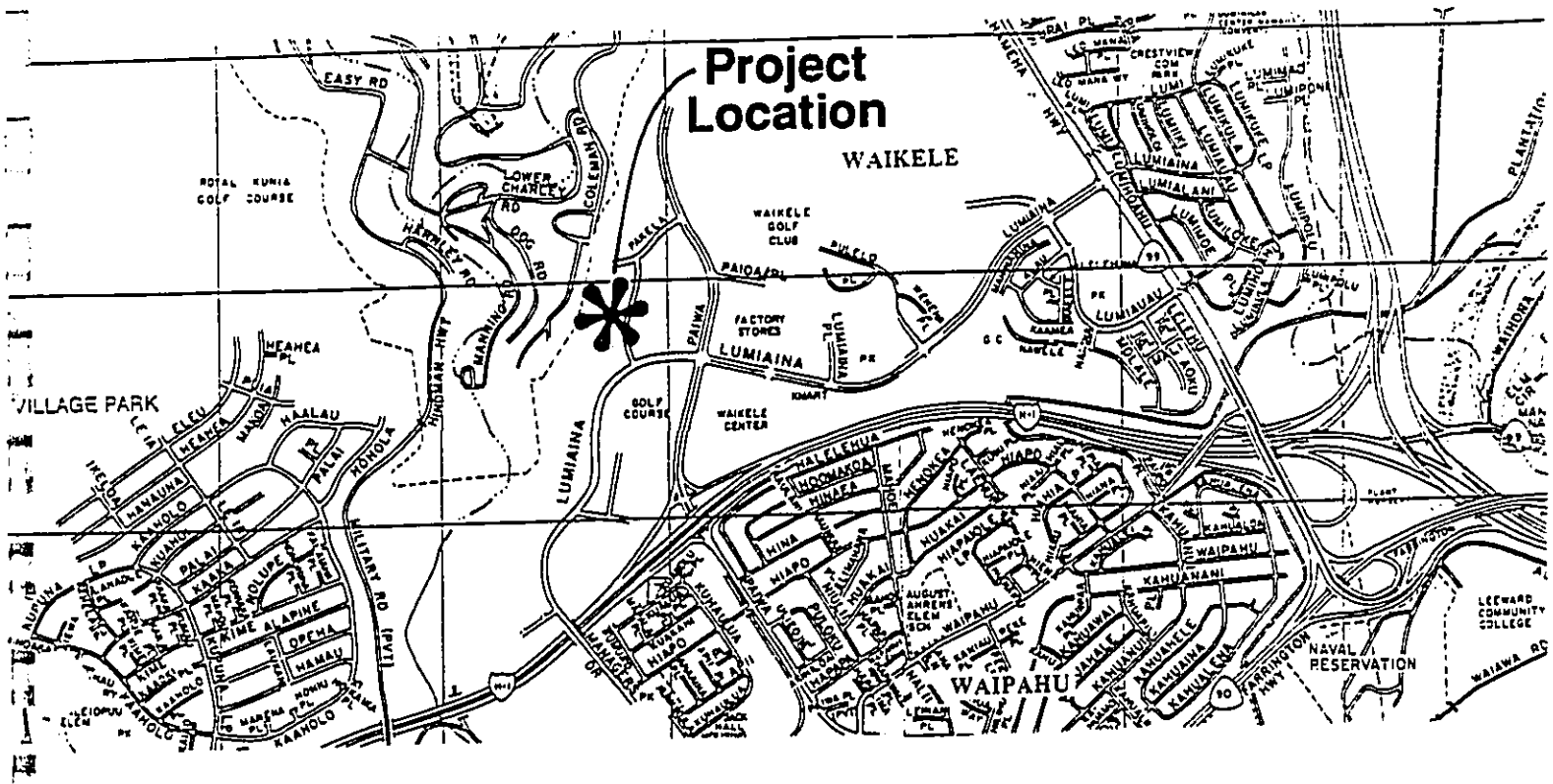
Figure 1-1
LOCATION MAP
Waikele Elementary School



0 2000 4000 FEET

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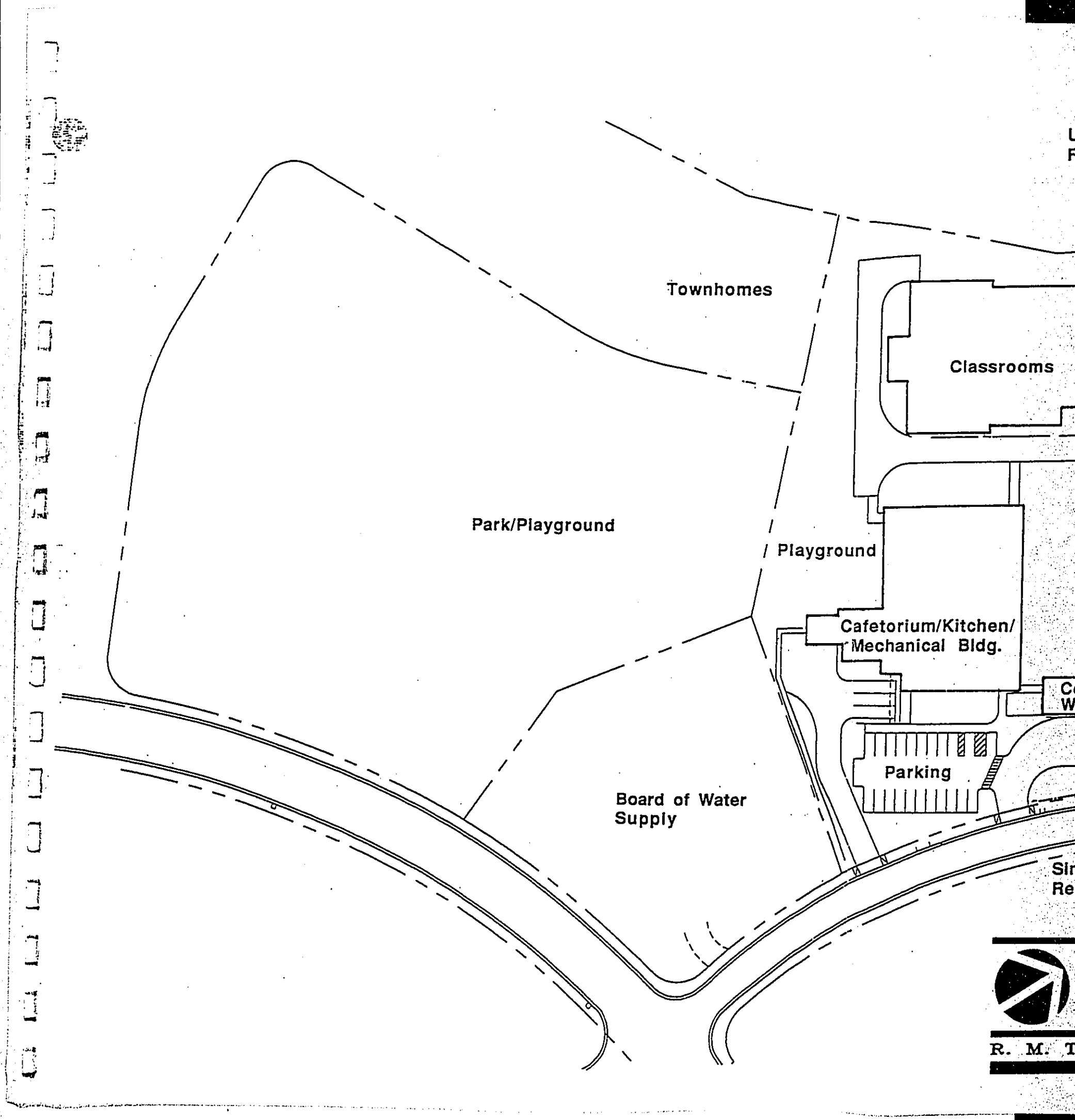
Figure 1-2
VICINITY MAP
Waikele Elementary School


Townhomes
Classrooms
Park/Playground
Playground
Cafetorium/Kitchen/
Mechanical Bldg.
Parking
Board of Water
Supply

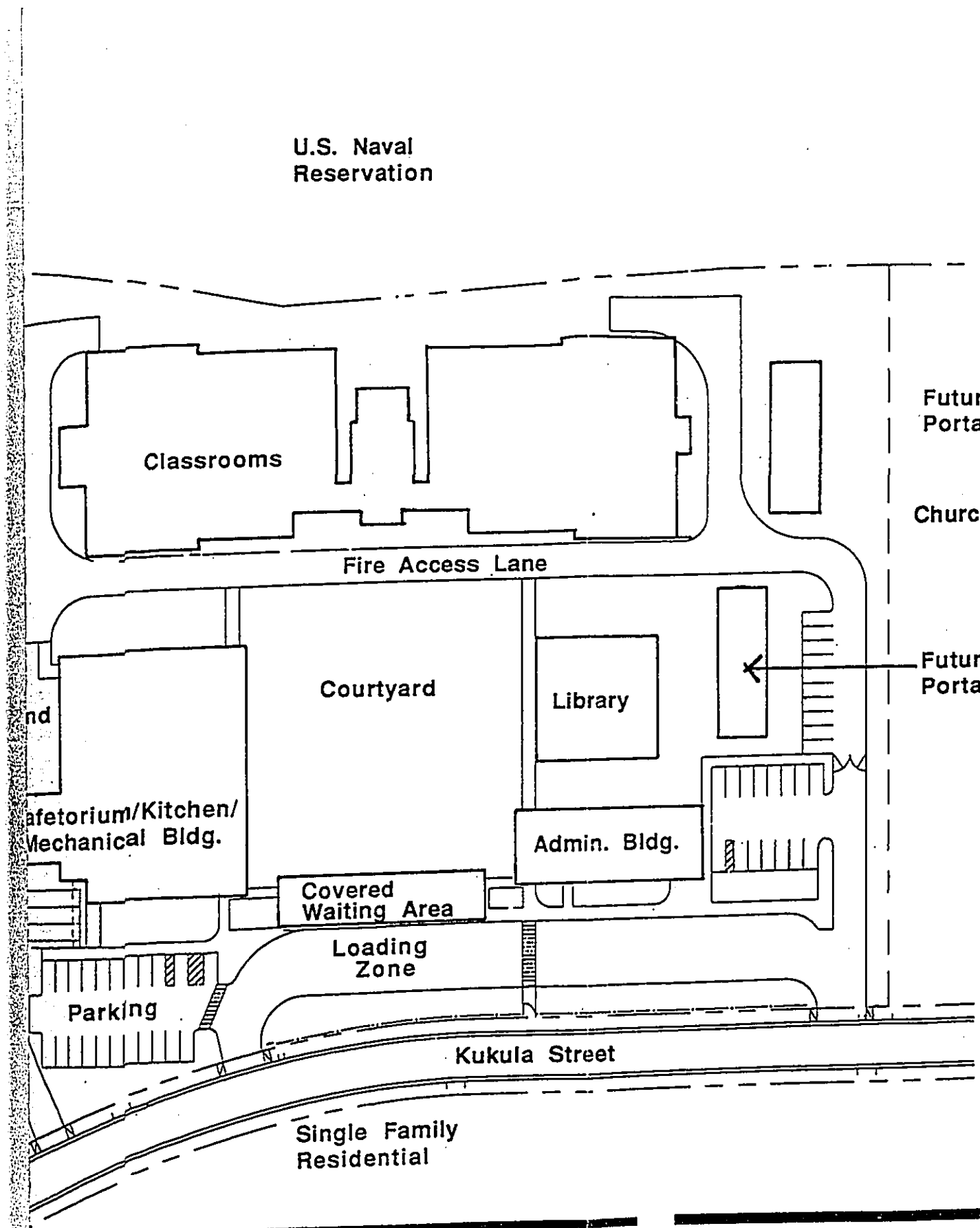


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Figure 1-3
OVERALL SITE PLAN
Waikele Elementary School

create a master planned community that offers residential uses, neighborhood scale commercial retail use, an Office/ Business Park, and an 18-hole golf course that extends throughout the development. Waikele is designed to provide a variety of middle income residential dwellings, a large proportion of open space, recreational uses, and neighborhood parks.

The overall development of Waikele is planned for implementation over an eight-year period. According to the *Final Waikele Environmental Impact Statement, January 1986*, the development of a school (6.0 acres), a neighborhood park (4.1 acres), and a recreation center (6.2 acres) is scheduled for development during the 5th and 6th year of the overall phasing plan. The end of 1995 and the beginning of 1996 mark the beginning of this particular phase.

The site west of Kukula Street between Pakela Street and Lumiaina Street was designated on the master plan for a school (**Figure 1-4**). The school master plan is being developed for the middle of this site fronting Kukula Street. The southern portion of this area is currently a park while the northern portion of this area is being identified as a future church site by the developer. The proposed project will be constructed in two phases. The first phase is anticipated to be complete and ready for occupancy by August 1998.

1.4 SITE LAYOUT AND FUNCTION

Figure 1-5a illustrates a site perspective of the school layout. Classrooms and school buildings are contained within the 6-acre campus site, while play fields are located in the adjacent 4 acres. The perspective of the proposed school shows the buildings grouped around a central courtyard that is intended to act as an outdoor assembly and gathering area (**Figure 1-5b**). Both the Administration Building and the Cafetorium are located along the street side of the courtyard in order to facilitate and monitor visitor access and to provide direct access for deliveries and service vehicles to the kitchen. The Custodial Services Center and the main air conditioning plant are located next to the Cafetorium.

The Cafetorium is near the street and playground area. This facility will be used after normal school hours by the A+ Program and will also be available to the community as a meeting facility. The Classroom buildings are located to the rear of the site to control access and to have them away from street traffic and the general public.

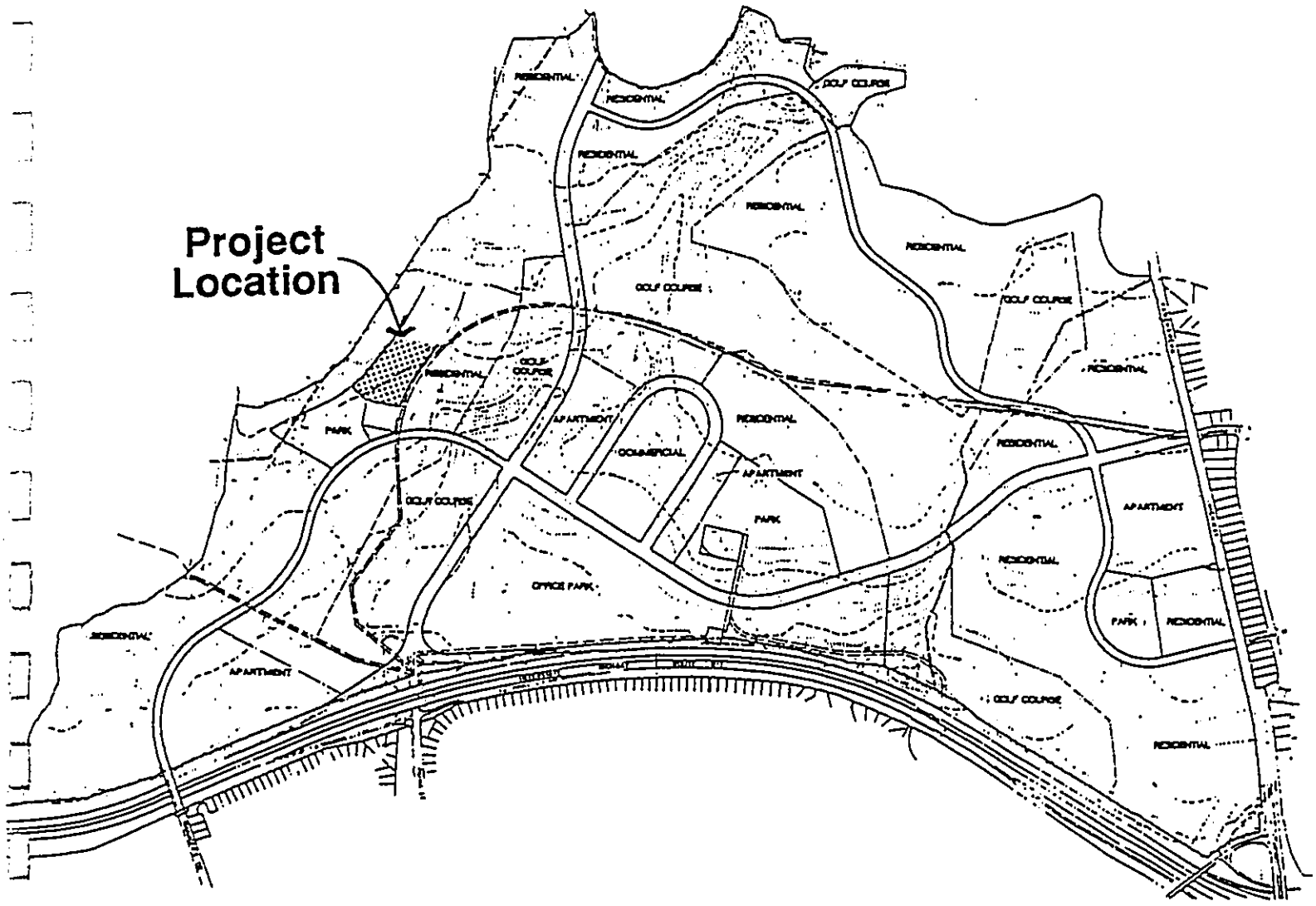

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Figure 1-4
WAIKELE MASTER PLAN
Waikele Elementary School

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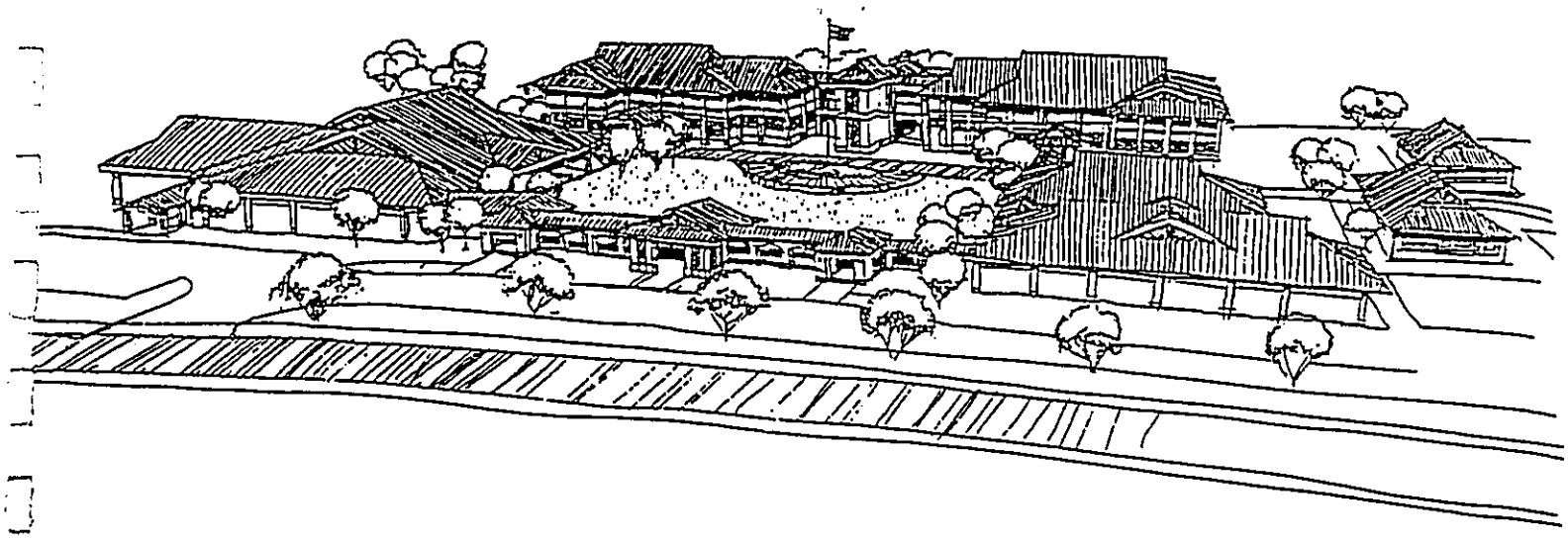

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Figure 1-5a
SITE PERSPECTIVE
Waikele Elementary School

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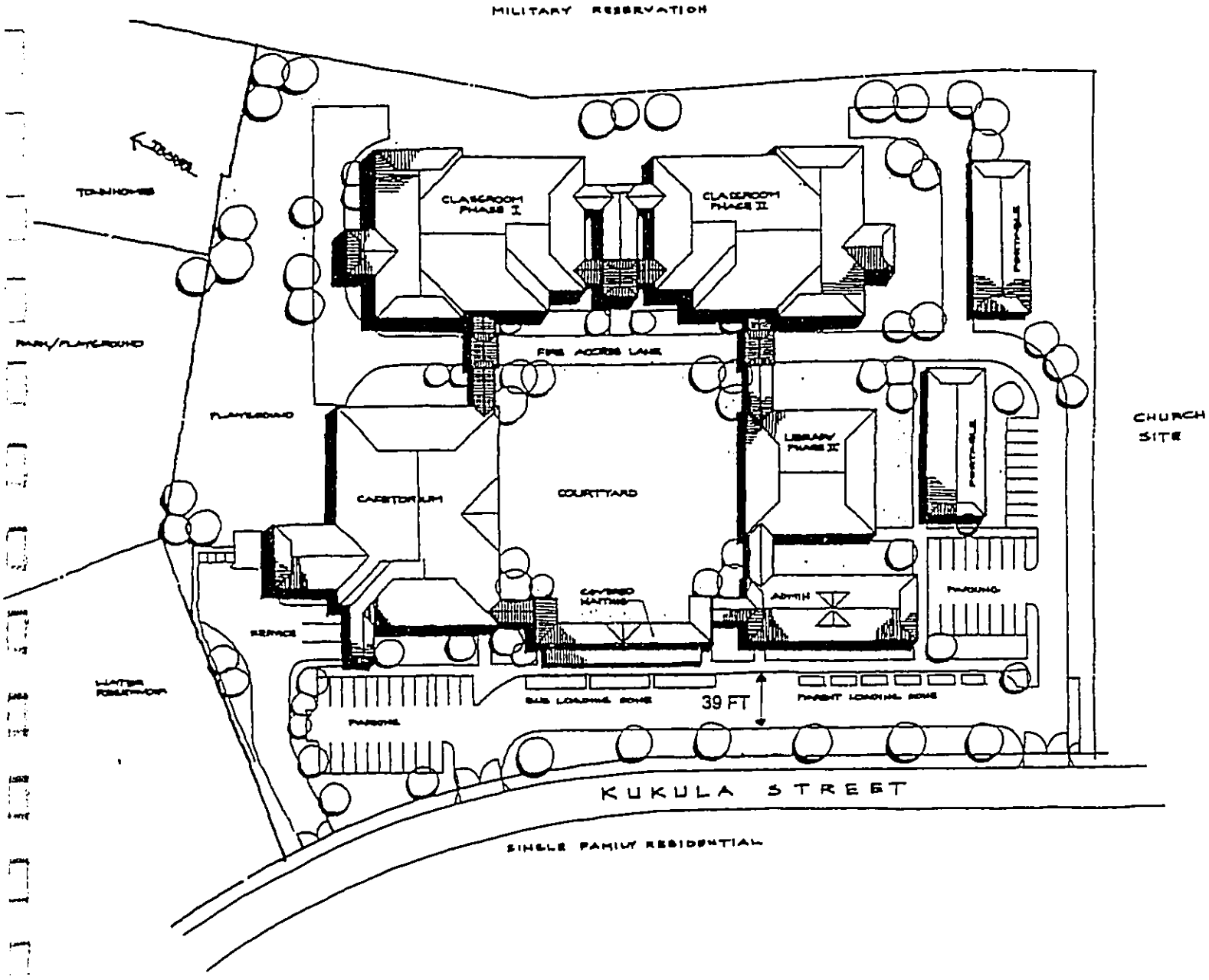

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Figure 1-5b
SITE LAYOUT PLAN
Waikele Elementary School

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April 1996

The exterior site design provides accessible elements and circulation from the public street, sidewalk, parking area and between the various buildings on the site to meet the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The interior of all buildings provides accessible paths and elements as required by ADAAG. Areas primarily used by children shall comply with the State of Hawaii's Children Design Guidelines.

1.4.1 Classroom Buildings

Each K-2 (kindergarten through second grade) Classrooms are designed to accommodate 20 students and one teacher. The 3-6 (third through sixth grade) Classrooms are designed to contain 25-28 students and one teacher (**Figure 1-6a**). Due to code requirements and the limited land area of the site the K-2 classrooms are located on the first floor.

The classroom buildings are surrounded on four sides by wide colonnaded open corridors that provide access to the Classroom, Teacher Work Center and Faculty Center on both the first and second floor (**Figures 1-6a, b, and c**). The ceilings in the classrooms and Faculty Center are at 9-feet, while the ceilings in the Student Resource Centers and Teacher Work Centers are at 8-feet.

1.4.2 Cafetorium

The ceiling throughout the Student Dining/ Multipurpose Room, Kitchen, Custodial Service Center and Main Mechanical Room is 14-feet high to accommodate ceiling fans, ventilation equipment and air conditioning chillers (**Figure 1-7a**). The height will also provide unobstructed access at the loading dock for step delivery vans. Ceilings in offices and minor spaces in the Cafetorium such as the A+ Program Office shall be at 10-feet for thermal comfort in these non-air conditioned spaces.

The Cafetorium contains a Student Dining/ Multipurpose Room which is capable of accommodating half the student design population of 375 in a dining configuration (**Figure 1-7b**). The kitchen is designed as a prep kitchen able to prepare breakfast and lunches for 750 students at Waikele Elementary School as well as 800 additional students at Kanoelani School in Waipio. The kitchen, Custodial Service Center, and Central Mechanical air conditioning plant are co-located since they both require access for delivery and service vehicles.

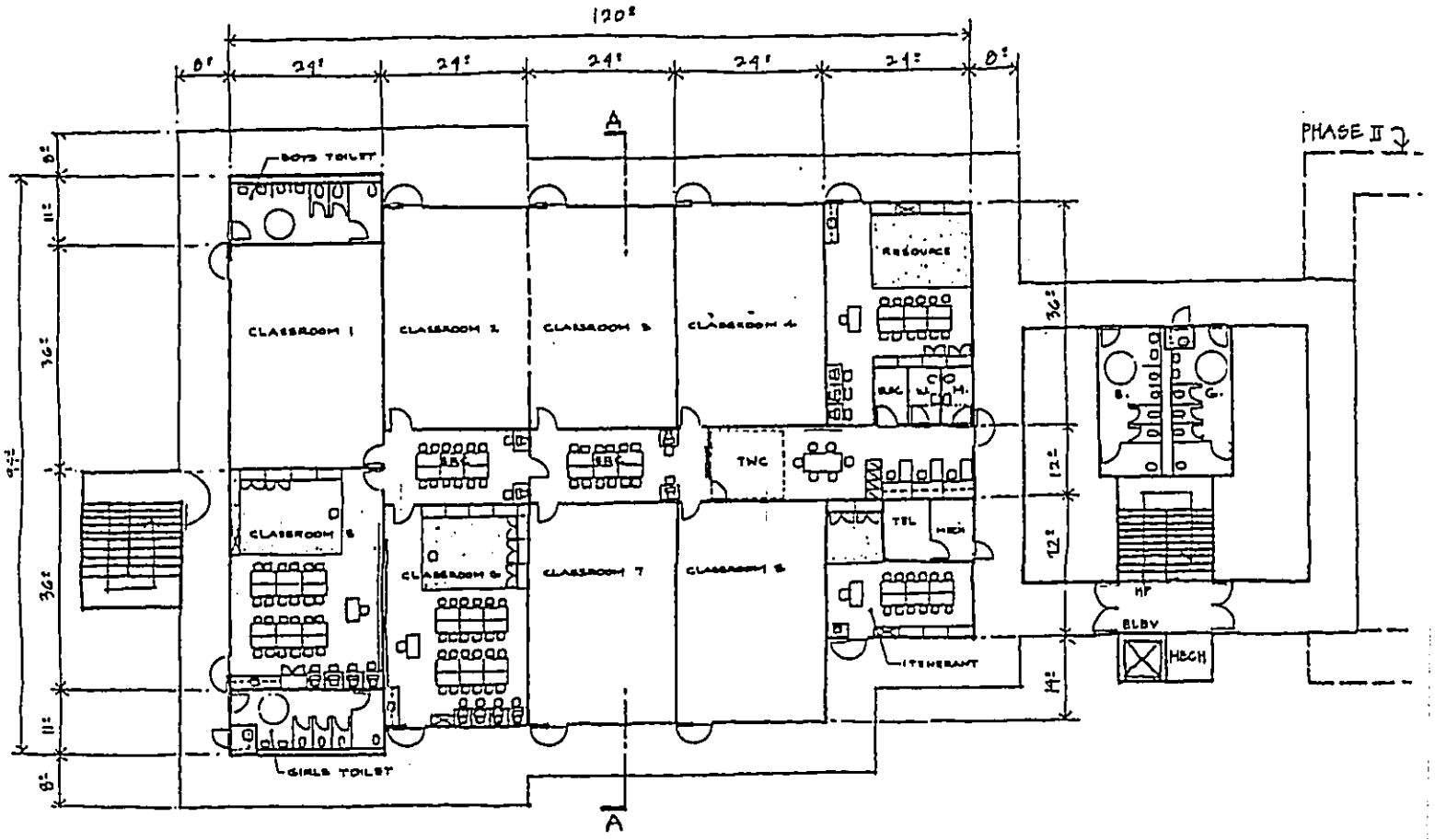

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Figure 1-6a
CLASSROOM BUILDINGS
1st FLOOR
Waikele Elementary School

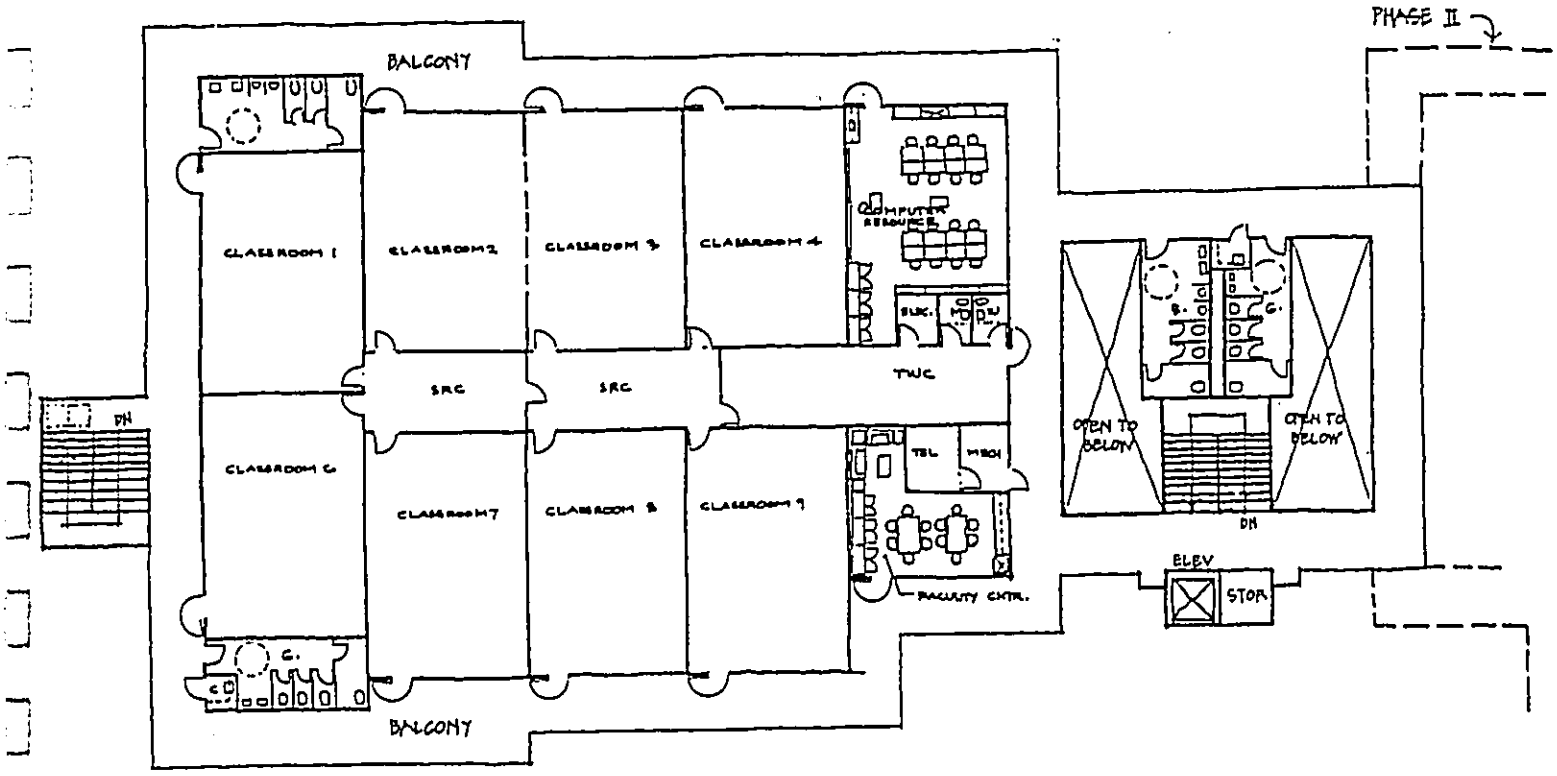

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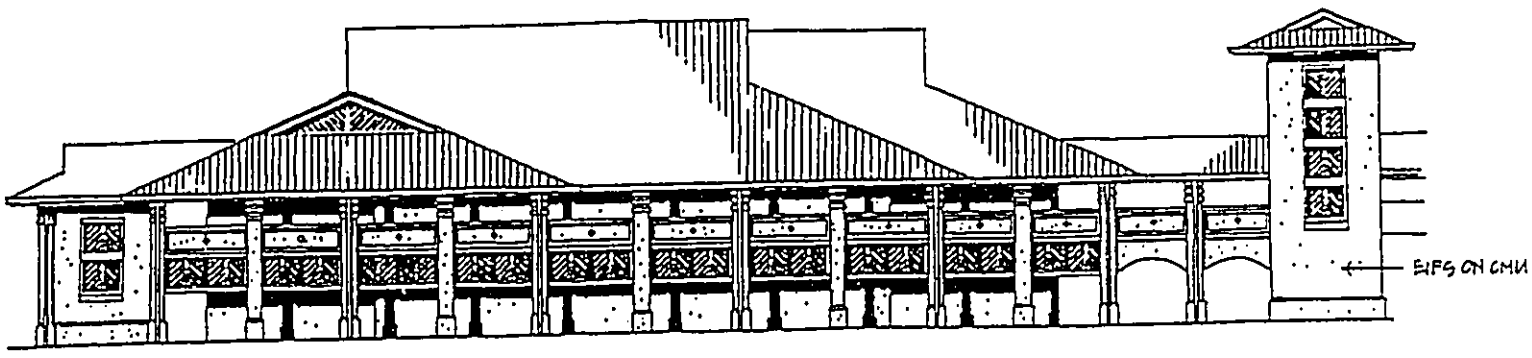
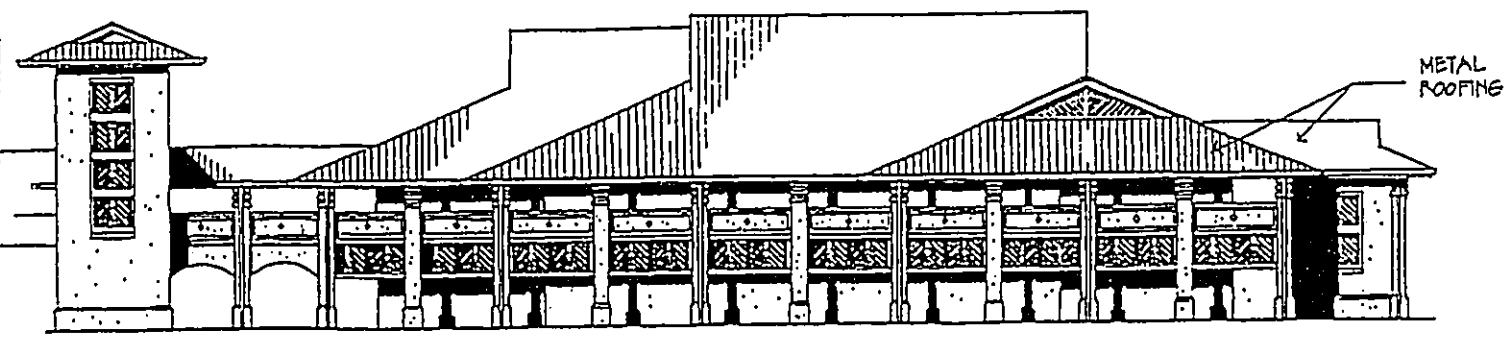
Figure 1-6b
CLASSROOM BUILDINGS
2nd FLOOR
Waikele Elementary School



CLASSROOM BLDG. PHASE I



CLASSROOM BLDG. PHASE II

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Figure 1-6c
CLASSROOM BUILDINGS
Waikele Elementary School

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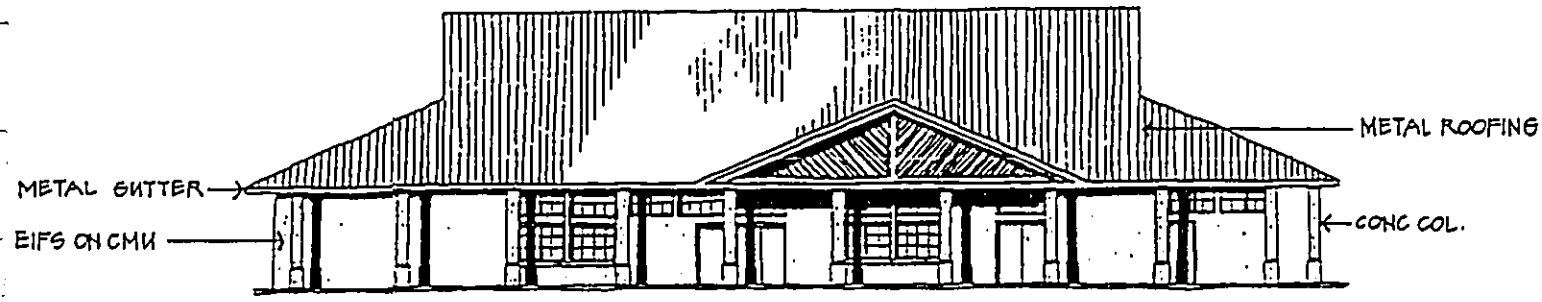

CAFETORIUM - COURTYARD ELEVATION
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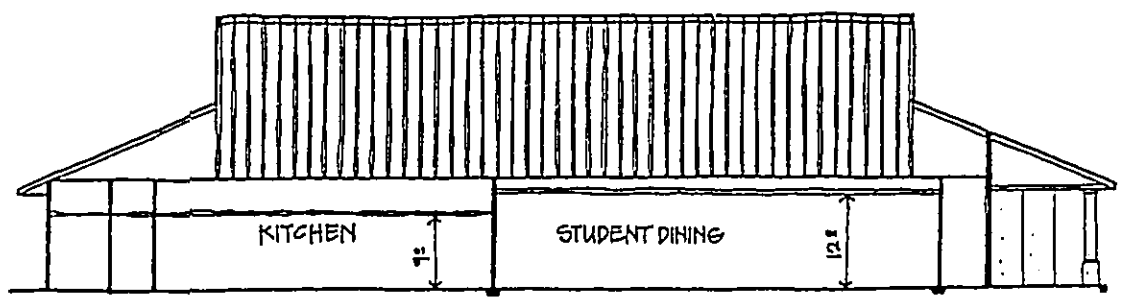

CAFETORIUM - BUILDING SECTION

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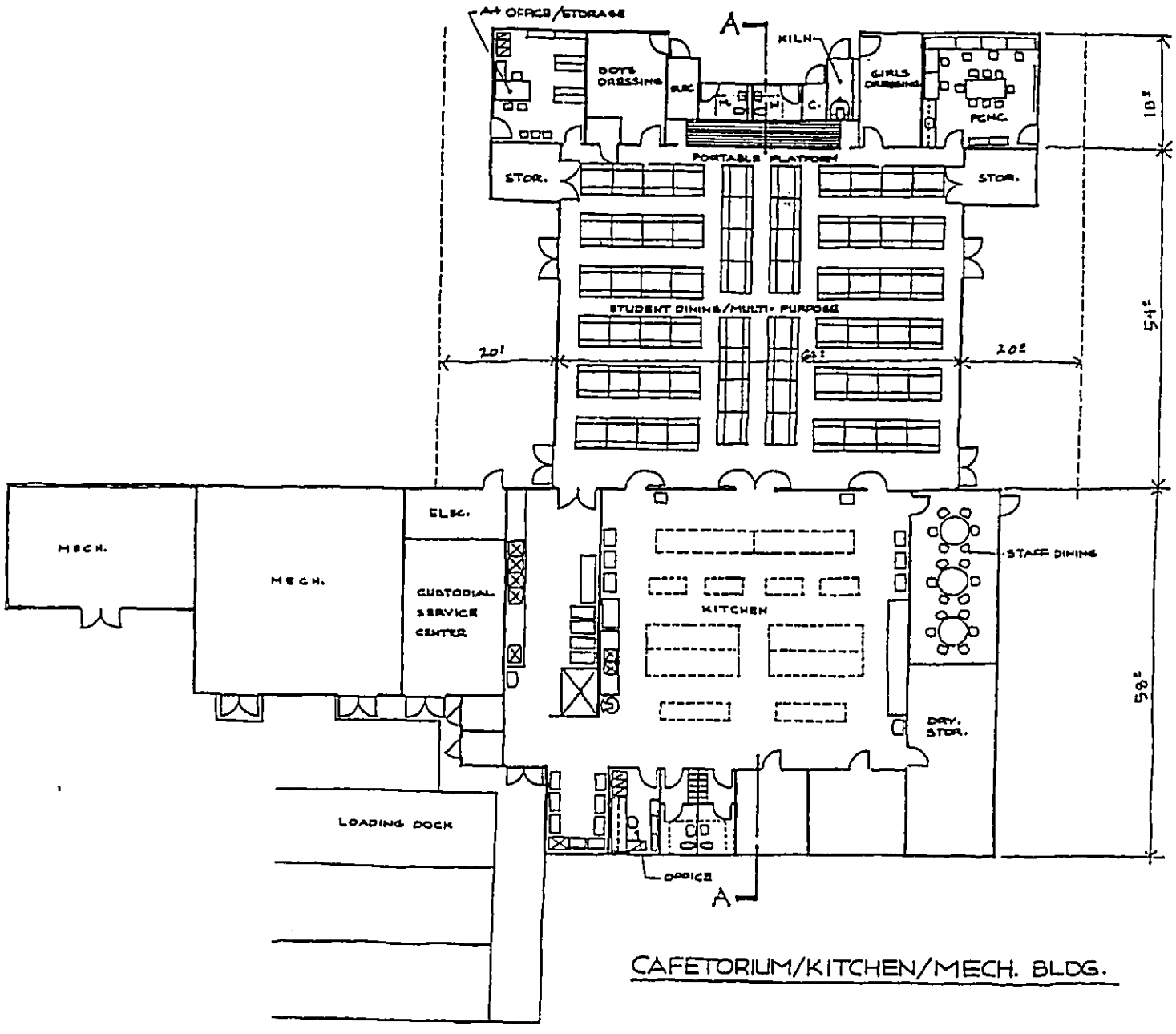
R. M. TOWILL CORPORATION
[redacted] April 1996

Figure 1-7a
CAFETORIUM
Waikele Elementary School



CAFETORIUM/KITCHEN/MECH. BLDG.

SCALE 1/16" =1'-0"

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April 1996

Figure 1-7b
CAFETORIUM SITE PLAN
Waikele Elementary School

1.4.3 Administration Building

The Administration building will act as a receiving area for small groups or parents who wish to obtain information or records or meet with school administrators. In addition, the building also provides counseling for students and acts as a central area for faculty to pick up mail, submit records, and meet with the administration staff. The ceiling in the Administration Building shall be at 9-feet because the rooms in this building are air conditioned and of relatively small size **(Figure 1-8)**.

1.4.4 Playground

A fenced playground will be located adjacent to the cafetorium and will be designed to accommodate preschool uses **(Figure 1-3 and Figure 1-5b).** The playground area will be approximately 900 sq. ft. The play fields located adjacent to the school campus to the southwest occupy approximately 4 acres and would be used for the elementary school grades.

1.5 OCCUPANCY

1.5.1 Students

The school is designed to accommodate 750 students, but by operating the school as a year-round, multi-track facility, up to 1000 students can be accommodated.

1.5.2 Faculty

Since the Waikele-Elementary School will have a year-round, multi-track curriculum, it will require 46 teachers for the 34 classrooms because teachers will teach only three of the four quarterly terms offered each year.

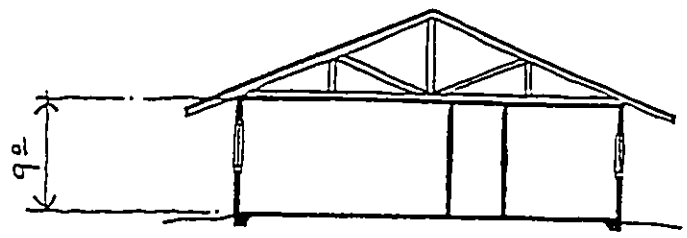
1.5.3 Staff

The Administration building is designed to accommodate a principal, vice principal, three student counselors, a student activity counselor, three clerical personnel, a secretary, and a nurse. Additional full and part-time staff will be working in the A+ Program, Kitchen and Custodial Service Center.

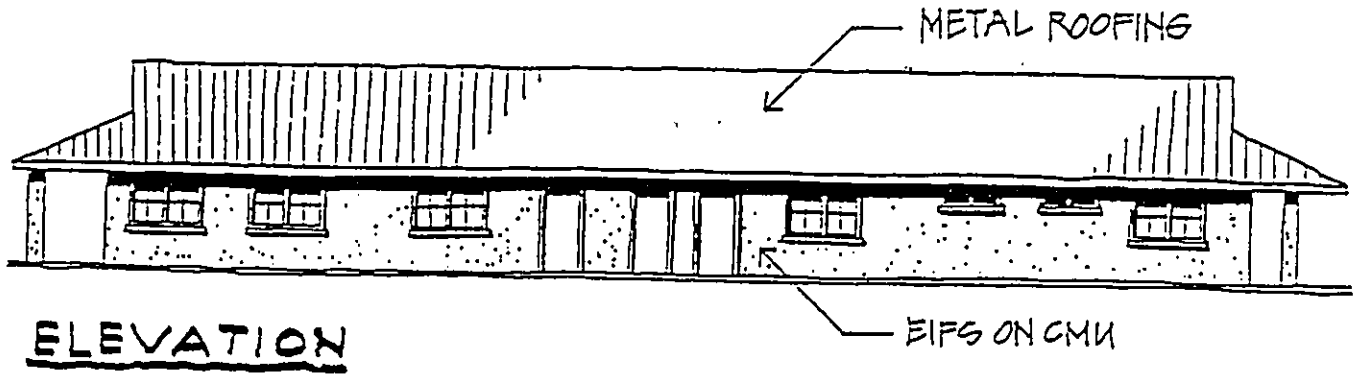
1.6 CONSTRUCTION ACTIVITY

1.6.1 General

The project will be conducted in two phases (**Figure 1-9**). Phase I will include one Classroom Building with 16 classrooms, the Cafetorium, Administration Building, site work and

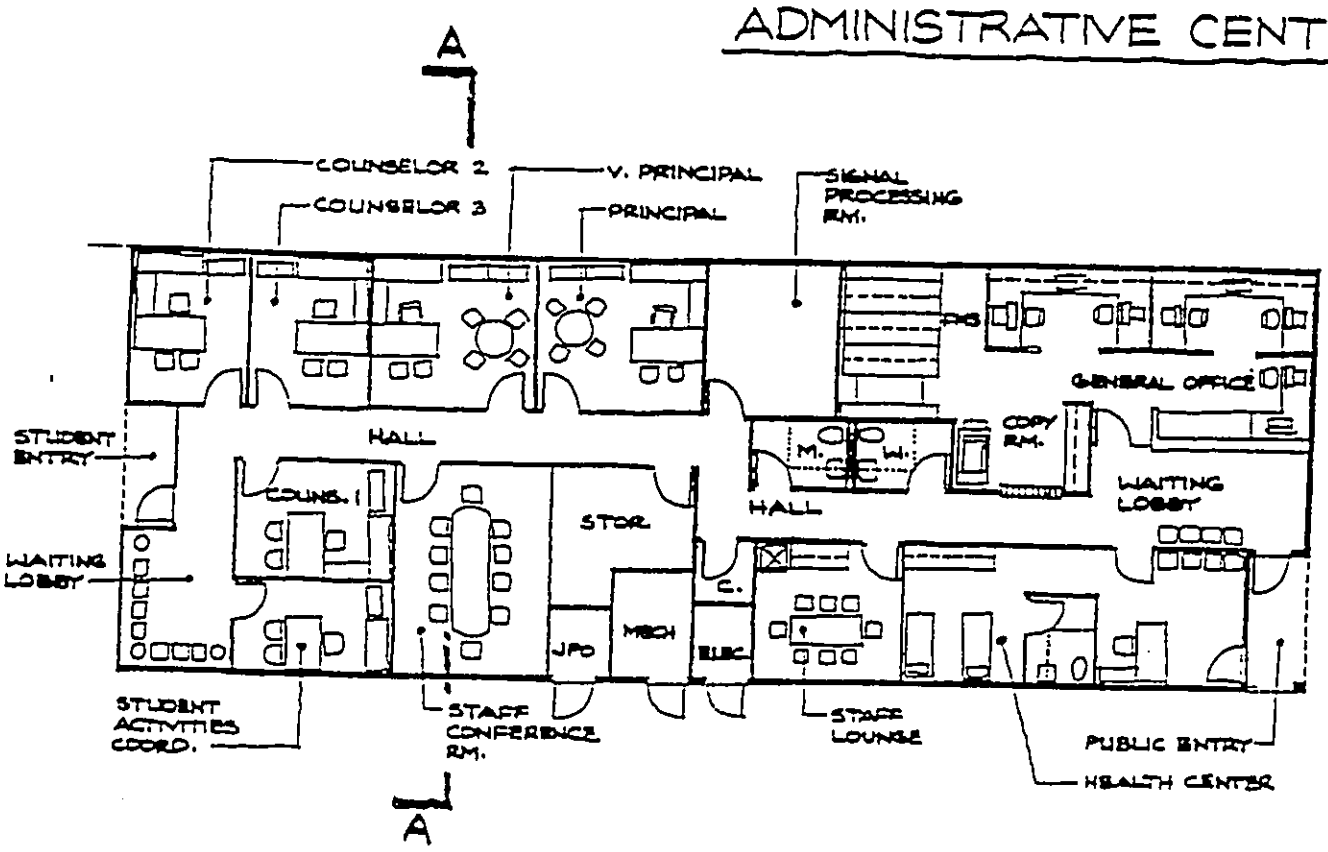


SECTION "A"



ELEVATION

ADMINISTRATIVE CENTER



SCALE 1/16" =1'-0"

Figure 1-8
ADMINISTRATION BUILDING
Waikele Elementary School

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April 1996

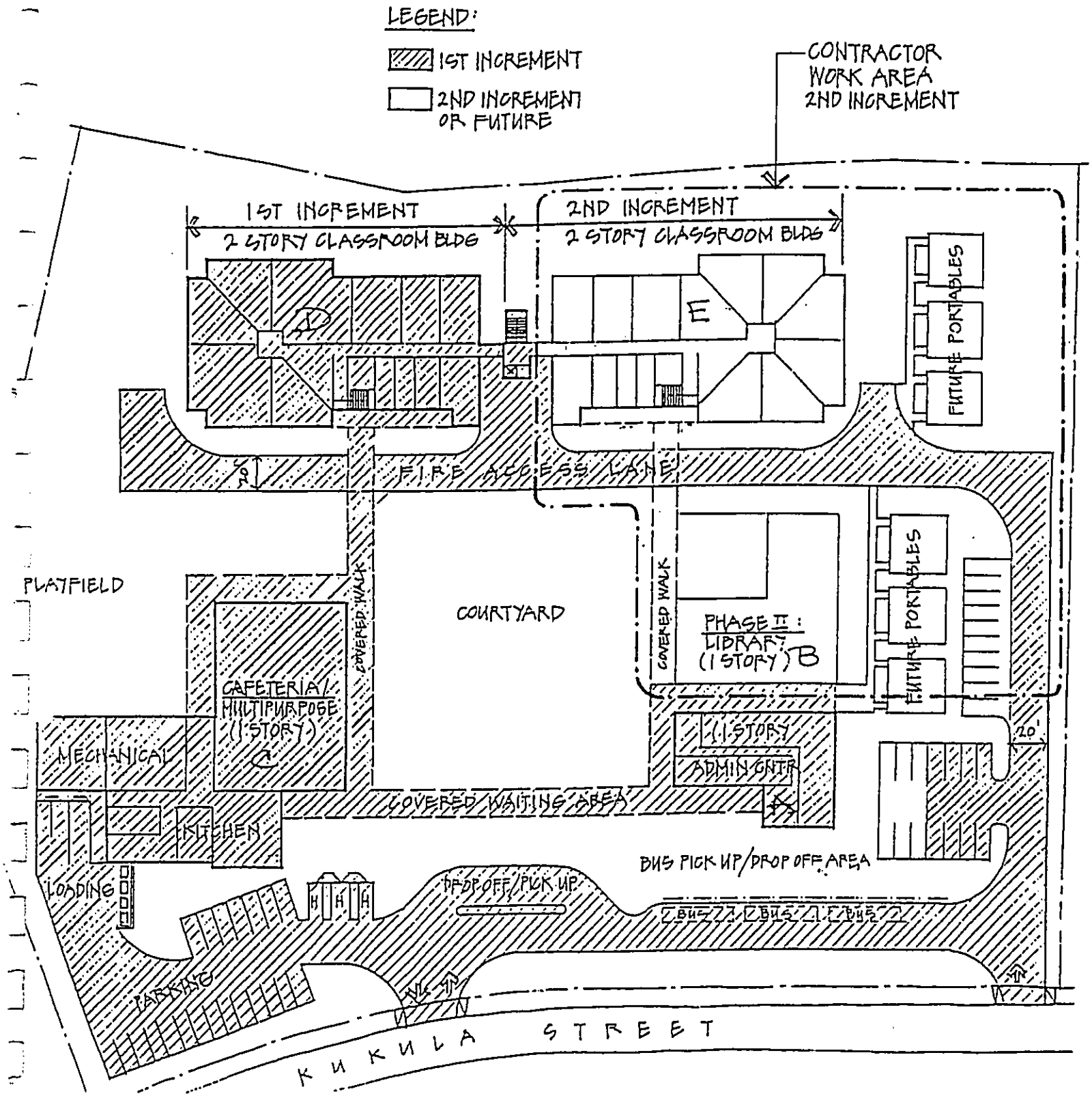

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Figure 1-9
CONSTRUCTION PHASING PLAN
Waikele Elementary School

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April 1996

infrastructure. Phase II will include a second Classroom Building and the Library. Phase II construction has been grouped at the northwest corner of the site to cause minimal disruption to school operations. The main mechanical air conditioning equipment and electrical transformers that will be installed in the first increment shall be designed to accommodate the future required capacity of Phase II construction. Phase I needs to be ready for occupancy by August 1998. This will require construction to be completed in June 1998. Phase II should follow approximately one year later.

1.6.2 Schedule and Cost

Construction is scheduled to begin pending completion of permits and approvals during the 4th quarter of 1996. Completion is anticipated for June 1998. The proposed Phase I construction budget established by the DOE is $10,300,000. Separate funding will be provided for furniture and equipment. Cost for Phase II construction will be determined at a later date.

SECTION 2
DESCRIPTION OF THE AFFECTED ENVIRONMENT

2.1 PHYSICAL ENVIRONMENT

2.1.1 Climate

Waikele is located in the central leeward side of the Island of Oahu. This area has year round warm, humid weather with average daytime temperatures that range from the mid-70s to high 80s with an annual precipitation of approximately 30 inches per year.

2.1.2 Topography, Geology, and Soils

The proposed project site is near the southern end of Oahu's Central Valley that slopes from an elevation of 212 feet above mean sea level at the southeast corner of the site (next to Kukula Street) to an elevation of 241 feet at the northwest corner. This amounts to an average slope of approximately four percent. The site also slopes along its frontage towards Kukula Street approximately 19 feet upwards towards the northeast corner of the site.

This area is geologically located on the southern slope of the Schofield Plateau. This plateau was built up by many successive lava flows originating from the Koolau shield volcano. This rock unit is made up of firm to very hard volcanic rocks which form bedrock in the vicinity of the proposed project site.

According to the *U.S. Soil Conservation Service, Soil Survey of the Islands of Kauai*, Oahu, *Maui, Molokai, and Lanai, State of Hawaii*, August 1972, soils in the proposed project area are classified as Molokai silty clay loam (MuB to MuD). They consist of well-drained soils and are formed in material weathered from basic igneous rock. This type of soil is generally found in nearly level to moderately steep lands with elevations ranging mainly from near sea level to 1,000 feet. These soils are reddish-brown to brown, stiff to hard, silty clays and clayey silts.

2.1.3 Hydrology

The Waikele Stream flows to the west of the project site. The stream is a continuously flowing stream found at the base of the Waikele Gulch. This stream flows through Waipahu Town into the West Loch of Pearl Harbor.

In general, groundwater should not be a problem in the project area. The basalt aquifer is 50 to 180 feet below the land surface (Environmental Communications, 1986).

According to the Flood Insurance Study for the City and County of Honolulu prepared by the Federal Insurance Administration (FIA) in September 1980, flood-prone areas have not been identified in the proposed project area.

2.1.4 Flora and Fauna

The proposed site and surrounding area were at one time under agricultural use for the cultivation of sugar cane (*Saccharum officinarum*). Since then, the region has been under development for the Waikele planned community. The proposed project site is surrounded by a growing community and residential areas. Open space and unique species of flora and fauna as resources are absent from the proposed site. Therefore, impacts to flora and fauna resources in this area are not anticipated.

2.1.5 Air Quality and Noise Levels

Air quality of the proposed project area is good due to low emission levels and the almost continual presence of tradewinds. The major factor affecting air quality in the area is vehicular traffic. Concentrations of carbon monoxide are most often related to vehicular emissions and tend to be highest during periods of rush hour traffic. Operation of construction vehicles is expected to temporarily contribute to carbon monoxide pollutants in the project vicinity. However, the overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on the nearby major roadways. During construction loose dirt and dust particles may be cast into the air by wind. The release of dirt and dust into the air can be prevented by requiring the contractor to periodically wet down the work area.

Noise will be generated during construction of the proposed project. Noise from machinery can be mitigated to some degree by requiring contractors to adhere to State and County noise regulations. This includes ensuring that machinery be properly muffled.

2.1.6 Archaeological and Historical Resources

The project site was part of the larger area used for agricultural purposes in the cultivation of sugar cane from the 1890s to mid-1982. During the *Final Environmental Impact Statement for Waikele*, a field reconnaissance survey was conducted for the overall project area. " As all of the

remains revealed in the literature search are (or were, in the case of those destroyed) located outside the project area, the proposed development represents no threat to them" (Environmental Communications, 1986). Therefore, it can be concluded that any remains in the immediate area of the proposed school site would have been destroyed by sugarcane production long ago and that the proposed structural development will pose no threat to any archaeological/ historical resources. However, should any unidentified cultural remains be uncovered during the development, work in the immediate area will cease and the appropriate government agencies will be contacted for further instructions.

2.1.7 Aesthetics

Design of the proposed development was conducted in the form of an extensive study utilizing value engineering and functional analysis techniques. An integral part of this process was to include interaction with designated representatives from the DOE - Leeward District, DOE - Education/ Curriculum, DOE - Facilities Branch, DOE - Food Services, State Commission on Persons with Disability (CPD), Department of Accounting and General Services (DAGS) and the design team. The proposed school has a well organized, aesthetically pleasing appearance. It has been designed in such a way to blend in with its surrounding environment. The proposed project will not significantly impact the visual character of the area.

2.2 SOCIO-ECONOMIC ENVIRONMENT

2.2.1 Population

The Waipahu-Waipio area has been undergoing gradual urbanization during the past 20 years. During the 1960s development was concentrated primarily in the areas closer to Honolulu such as Aiea, Pearl City, and Waipahu. As these communities have approached saturation in the 1970s, new communities have developed at more distant locations such as Mililani, Makakilo, and Village Park. Given the limited availability of development opportunities in Hawaii Kai and Kailua-Kaneohe, the Waipahu-Waipio area was considered the logical area for continued major growth on Oahu during the 1980s and 1990s.

As indicated in the *Final Waikele Environmental Impact Study, January 1986*, "the Waipahu-Waipio market area can be expected to capture a larger share of Oahu's future population and housing growth than it has historically. Several factors would contribute to this:

- Oahu is experiencing a growing scarcity of urban areas, and the Ewa District offers the relative advantages of close proximity to Honolulu and major transportation networks as well as large tracts of developable land.

- Further increases to the industrial inventory must necessarily occur at industrial parks within the Waipahu-Waipio area. The employment generated by the development of these parks, together with the employment created by the new facilities at Barbers Point deep draft harbor, will further encourage population growth at Waipahu-Waipio.

- City and County government policies which target the Ewa District for major growth can only increase its pre-eminence as a location for new population and housing development."

The Waipahu-Waipio area contains all of the Ewa Development Plan (DP) Area and substantial portions of the Primary Urban Center and Central Oahu DP Areas. According to The State of Hawaii Data Book 1993-94 , the resident population in the Ewa District has continually increased from approximately 132,300 in 1970 to 230,200 in 1990. As of 1990, the resident population in the Waipahu area was approximately 31,400 and in Waipio it numbered 11,800. Nearby existing educational facilities (e.g. August Ahrens, Honowai, and Waipahu Elementary Schools) are already experiencing over-crowding. Therefore, given the emergence of this new community, and the expected increase over the next two decades, the Waipahu-Waipio area is need of additional educational facilities.

2.2.2 Landownership and Surrounding Land Use

The proposed project site is owned by the State of Hawaii. Most, if not all of the surrounding areas are owned by Schuller Homes. The proposed project site is bordered by the Naval Magazine, Lualualei Waikele Branch military installation to the west, a vacant lot designated as a future church site to the north, a single-family residential townhouse development to the southwest, and a four acre park/ playground to the south that is also owned by the DOE.

2.3 PUBLIC FACILITIES AND SERVICES

2.3.1 Transportation/Roadways and Traffic

A traffic study was undertaken by TMC (The Traffic Management Consultant) in April 1996 to identify and analyze traffic impacts resulting from development of the proposed school. The study also provides recommendations to mitigate impacts due to development (see **Appendix A**).

The roadway system at Waikele utilizes existing city bus and express transit routes provided on Kamehameha and Farrington Highways and Waipahu Street. The routes connect to the larger existing highway and street system.

The study area included Paiwa Street, Lumiania Street, Kukula Street, and Pakela Street. Intersections analyzed in the study are:

1. Paiwa Street at Lumiaina Street
2. Lumiaina Street at Kukula Street
3. Kukula Street at Pakela Street
4. Paiwa Street at Pakela Street

The intersections of Alelo Street at Pakela Street and Alelo Street at Lumiaina Street were also examined, but were not anticipated to result in adverse traffic impacts based on unrestricted access to the elementary school on Kukula Street.

Recommendation

According to the study the eight-phase traffic signal at the intersection of Paiwa Street and Lumiaina Street operates at reasonable Levels of Service (LOS) during the peak hours of traffic because of the short cycle lengths. With the development of the proposed Waikele Elementary School, extended green times will be required to accommodate the increases in pedestrian traffic that are expected to be generated before and after school hours. The resulting extended traffic signal cycle lengths would increase the delays experienced at the intersection of Paiwa Street and Lumiaina Street and further deteriorate the operating LOS. In order to mitigate this situation, the following improvements are recommended at the intersection of Paiwa Street and Lumiaina Street:

1. The center lane on the westbound approach of Lumiaina Street at Paiwa Street should be restriped to provide a shared left turn/through lane. The improved westbound

approach would provide an exclusive left turn lane, a shared left turn/through lane, and a shared through/right turn lane. Appropriate lane use control signs should be installed. Reconfiguration of the loop sensors may be required to accommodate the dual left turn lanes. The southbound lanes on Paiwa Street may also require widening to accommodate the double left turn movement. (At this writing, AMFAC/JMB Hawaii, Inc., the developer of Waikele, is submitting a proposal to the City and County of Honolulu to implement this recommendation.)

2. The curb lane on the northbound approach of Paiwa Street at Lumiaina Street should be restriped to provide an exclusive right turn lane. Appropriate land use control signs should be installed. Optional right turn only traffic signal phase and appropriate traffic signal heads may be installed to facilitate the right turn movement during the left turn phase on westbound Lumiaina Street. Reconfiguration of the loop sensors may be required to accommodate the exclusive right turn lane and modification of the traffic signal phasing.

3. The curb lane on the eastbound approach of Lumiaina Street at Paiwa Street should be restriped to provide an exclusive right turn lane. Appropriate lane use control signs should be installed. Optional right turn only traffic signal phase and appropriate traffic signal heads may be installed to facilitate the right turn movement during the left turn phase on northbound Paiwa Street. Reconfiguration of the loop sensors may be required to accommodate the exclusive right turn lane and modification of the traffic signal phasing.

4. Clear lines of sight from the project access driveways should be established to accommodate adequate driveway sight distances. This can be accomplished by clearing any obstructions from the "sight triangles" at the project access driveways. Appropriate sight distances should be determined at the design stage of the project.

5. The existing "no-parking" restriction on Kukula Street should continue, during the peak periods of traffic, to maintain two lanes of traffic and an active loading/ unloading curb lane along the school frontage.

Traffic Mitigation Measures

Additional traffic measures can be considered, should the school experience further traffic operational problems that may occur on special occasions, such as on the opening day of the Fall session or during special events held at the school. The following measures should also be considered to further mitigate any unforseen traffic impacts that may occur:

1. The site development of the proposed elementary school should be coordinated with the proposed Grace Bible Church site, located on Pakela Street, to provide future opportunities for joint access and use of parking facilities during special events held at the church or the school.

2. Driveway access can be restricted, during the peak periods of traffic, to entry-only at the north access driveway and exit-only at the south access driveway. These controls would create a one-way loop between the access driveways and the loading/unloading area, located on the school site.

3. Driveway access can be further restricted, during the peak periods of traffic, to prohibit left turns onto and off Kukula Street. School traffic would enter Kukula Street from Pakela Street, via Paiwa Street and exit at Lumiaina Street.

Conclusion

Traffic operations at the intersection of Paiwa Street and Lumiaina Street are affected by the heavy turning movements to and from Lumiaina Street. Operations would be further impacted by increase in pedestrian activity resulting from the development of the proposed elementary school. The proposed improvements at the intersection of Paiwa Street and Lumiaina Street are expected to mitigate existing and future traffic congestion and accommodate the projected pedestrian traffic, generated by the elementary school. The PM commuter peak hour traffic is not expected to be significantly impacted by the proposed elementary school.

Based upon the analysis and recommendations presented herein, the proposed Waikele Elementary School is not expected to have any significant impacts on traffic operations in the study area.

2.3.2 Recreation

In addition to the recreational amenities of Waikele, the Waikele Elementary School will also provide benefits to the growing community and the greater Waipahu community. The Cafetorium Multipurpose Room can be used as an assembly or meeting area for students, parents, and community members. The school is also conveniently located near other recreational resources such as a park and golf course.

2.3.3 Infrastructure and Utilities

Water

The existing water system located to the east of the project site along Kukula Street consists of a 16-inch water main with fire hydrants (spaced about every 350 feet). The 16-inch water main is connected to the Waikele Board of Water Supply Reservoir with spillway elevation 395 feet mean sea level.

The proposed 12-inch water line, tapped live from the existing 16-inch water main will provide water for fire and domestic needs. The water flow will be monitored by an 8: x 2" FM water meter. A 10-inch reduced pressure backflow preventer will be provided adjacent to the water meter (within the school property) to eliminate the possibility of contaminated water flowing back into the City's water supply. Fire hydrants will be spaced to provide 150 feet hose coverage over the buildings. Water requirements, including irrigation, are anticipated at 48,000 gallons per day.

Sewage

The existing gravity sewer system along Kukula Street consists of an 8-inch sewer line and manholes. The project site is located in part of the tributary of the regional Honouliuli Sewage Treatment Plant (HSTP). Sewage generated from the project will gravity flow from the Waipahu Sewage Pump Station located on Depot Road. Once at the pump station, sewage will be pumped to the HSTP for treatment. Effluent from the plant is then discharged off the Ewa coast into the Pacific Ocean.

The proposed gravity sewer system will collect sewage from various school buildings onsite. The sewer will then be discharged into an existing sewer manhole located about 120 feet north of the main driveway. The proposed gravity system will consists of sewer manholes, 6 and 8-inch gravity sewer lines, and clean outs. Pipe slopes will be set to ensure a minimum velocity of 2 feet per second at full flow.

Confirmation of sufficient capacity for this system was received from the City Department of Waste Water Management, on September 17, 1996.

Drainage

The existing topography at the project site generally slopes to the southeast. Runoff sheet flows across the partially vegetated dirt area toward the Board of Water Supply reservoir located at the corner of Lumiaina Street and Kukula Street and the existing park located at the south boundary of the site. An unlined ditch covered with weeds and hale koa trees which varies in depth from about 1 to 2 feet exists along the west boundary of the site. This ditch is aligned approximately parallel to the direction of sheet flow and thereby collects a superficial amount of runoff. This unlined ditch is not continuous with intermittent mounding within the ditch. The downstream end of the ditch located at the southwest corner of the proposed site stops at a wooden fence which separates the proposed site and an existing townhouse complex. Runoff which currently exits the site is collected by a swale situated along the east perimeter of the park and an inlet box located about 20 feet of Lumiaina Street. Runoff then enters then existing Waikele storm drainage system along Lumiaina Street.

The proposed drainage scheme will not significantly alter the existing drainage pattern. Offsite runoff from the west side of the project site will be collected by a new grass lined ditch, with a 2 feet depth trapezoidal ditch section, and discharged into the park area. A new inlet box, headwall, and drain pipe will be provided to the west of the future classrooms and potables and will be designed to collect runoff from the existing unlined ditch and residual offsite runoff. Offsite runoff from the north perimeter of the site will be routed through the onsite drainage system and discharged into an existing catch basin located along Kukula Street.

Onsite runoff west of the proposed cafetorium. Drainage below the west side of the proposed cafetorium and library will be collected by drain pipes and inlet boxes and discharged into an existing catch basin located along Kukula Street. Runoff from downspouts will not be collected by an underground drainage system.

Electrical and Phone Service

Electrical service to the campus will be from an existing Hawaiian Electric Company (HECO) pull-box at the street. The utility metering equipment and main distribution switchboard will be located near the air conditioning chiller and associated equipment. Telephone service will be from GTE Hawaiian Tel.

Solid Waste Collection and Services

Solid waste generated at the campus will be collected daily by a private collection company contracted by the State.

2.3.4 Public Services

Police

Since the development of the Waikele Community, additional police officers have been required to service the area. Since the development of Waikele is designed to be phased over several years, the impacts on police services and facilities will be gradual. The school site and surrounding area are serviced by the Pearl City Police Station located at 1100 Waimano Home Road and are considered to be part of the Waipahu police "beat". Average response time within the Waipahu District is approximately 6.09 minutes. The Honolulu Police Department considers protection in the area adequate (Environmental Communications, Inc., 1986).

Fire Department

Development of the Waikele community, has created an increase in population resulting in a potential increase of emergencies handled by the Fire Department. As part of the overall development, a fire station site of approximately 25,000 square feet has been reserved for future acquisition by the City and County of Honolulu within the Business Park area. Since the development of Waikele is designed to be phased over several years, the impacts on fire protection and facilities will be gradual. This will provide time for government services to budget and acquire the needed personnel and facilities. In the interim, the proposed school and surrounding area will be served by the Waipahu Fire Station located at 94-121 Leonui Street.

Health/ Medical Services

The Waikele development as a whole will result in a greater demand on existing health care facilities serving the area. However, it is anticipated that existing facilities in the Waipahu area (e.g., St. Francis Medical Center West) are adequate to satisfy all medical needs.

SECTION 3
RELATIONSHIP TO STATE AND COUNTY LAND USE PLANS AND POLICES

3.1 THE HAWAII STATE PLAN

The Hawaii State Plan (Chapter 226, Hawaii Revised Statutes) provides a guide for the future of Hawaii by setting forth a broad range of goals, objectives, and policies to serve as guidelines for growth and development of the State. The proposed project is generally consistent with the Hawaii State Plan. The following objectives of the State Plan are relevant to the proposed project:

Section 226-5: Population

The proposed project supports the State's objectives in guiding population growth so as to be consistent with the achievement of physical, economic, and social objectives. This is addressed by ensuring that adequate support services and facilities are provided to accommodate the desired distribution of future growth.

Section 226-21: Socio-Cultural Advancement - Education

The proposed project serves the State's objective to ensure the availability of adequate and accessible educational services and facilities that are designed to meet individual and community needs. The proposed project will assist to alleviate the impacts of future developments in the Central Oahu/ Ewa area.

3.2 STATE FUNCTIONAL PLANS

The Hawaii State Functional Plan (Chapter 226) provides a management program that allows judicious use of the State's natural resources to improve current conditions and attend to various societal issues and trends. The proposed project is generally consistent with the State Functional Plans. The following objectives of the State Functional Plans are relevant to the proposed project:

Education Implementing Action A(1)(e):

The proposed project will help to establish a learning center in the district, to expand educational opportunities for students, parents, and the community, and by providing additional, supervised space to allow for students and teacher "teaming" on projects in

small groups. The proposed school will also serve as a model for educational excellence in the community by operating as a year-round, multi-track facility.

Education Implementing Action A (4)(a):
Through detailed planning and conceptual design the proposed project serves to secure the necessary resources to implement and carry out a program that provides for a safe and secure learning environment.

Education Implementing Action B (3) (a):
The increased technology in the classroom and on campus is a significant element in the design of the spaces and relationship of areas.

3.3 STATE LAND USE LAW

The State of Hawaii Land Use District classifications designate the proposed project area as "Urban" (**Figure 3-1**). No land use changes will be required for the proposed project.

3.4 CITY & COUNTY ZONING

Zoning for the proposed Waikele Elementary School site is "R-5", Residential (**Figure 3-2**). According to the Land Use Ordinance (LUO), Article 5, Section 5.40 Residential districts: Purpose and intent, the proposed project is a *Principal* permitted use and structure for this district classification. A zoning change will not be required for development for the proposed project.

3.5 CITY & COUNTY GENERAL PLAN

The General Plan of the City and County of Honolulu provides a statement of long range social, economic, environmental, and design objectives for the Island of Oahu and a statement of policies necessary to meet these objectives. An objective of the General Plan, Health and Education, Objective B, is to provide a wide range of educational opportunities for the people of Oahu. Specifically, Policy 4 states: "Encourage the construction of school facilities that are designed for flexibility and high levels of use."

The proposed project is consistent with the General Plan and will relieve overcrowding, while ensuring "flexibility and high levels of use," through use as a year-round multi-track facility.

3.6 CITY & COUNTY DEVELOPMENT PLAN

The proposed project is located within the Development Plan district of Central Oahu. According to the Central Oahu Development Plan Land Use map the project site is designated public facility **(Figure 3-3).** Development of an elementary school on this site is an allowed use.

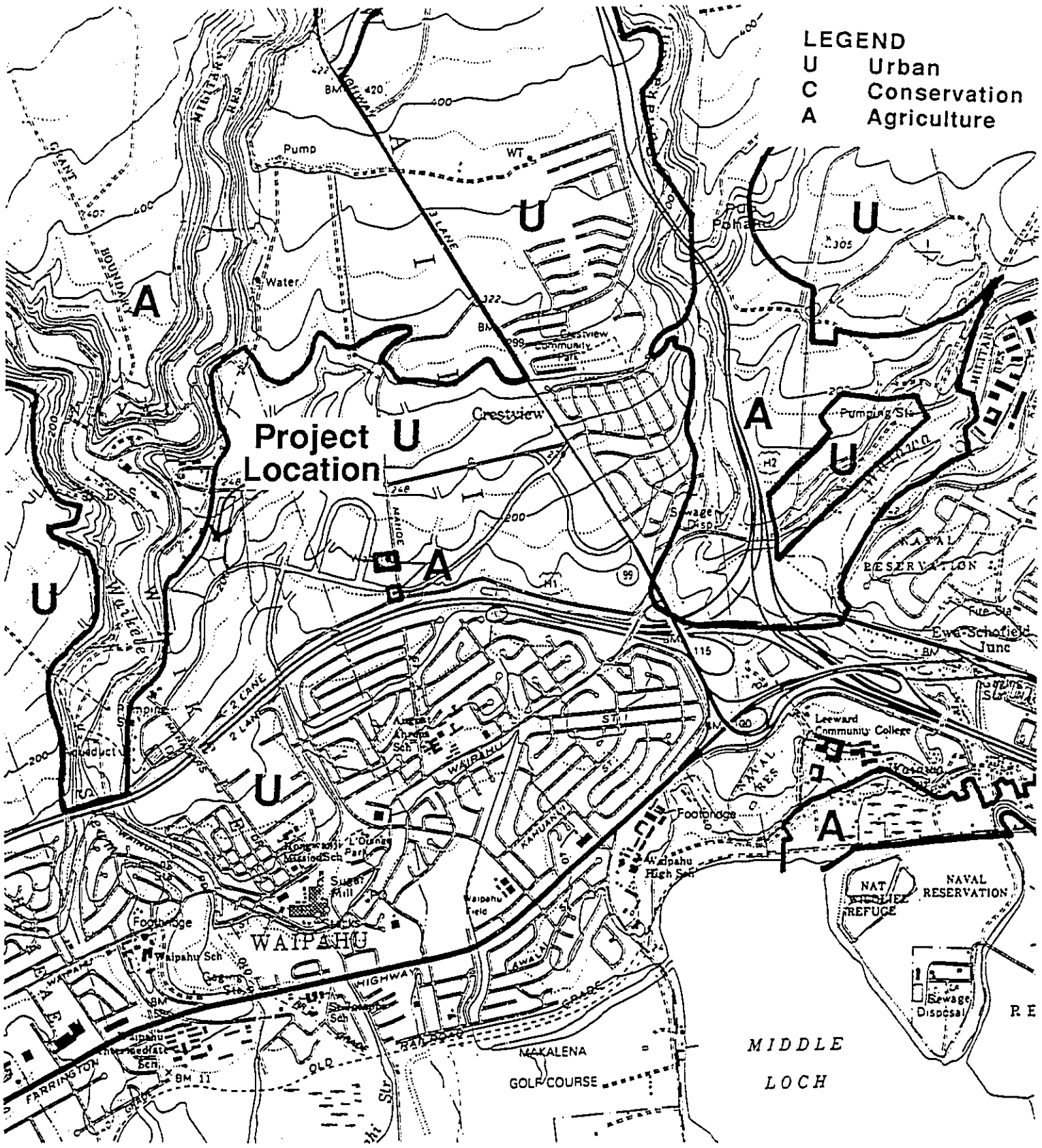


Figure 3-1
LAND USE MAP
Waikele Elementary School

R. M. TOWILL CORPORATION
April 1996

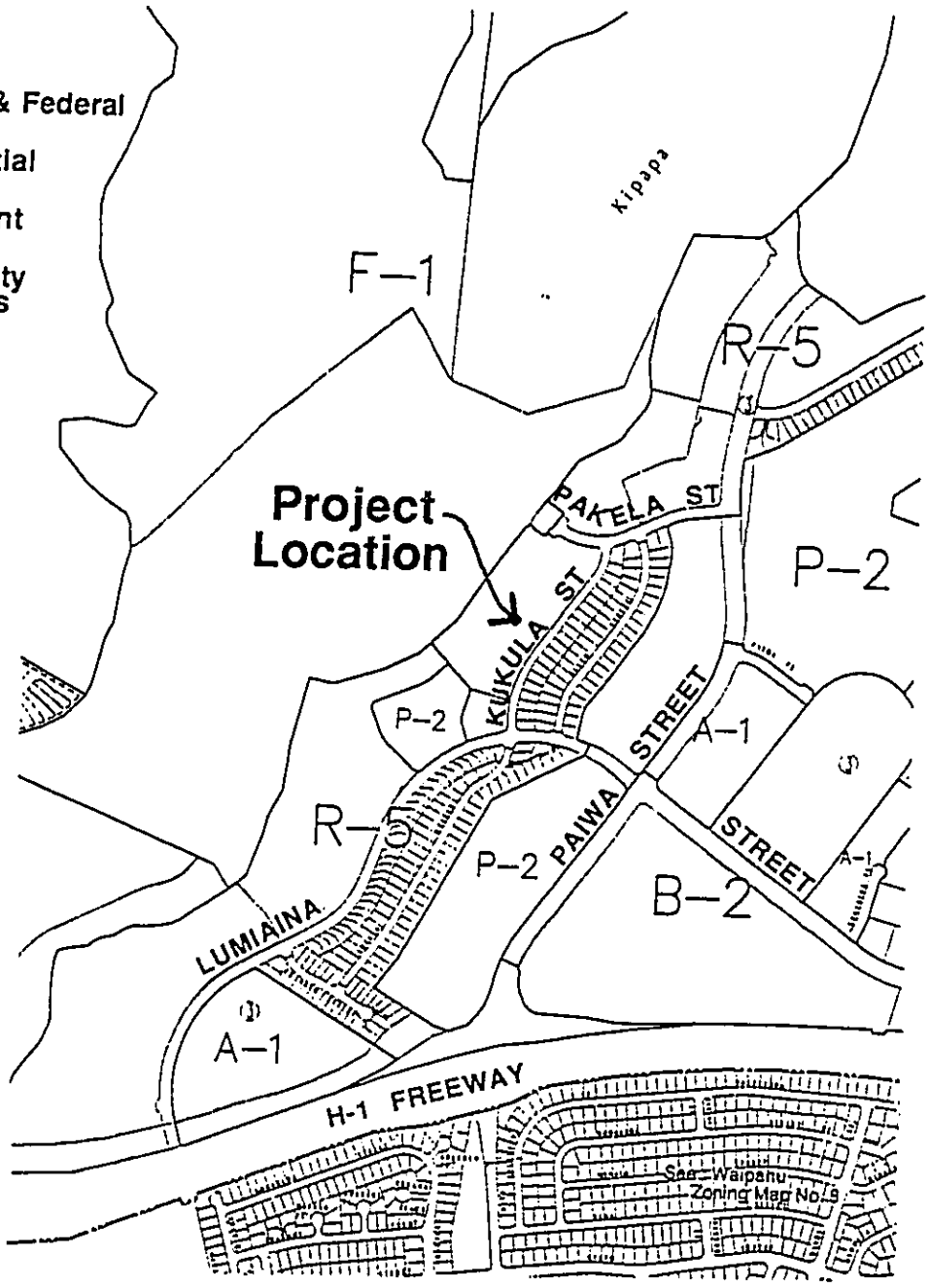
LEGEND

Preservation Zones
- P-2 General
- F-1 Military & Federal

Residential Zones
- R-5 Residential

Apartment Zones
- A-1 Apartment

Business Zones
- B-2 Community Business



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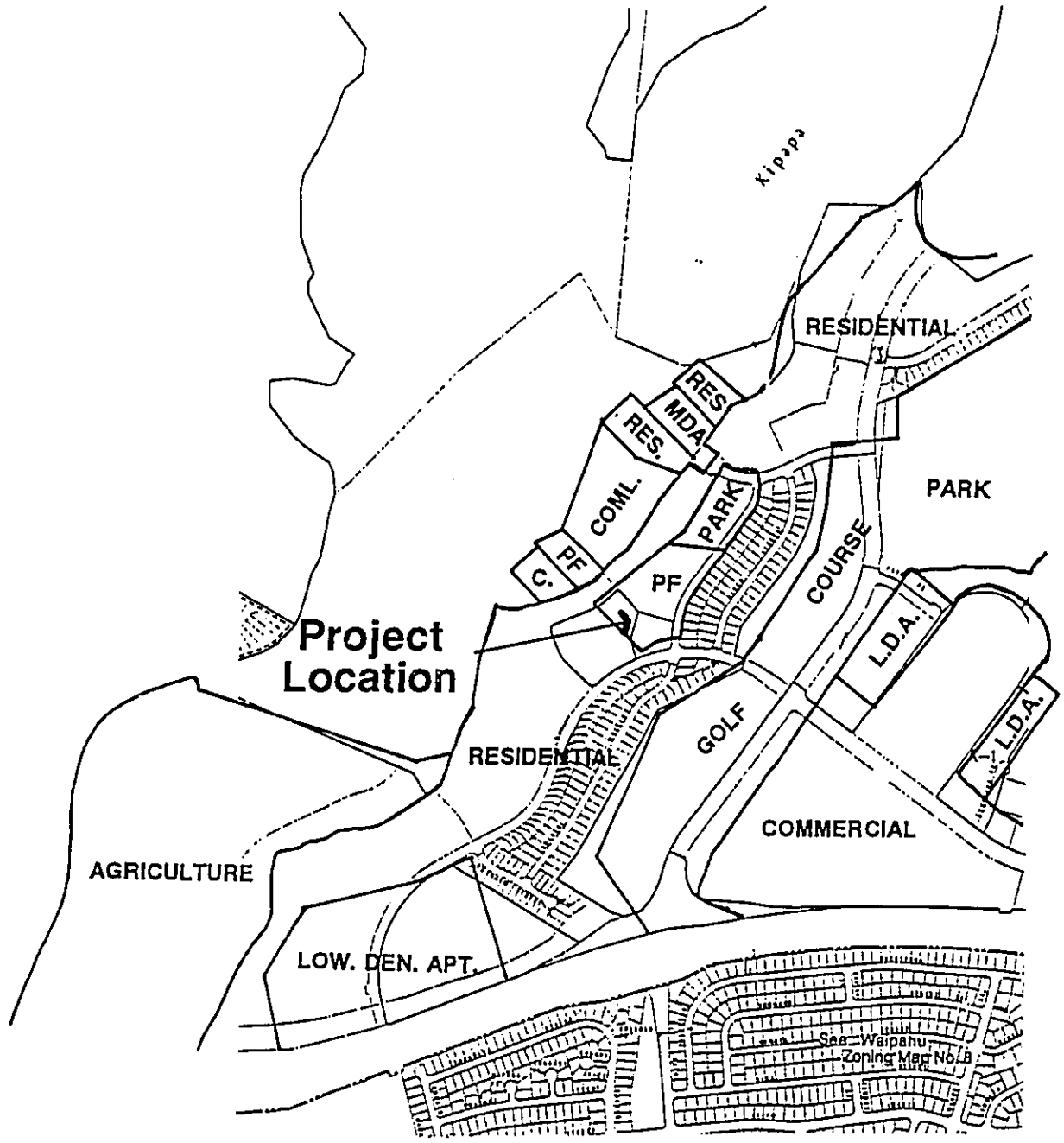
R. M. TOWILL CORPORATION
April 1996

Figure 3-2
COUNTY ZONING
Waikele Elementary School



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R. M. TOWILL CORPORATION
April 1996

Figure 3-3
DEVELOPMENT PLAN
LAND USE MAP
Waikele Elementary School

SECTION 4
ALTERNATIVES TO THE PROPOSED ACTION

4.1 NO ACTION

The no action alternative will contribute to crowding of other schools serving the area; for example, August Ahrens, Honowai, and Waiphau Elementary Schools. A primary disadvantage to this alternative would be that without the addition of this facility, the ratio of students to teachers will increase in outlying areas, affecting the learning and education of students. The no action alternative would also result in lost employment opportunities which would have been realized in connection with construction and operation.

4.2 ALTERNATIVES

There have been several detailed design alternatives considered with regards to architecture and civil, structural, mechanical, and electrical engineering. Of all the alternatives discussed in the *Functional Analysis Concept Development Study, Volume I, Waikele Elementary School*, by CDS International, Inc. (**see Appendix B**), Site Alternative 4 is the preferred design. This is the site that has been set aside for the school within the Waikele planned development.

4.3 RECOMMENDED ACTION

The recommended action is to proceed with development of the Waikele Elementary School on the proposed site, utilizing the agreed upon, functional analysis concept design.

SECTION 5

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

No short-term exploitation of resources resulting from development of the project site will have long-term adverse consequences. The appearance of the proposed project site will be altered from its present open vacant appearance to that of a completed elementary school. The development will be visible but visually integrated with the surrounding areas.

Development of the proposed project will result in a commitment of the parcel of land for a long-term period. Commitment of land for the purpose of the elementary school will likely foreclose certain future use options of this land such as open space or agricultural activities.

The proposed project will, in the short- and long-term serve the diverse learning needs of students, parents, and the residential and business community.

SECTION 6

IRREVERSIBLE/ IRRETRIEVABLE COMMITMENT OF RESOURCES BY THE PROPOSED ACTION

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for management and maintenance functions). Reuse of much of these materials and resources is not practicable. Although labor is compensated during the various stages of development, labor expended for the project development is non-retrievable.

SECTION 7

NECESSARY PERMITS AND APPROVALS

7.1 STATE AGENCIES

Office of Environmental Quality Control (OEQC)

Environmental Assessment Review

7.2 CITY AND COUNTY AGENCIES

Building Department

Building Department

Department of Public Works

Grading Permit

SECTION 8

CONSULTED AGENCIES AND PARTICIPANTS IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

8.1 STATE AGENCIES

Department of Accounting And General Services (DAGS)
Department of Business, Economic Development, and Tourism (DBEDT)
Department of Education (DOE)
Department of Health (DOH)
Department of Transportation (DOT)

8.2 CITY AND COUNTY OF HONOLULU

Department of Planning
Department of Transportation Services (DTS)
Department of Land Utilization (DLU)
Department of Public Works (DPW)

8.3 INDIVIDUALS AND ORGANIZATIONS

AMFAC/ JMB Hawaii
Waipahu Neighborhood Board #22
State Senator Cal Kawamoto
Representative Nestor Garcia
City Council Member Rene Mansho

SECTION 9

COMMENTS TO THE DRAFT ENVIRONMENTAL ASSESSMENT

This Section contains the comments and responses to comments prepared during the draft environmental phase of review.

July 2, 1996

Neal Shimoda
94-1033 Alelo St.
Waipahu, HI 96797
Fax 521-9587

Dept. of Accounting and General Services
State of Hawaii
P.O. Box 119
Honolulu, HI 96810
Fax 586-0521

Attn: Gordon Matsuoka

To Whom This May Concern:

I am a resident of the Signatures Neighborhood in Waikele. On Kukula Street, there are plans being made for an elementary school and a church. There are three main points that I am concerned about:

1) Kukula Street is not wide enough for the traffic anticipated from an elementary school and a church with a day care program.

2) There is grossly inadequate parking for the neighborhood, school and church as presently planned.

3) The church as presently planned needs to commit to its closest resident neighbors that its functions will not be disruptive to the community.

These concerns must be addressed and adequate resolutions provided before any further steps are taken. Our neighborhood has to live with any mistakes that are made. Safety for our children, comfort in the homes we live in, pride in our neighborhood, and stability for the financial investment we have made in our homes are the driving forces in the concerns enumerated above.

Please provide a written response by 7/8/96.

Sincerely,

Neal T Shimoda

cc. Brian Takeda, R.M. Towill Corporation; Rep. Nestor Garcia; Sen. Calvin Kawamoto; Councilmember Rene Mansho

BENJAMIN J. CAYETANO
GOVERNOR

SAM CALLEJO
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119 HONOLULU, HAWAII 96810

LETTER NO PM-1119.6

SEP 11 1996

Mr. Neil T. Shimoda
94-1033 Alelo Street
Waipahu, Hawaii 96797

Dear Mr. Shimoda:

Subject: Draft Environmental Assessment for
Waikele Elementary School
D.A.G.S. Job No. 12-16-0887
TMK: 9-4-07: 69

We have reviewed your comments dated July 2, 1996, and have prepared the following response.

Kukula Street has a 44-foot-wide right-of-way with a 28-foot-wide paved surface. The street was originally designed as a no-parking thoroughfare by the developer, AMFAC/JMB Hawaii, during the master planning of Waikele. The State and its consultants examined the full utilization of Kukula Street with both the elementary school and adjacent church. Kukula Street was found to be in compliance with engineering standards for sufficient capacity, provided there is no parking during school hours. This conclusion was again verified during preparation of the Draft Environmental Assessment, Traffic Impact Analysis, conducted in April and May 1996.

We are keenly aware of the tight parking situation for residents and guests along both Kukula Street, Alelo Street and the surrounding neighborhood. Although the number of parking spaces proposed for the school was determined through the joint Functional Analysis Concept Design (FACD) team, the Department of Accounting and General Services (DAGS) and Department of Education (DOE) will be examining options to ensure that the school will not contribute to the existing tight neighborhood parking situation. Options under consideration include:

- Provide additional parking within Waikele Elementary School in Phase II areas which will not be slated for immediate development. The northernmost portion of the school could be used for spillover parking in the location of the portable classrooms during events which you describe such as PTA meetings and May Day programs.

- Additional parallel parking may be provided within the drop-off zone during special school or community events. This area would be contained within school property and would provide approximately 300 feet of additional parking area.

- Provide additional parking along Lumiaina Street within the park area fronting the elementary school. This option will be included in the design of the school's second increment to provide the balance of the required parking spaces. At least 10 additional parking spaces will be provided.

In addition to the above options, the proposed Grace Bible Church has offered to provide use of its parking facilities during non-school hours for special events. This arrangement would be reciprocal with the Waikele Elementary School providing spillover parking for the church should it be required on Sundays and non-school periods. We believe this will benefit the neighborhood by greatly maximizing the joint use of on-site parking.

Representatives from Grace Bible Church have already informed us they are working with the neighborhood to ensure an acceptable and wanted church facility that will serve the community.

Thank you for this opportunity to respond. We hope we have addressed your concerns and questions regarding this project.

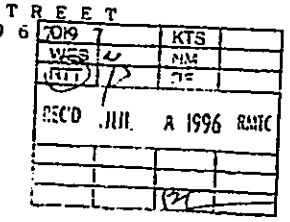
Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
cc: RMTC - Brian Takeda
CDS International - Richard Balcom

BOYD T. MARUMOTO
94-1060 KUKULA STREET
WAIPAHU, HAWAII 96

JULY 5, 1996



Department of Accounting and General Services
State of Hawaii
P.O. Box 119
Honolulu, HI 96810

Attention: Mr. Gordon Matsuoka

Subject: Draft EIS for planned elementary school at Waikele Subdivision

Dear Sir:

As a resident in the immediate vicinity of the planned elementary school, I would like to address my concerns regarding this matter.

Kukula Street is presently too narrow to provide safe and adequate access to the elementary school. Prudent engineering practice would require at least a third lane to allow for through-traffic as well as the left turns into and out of the school entrances (Two lanes flowing toward mauka, and one lane toward makai). The EIS study did not address queing problems, so this added lane may provide the solution.

The 46 parking stalls per the present design are inadequate to support the anticipated requirements. These stalls will accommodate only the teachers and school staff. Functions which involve parents and teachers such as PTA meetings and May Day programs, will put the demand for parking spaces at a higher level.
The addition of the third lane to alleviate the traffic problem above, also provides part of the solution to the parking problem by allowing parking on one side of the street during non-peak hours. The other part of the solution is to provide more on-site parking within the school property.

The EIS did not indicate if the school facilities will be used after regular school hours for non-school related functions. If it is the intent of the DOE to to do so, then the effects of this use should be included as part of the EIS (ie. noise level, parking, traffic, pollution, etc.)

Your consideration and action regarding the above concerns will be greatly appreciated.

Very truly yours,

Boyd Marumoto

cc: R.M. Towill Corp - Mr. Brian Takeda
Senator Calvin Kawamoto
Representative Nestor Garcia
Councilmember Rene Mansho

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119, HONOLULU, HAWAII 96810

SAM CALLEJO
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

LETTER NO. PM-1118.6

SEP 11 1996

Mr. Boyd T. Marumoto
94-1060 Kukula Street
Waipahu, Hawaii 96797

Dear Mr. Marumoto:

Subject: Draft Environmental Assessment for
Waikele Elementary School
D.A.G.S. Job No. 12-16-0887
TMK: 9-4-07: 69

We have reviewed your comments dated July 5, 1996, and have prepared the following response.

Kukula Street has a 44-foot-wide right-of-way with a 28-foot-wide paved surface. The street was originally designed as a no-parking thoroughfare by the developer, AMFAC/JMB Hawaii, during the master planning of Waikele. The State and its consultants examined the full utilization of Kukula Street with both the elementary school and adjacent church. Kukula Street was found to be in compliance with engineering standards for sufficient capacity, provided there is no parking during school hours. This conclusion was again verified during preparation of the Draft Environmental Assessment, Traffic Impact Analysis, conducted in April and May 1996.

We are keenly aware of the tight parking situation for residents and guests along both Kukula Street, Alelo Street and the surrounding neighborhood. Although the number of parking spaces proposed for the school was determined through the joint Functional Analysis Concept Design (FACD) team, the Department of Accounting and General Services and the Department of Education will be examining options to ensure that the school will not contribute to the existing tight neighborhood parking situation. Options under consideration include:

- Provide additional parking within Waikele Elementary School in Phase II areas which will not be slated for

immediate development. The northernmost portion of the school could be used for spillover parking in the location of the portable classrooms during events which you describe such as PTA meetings and May Day programs.

- Additional parallel parking may be provided within the drop-off zone during special school or community events. This area would be contained within school property and would provide approximately 300 feet of additional parking area.

- Provide additional parking along Lumiaina Street within the park area fronting the elementary school. This option will be considered in the design of the school's second increment to provide the balance of the required parking spaces. At least 10 additional parking spaces will be provided.

In addition to the above options, the proposed Grace Bible Church has offered to provide use of its parking facilities during non-school hours for special events. This arrangement would be reciprocal with the Waikele Elementary School providing spillover parking for the church should it be required on Sundays and non-school periods. We believe this will benefit the neighborhood by greatly maximizing the joint use of on-site parking.

Your final concern involving use of school facilities after non-school hours will be addressed by requiring that all operations of the school be governed in accordance with State and City and County of Honolulu regulations involving noise, traffic, parking and pollution.

Thank you for this opportunity to respond. We hope we have addressed your concerns and questions regarding this project.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
cc: RMTC - Brian Takeda
CDS International - Richard Balcom

July 6, 1996

HAND DELIVERED

GORDON MATSUOKA
Department of Accounting and
General Services
State of Hawaii
1151 Punchbowl Street, Rm. 426
P O Box 119
Honolulu, HI 96813

RE: DRAFT ENVIRONMENTAL ASSESSMENT
WAIKELE ELEMENTARY SCHOOL
DAGS JOB NO. 12-16-0887

Dear Mr. Matsuoka:

Thank you for the opportunity to provide input in regards to the May 1996 Draft Environmental Assessment (DEA) dealing with the Waikele Elementary School. We represent families of the Signatures neighborhood which is the group of homes most closely located to the proposed school.

Upon review of the DEA, numerous questions and concerns were identified which the Signatures neighborhood strongly feels need to be addressed or re-addressed prior to the approval of the construction of the new Waikele Elementary School. Failing to do so would result in safety and health hazards for our families and would negatively impact the quality of our lives. The specific questions and concerns are attached to this letter and grouped into five major categories as follows:

1) Traffic
2) Parking
3) Safety
4) Environmental (Sanitation, Health, Sewage/Drainage, Air Quality, Aesthetics)
5) Quality of Life (Noise Levels, Utility)

As you are probably aware, the community had an opportunity to voice some of these concerns at a meeting held at the Waikele Clubhouse on July 2, 1996 where

representatives of DOE, the Functional Analysis Concept Development (FACD) Design Team, the City Council and the Legislature were in attendance. These same officials along with other key contributors ("review committee") are planning to meet Wednesday, July 10, 1996, to discuss these questions and concerns, as well as formulate possible options and alternatives which will then be presented to the community. These options and alternatives may include the redesign of the facilities and would basically change the scope of the DEA. Therefore we ask that until all the questions and concerns put forth have been adequately answered to the satisfaction of our community and we are informed as to the various options and alternatives that are proposed by the review committee, that no decision be made to finalize the DEA

We hope that you will give these questions and concerns the time and effort that they deserve. Your final decision will have a long-term impact on the health and safety of our neighborhood community. Please send your written responses to

R. K. Empie
Carrie Mukaida
94-1022 Kukula Street
Waipahu, Hawaii 96797

Clarice Mauricio
94-1036 Alelo Street
Waipahu, Hawaii 96797

Sincerely,

Carrie Mukaida Clarice Mauricio

SIGNATURES NEIGHBORHOOD COMMITTEE

attachment

cc: Benjamin J. Cayetano, Governor w/attach

R.M. Towill, Consultant w/attach.
Brian Takeda
420 Waikamilo Road, Suite 411
Honolulu, Hawaii 96817

Office of Environmental Quality Control (OEQC)
Gary Gill, Director OEQC w/attach.
220 South King Street
Central Pacific Plaza, Suite 400
Honolulu, HI 96813

LIST OF QUESTIONS AND CONCERNS
ABOUT THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA) DATED MAY 1996
FROM THE RESIDENTS OF THE SIGNATURES NEIGHBORHOOD

1 **TRAFFIC**

a. What were the assumptions used to reach the conclusion concerning traffic flow (i.e. the direction and streets the cars would use to access and exit the school)?

b. Why was a Traffic Modeling Study not included in the DEA?

c. Why was the anticipated increased traffic volume on Alelo Street not included in the traffic study? *...Alelo Street is approximately 200 feet from the proposed Waikele Elementary School site and will be impacted by the anticipated traffic flow pattern presented by a member of the Development Team at the DOE Informational Meeting held on July 2, 1996 at the Waikele Clubhouse.*

d. Why was the planned construction of the church (which now includes a multi-purpose sports center in addition to a day-care center) not considered in the traffic analysis? *...The increased traffic to and from the church during school hours will significantly impact the anticipated traffic flow pattern and the residents throughout the Signatures neighborhood. The programs that the church plans to offer are meant to accommodate the children not in school sessions based on the multi-track system. This will have the affect of a fully loaded "school population" in the general vicinity year-round.*

e. How will the queuing at the school during the morning and afternoon peak hours affect the traffic on Kukula Street and Alelo Street? *...Based on information given at the July 2, 1996 meeting, Department of Transportation Services (DTS) anticipates students being dropped-off not only in the drop-off zone but also along Kukula Street. Their current solution is to place a fence fronting the school property to prevent students from crossing the drop-off zone and traffic pattern. Based on the narrow width of Kukula Street (two-way traffic) and the anticipated drop-off of students along both sides of this street, the queuing problem would be exacerbated and would pose a safety hazard for pedestrian traffic.*

f. Why did the DEA fail to identify the locations of traffic control devices (i.e. signs, traffic signals, etc.)? *...These devices would alter traffic flow and need to be factored into the traffic study.*

g. What were the assumed vehicle speed limits used in the traffic study? *The community believes lower speed limits will affect queuing and the flow of traffic from Kukula Street onto and off of Pakela Street and Lumiaina Street*

1 **TRAFFIC (cont'd)**

h. Why did the DEA not address Department of Transportation Services (DTS) concerns regarding the current 28-foot width of Kukula Street? *..The minutes of the FACD Working Session #2 dated November 29, 1995 documented DTS's expressed concern that Kukula Street is too narrow to adequately handle school traffic*

i. Why was Lumiaina Street, a four-lane major roadway, not selected as the primary ingress/egress point to the school?

j. During the traffic study for the DEA, were the documented traffic violations (i.e. speeding, illegal U-turns, accidents, etc.) on the streets in the Signatures and Royal Pines neighborhood and traffic violation complaints to the HPD and Waikele Community Association considered?

k. Why are there inconsistencies in the DEA concerning the assumptions made in the traffic study? *The introduction to the DEA identifies Waikele Elementary School will service the Waikele residents and alleviate overcrowding at August Ahrens Elementary School. The appendix for the traffic study in the DEA notes Waikele Elementary will service only the Waikele community*

l. How will the planned opening of Managers Drive and the future connection of Paiwa Street to Kamehameha Highway affect the traffic flow within the study area?

2. **PARKING**

a. Why did the traffic study in the DEA not consider the increase in the number of non-resident automobiles that would park on adjacent streets and how this additional non-resident parking would affect the flow of traffic? *...Given the fact that the school and church are surrounded by "No Parking" Streets (e.g., Lumiaina Street, Kukula Street, and Pakela Street), the limited amount of parking stalls proposed for the school and the church would force people to park on adjacent streets, one of which is Alelo Street.*

b. Where will the vendors, maintenance personnel, construction personnel, guests, parents, and other visitors park while visiting the school? *..The Waikele Elementary School FACD Executive Summary Report identifies a total of 46 parking stalls will be available. Based on the discussion at the DOE Informational Meeting at the Waikele Clubhouse on July 2, 1996, these 46 parking stalls will accommodate the planned school staff only*

2 **PARKING (cont'd)**

c. Do the labor union contracts mandate on-site parking for teachers, facility maintenance and administrative personnel? If yes, then where will it be located and how will it affect the flow of traffic into and out of the school during peak periods? If no, then how will off-site parking affect traffic on the feeder streets? *Refer to 2.a. The DEA identified 46 stalls available for the school teachers and staff, but the total count of school personnel per the DEA /FACD Executive Summary Report will exceed 64 employees.*

d. Where will parents and relatives attending school sponsored activities (i.e. holiday programs, graduations, PTSA meetings, etc.) park their cars? *Note The community feels parking on the grass in the adjacent "park" fronting Lumiaina Street is not an acceptable option. The resultant destruction of the green area and sprinkler systems will significantly degrade the surrounding neighborhood.*

e. Why did the DEA and Master Plan specify Kukula Street must be "24-Hour No Parking?" *...Off-peak hour parking (e.g. 6 p.m. to 6 am) and weekend parking should be allowed as a minimum.*

3 **SAFETY**

a. Why did the DEA not identify the locations of crosswalks? *...The location of these crosswalks will dictate pedestrian traffic flow and possible locations of JPOs, which may further alter the anticipated traffic flow.*

b. Why did the DEA not address mandated speed limits for the school zone? *...Standard speed limits of 15 mph would increase the safety of the children crossing the street to access the school, but may also increase queuing problems which would further indicate that Kukula Street is inadequate to handle school and church traffic.*

c. Will the entire length of Kukula Street be considered as a school zone for the purpose of speed limits?

d. Will Lumiaina Street, Pakela Street and Alelo Street also be considered as a school zone for the purpose of speed limits?

e. Why did the traffic study **not** address the safety issues concerning the four "blind curves" on Kukula Street and Alelo Street? *...These areas restrict a driver's line of sight and the increased volume of traffic on these streets during the school year would adversely affect the safety of the school children and other pedestrians walking to and from the school.*

3 **SAFETY (cont'd)**

f. Why did the DEA not address the safety of the pedestrians resulting from the narrow width of the existing sidewalks along Kukula Street? *Children walking to and from school may easily be forced off the sidewalk by other pedestrian traffic in passing.*

g. Why did the DEA not address safety concerns caused by the increased holiday shopping traffic into and out of the Waikele Shopping Center? *..This is especially important since the Waikele Elementary School is being planned as a year-round, multi-track facility.*

4. **ENVIRONMENTAL (Sanitation, Health, Sewage/Drainage, Air Quality, Aesthetics)**

a. Why did the DEA not address health issues resulting from increased trash and accumulation of food waste associated with the daily preparation of approximately 3,100 school meals (i.e. breakfast and lunch)?

b. Was the Board of Health consulted on the problems (i.e. increased presence of rodents, scavenging wild dog and cats, etc.) associated with daily accumulation of trash and food waste in a residential area?

c. What were the quantitative factors used to determine the adequacy of the present sewage system in Signatures to handle the increased volume of sewage and water run-off from the school? *...A previous heavy rain revealed the drainage system along Alelo Street was inadequate.*

d. Did the analysis of the sewer system and drainage requirements consider the additional load from the planned church complex adjacent to the school? *.. The May 1996 DEA states that the church plans were not available.*

e. Why was air quality addressed only during construction periods? What affects on the air quality will idling cars, buses and delivery vehicles during peak periods (drop-off/pick-up) have on the health of residents located along Kukula Street? *...All homes have bedrooms facing the street.*

f. The DEA states that the school "...has been designed in such a way as to blend in with its surrounding environment. The proposed project will not significantly impact the visual character of the area." However, the plans call for a chain-link fence along the frontage of the school with "cattle gates" for driveway entrances. These types of fences and gates are prohibited in all the surrounding neighborhoods under the Waikele Community Association's DCCRs and therefore will significantly impact the visual character of the area.

5. **QUALITY OF LIFE (Noise Levels, Utility)**

a. Why did the DEA **not** address the impact of the noise level on the residents created by the early morning deliveries to the school cafeteria and other activities (i.e. trash pick-ups, back-up truck beepers, delivery trucks, unloadings/loadings, etc.) associated with the daily preparation of approximately 3,100 school meals (breakfast and lunch)? *The DEA stated that " The kitchen is designed as a prep kitchen able to prepare breakfast and lunches for 750 students at Waikele Elementary School as well as 800 additional students at Kanoelani School in Waipio." These early morning deliveries could start as early as 3 a.m. to support the high volume of meals prepared and also delivered off-site.*

b. Why were noise levels only addressed during the construction period? Why did the DEA **not** address the impact of noise levels associated with the operations of the school such as the air conditioning equipment which could run continuously 24-hrs. per day, year-round, and in close proximity to residential homes? What are the anticipated decibel levels during peak operational periods?

c. Why did the DEA **not** take into consideration the fact that the "24-Hour No Parking" restriction on Kukula Street would reduce the utility of the residences along Kukula Street. *With today's extended families, multiple parking spaces are required for each residence, including visitors. Some driveways are too short in length to legally park a car in their driveway thereby limiting some homes to only two parking spaces.*

BENJAMIN J. CAYETANO
GOVERNOR

SAM CALLEJO
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119 HONOLULU, HAWAII 96810

LETTER NO. PM-1121 6

SEP 11 1996

Mr. R. K. Empie
Ms. Carrie Mukaida
94-1022 Kukula Street
Waipahu, Hawaii 96797

Dear Mr. Empie and Ms. Mukaida:

Subject: Response to Draft Environmental Assessment for
Waikele Elementary School
D.A.G.S. Job No. 12-16-0887
TMK: 9-4-07: 69

We have reviewed your response dated July 6, 1996. We understand and share your concern that the Waikele Elementary School be developed in a responsible manner. A series of meetings has been held with representatives from the Legislature, Honolulu City Council, your Neighborhood Board #22, Department of Education, Department of Accounting and General Services, City Department of Transportation Services, other governmental agencies and the developer of Waikele, AMFAC/JMB Hawaii. The purpose of these meetings was to address the concerns stated through prior public meetings as well as in your letter.

Attached is our prepared response to each of your stated concerns. We hope we have adequately addressed your questions. If after you have reviewed our response you still have questions, please do not hesitate to contact Mr. Daniel Jandoc of my staff at 546-0476.

Thank you for this opportunity to respond.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
Attach.
cc: RMTC - Brian Takeda
CDS International - Richard Balcom

Response to List of Questions and Concerns Regarding
DRAFT ENVIRONMENTAL ASSESSMENT FOR
WAIKELE ELEMENTARY SCHOOL

August 10, 1996

1. TRAFFIC

a. ***What were the assumptions used to reach the conclusions concerning traffic flow?***

The school traffic assignment in the Draft Traffic Impact Analysis Report (TIAR) is based on distribution of dwelling units in the Waikele community. It was further assumed that unrestricted access would be permitted at all school driveways.

b. ***Why was a Traffic Modeling Study not included in the Draft Environmental Assessment (DEA)?***

The TIAR presents the results of several models used to develop the traffic impact analysis.

c. ***Why was the anticipated increased traffic volume on Alelo Street not included in the traffic study?***

The TIAR analysis, based on unrestricted access at the school driveways on Kukula Street, indicate that Alelo Street will not be significantly impacted by school traffic.

d. ***Why was the planned construction of the church not considered in the traffic analysis?***

The purpose of the TIAR is to analyze the proposed school traffic and to mitigate its impact. At the time of the study, plans for the church were not made available. However, assumptions were made in the Draft TIAR to estimate the peak hour traffic from a "typical" church and an "average-size" day care facility. This information was used and incorporated into the Draft TIAR as part of the background traffic.

Since the Draft TIAR was completed, a meeting was held with representatives of Grace Bible Church. It is our intention to incorporate any new information they provide into our Final TIAR. However, any traffic impacts resulting from development of the church should be identified and mitigated as part of a separate traffic impact analysis report prepared by the developer of the church.

e. ***How will the queuing at the school during the morning and afternoon peak hours affect the traffic on Kukula Street and Alelo Street?***

We will be analyzing additional temporary/spillover parking on the school site for parents who wish to park their cars and walk their children to the classrooms. Although not encouraged, the curb lane on the school side of Kukula Street could operate as an active loading/unloading lane, leaving two lanes for moving traffic. We are also working with representatives of the proposed Grace Bible Church to look at providing a secondary joint access off Pakela Street, thereby increasing the off-street queuing area should it be needed in the future. Queuing is not expected to affect Alelo Street.

f. ***Why did the DEA fail to identify the locations of traffic control devices?***

Section IV A. Area Roadway System, discusses the existing traffic controls on streets which were considered in the traffic impact analysis.

g. ***What were the assumed vehicle speed limits used in the traffic study?***

Standard City and County of Honolulu speed limits of 25 miles per hour were assumed in the TIAR. Lower speeds on Lumiaina Street and on Pakela Street may actually reduce delay on Kukula Street. At lower speeds, motorists on the side street will accept shorter gaps in traffic when turning onto or crossing the main street.

h. ***Why did the DEA not address the Department of Transportation Services (DTS) concerns regarding the current 28-foot width of Kukula Street?***

On January 11, 1996, representatives of DTS, Department of Accounting and General Services (DAGS) and Department of Education (DOE) met to review the adequacy of the site plan for Waikele Elementary School in relation to traffic impacts to the area. According to DTS, the proposed site plan layout was acceptable pending modification of the following:

1) The two driveways from Kukula Street to the off-street passenger loading areas and parking lots should be made one way in at the north end and one way out at the south end.

2) The bus and car passenger-loading zones should be consolidated by eliminating a curb peninsula that was onginally intended to separate the two loading areas.

3) The two driveways from Kukula Street to the off-street parking lots and passenger-loading zones should be as narrow as possible while still accommodating the movements of bus traffic.

4) A 4-foot-high chain link fence should be installed along Kukula Street frontage of the school to control pedestrian access into the school from the street sidewalk.

5) No left turn signs should be installed at the entrance and exit driveways at Kukula Street to the off-street passenger-loading zone.

DTS stated that the proposed location of the service driveway into the school site was acceptable since it was more than 160 feet from the intersection of Kukula Street with Lumiaina Street. DTS also stated that the three proposed driveways into the school site should not be a problem. However, the driveway curb cuts into Kukula Street should be standard City and County of Honolulu 4-foot concrete sidewalk flares.

At this time, we are awaiting any comments DTS may have concerning the Draft TIAR. Once we receive their response, we will work with them to resolve any further concerns they may have.

i. ***Why was Lumiaina Street, a four-lane major roadway, not selected as the primary ingress/egress point to the school?***

Direct access on Lumiaina Street is not recommended because it presents potential safety and operational problems. Children crossing a heavily travelled, four-lane roadway to and from the school site pose a safety problem. Kukula Street is narrower and carries lower traffic volumes than Lumiaina Street and provides safer conditions for children. Operational problems along Lumiaina Street would occur from parents parking and stopping along the curbside to drop off and pick up children. Finally, vehicular access and egress off a heavily travelled collector roadway, such as Lumiaina Street, will be more difficult than a local roadway such as Kukula Street.

j. ***During the traffic study for the DEA, were the documented traffic violations on the streets in the Signatures and Royal Pines neighborhood and traffic violation complaints to the HPD and Waikele Community Association considered?***

No. Traffic accident reports and statistics are held in the strictest confidence by City and County of Honolulu and State agencies, and are not released to the general public. Access to such information requires the explicit approval of these public agencies or some other legal authorization.

k. ***Why are there inconsistencies in the DEA concerning the assumptions made in the traffic study?***

According to the DOE, Leeward District Office, the proposed Waikele Elementary School will serve the immediate needs of the Waikele community. Waikele community students now at Pearl City will be moved to the Waikele Elementary School when the first phase is built. As the future phase of Waikele school is completed and as capacity is available, some relief from overcrowding may be provided to August Ahrens Elementary School.

l. ***How will the planned opening of Managers Drive and the future connection of Paiwa Street to Kamehameha Highway affect the traffic flow within the study area?***

The future extension of Managers Drive and Parwa Street is expected to occur beyond the time frame of the TIAR. Traffic impacts resulting from the improvements should be addressed by the TIARs prepared for the respective roadway improvements.

2. PARKING

a. ***Why did the traffic study not consider the increase in the number of non-resident automobiles that would park on adjacent streets and how this additional non-resident parking would affect the flow of traffic?***

Although the number of parking spaces proposed for the school were determined through the joint Functional Analysis Concept Design (FACD) team, DAGS and DOE will be examining options to ensure that the school will not contribute to the existing tight neighborhood parking situation. Options under consideration include:

- The portions of the school designated for the location of the portable classrooms could be used for spillover parking during events which you describe such as PTA meetings and May Day programs.
- Additional parallel parking will be provided within the drop-off zone during special school or community events. This area would be contained within school property and would provide approximately 300 feet of additional parking area.
- Provision of additional parking along Lumiaina Street within the park area fronting the elementary school. This option will be included in the design of the school's second increment to provide the balance of the required parking spaces. At least 10 additional parking spaces will be provided.

In addition to the above options, the proposed Grace Bible Church has offered to provide use of its parking facilities during non-school hours for special events. This arrangement would be reciprocal with the Waikele Elementary School providing spillover parking for the church should it be required on Sundays and non-school periods. We believe this would benefit the neighborhood by greatly maximizing the joint use of on-site parking.

b. ***Where will the vendors, maintenance personnel, construction personnel, guests, parents and other visitors park while visiting the school?***

As noted above, DAGS and DOE will work to ensure that, as much as is possible, the school will not contribute to the existing tight neighborhood parking situation. This means ensuring the provision of additional parking wherever possible. During non-peak school hours, parking for

visitors, guests and other personnel will be available in the drop-off area.

c. ***Do the labor union contracts mandate on-site parking for teachers, facility maintenance and administrative personnel?***

We have inquired with the Hawaii State Teachers Association (HSTA), Hawaii Government Employees Association (HGEA) and DOE. Based on our inquiry, the unions do not specifically mandate on-site parking. However, whenever it is possible, DOE will provide on-site parking to personnel necessary to the functioning of the school.

d. ***Where will parents and relatives attending school sponsored activities park their cars?***

Please refer to our response for Item 2.a. and 2.b. above.

e. ***Why did the DEA and Master Plan specify Kukula Street must be "24-Hour No Parking?"***

Kukula Street was originally designated a no-parking thoroughfare by the developer, AMFAC/JMB Hawaii, during the master planning of Waikele. As you are aware, the no-parking provision is only now being enforced.

3. SAFETY

a. ***Why did the DEA not identify the locations of crosswalks?***

Existing crosswalks at intersections in the study area will be maintained. New crosswalks are not planned at this time.

b. ***Why did the DEA not address mandated speed limits for the school zone?***

Current City and County of Honolulu, DTS, policy does not mandate special speed limits within school zones. However, community requests for lower speed limits in the area will be considered by DTS.

c. ***Will the entire length of Kukula Street be considered as a school zone for the purpose of speed limits?***

Please refer to Item 3.b. above.

d. ***Will Lumiaina Street, Pakela Street, and Alelo Street also be considered as a school zone for the purpose of speed limits?***

Please also refer to Item 3.b. above.

e. ***Why did the traffic study not address the safety issue concerning the four "blind curves" on Kukula Street and Alelo Street?***

Safe sight distances along Kukula Street and Alelo Street will be verified by DTS. Any remedial action necessary to maintain safe sight distances will be taken.

f. ***Why did the DEA not address the safety of the pedestrians resulting from the narrow width of the existing sidewalks along Kukula Street?***

Existing sidewalks along Kukula Street conform to City and County of Honolulu standards for adequacy to accommodate pedestrian traffic to and from the proposed school.

g. ***Why did the DEA not address safety concerns caused by the increased holiday shopping traffic into and out of the Waikele Shopping Center?***

Traffic from elementary schools and shopping centers do not generally conflict. The AM peak hour traffic for a shopping center is relatively low, consisting of employees and deliveries. Store openings usually occur around 9:00 AM. A shopping center's peak hours of traffic occurs around noon and during the early evening. The school PM peak hour occurs during the mid-afternoon. Finally, the heaviest shopping center traffic occurs on weekends when school is not in session. During the holiday shopping season, school students will be on vacation during the Christmas-New Year's Day period under a year-round, multi-track operation.

4. ENVIRONMENTAL

a. ***Why did the DEA not address health issues resulting from increased trash and accumulation of food waste associated with the daily preparation of approximately 3,100 school meals?***

Trash and food waste generated by the school will be removed daily. Trash awaiting removal will be stored in appropriate containers designed for such purpose. All other handling and disposal of solid waste will be in accordance with applicable regulations of the City and County of Honolulu and State of Hawaii.

b. ***Was the Board of Health consulted on the problems associated with daily accumulation of trash and food waste in a residential area?***

As noted, all solid waste including food waste generated by the school will be subject to applicable regulations of the City and County, and

State. These regulations will include requirements of the State Department of Health (DOH) for waste disposal and waste storage awaiting disposal. Because this waste will be removed daily, no adverse impacts are expected.

c. ***What were the quantitative factors used to determine the adequacy of the present sewage system in Signatures to handle the increased volume of sewage and water run-off from the school?***

The infrastructure requirements for Waikele were sized by the developer, AMFAC/JMB Hawaii. This includes providing for sufficient drainage, waste water and potable water requirements for the larger Waikele Community as well as public facilities, such as the Waikele Elementary School. The general quantitative factors involved in sizing the specific Waikele Elementary School waste water and drainage systems included size of the school population being served, slope and size of area served, climate and rainfall and other factors as stipulated by applicable City and County, and State regulations. The adequacy of the sewer system will be determined by the Department of Waste Water Management, City and County of Honolulu.

d. ***Did the analysis of the sewer system and drainage requirements consider the additional load from the planned church complex adjacent to the school?***

As noted above, the overall infrastructure system for Waikele was sized by AMFAC/JMB Hawaii, to account for future growth of residents and public facilities such as the proposed elementary school. Development of site-specific drainage and waste water requirements for the school, therefore, will be based on allowances as coordinated by the City and County of Honolulu, Public Works, Waste Water Management and other Departments.

e. ***Why was air quality addressed only during construction periods? What affects [sic] on the air quality will idling cars, buses and delivery vehicles during peak periods (drop-off/pick-up) have on the health of residents located along Kukula Street?***

Air quality is specifically addressed during construction because of the close proximity of the project to residences along Kukula, Lumiaina, Pakela and Alelo Streets. Air quality impacts associated with the developed school, however, are not expected to result in adverse impacts:

- According to the Draft TIAR, it is possible to maintain sufficient traffic flow through Kukula Street. This would include periods of potential congestion such as during morning and afternoon rush hours, as well as during non-school hour special functions such as

PTA and May Day programs. This maintenance of traffic flow would be facilitated by improvements such as proposed in the Draft TIAR.

- The area immediately surrounding the proposed elementary school includes open park land to the south and relatively undeveloped land to the immediate west. This open space, in conjunction with presence of tradewinds, would tend to diffuse vehicular exhausts.

- Delivery vehicles are not expected to operate within the same time frame as early morning/late afternoon peak periods for drop-offs and pick-ups.

f. ***The DEA states that the school ". . . has been designed in such a way as to blend in with its surrounding environment. The proposed project will not significantly impact the visual character of the area." However, the plans call for a chain-link fence along the frontage of the school with "cattle gates" for driveway entrances. These types of fences and gates are prohibited in all the surrounding neighborhoods under the Waikele Community Association's DCCRs and therefore, will significantly impact the visual character of the area.***

As noted in the DEA, the proposed project was designed using a Functional Analysis Concept Design (FACD) team. This team focused on the design of the overall school in relation to the architecture present throughout the Waikele Community. The restriction over use of specific types of fencing and gate materials, however, is a residential use restriction and not a restriction on the requirements of public facilities such as schools or parks.

The final decision whether to use chain-link fencing or "cattle-gates" at Waikele Elementary School will be based on cost to the public, and the need for safety and security for students. These types of materials have been used at many public schools and facilities throughout the State. We believe use of these materials at Waikele Elementary School would not materially detract from the larger Waikele Community.

5. QUALITY OF LIFE (NOISE LEVELS, UTILITY)

a. ***Why did the DEA not address the impact of the noise level on the residents created by the early morning deliveries to the school cafeteria and other activities associated with the daily preparation of approximately 3,100 school meals?***

The activities of any public facility must conform to noise regulations of the State of Hawaii, DOH. This includes ensuring that noise levels from and associated with the proposed school cafeteria do not exceed

standards. Because the DOE must adhere to these standards, no adverse impacts are anticipated.

b. ***Why were noise levels only addressed during the construction period? Why did the DEA not address the impact of noise levels associated with the operations of the school such as the air conditioning equipment which could run continuously 24-hours a day, year-round, and in close proximity to residential homes? What are the anticipated decibel levels during peak operational periods?***

As noted above, noise levels associated with operations of the school are not expected to exceed standards of the State DOH. According to Benjamin Notkin Hawaii, the mechanical engineer for this project, the air conditioning units designed for the school must meet noise standards and requirements for both the students as well as the surrounding neighborhood. In addition, 24-hour units which would be required for protection of electrical and electronic equipment would adhere to noise standards that are stricter than for units operating only during daylight hours.

c. ***Why did the DEA not take into account consideration the fact that the "24-Hour No Parking" restriction on Kukula Street would reduce the utility of the residences along Kukula Street?***

Kukula Street was originally designed as a no-parking thoroughfare by the developer, AMFAC/JMB Hawaii, during the master planning of Waikele. The no-parking restriction, therefore, was in place before the start of planning for the Waikele Elementary School. However, we can appreciate the sensitivity of the immediate surrounding neighborhood concerning this issue. As we have noted above, DAGS and DOE will work to ensure that on-site activities do not contribute to the existing tight parking situation.

July 8, 1996

Mr. Gordon Matsuoka
Department of Accounting and
General Services
1151 Punchbowl Street, Room 426
P. O. Box 119
Honolulu, Hawaii 96813

RE: Draft Environment Assessment - Waikele Elementary School
DAGS Job Number 12-16-0887

Dear Mr. Matsuoka:

I would like to bring to your attention two other topics that were missing from the report that the residents of the Signatures subdivision will be submitting to you today.

My first set of questions are concerning the Navy's use of the underground munitions storage tunnels on the Ewa side (and we assume under) the property.

1. Are the tunnels still being used for storage of munitions, and if not, is anything being stored there that could be harmful to the students and adult population? Is there a procedure by which the school will be notified by the Navy of the existing contents; and how will the information be passed to parents and the community?

2. Are the tunnels in good condition, and is proper and qualified scheduled inspection of the tunnels being conducted to assure safety for those who will be in the school, park or church?

3. Are there safeguards and emergency plans in place should there be an earthquake or accident in the munitions tunnels? Will there be a procedure in place (staff) to provide for emergency aid, notification, safety and welfare of the staff and student population? Are there special architectural provisions that have been incorporated because of the tunnels? If no, why not?

Mr. Gordon Matsuura
July 8, 1996
Page Two

4. Is there any history of spillage or leakage of hazardous or nuclear material that could affect the health and safety of the residents, school, park and proposed church? What provision will the school have in place to ensure the safety of the children should there be such an occurrence?

The second set of questions pertain to the prior use of the property.

1. Has the soil been tested for pesticides and hazardous residue? What were the results of the testing? Did the analysis show carcinogenic contaminants? If the soil was not tested, why not? Based on current vegetation, it is assumed that the site was former cane land for many years, and I am aware of commercial cane land has used pesticides and other chemicals to enhance their production, some of which may continue to have a residual effect.

2. Will there be follow-up soil testing for hazardous waste/pesticides after the construction is completed? We assume that there will be some grading of the site during construction, and previously covered soil will then be exposed, which may or may not be contaminated. What provisions will there be should hazardous material be discovered to protect the community, the staff and the population?

Thank you for your immediate attention to my concerns. I look forward to your response.

Sincerely,

Clarice Mauricio
94-1036 Alelo Street
Waipahu, Hawaii 96797

cc: Senator Calvin Kawamoto
Representative Nestor Garcia
Councilwoman Rene Mansho
Mr. Daryl Young, Waipahu Neighborhood Board

BENJAMIN J. CAYETANO
GOVERNOR

SAM CALLEJO
ACTING SCHOOL BOARD
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119 HONOLULU, HAWAII 96810

LETTER NO PM-1117.6

SEP 11 1996

Ms. Clarice Mauricio
94-1036 Alelo Street
Waipahu, Hawaii 96797

Dear Ms. Mauricio:

Subject: Draft Environmental Assessment for
Waikele Elementary School
D.A.G.S. Job No. 12-16-0887
TMK: 9-4-07: 69

We have reviewed your comments dated July 8, 1996, and have prepared the following response.

Your letter identifies two concerns. The first involves the presence of underground munitions storage tunnels on the ewa side of the Waikele Elementary School. We have forwarded your letter to the U. S. Department of the Navy. Their response dated July 31, 1996, is attached for your consideration.

Your second concern involves prior use of pesticides or hazardous materials at the school site. A review of the Waikele Final Environmental Impact Statement (EIS), dated January 1986, indicates that initially there was concern over prior use of pesticides and chemicals affecting the underlying aquifer providing drinking water to Waikele. According to the EIS, "several wells in the Waipahu and Mililani areas have been found to be contaminated with EDB, DBCP and TCP. New wells drilled to serve the Waikele development may be contaminated and require treatment before distribution and use" (Office of Environmental Quality Control, November 26, 1985). Since the initial finding of pesticides, the developer, AMFAC, and the Honolulu Board of Water Supply have worked to install the necessary treatment facilities to remove any potential contaminants. Today, testing and treatment continue on a regular basis to ensure a safe and secure water supply to Waikele.

We have forwarded your letter to AMFAC JMB Hawaii to also allow them the opportunity to provide any additional or follow-up information to the above. Their response dated August 28, 1996, is attached for your consideration. Although there are no requirements to have the soils tested for chemicals, the State contacted a consultant to do such testing. We will forward the results to you upon our receipt.

Thank you for this opportunity to respond. We hope we have adequately addressed your concerns and questions regarding this project.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
Attach.
cc: R. M. Towill Corp. - Brian Takeda
CDS International - Richard Balcom

DEPARTMENT OF THE NAVY
PACIFIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
(MAKALAPA HI)
PEARL HARBOR HAWAII 96860-7300

11011 -
Ser 2412/3168
31 JUL 96

State of Hawaii
Department of Accounting and General Services
Attn: Mr. Daniel Jandoc
P.O. Box 119
Honolulu, HI 96810

Gentlemen:

This responds to your letter of July 10, 1996, concerning the Draft Environmental Assessment being prepared for the Waikele Elementary School. The below answers are keyed to the questions in Ms. Clarice Mauricio's letter of July 8, 1996:

a. Answer 1: The Waikele Branch of the Naval Magazine, Lualualei, is presently unused. Nothing is stored in the tunnels and there are no plans to use the tunnels for military purposes at this time. We have no objection to notifying the State of any future plans that might develop while the Navy has control of these facilities.

b. Answer 2: The tunnels are located completely on Navy property and do not extend under any adjacent property not owned by the federal government. As advised above, the tunnels are not being used. The tunnels are in good repair and are properly maintained.

c. Answer 3: Since the tunnels do not extend under adjacent property and are not being used, this question does not apply.

d. Answer 4: There is no history of any spillage that could affect adjacent land.

We trust this satisfactorily answers your inquiry. If there are any further questions, please contact Mr. Ken Alexanderson at 474-5926.

Sincerely,

DENNIS PACHT
Deputy Director
Real Estate Division

Amfac
700 ... Street
Honolulu, Hawaii 96813
Telephone (808) 543-8900

RECEIVED
Aug 30 3 2- 1996

August 28, 1996

State P.W. Engr	Approval
P.W. Secy	Sign
Staff Serv Br	Info
Planning Br	File
Proj. Mgmt. Br	See me
Survey B	Comments
Insp Br	Invest &
Qual. Cont. Engr	Rect
Contract Serv. Br	

Mr. Gordon Matsuoka
State Public Works Engineer
Department of Accounting and General Services
State of Hawaii
P. O. Box 119
Honolulu, HI 96810

Dear Mr. Matsuoka:

Re: Waikele Elementary School (DAGS Job No. 12-16-0887)

We received your letter dated August 9, 1996, and offer the following responses to the second set of questions.

1. *Has the soil been tested for pesticides and hazardous residue?* Amfac did not test the soil prior to the dedication of the site to the State of Hawaii.

   What were the results of the testing? N/A.

   Did the analysis show carcinogenic contaminants? N/A.

   If the soil was not tested, why not? There was no requirement to test the soil prior to conveyance.

2. *Will there be follow-up soil testing for hazardous waste/pesticides after the construction is completed?* This would be up to the State of Hawaii to decide.

Beyond the direct answers to the questions referred to in your letter, we offer the following information to provide some general background relating to the agricultural use of the Waikele site.

- Fertilizers, similar to residential lawn fertilizers, containing nitrogen, phosphorus, and potassium, were used on the sugarcane crops. Control of weeds was done with herbicides registered for use with the U.S. Environmental Protection Agency. Herbicides were applied during the first eight months of the crop cycle. Since the last crop of cane in this area was harvested in the early 1980s, almost 15 years ago, and with the normal degradation process of herbicides in the soil, it would be very unlikely that there would be any significant amount of herbicide residual present in the soil today.

Amfac

If there are any other questions, please call me at 543-8929.

Sincerely,

AMFAC PROPERTY DEVELOPMENT CORP.

John L. Higham
Director of Development

JLH:lyk

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUN

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

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To Brian Takeda	From Faith Miyamoto
Co. Ron Tawill	Co. DTS
Dept.	Phone # 527-6976
Fax # 842-1937	Fax # 527-6987

7/96-03263R

August 6, 1996

Mr. Gordon Matsuoka, State Public Works Engineer
Department of Accounting and General Services
State of Hawaii
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Matsuoka:

Subject: Draft Environmental Assessment for Waikele Elementary School

In response to your July 17, 1996 letter, we reviewed the subject draft environmental assessment and have the following comments:

1. The environmental assessment should identify the measures that will be implemented to accommodate the increases in pedestrian traffic before and after school hours. The location of street crossings should be coordinated with this department.

2. Adequate vehicular sight distance to pedestrians and other vehicles must be provided and maintained at all driveway locations. Landscaping, walls, and structures should be designed to provide the greatest vehicular sight.

3. The traffic circulation pattern and driveway access restrictions for the school site should be clearly identified. It is our understanding that there will be a one-way counterclockwise traffic pattern along the frontage road where drop-off/pick-up activities are to occur. The traffic study should be consistent with the proposed traffic patterns and driveway restrictions.

4. The drop-off/pick-up area should be designed to accommodate all passenger loading activities to avoid vehicular queuing onto Kukula Street. The proposed pedestrian gate located between the two driveways should be closed to discourage passenger loading on Kukula Street.

5. Driveway grades should not exceed five (5) percent for a minimum distance of thirty-five (35) feet from the curb prolongation.

6. The school should work with the proposed church to examine and pursue the possibility of providing additional vehicular access to Pakela Street through the church site to relieve traffic on Kukula Street.

7. The school should identify the hours when traffic activity is anticipated to occur. Presently, there are parking restrictions on both sides of Kukula Street. These restrictions could be modified to allow parking on the residential side of the street at times other than the peak traffic periods for the school.

8. There are planned improvements for the Lumiaina Street/Paiwa Street intersection to provide an exclusive left and shared left and through movement at the westbound approach. These improvements are being proposed by AMPAC. However, there are presently no provisions for the increase in vehicular and pedestrian traffic being generated by the school. An updated traffic assessment should be conducted after the school is in operation to verify traffic patterns, specific phasing and timing, and to determine if there are additional improvements that may need to be provided as part of the school generated traffic.

9. Construction plans for all work within the proposed City's right-of-way should be submitted to this department for review and approval.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation System Planning Division at 527-6976.

Respectfully,

for CHARLES O. SWANSON
Director

cc: Mr. Brian Takeda,
R. M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR

SAM CALLEJO
COMPTROLLER

MARY PATRICIA WATERHOUSE
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119 HONOLULU HAWAII 96810

LETTER NO PM-1120.6

SEP 11 1996

Mr. Charles O. Swanson
Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, Suite 300
Honolulu, Hawaii 96813

Dear Mr. Swanson:

Subject: Response to Comments - Draft EA for
Waikele Elementary School
D.A.G.S. Job No. 12-16-0887
TMK: 9-4-07: 69

We have reviewed your comments dated August 6, 1996, and have prepared the following response.

1. ***The Environmental Assessment (EA) should identify measures to accommodate increases in pedestrian traffic before and after school hours. Locations of street crossings should be coordinated with Department of Transportation Services (DTS).***

   The mitigation measures and traffic plan provided in the Draft EA, Traffic Impact Analysis Report (TIAR), have taken into account the vehicular and pedestrian traffic that would be generated during school operations.

   No new street crossings are proposed. The existing Kukula Street intersections at Lumiaina Street and at Pakela Street are legal street crossings providing access to the school. The possibility of adding visible crosswalk striping will be coordinated with DTS.

2. ***Adequate vehicular sight distance must be provided.***

   Adequate vehicular sight distances to pedestrians, other vehicles, landscaping, walls and other structures will be incorporated into the design of the project. This will be verified during the design phase when engineering drawings will be submitted to DTS for review.

3. ***Traffic circulation patterns and driveway access restrictions should be identified.***

   Initially, it is proposed that the school driveways will be two-way. The TIAR was developed based on this premise and found no significant impact. However, depending on future conditions involving school enrollments and traffic flow, access may be modified to accommodate increased demand.

4. ***The drop-off/pick-up area should be designed to accommodate all passenger-loading activities. The pedestrian gate between the two driveways should be closed to discourage passenger loading on Kukula Street.***

   The proposed loading area is designed to accommodate all passenger loading. Use of the gate to provide pedestrian access will be reviewed to ensure adequate safety for pedestrians. This will be coordinated with DTS during the design phase.

5. ***Driveway grades should not exceed 5 percent for a minimum distance of 35 feet from the curb prolongation.***

   On-site driveway grades will be designed in general accordance with this specification. However, joint access between the school and proposed adjacent church may require a future shared driveway. The specific requirements for this shared driveway will be coordinated with DTS as this information becomes available.

6. ***The school should work with the proposed church to examine and pursue the possibility of additional vehicular access through the church to relieve traffic on Kukula Street.***

   The Department of Accounting and General Services (DAGS) and the Department of Education (DOE) are currently discussing this possibility with the prospective new owner of the church. Discussions at this time remain preliminary.

7. ***The school should identify the hours when traffic is expected to occur. Presently, there are parking restrictions on both sides of Kukula Street. These restrictions could be modified to allow parking on the residential side of the street at times other than the peak traffic periods.***

   Traffic is expected to occur within the same morning and afternoon timeframes as other schools, which is 7:00 a.m. to 3:00 p.m. During these school hours, parking should be restricted to ensure efficient traffic operations.

8. ***There are planned improvements for the Lumiaina Street/Paiwa Street intersection which are proposed by AMFAC.***

   The traffic improvement measures proposed by AMFAC are consistent with the traffic mitigation and improvements recommended in the TIAR. A future updated traffic assessment will be considered by DAGS as conditions warrant. This assessment would be used to verify traffic patterns, phasing and timing of traffic flows and to determine if additional improvements are required.

9. ***Construction plans for all work within the City right-of-way should be submitted to DTS for review.***

   Per your instructions, constructions plans for work within the City and County of Honolulu's right-of-way will be submitted to DTS for review.

Thank you for this opportunity to respond. If you have any further comments or questions, please contact Mr. Daniel Jandoc of my staff at 586-0476.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

DJ/si
cc: RMTC - Brian Takeda
CDS International - Richard Balcom

REFERENCES

CDS International, Inc. 1995. *Functional Analysis Concept Development Study, Executive Summary, Waikele Elementary School.* December 6, 1995.

CDS International, Inc. 1995. *Functional Analysis Concept Development Study, Volume I, Waikele Elementary School.* December 6, 1995.

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The Traffic Management Consultant, 1996. *Traffic Impact Analysis Report for the Proposed Waikele Elementary School.*

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APPENDIX A

Traffic Impact Analysis Report
for the Proposed
Waikele Elementary School

Traffic Consultant Management (TMC)

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

WAIKELE ELEMENTARY SCHOOL

PREPARED FOR

R. M. TOWILL CORPORATION

PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT

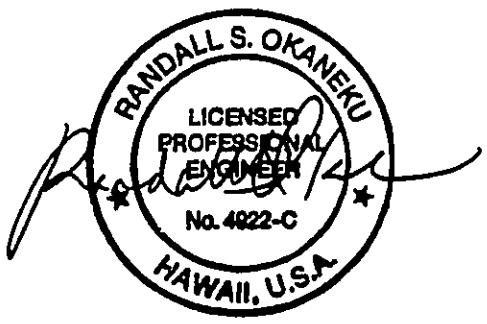
TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

WAIKELE ELEMENTARY SCHOOL

PREPARED FOR

R. M. TOWILL CORPORATION

AUGUST 6, 1996



PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT

RANDALL S. OKANEKU, P. E., PRINCIPAL • 1188 BISHOP STREET, SUITE 1907 • HONOLULU, HAWAII 96813

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TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED
WAIKELE ELEMENTARY SCHOOL

I. Introduction

A. Purpose of Study

The purpose of this study is to identify and analyze the traffic impacts resulting from the development of the proposed Waikele Elementary School in Waipahu, Oahu, Hawaii. This study also recommends improvements that would mitigate the traffic impacts identified in this study. This report presents the findings and recommendations of the study.

B. Scope of the Study

1. Description of the proposed project.
2. Description of the study area and surrounding land uses.
3. Evaluation of existing roadway and traffic conditions.
4. Estimation of future traffic without the project.
5. Development of trip generation characteristics for the proposed project.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendation of improvements that would mitigate the traffic impacts identified in this study.

II. Project Description

A. Location and Access

The proposed project is located in Waipahu, Oahu, Hawaii. The 8-acre site is identified as Tax Map Key 9-4-07:7. Figure 1 depicts the location of the proposed elementary school in Waikele. Access to the site is proposed via two full-service access driveways located on the west side of Kukula Street, between Pakela

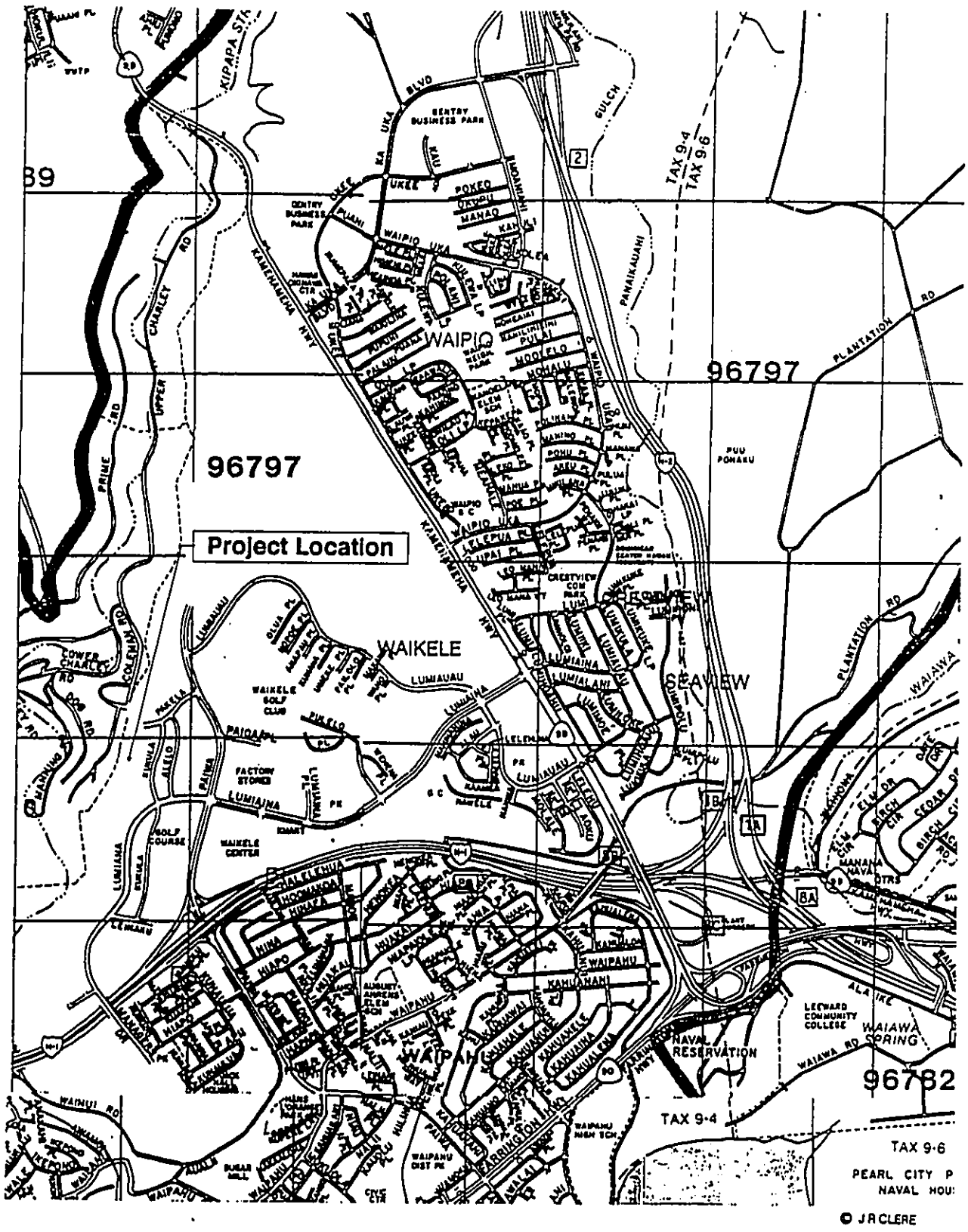


Figure 1. Project Location

Street and Lumiaina Street. A third driveway would provide service access. Figure 2 illustrates the proposed site plan. Based upon the traffic circulation pattern between the access driveways and the drop-off/pick-up area, the north driveway would be primarily used as an entrance driveway and the south driveway would be primarily used as an exit driveway. Both driveways provide access to off-street parking areas, and would therefore operate under two-way conditions.

B. Land Use Intensity

The proposed school can accommodate up to 1,000 students, operating as a year-round, multi-track facility, however for the purpose of this traffic impact analysis, the design enrollment for the elementary school is 750 students. Waikele Elementary School is scheduled to open in the Fall of 1998.

III. Study Area Conditions

A. Study Area

The study area includes Paiwa Street, Lumiaina Street, Kukula Street, and Pakela Street. The intersections analyzed in this study are:

1. Paiwa Street at Lumiaina Street
2. Lumiaina Street at Kukula Street
3. Kukula Street at Pakela Street
4. Paiwa Street at Pakela Street

B. Existing and Anticipated Future Development

1. Waikele Residential Development

Waikele was originally planned for 2,709 dwelling units. Approximately 1,940 dwelling units have already been constructed and sold, while 1,140 dwelling units are under construction or planned for the future for a total of 3,080 dwelling units. The future Waikele residential developments, being planned or under construction, include: the Tropics, located at the north end of Paiwa Street; the Classics and Village on the Green, located along Lumiauau Street; and Parcel 15, located at the west end of Lumiaina Street.

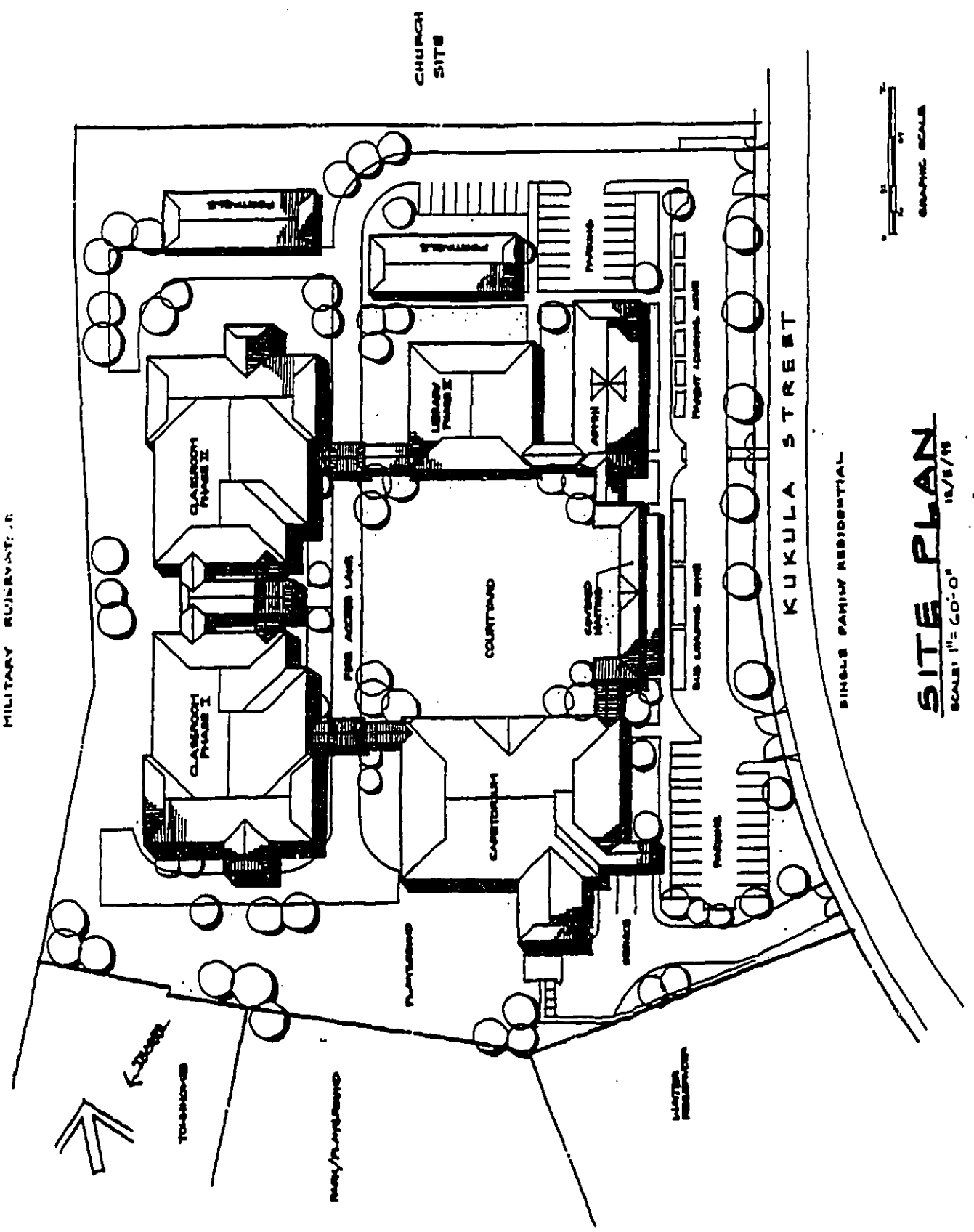


Figure 2. Site Plan

2. Waikele Center

The total commercial floor area, originally planned for the Waikele Center, was 467,000 square feet. Approximately 733,000 square feet of gross leasable area has been constructed at the Waikele Center, and another 9,500 square feet of gross leasable area is under construction, for a total of 742,500 square feet of gross leasable area. At the time of the field investigation, Waikele Center was reported to be 100 percent leased.

3. Future Church Site

The future Grace Bible Community Outreach Center site is proposed on the southwest corner of Kukula Street and Pakela Street, immediately north of the project site. Plans for the church are in their preliminary stages at this writing. Access to the church is proposed to be located exclusively on Pakela Street. The preliminary development plan for the future church site was obtained from representatives of the Grace Bible Church, and is subject to change.

4. Waipahu Town Plan

The City & County of Honolulu sponsored the development of a Special Area Plan for Waipahu. The findings of the plan are published in the "Waipahu Town Plan", prepared by Wilson Okamoto & Associates, Inc. and dated December 1995. The closing of the Oahu Sugar Mill provided the impetus to develop a comprehensive, community-based plan for Waipahu. Although the planning area is located on the south side of Interstate Route H-1, several recommendations included in the Preferred Plan may impact traffic in Waikele.

The Manager's Drive site is a 39.6-acre site, located between the Sugar Mill and the Freeway. The proposed uses on the City-owned property include a 1,000-student private school and about 120 single-family dwelling units. Light industrial and commercial uses are being proposed on the Sugar Mill site. The Special Area Plan is expected to be implemented through a combination of private and public initiatives.

The proposed roadways in the Special Area Plan include the widening of the Manager's Drive Overpass on Interstate Route H-1 from two lanes to four lanes. Manager's Drive is proposed to be extended through the Sugar Mill

site to Waipahu Street, opposite Mokuola Street. East-west connector roadways also are planned between Manager's Drive and Paiwa Street and between Manager's Drive and Waipahu Street. The extension of Manager's Drive will affect traffic circulation patterns between Waikele and Waipahu. The implementation of the Waipahu Town Plan is beyond the time frame of the development of the Waikele Elementary School. The Waipahu Town Plan recommends that a traffic study should be prepared to assess the traffic impacts of the proposed road improvements and land developments.

IV. Existing Conditions

A. Area Roadway System

Paiwa Street is a two way, four-lane, divided roadway, oriented in the north-south directions. Paiwa Street is the primary collector roadway for Waikele, beginning at the north boundary of Waikele and extending to Interstate Route H-1 at the Paiwa Interchange. Paiwa Street extends further south, through Waipahu to Farrington Highway. Paiwa Street is signalized at its intersection with Lumiaina Street and unsignalized at its intersection with Pakela Street.

Lumiaina Street is a two-way, four-lane, undivided collector roadway, generally oriented in the east-west directions. Lumiaina Street begins at the Manager's Drive Overpass at Interstate Route H-1 and extends in the easterly direction to Kamehameha Highway. Lumiaina Street is unsignalized at its intersection with Kukula Street and signalized at its intersection with Paiwa Street.

Kukula Street is a two-way, two lane, local street between Pakela Street and Lumiaina Street. Kukula Street is stop-controlled at its Tee-intersection with Pakela Street and its four-legged intersection with Lumiaina Street. At the present time on-street parking is prohibited on both sides of Kukula Street, between Pakela Street and Lumiaina Street. Kukula Street extends south of Lumiaina Street to Leihaku Street.

Pakela Street is a two-way, two lane, local street, which begins at Paiwa Street and extends to the U. S. Navy facility, located at the west end of Pakela Street. Pakela Street is stop-controlled at its Tee-intersection with Paiwa Street. At the present time, on-street parking is prohibited on both sides of Pakela Street.

B. Existing Traffic Volumes and Operating Conditions

1. General

a. Field Investigation

A manual traffic count survey was conducted in the vicinity of the project in April, 1996, during the school peak periods of traffic between the hours of 5:30 AM and 8:30 AM, and from 1:00 PM to 3:00 PM. The mid-afternoon peak period is selected to analyze the after-school traffic generated by the proposed elementary school. The traditional PM commuter peak period (3:00 PM to 6:00 PM) was not included in this analysis, since the elementary school is not expected to significantly impact the evening peak hour traffic. Additional traffic count data were obtained from the City & County of Honolulu Department of Transportation Services.

It should be noted that the traffic count data includes traffic generated by the construction activities, located at the north end of Paiwa Street, and a base yard, located at the west end of Lumiaina Street. Kukula Street was used as a cutoff route between the construction sites, avoiding the traffic signal at Paiwa Street and Lumiaina Street.

b. Capacity Analysis Methodology

The highway capacity analysis, performed in this study, is based upon procedures presented in the "Highway Capacity Manual" (HCM), Special Report 209, Transportation Research Board, 1994 and the "Highway Capacity Software", Federal Highways Administration.

Level of Service (LOS) is defined as "a qualitative measure describing operational conditions within a traffic stream." Several factors are included in determining LOS such as: speed, delay, vehicle density, freedom to maneuver, traffic interruptions, driver comfort, and safety. LOS "A", "B", and "C" are considered satisfactory levels of service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition and LOS "F" is an unacceptable condition.

2. Existing AM Peak Hour Traffic Analysis

The AM peak hour of traffic in the vicinity of the project occurs between 6:30 AM and 7:30 AM. The intersection of Paiwa Street and Lumiaina Street operates at an overall LOS "D". The AM peak hour traffic at the intersection of Paiwa Street and Lumiaina Street is dominated by the heavy left turn movement from westbound Lumiaina Street to southbound Paiwa Street. It appears that the heavy left turn demand is a result of external traffic turning off Kamehameha Highway and headed westbound on Interstate Route H-1 or to Waipahu Town during the AM peak hour of traffic. Traffic flows relatively smoothly at this intersection due to the low traffic demands on the other legs of the intersection and little pedestrian activity. The left turn movement on westbound Lumiaina Street and the right turn movement on northbound Paiwa Street operate at LOS "D".

The remaining intersections in the study area operate at LOS "A" during the AM peak hour of traffic. Figure 3 depicts the existing AM peak hour traffic volumes and operating LOS.

3. Existing Mid-Afternoon Peak Hour Traffic Analysis

The mid-afternoon peak hour of traffic occurs between 2:00 PM and 3:00 PM. The intersection of Paiwa Street and Lumiaina Street continues to operate at an overall LOS "D". Mid-afternoon traffic at the intersection of Paiwa Street and Lumiaina Street is again dominated by the heavy left turn movement on westbound Lumiaina Street. During the mid-afternoon, it appears that the heavy left turn movement is a result of traffic generated by the Waikele Center. The left turn movement on westbound Lumiaina Street operates at LOS "D".

The remaining intersections in the study area operate at LOS "A" during the mid-afternoon peak hour. The existing mid-afternoon peak hour traffic volumes and operating LOS are depicted in Figure 4.

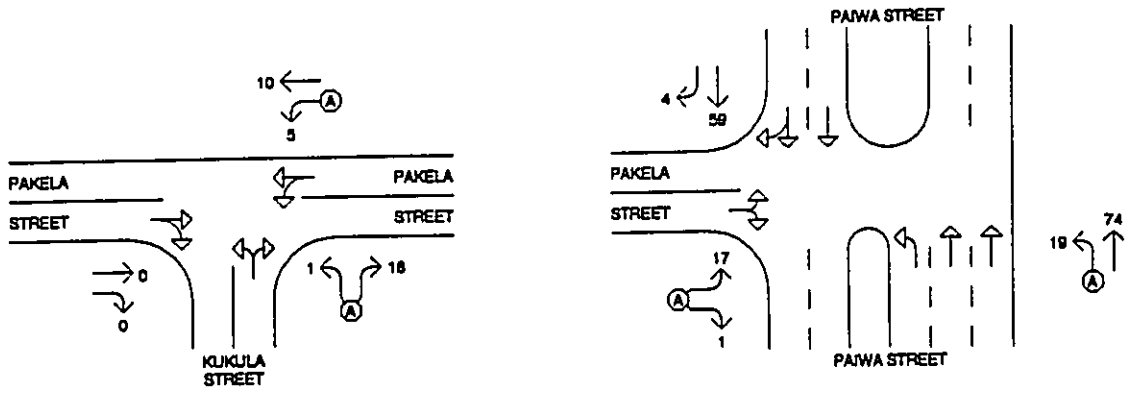
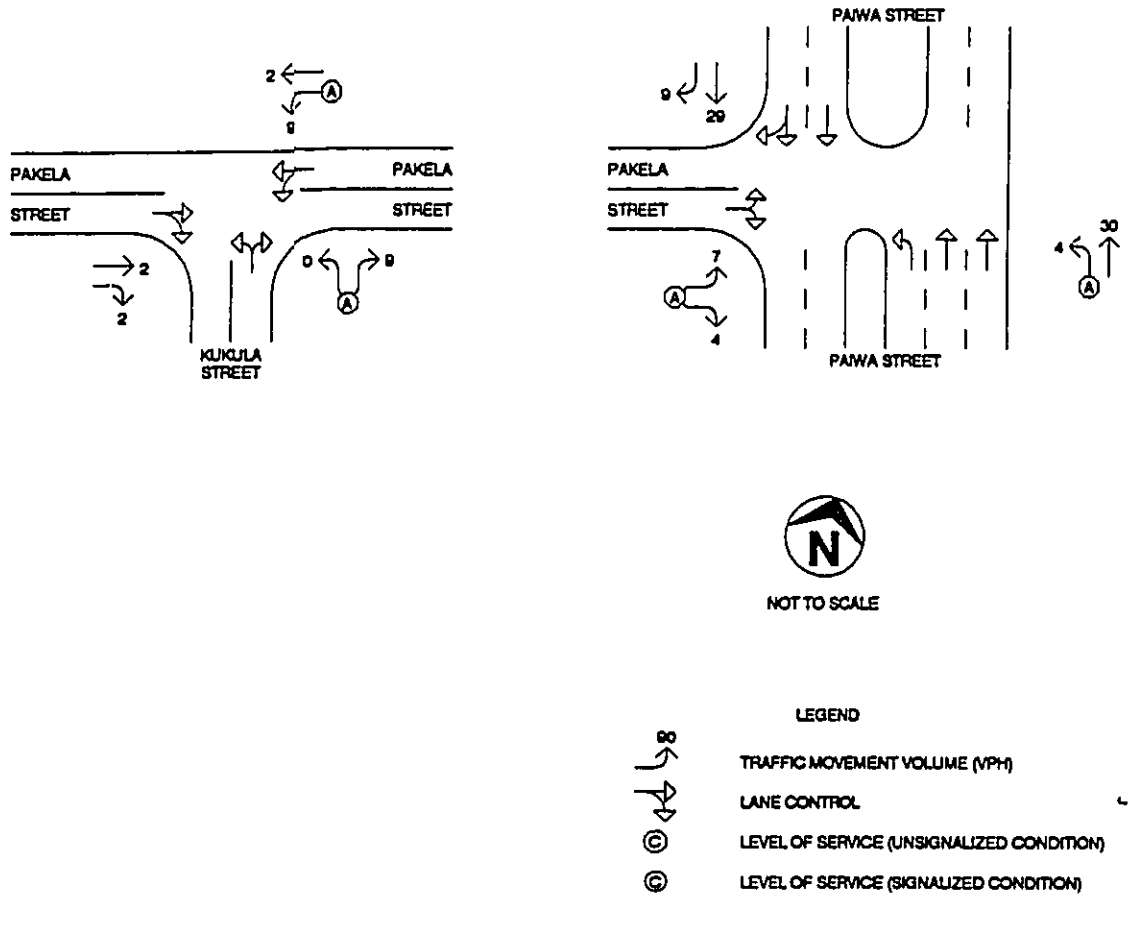


Figure 3. Existing AM Peak Hour Traffic



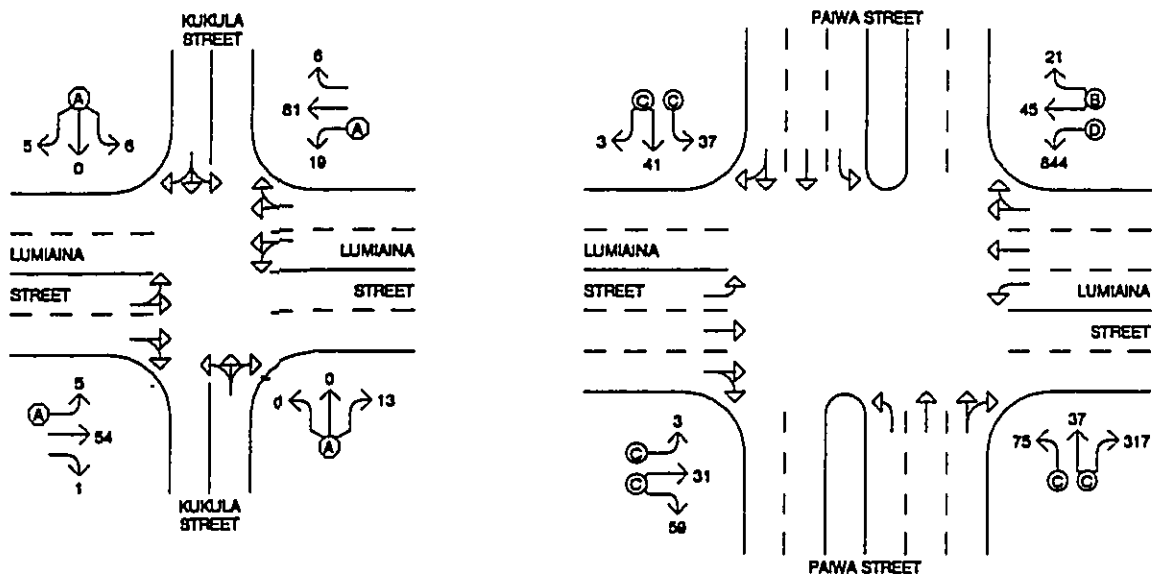


Figure 4. Existing Mid-PM Peak Hour Traffic

V. Projected Traffic

A. Site Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 5th Edition, 1991. The ITE trip rates for an elementary school are developed by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips with school enrollment.

2. Trip Generation Characteristics

Based upon the design enrollment of 750 students, the proposed elementary school is expected to generate a total of 191 vehicles per hour (vph) during the AM peak hour of generator, 115 vph entering the site and 76 vph exiting the site. During the mid-afternoon peak hour of generator, the proposed project is expected to generate 163 vph, 91 vph entering the site and 72 vph exiting the site.

Based upon the school district boundaries, the initial school enrollment would consist of students residing within the Waikele Development. At full build-out of the proposed elementary school, any excess capacity would be utilized to relieve the August Ahrens Elementary School in Waipahu.

Trips generated by an elementary school during the AM peak hour are primarily considered secondary trips, i.e., parents dropping off children on their way to work. However for the purpose of this traffic impact analysis, a conservative approach is taken by assuming that all the school trips generated during the peak hours of traffic are "new" trips.

The PM commuter peak hour traffic, generated by the proposed project, is not considered significant and is not analyzed in this study. The proposed elementary school is expected to generate only 53 vph during the PM commuter peak hour of adjacent street traffic. Table 1 shows a summary of the trip generation characteristics.

Table 1. Trip Generation Characteristics				
Land Use: Elementary School Independent Variable: 750 Students		Directional Split	Avg Trip Rate	Vehicle Trips/Hr
AM Peak Hour of Generator	Enter	60%	0.15	115
	Exit	40%	0.10	76
	Total	100%	0.25	191
PM Peak Hour of Generator (Mid-Afternoon)	Enter	56%	0.12	91
	Exit	44%	0.10	72
	Total	100%	0.22	163
PM Peak Hour of Adjacent Street Traffic	Enter	30%	0.02	16
	Exit	70%	0.05	37
	Total	100%	0.07	53

B. External Traffic

Projected traffic conditions within the study area are based upon full build-out and occupancy of the Waikele Development. Traffic in the vicinity of the project is expected to reach a "steady state" after the completion of the development of Waikele.

As discussed earlier, construction activities at the west end of Lumiaina Street and the north end of Paiwa Street generate temporary construction traffic. In order to discount the effect of construction traffic on the future conditions, the projected traffic on Lumiaina Street, west of Paiwa Street, and on Paiwa Street, north of Lumiaina Street, are based upon the full build-out and occupancy of the Waikele Master Plan.

The projected traffic on Lumiaina Street, east of Paiwa Street, is adjusted for the Waikele Center expansion, scheduled for completion in July 1996. The traffic projections also account for the remaining infill of existing developments in Waikele.

A future church site is proposed on the property immediately to the north of the elementary school. Based upon a preliminary development plan, it is assumed that a church with 9,000 square feet of gross floor area (GSF), a day care center with 9,000 GSF, and a 48,000 GSF multi-purpose meeting building would be developed on the adjacent property.

C. Total Traffic Volumes Without Project

1. General

The purpose of the traffic analysis without the proposed project is to establish base line conditions from which to measure the traffic impacts of the proposed elementary school. The school is expected to open in the Fall of 1998.

2. AM Peak Hour Traffic Analysis Without the Project

During the AM peak hour of traffic without the proposed project, the southbound approach on Paiwa Street at Lumiaina Street is expected to worsen to LOS "D". This is a result of the increase in traffic due to full build-out of the Waikele Development. The other intersections in the study area are expected to operate at satisfactory Levels of Service during the AM peak hour of traffic without the proposed project. Figure 5 depicts the AM peak hour traffic without the proposed project.

3. Mid-Afternoon Peak Hour Traffic Analysis Without the Project

The northbound and southbound approaches on Paiwa Street are expected to deteriorate to LOS "D" during the mid-afternoon peak hour of traffic without the proposed project. The remaining intersections in the study area are expected to operate at satisfactory Levels of Service during the mid-afternoon peak hour of traffic without the proposed project. Figure 6 depicts the mid-afternoon peak hour traffic without the proposed project.

VI. Traffic Impact Analysis

A. General

The eight-phase traffic signal at the intersection of Paiwa Street and Lumiaina Street operates at reasonable Levels of Service during the peak hours of traffic because of the short cycle lengths. With the development of the proposed

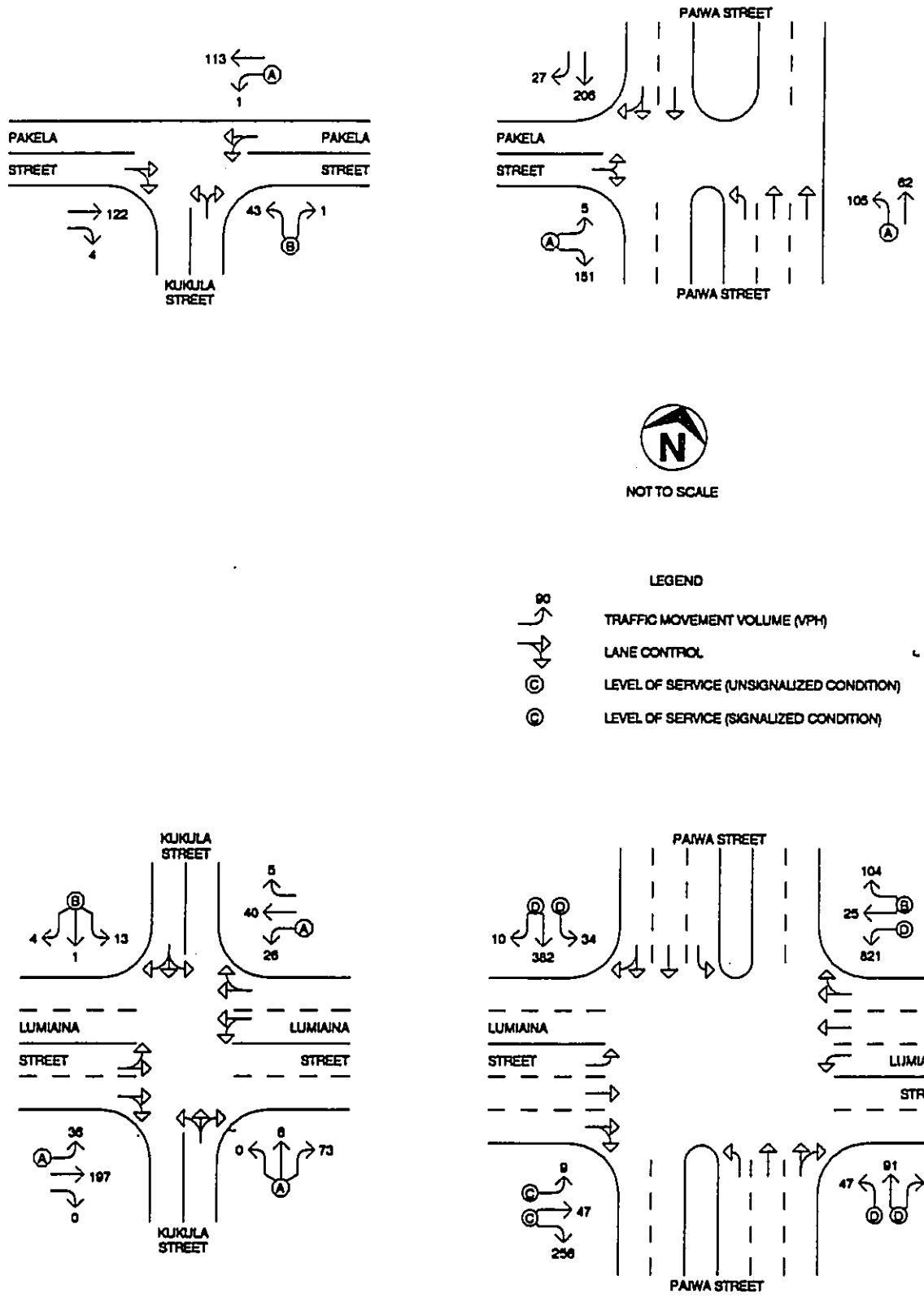
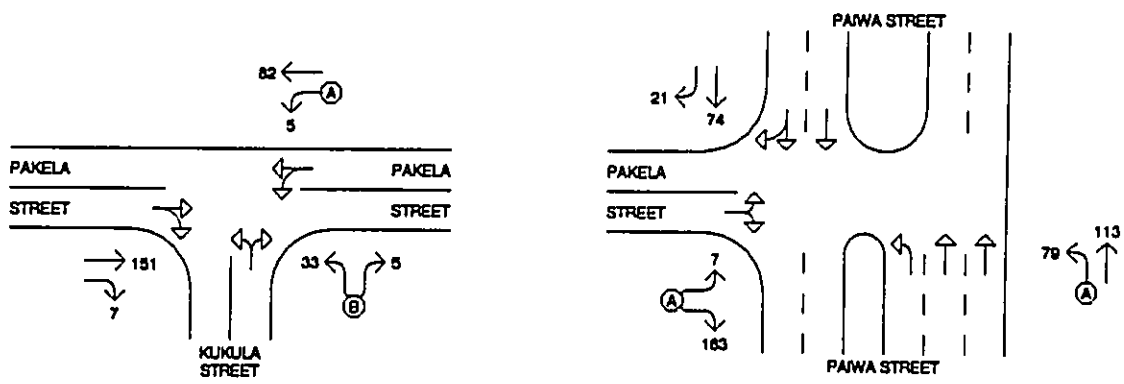


Figure 5. AM Peak Hour Traffic Without Project



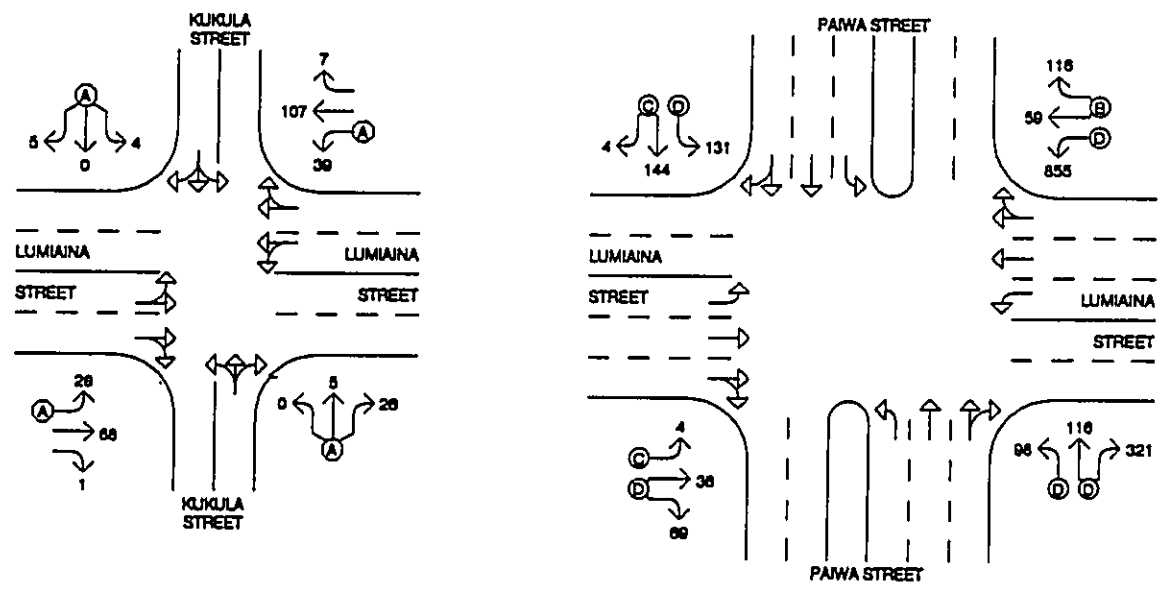


Figure 6. Mid-PM Peak Hour Traffic Without Project

Waikele Elementary School, extended green times will be required to accommodate the increases in pedestrian traffic that are expected to be generated before and after school hours. The resulting extended traffic signal cycle lengths would increase the delays experienced at the intersection of Paiwa Street and Lumiaina Street and further deteriorate the operating Levels of Service. In order to mitigate this situation, the following improvements are recommended at the intersection of Paiwa Street and Lumiaina Street:

1. The center lane on the westbound approach of Lumiaina Street at Paiwa Street should be restriped to a shared left turn/through lane. The improved westbound approach should provide an exclusive left turn lane, a shared left turn/through lane, and a shared through/right turn lane.
2. The curb lane on the northbound approach of Paiwa Street at Lumiaina Street should be restriped to provide an exclusive right turn lane.
3. The curb lane on the eastbound approach of Lumiaina Street at Paiwa Street should be restriped to provide an exclusive right turn lane.

B. AM Peak Hour Traffic Analysis With the Project

The traffic operation at the intersection of Paiwa Street and Lumiaina Street would improve from an overall LOS "D" to LOS "C" during the AM peak hour of traffic with the proposed project. The individual traffic movements at the intersection of Paiwa Street and Lumiaina Street would improve to LOS "C" or better.

Both school access driveways are expected to operate at LOS "A" during the AM peak hour of traffic. The remaining intersections in the study area are expected to operate at satisfactory Levels of Service during the AM peak hour of traffic with the proposed project. Figure 7 depicts the AM peak hour traffic with the proposed project.

C. Mid-Afternoon Peak Hour Traffic Analysis With the Project

During the mid-afternoon peak hour of traffic with the proposed project, the traffic operation at the intersection of Paiwa Street and Lumiaina Street would improve from an overall LOS "D" to LOS "C". The left turn movement from westbound Lumiaina Street to southbound Paiwa Street continues to operate at LOS "D". However, the length of the left turn queue will be reduced significantly

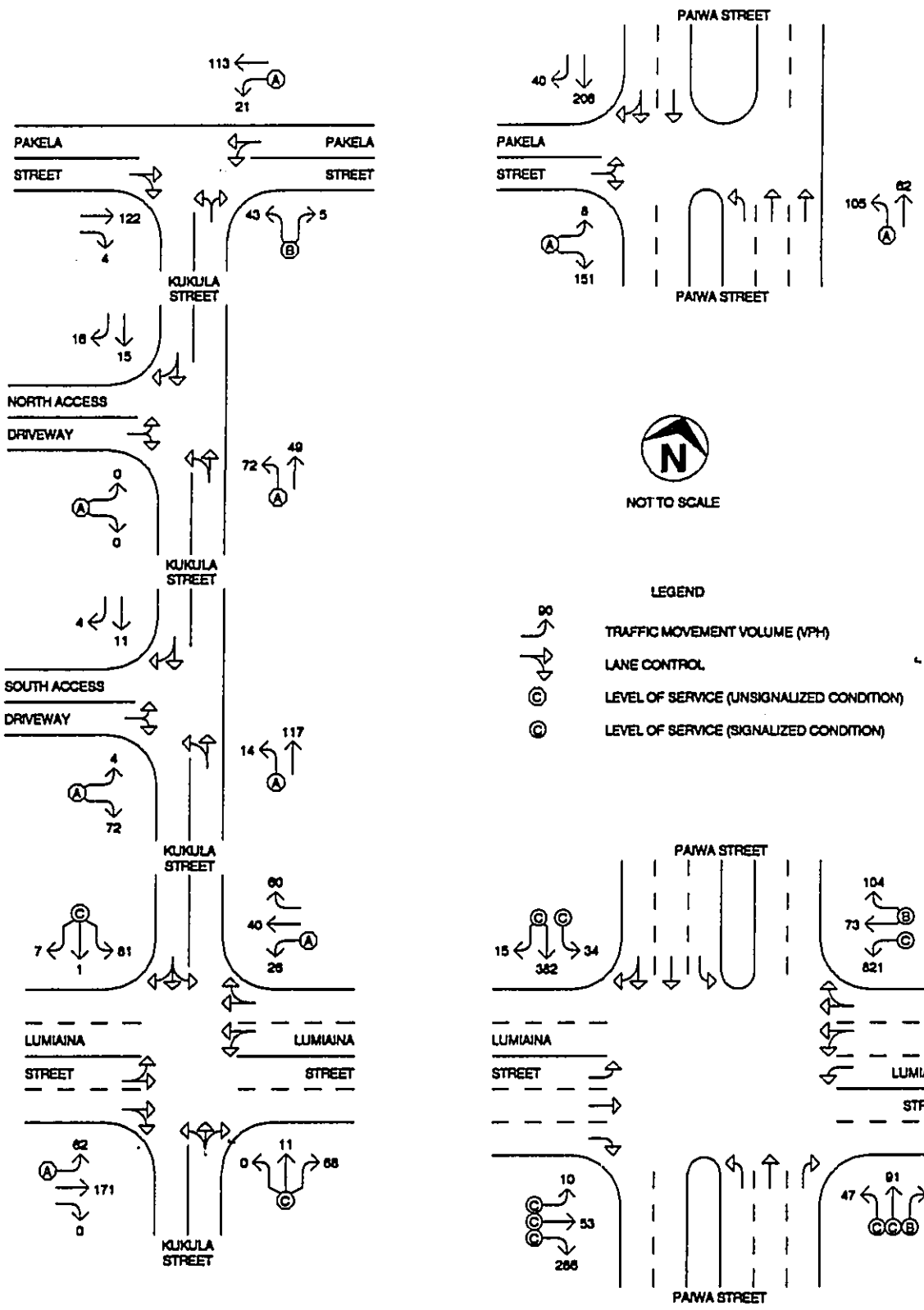


Figure 7. Cumulative AM Peak Hour Traffic With Project

due to the proposed dual left turn lanes. The other individual traffic movements at the intersection of Paiwa Street and Lumiaina Street are expected to operate at satisfactory LOS.

Both school access driveways are expected to operate at LOS "A" during the mid-afternoon peak hour of traffic. The remaining intersections in the study area are expected to operate at satisfactory Levels of Service during the mid-afternoon peak hour of traffic with the proposed project. Figure 8 depicts the mid-afternoon peak hour traffic with the proposed project.

VII. Recommendations and Conclusions

A. Recommendations

1. The center lane on the westbound approach of Lumiaina Street at Paiwa Street should be restriped to provide a shared left turn/through lane. The improved westbound approach would provide an exclusive left turn lane, a shared left turn/through lane, and a shared through/right turn lane. Appropriate lane use control signs should be installed. Reconfiguration of the loop sensors may be required to accommodate the dual left turn lanes. The southbound lanes on Paiwa Street may also require widening to accommodate the double left turn movement. (At this writing, Amfac/JMB Hawaii, Inc., the developer of Waikele, is submitting a proposal to the City & County of Honolulu to implement this recommendation.)

2. The curb lane on the northbound approach of Paiwa Street at Lumiaina Street should be restriped to provide an exclusive right turn lane. Appropriate lane use control signs should be installed. Optional right turn only traffic signal phase and appropriate traffic signal heads may be installed to facilitate the right turn movement during the left turn phase on westbound Lumiaina Street. Reconfiguration of the loop sensors may be required to accommodate the exclusive right turn lane and modification of the traffic signal phasing.

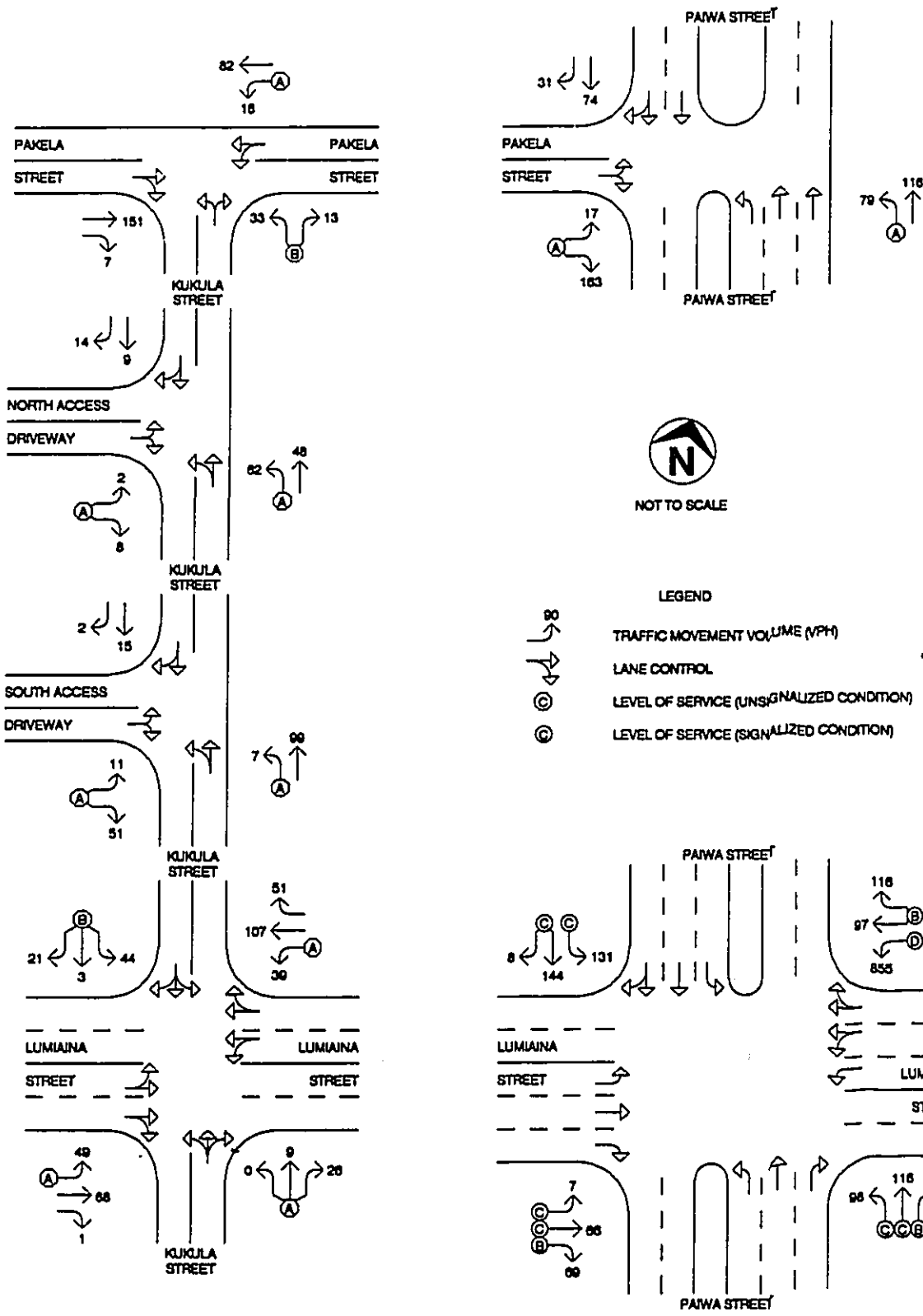


Figure 8. Cumulative Mid-PM Peak Hr. Traffic With Project

3. The curb lane on the eastbound approach of Lumiaina Street at Paiwa Street should be restriped to provide an exclusive right turn lane. Appropriate lane use control signs should be installed. Optional right turn only traffic signal phase and appropriate traffic signal heads may be installed to facilitate the right turn movement during the left turn phase on northbound Paiwa Street. Reconfiguration of the loop sensors may be required to accommodate the exclusive right turn lane and modification of the traffic signal phasing.

4. Clear lines of sight from the project access driveways should be established to accommodate adequate driveway sight distances. This can be accomplished by clearing any obstructions from the "sight triangles" at the project access driveways. Appropriate sight distances should be determined at the design stage of the project.

5. The existing "no-parking" restriction on Kukula Street should continue, during the peak periods of traffic, to maintain two lanes of traffic and an active loading/unloading curb lane along the school frontage.

B. Traffic Mitigation Measures

The proposed traffic improvements, recommended in the previous section, are expected to mitigate the traffic impacts resulting from the proposed school. Additional traffic mitigation measures can be considered, should the school experience further traffic operational problems that may occur on special occasions, such as on the opening day of the Fall session or during special events held at the school. The following measures should be considered to further mitigate any unforseen traffic impacts that may occur:

1. The site development of the proposed elementary school should be coordinated with the proposed Grace Bible Church site, located on Pakela Street, to provide future opportunities for joint access and use of parking facilities during special events held at the church or the school.

2. Driveway access can be restricted, during the peak periods of traffic, to entry-only at the north access driveway and exit-only at the south access driveway. These controls would create a one-way loop between the access driveways and the loading/unloading area, located on the school site.

3. Driveway access can be further restricted, during the peak periods of traffic, to prohibit left turns onto and off Kukula Street. School traffic would enter Kukula Street from Pakela Street, via Paiwa Street and exit at Lumiaina Street.

C. Conclusions

Traffic operations at the intersection of Paiwa Street and Lumiaina Street are affected by the heavy turning movements to and from Lumiaina Street. Operations would be further impacted by increase in pedestrian activity resulting from the development of the proposed elementary school. The proposed improvements at the intersection of Paiwa Street and Lumiaina Street are expected to mitigate existing and future traffic congestion and accommodate the projected pedestrian traffic, generated by the elementary school. The PM commuter peak hour of traffic is not expected to be significantly impacted by the proposed elementary school.

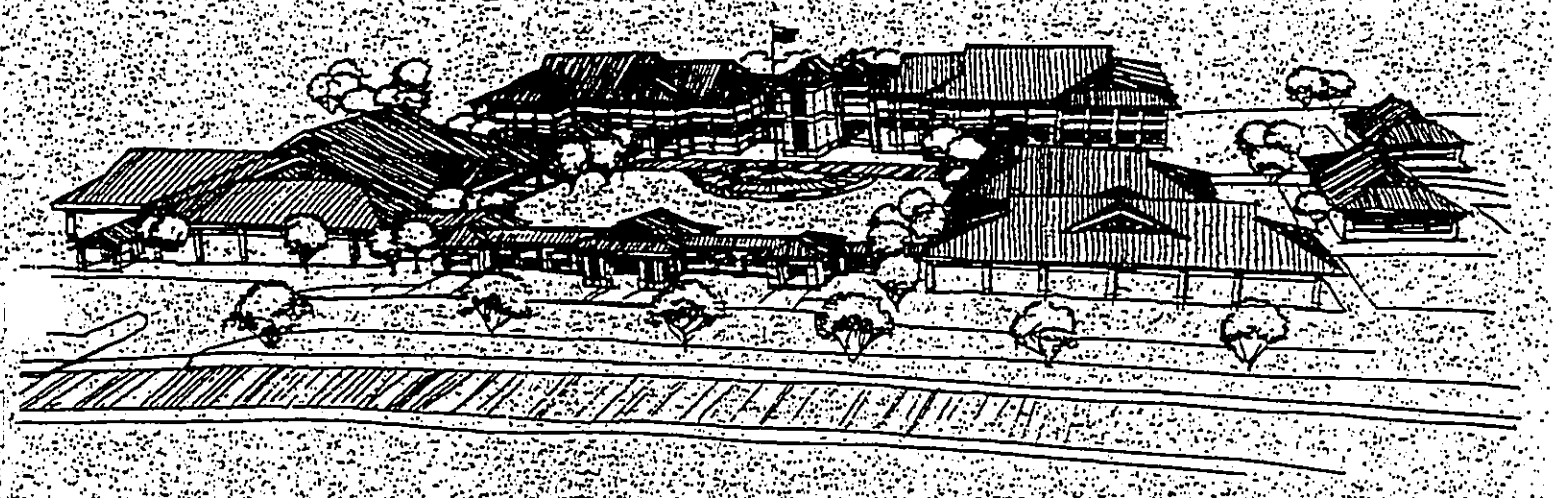
Based upon the analysis and recommendations presented herein, the proposed Waikele Elementary School is not expected to have any significant impacts on traffic operations in the study area.

APPENDIX B

Functional Analysis Concept Development Study
Volume I
Waikele Elementary School
Department of Education - State of Hawaii
Leeward School District - Oahu, Hawaii

FUNCTION ANALYSIS CONCEPT DEVELOPMENT STUDY

Volume 1



Waikele Elementary School

Department of Education - State of Hawaii
Leeward School District - Oahu, Hawaii

Designer
CDS INTERNATIONAL, INC.

FACD Facilitator
VALUE MANAGEMENT STRATEGIES, INC.

December 28, 1995

Value Management Strategies, Inc.

R. Terry Hays, CVS
President

December 27, 1995

Mr. Richard Balcom
CDS International
Pauahi Tower, Suite 400
1001 Bishop Street
Honolulu, HI 96813

Reference: Waikele Elementary School FACD Report

Dear Richard:

Value Management Strategies, Inc. is pleased to submit the Function Analysis Concept Development (FACD) project report which summarizes the events of the study on the referenced project conducted November 27-December 6, 1995, in Honolulu.

Enclosed are ten copies of the Volume I - Project Engineering Design Concept Report for the Waikele Elementary School Master Plan and Phase 1 project. We appreciate your support during this study and look forward to the opportunity to assist you again in the future.

Sincerely,

VALUE MANAGEMENT STRATEGIES, INC.

R. Terry Hays, CVS
President

3520 Monte Real Escondido, CA 92029-7910

phone (619) 741-1155 ◆ fax (619) 489-6765

FUNCTION ANALYSIS CONCEPT DEVELOPMENT STUDY REPORT

WAIKELE ELEMENTARY SCHOOL
Master Plan and Phase 1 Design

November 27-December 6, 1995

Owner

Department of Education
and
Department of Accounting and General Services
State of Hawaii

Value Engineering Consultant

VALUE MANAGEMENT STRATEGIES, INC.
San Diego, California

R. Terry Hays, CVS
Certified Value Specialist No. 870202

TABLE OF CONTENTS

INTRODUCTION & SUMMARY

PURPOSE & SCOPE

- This design concept documents the evolution and development of the design for the Master Plan and Phase 1

  Waikele Elementary School
  Leeward School District
  Oahu, Hawaii

- Volume I documents the activities and results of an intensive nine day on-site study effort which was undertaken, using a value engineering approach to develop, submit and obtain approval of the design concept.

- The specific approach used to effect the development of the design concept for this project represents a fast-track project development process to facilitate the timely delivery of facilities required by DOE and DAGS. This is deemed to be an especially beneficial approach for the user due to the project's timing, budget concerns and number of different groups involved in decisions regarding this project.

- This document represents Volume I of the "Design Development Submittal" and covers both the process and results of the on-site work undertaken to develop the Design Concept Submittal and the value engineering activities associated therewith. To this extent the major sections of this report are as follows:

Section I:	Introduction
Section II:	Design Concept
Section III:	Alternative Study Details
Section IV:	Meeting Minutes
Section V:	Process Activities

METHODS & PROCEDURES

- This effort was conducted in the form of a value engineering study utilizing a multi-discipline team approach consisting of professional team members (architectural, structural, civil, mechanical, electrical, and cost estimator), with CDS, International, Inc. as the designer and led by a Certified Value Specialist from Value Management Strategies, Inc., San Diego, California.

- The effort was directed by DAGS and DOE representatives who also participated in the on-site activities.

- The study utilized value engineering and function analysis techniques and was concentrated over the period of November 27 - December 6, 1995.

- Minutes of meeting with DAGS and DOE representatives during the FACD period are contained in Section IV of this report. Feedback received at these meeting were key to the design development of this project.

- The "Process Activities" undertaken during this effort through completion of the on-site study are described and documented in Section V of this report. The functional analysis relationship diagrams developed during this study are also contained in this section.

- The results of this activity are the Executive Summary Report (ESR), which was prepared on-site and is included in its entirety in Section II. The original ESR was edited to reflect comments made at the closing meeting. The changes are shown in italics. Copies of the original ESR Comment Sheets are at the end of Section II

PROJECT DESCRIPTION

The purpose of this project is to provide the facilities to accommodate 1000 students in grades K through 6 in a year round, multi-track learning center. The starting point for the design was a 0% concept developed by the designer, CDS, International, as a result of preliminary investigation and discussions with DOE and DAGS representatives. The proposed Phase 1 design the construction budget established by the DOE is $9,695,000.

The area to be served by the Waikele Elementary School is a new, fast growing community. The community developer, AMFAC was required to provide site for this school as part of their development. This school will also help to relieve the pressure of over crowding at August Ahrens Elementary School in Waipahu. The school will be designed to accommodate 750 students. By operating the school as a year-round, multi-track facility, 1000 students can be accommodated.

The project will be constructed in two phases. Phase 1 will include the Cafetorium, Administration Building, a Classroom Building with 16 classrooms and the site infrastructure. Phase 2 will include a second Classroom Building, the Library and six portable classrooms. The rainfall does not exceed 40" annually, therefore covered walkways connecting buildings is not permitted.

The various buildings of the proposed school are grouped around a central courtyard which will act as an outdoor assembly and gathering area. Both the Administration building and Cafetorium are located along the street side of the courtyard to control access by visitors and to provide direct access for delivery and service vehicles to the kitchen, Custodial Services Center and the main mechanical air conditioning plant which are collocated with the Cafetorium.

The Cafetorium is near the street and playground area since this facility will be used after normal school hours by the A+ Program and will be available to the community as a meeting facility. The Library is located between the Administration building and classrooms buildings since it needs to be accessible to both the administration staff and students and have access for a delivery vehicles from the parking area. The Classroom buildings are located to the rear of the site to control access to these facilities and locate them away from vehicular traffic and the general public.

Phase 1 needs to be ready for occupancy by August, 1998. This will require construction to be completed in June 1998. Phase 2 should follow by one year.

SUMMARY OF ALTERNATIVES

- Section III summarizes both detailed and roughly analyzed alternatives. These represent the major alternatives considered. These alternatives are organized by trade category and sequence number for reference only. Trade categories are as follows: .

Trade Category	Designation
Civil/Site	C
Architectural	A
Structural	S
Mechanical	M
Electrical	E

- Please note that in Section III each alternative consists of a number of pages which are numbered *in sequence to the individual alternative.*

SUMMARY OF ALTERNATIVES

Number	Description	Function Impact	Result
C-1.1	Site Alternative 1	Reduces cost $200,000, poor access to Cafetorium	Rejected See C-1.4
C-1.2	Site Alternative 2	Reduces cost $100,000, poor access to Library	Rejected See C-1.4
C-1.3	Site Alternative 3	Reduces cost $20,000, complicates Phase 2 construction	Rejected See C-1.4
C-1.4	Site Alternative 4	Increases cost $168,000, improves traffic circulation and safety	Implemented
A1.0	Classroom Building Design	Increases cost $324,000, creates learner centered environment	Implemented
A2.0	Cafetorium Design	Reduces cost $650,000, meets DOE operational needs	Implemented
A3.0	Administration Building Design	Reduces cost $166,000, meets DOE operational needs	Implemented
A4.0	Library Design	Reduces cost $98,000, meets DOE operational needs	Implemented
M1.0	Use classroom ventilators	Reduces cost $240,000, eliminates ductwork in classrooms	Implemented
S1.1	Use 8" CIP walls in lieu of CMU	Increases cost, better and more versatile system	Rejected due to budget constraints
S1.2	Structural Steel Framed Building	Saves $68,000, not as damage or vandal resistant	Rejected
S1.3	Pre-engineered Steel Rigid Steel Frame Building	Reduces cost, not as damage or vandal resistant	Rejected
S2.1	8" CIP Floor Slabs	Saves $13,000, reduces number of joists/beams, reduces conflicts with M&E equipment	Implemented
S2.2	6½" Thick Post Tensioned Concrete Floor Slab	Saves $35,000, future renovations would be difficult	Rejected See S2.1
S2.3	3½" Concrete Plank with 3" Concrete Topping	Saves $47,000, careful coordination of plank penetration locations needed, cracking potential of floors	Rejected See S2.1

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-DEC 6	RECOMMENDATION NO. C1.1
ITEM: Site Alternative 1		SHEET NO. 1 of 3

ORIGINAL DESIGN: (Attach sketch where appropriate)

The elementary school campus is developed around a center courtyard with the Cafetorium at the southeast corner of the site, the administration building at the northeast corner of the site, the two classroom buildings positioned across the back of the site and the library positioned between the administration building and the phase 2 classroom building. All buildings are positioned around the courtyard. Portable classroom buildings are positioned north of the library and phase 2 classroom.

PROPOSED DESIGN:

Relocate Cafetorium to the northwest corner of the site, the classroom buildings to the center of the site, the library to the southeast corner of the site and the portable classrooms to the southwest corner of the site. Switch locations of the bus and parent pick-up area.

ADVANTAGES:

- Reduces grading
- Relocates Phase 2 work to downwind side of site
- Reduces covered walkways requirements
- Increases parking area
- Better traffic flow
- Leaves room for future expansion

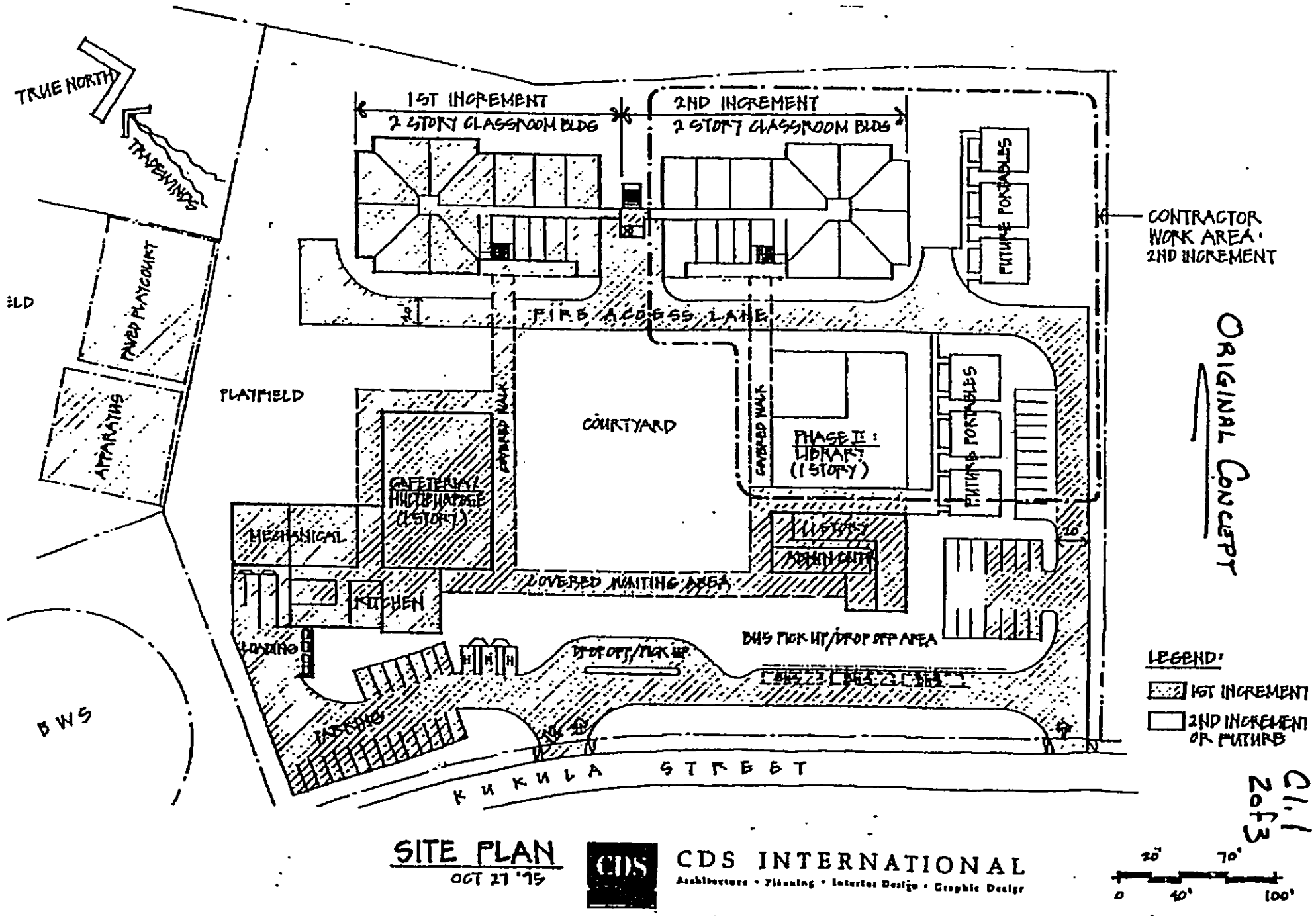
DISADVANTAGES:

- Less secure
- Increases blind spots on site
- Smaller courtyard area
- Traffic pattern to kitchen

DISCUSSION / JUSTIFICATION:

This alternative was rejected in favor of Alternative 4. Cafetorium/kitchen location major disadvantage to DAGS/DOE.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 200,000

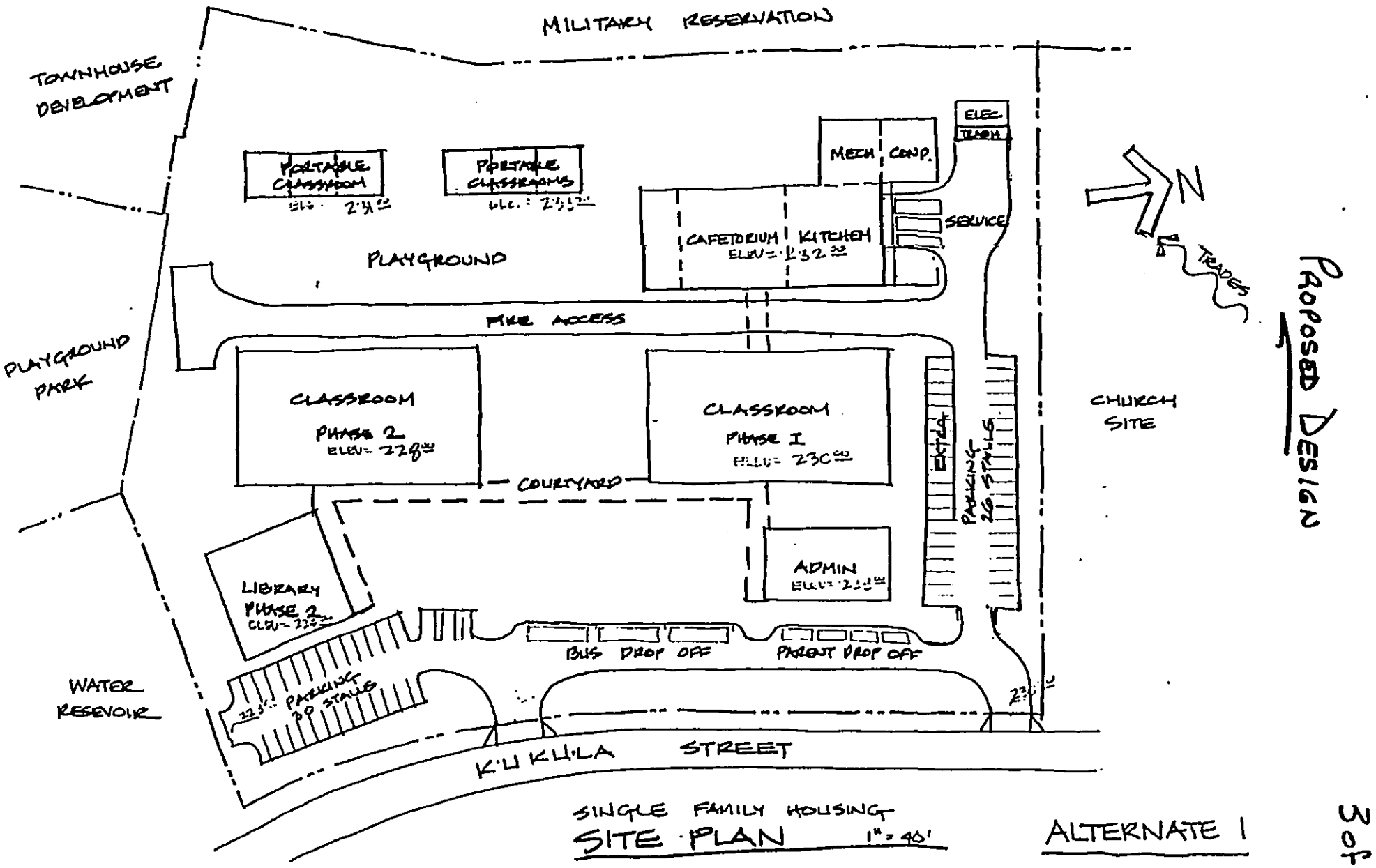


ORIGINAL CONCEPT

SITE PLAN
OCT 27 '95

CDS INTERNATIONAL
Architecture • Planning • Interior Design • Graphic Design

C1.1
2 of 3



SITE PLAN 1" = 40'

ALTERNATE 1

C-1.1
3 of 3

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. C1.2
ITEM: Site Alternative 2		SHEET NO. 1 of 3

ORIGINAL DESIGN: (Attach sketch where appropriate)

The elementary school campus is developed around a center courtyard with the Cafetorium at the southeast corner of the site, the administration building at the northeast corner of the site, the two classroom buildings positioned across the back of the site and the library positioned between the administration building and the phase 2 classroom building. All buildings are positioned around the courtyard. Portable classroom buildings are positioned north of the library and phase 2 classroom.

PROPOSED DESIGN:

Relocate the administration building to in front of the courtyard and places the Phase 1 classroom building to the northeast corner of the site. Place the Phase 2 classroom at the original location of the Phase 1 classroom and relocate the library to the northwest corner of the site. Place the portable classrooms along the north edge of the site. Switch locations of the bus and parent pick-up area and add a dedicated service road to the kitchen.

ADVANTAGES:

- Reduces grading
- Better traffic circulation
- Separate service vehicles from other traffic
- Increased parking
- Places Phase 2 construction at the back of the site

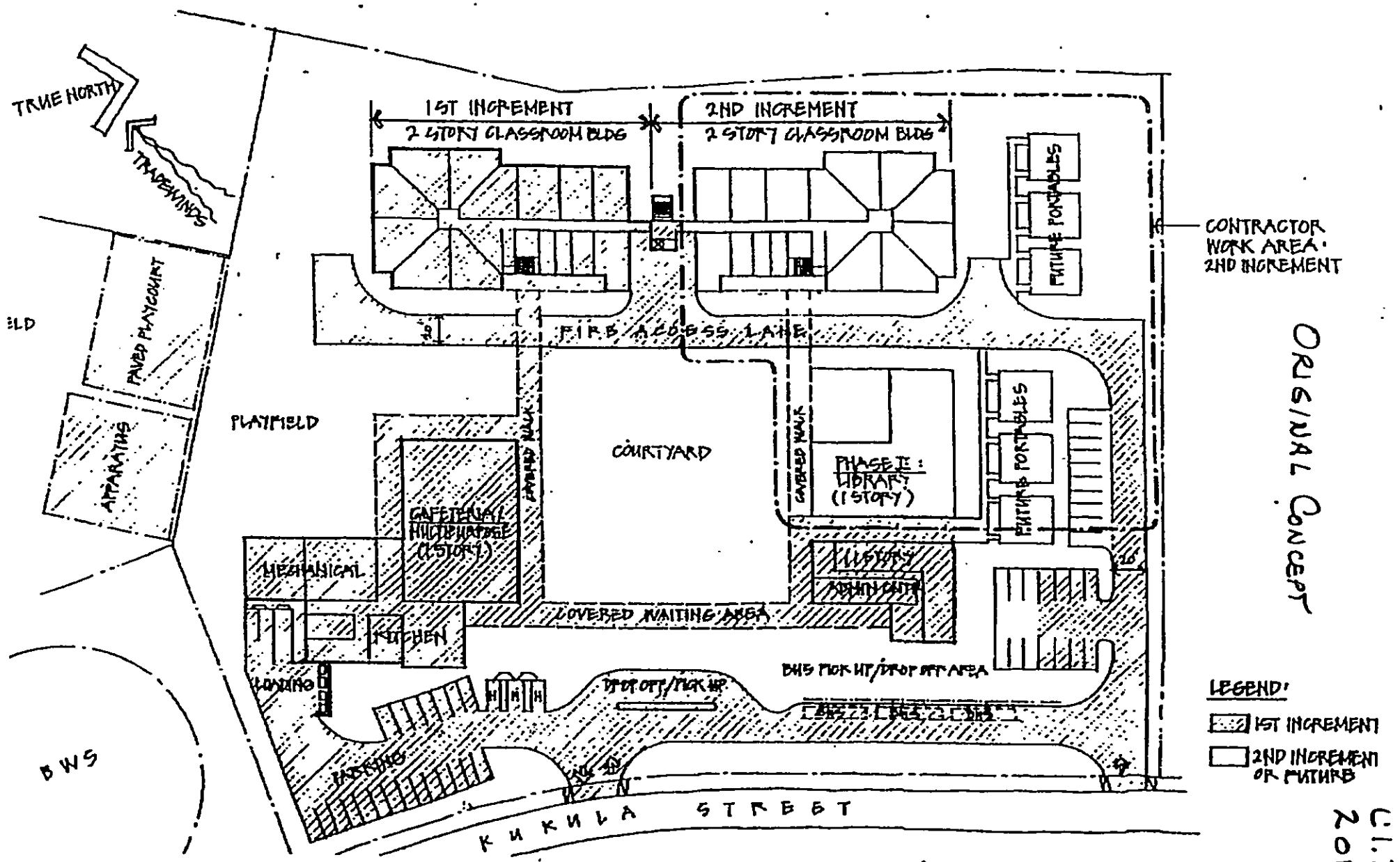
DISADVANTAGES:

- Library is accessed from second level of the classroom buildings
- Increases pedestrian walkways
- Increases paving

DISCUSSION / JUSTIFICATION:

This alternative was rejected in favor of Alternative 4. Library location and site circulation are major disadvantages to DAGS/DOE.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 100,000

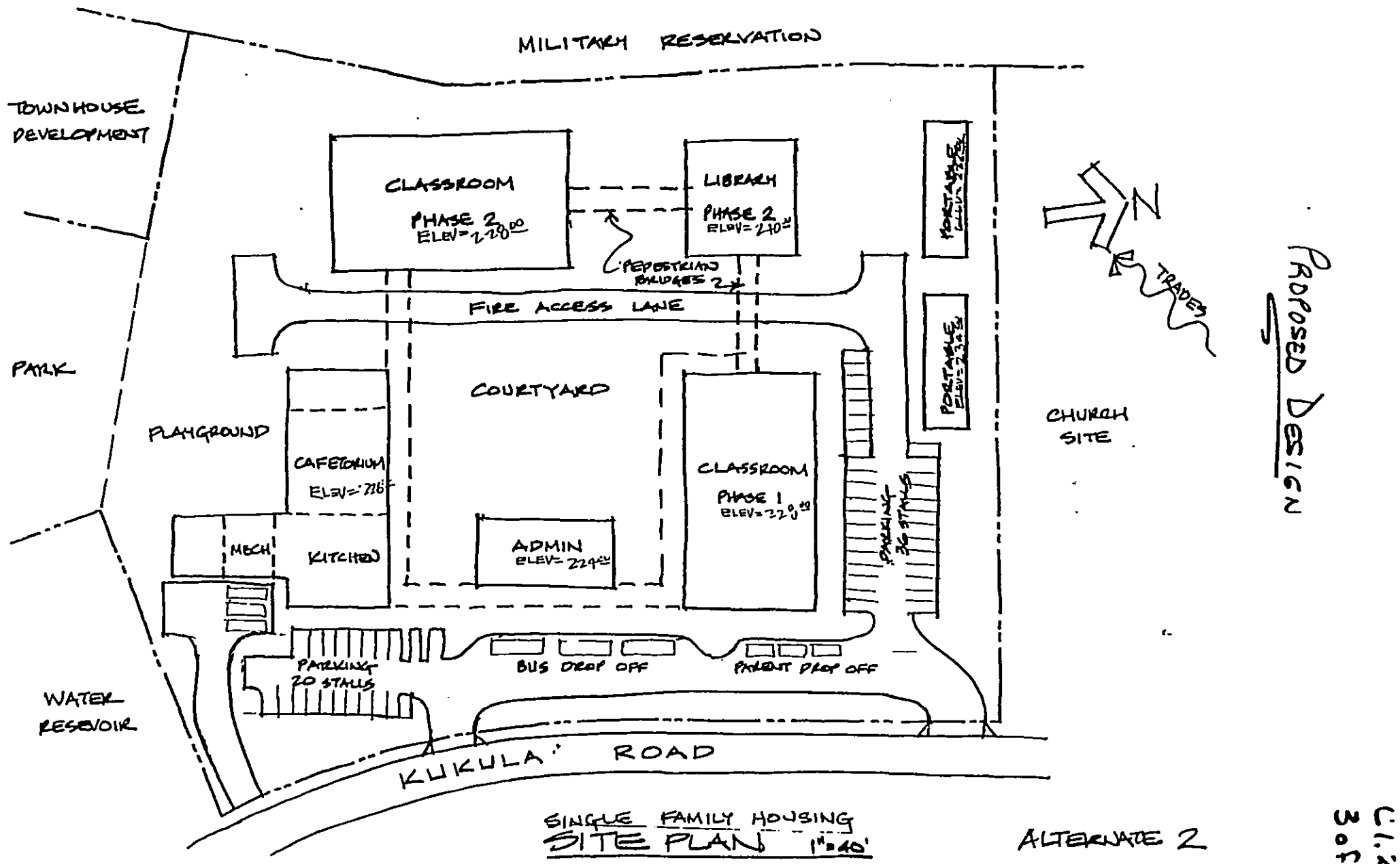


ORIGINAL CONCEPT

SITE PLAN
OCT 27 '95

CDS INTERNATIONAL
Architecture • Planning • Interior Design • Graphic Design

C1.1
2 OF 3



SINGLE FAMILY HOUSING
SITE PLAN 1"=40'

ALTERNATE 2

C.1.2
3 of 3

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. C1.3
ITEM: Site Alternative 3		SHEET NO. 1 of 3

ORIGINAL DESIGN: (Attach sketch where appropriate)

The elementary school campus is developed around a center courtyard with the Cafetorium at the southeast corner of the site, the administration building at the northeast corner of the site, the two classroom buildings positioned across the back of the site and the library positioned between the administration building and the phase 2 classroom building. All buildings are positioned around the courtyard. Portable classroom buildings are positioned north of the library and phase 2 classroom.

PROPOSED DESIGN:

Relocate the mechanical equipment to the northwest corner of the site and shift the portable classrooms east along the north edge of the site. Switch locations of the bus and parent pick-up area and add a dedicated service road to the kitchen..

ADVANTAGES:

- Places mechanical equipment closer to the pint of use, reduced pipe length.
- Better traffic circulation
- Separate service vehicles from other traffic
- Increased parking

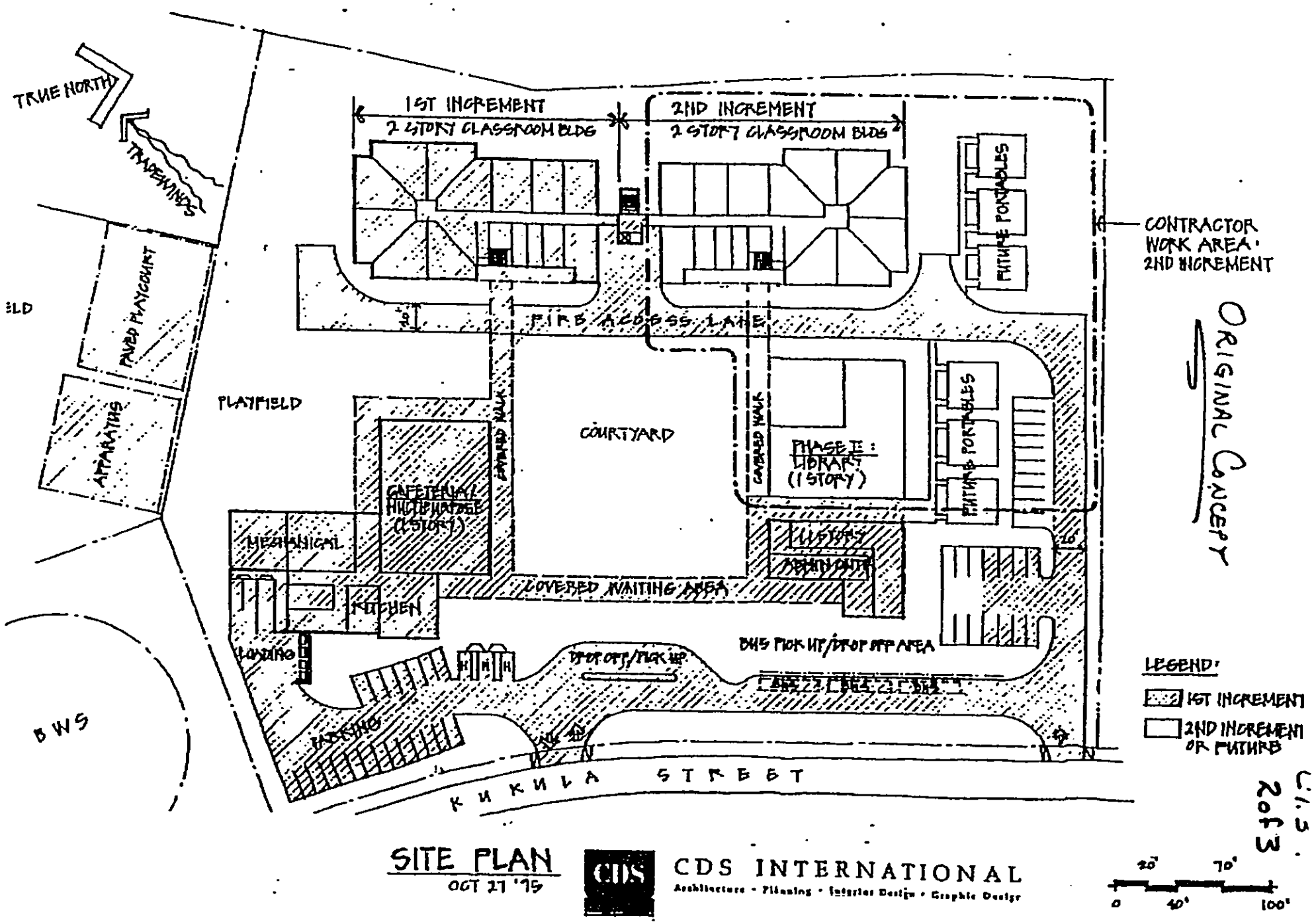
DISADVANTAGES:

- Mechanical equipment in Phase 2 construction area
- Phasing
- Increases paving

DISCUSSION / JUSTIFICATION:

This alternative was rejected in favor of Alternative 4. Mechanical equipment location complicates Phase 2 construction.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 20,000



ORIGINAL CONCEPT

SITE PLAN
OCT 27 '95

CDS INTERNATIONAL
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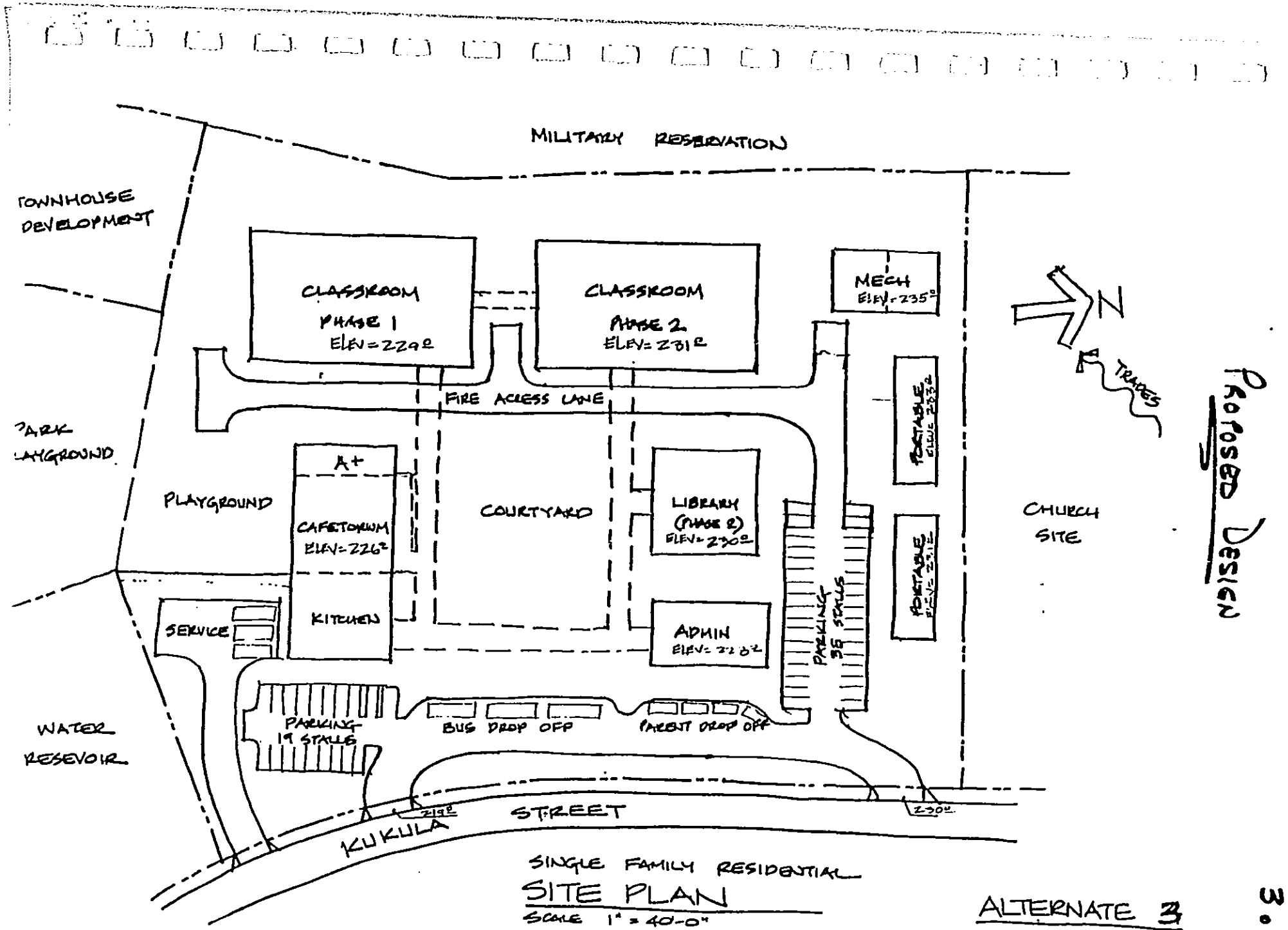
0 40' 70' 100'

C1.3
2 of 3



PROPOSED DESIGN

SITE PLAN

SCALE 1" = 40'-0"

ALTERNATE 3

C1.3

3 of 3

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. C1.4
ITEM: Site Alternative 4		SHEET NO. 1 of

ORIGINAL DESIGN: (Attach sketch where appropriate)

The elementary school campus is developed around a center courtyard with the Cafetorium at the southeast corner of the site, the administration building at the northeast corner of the site, the two classroom buildings positioned across the back of the site and the library positioned between the administration building and the phase 2 classroom building. All buildings are positioned around the courtyard. Portable classroom buildings are positioned north of the library and phase 2 classroom.

PROPOSED DESIGN:

Vary elevation between Phase 1 and Phase 2 classroom buildings 2 feet. Switch locations of the bus and parent pick-up area and add a dedicated service road to the kitchen. Revise the footprint of all buildings.

ADVANTAGES:

- Better traffic circulation
- Separate service vehicles from other traffic
- Maintain large courtyard area
- Provides good access for Phase 2 work

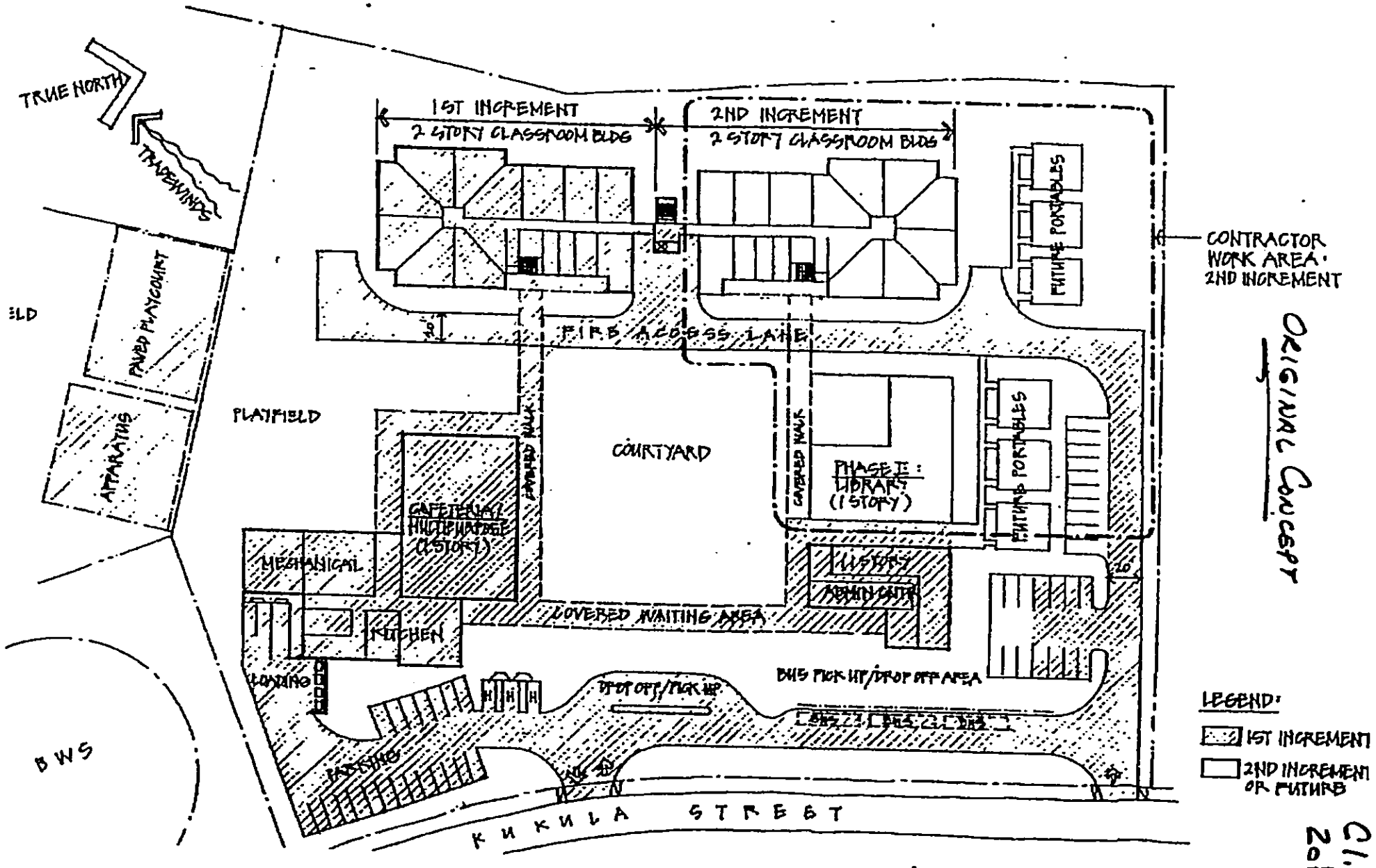
DISADVANTAGES:

- None apparent

DISCUSSION / JUSTIFICATION:

This alternative was further refined to reflect adjustments to the building and implemented into the design. The increased earthwork and site cost from the 0% design and this concept is primarily due to improved definition of the required site work. Some added cost can be attributed to the separate entrance of Kukula for kitchen delivery vehicles.

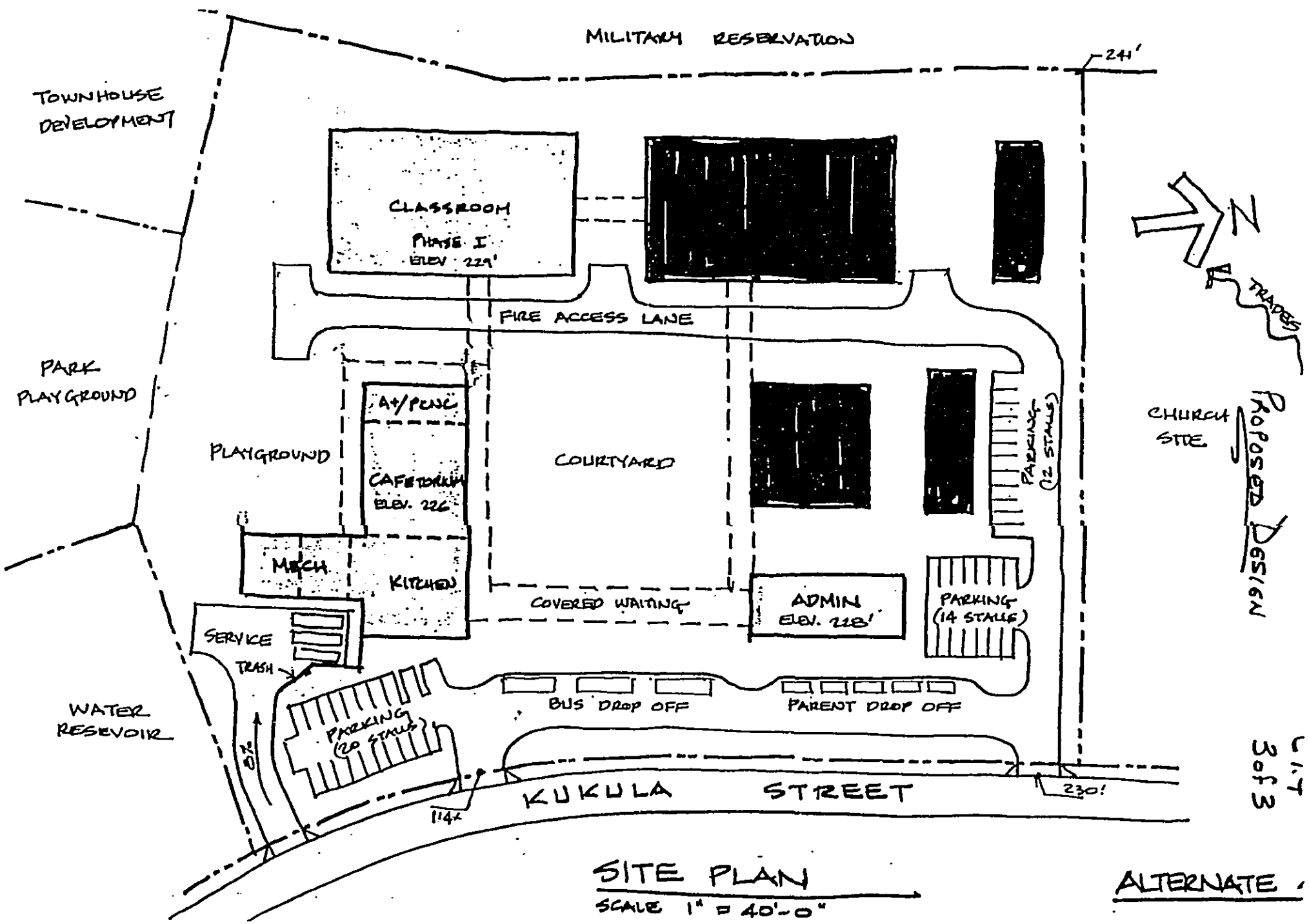
COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 2,355,805	$	$ 2,355,805
RECOMMENDED CHANGE	$ 2,523,665	$	$ 2,523,665
SAVINGS			$ (167,860)



SITE PLAN
OCT 27 '75

CDS INTERNATIONAL
Architecture • Planning • Interior Design • Graphic Design

C1.4
2073



SITE PLAN
SCALE 1" = 40'-0"

ALTERNATE

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. A1.0
ITEM: Classroom Building		SHEET NO. 1 of 5

ORIGINAL DESIGN: (Attach sketch where appropriate)

0% design classroom building was a concept modified from a recently designed school. Classrooms are accessed from a central corridor. Classrooms are irregularly shaped. Building has a gross area of 24,972 SF and a programmed space of 18,498 SF.

PROPOSED DESIGN:

Building concept is based on learner-centered educational plan and year-round, multi-tracked schedule. This requires additional space for student work centers and work space/storage for off-track teachers. The classrooms are rectangular in shape. Building has a gross area of 31,258 SF and a programmed space of 18,496 SF.

ADVANTAGES:

- Creates a learner centered environment
- Meets DOE desires for school
- Classroom shape good for a variety of arrangements

DISADVANTAGES:

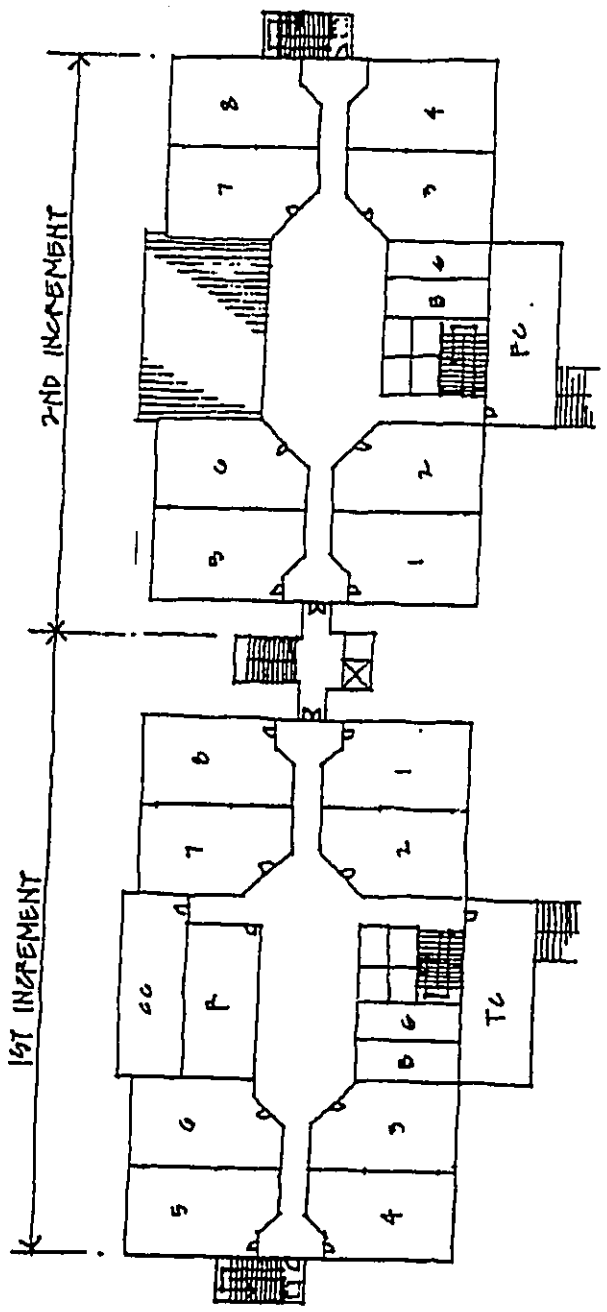
- Increase size and cost for classroom building.

DISCUSSION / JUSTIFICATION:

During the FACD several concepts for the classroom building were developed. This concept was the result of the other design iterations for this building and DOE/DAGS feedback. This design meets the operational and educational needs established by DOE.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 3,221,446	$	$ 3,221,446
RECOMMENDED CHANGE	$ 3,545,269	$	$ 3,545,269
SAVINGS			$ (324,223)

A1.0
2 of 5



SECOND FLOOR PLAN
1/32"

WAIKELE ELEMENTARY SCHOOL
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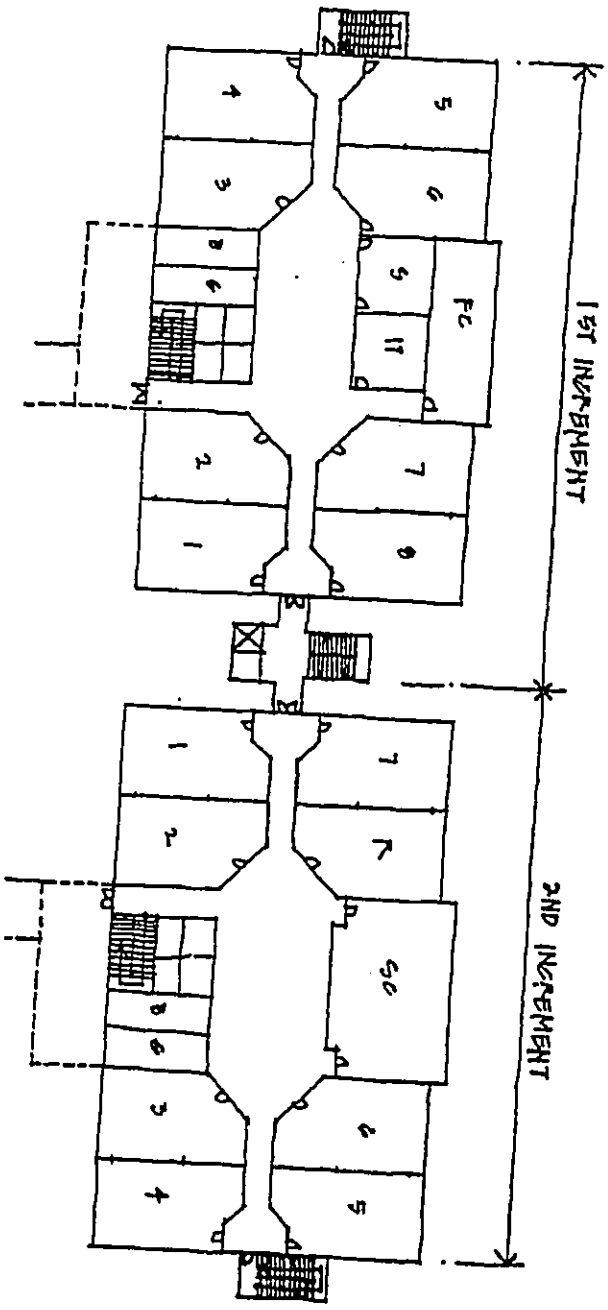
CDS

0% DESIGN

A1.0
3.f5



FIRST FLOOR PLAN
1/32"

WAIKELE ELEMENTARY SCHOOL
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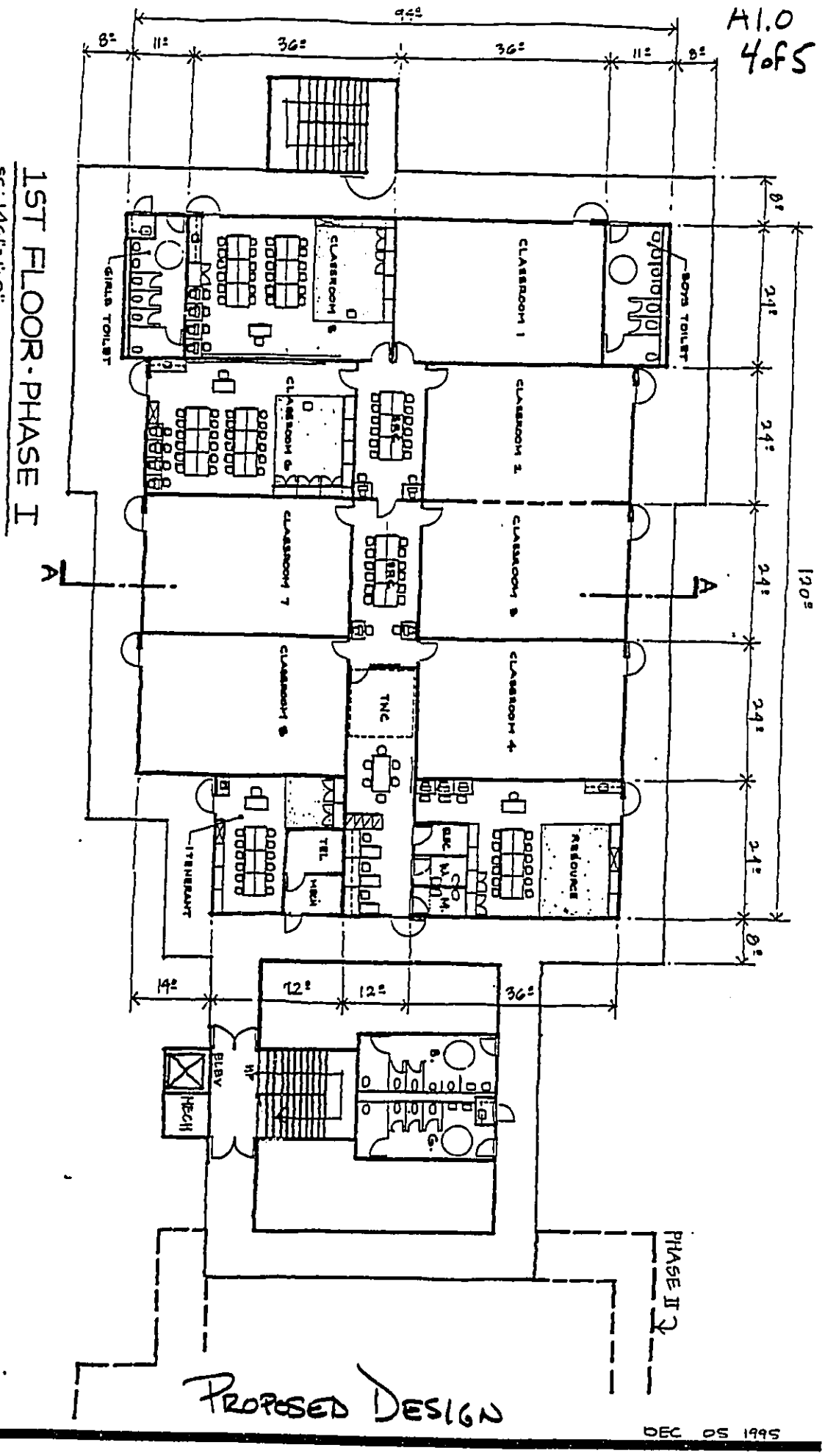
0% DESIGN

A1.0
4 of 5



1ST FLOOR - PHASE I

SCALE: 1/16" = 1'-0"

PROPOSED DESIGN

DEC 05 1995

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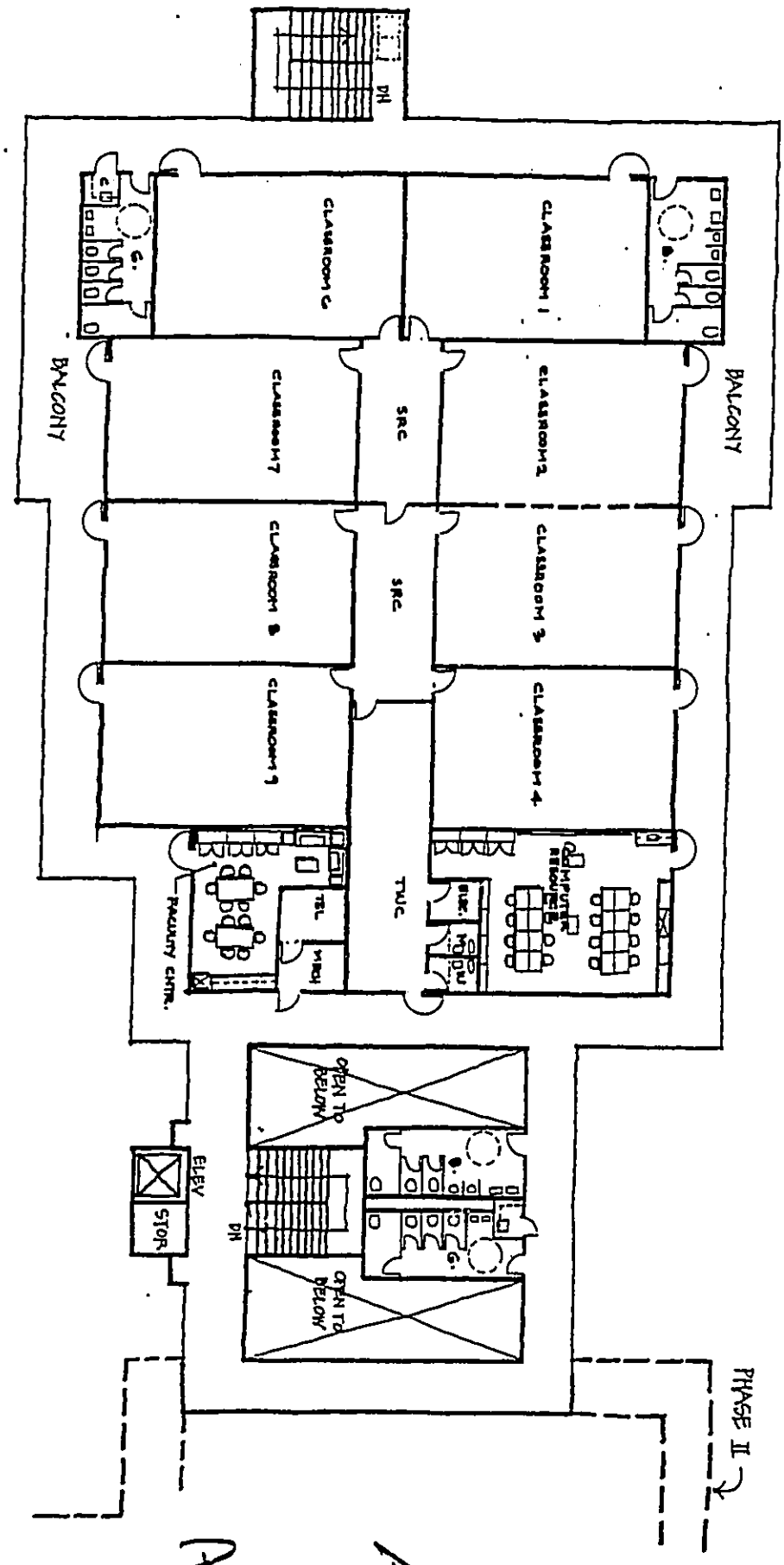
A1.0
5 of 5

2ND FLOOR - PHASE I

SC: 1/16" = 1'-0"



PROPOSED DESIGN

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WAIKELE ELEMENTARY SCHOOL

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VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. A2.0
ITEM: Cafetorium		SHEET NO. 1 of 3

ORIGINAL DESIGN: (Attach sketch where appropriate)

0% design classroom building was a concept modified from a recently designed school. Cafetorium includes a prep kitchen, multi-purpose dining area, space for the A+ program and required support area. The school mechanical room is attached to this building. Building has a gross area of 11,184 SF and a programmed space of 9,009 SF.

PROPOSED DESIGN:

Building area and layout refined to address DOE/DAGS issues. PCNC office relocated here from Administration building. Building has a gross area of 10,796 SF and a programmed space of 9,943 SF.

ADVANTAGES:

- Meets DOE needs

DISADVANTAGES:

- None apparent.

DISCUSSION / JUSTIFICATION:

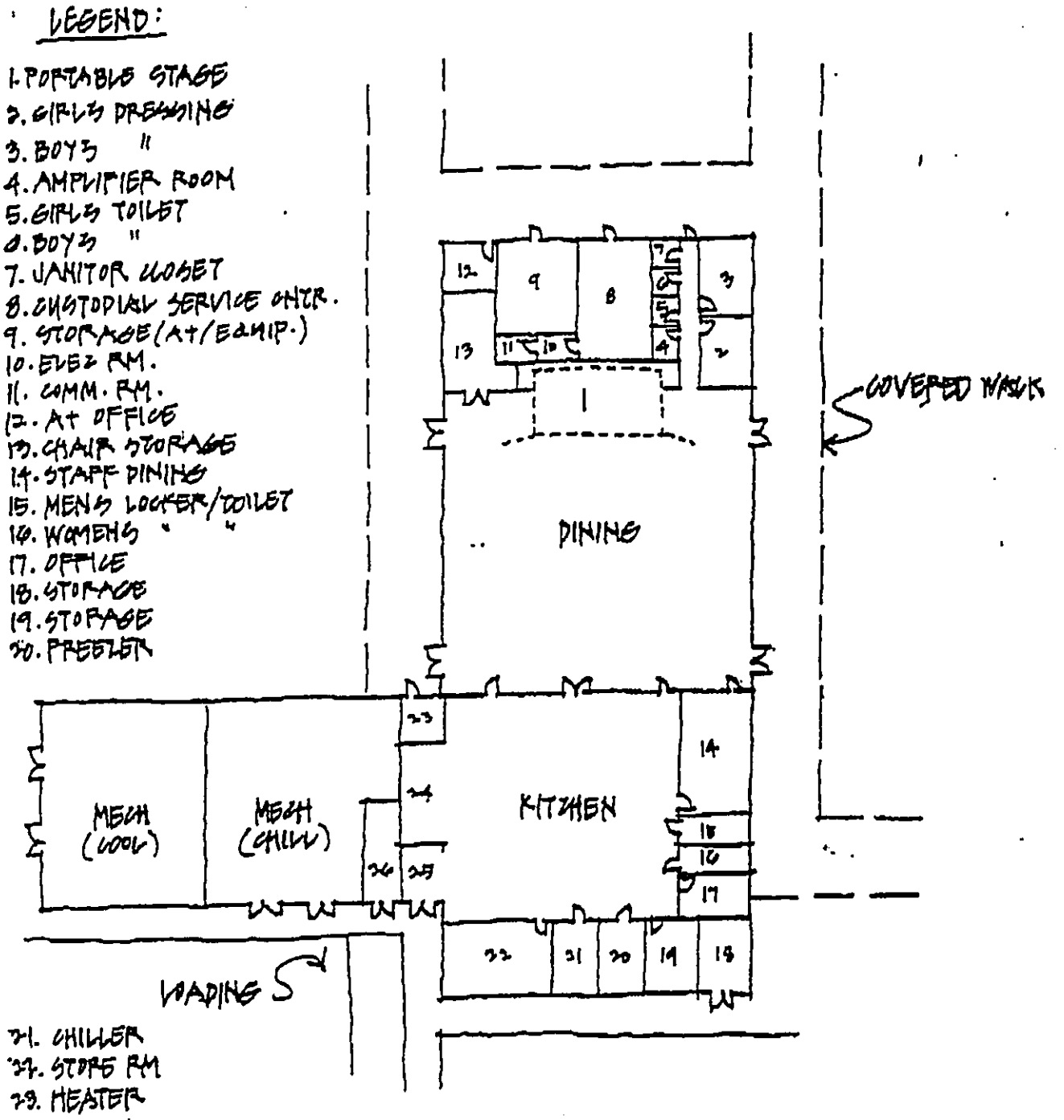
During the FACD several concepts for the Cafetorium were developed. This concept was the result of the other design iterations for this building and DOE/DAGS feedback. This design meets the operational and educational needs established by DOE.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,865,535	$	$ 1,865,535
RECOMMENDED CHANGE	$ 1,215,246	$	$ 1,215,246
SAVINGS			$ 650,289

A2.0
2 of 3

LEGEND:

1. PORTABLE STAGE
2. GIRLS DRESSING
3. BOYS "
4. AMPLIFIER ROOM
5. GIRLS TOILET
6. BOYS "
7. JANITOR CLOSET
8. CUSTODIAL SERVICE CNTR.
9. STORAGE (AT/EQUIP.)
10. ELEC RM.
11. COMM. RM.
12. AT OFFICE
13. CHAIR STORAGE
14. STAFF DINING
15. MENS LOCKER/TOILET
16. WOMENS " "
17. OFFICE
18. STORAGE
19. STORAGE
20. FREEZER



21. CHILLER
22. STORE RM
23. HEATER
24. UTILITY
25. JAN WASH
26. ELEC R.M.

① CAFETERIA/KITCHEN/MECH BLDG
1/32"

ORIGINAL CONCEPT

WAIKELE ELEMENTARY SCHOOL 21 NOV 1988 CDS

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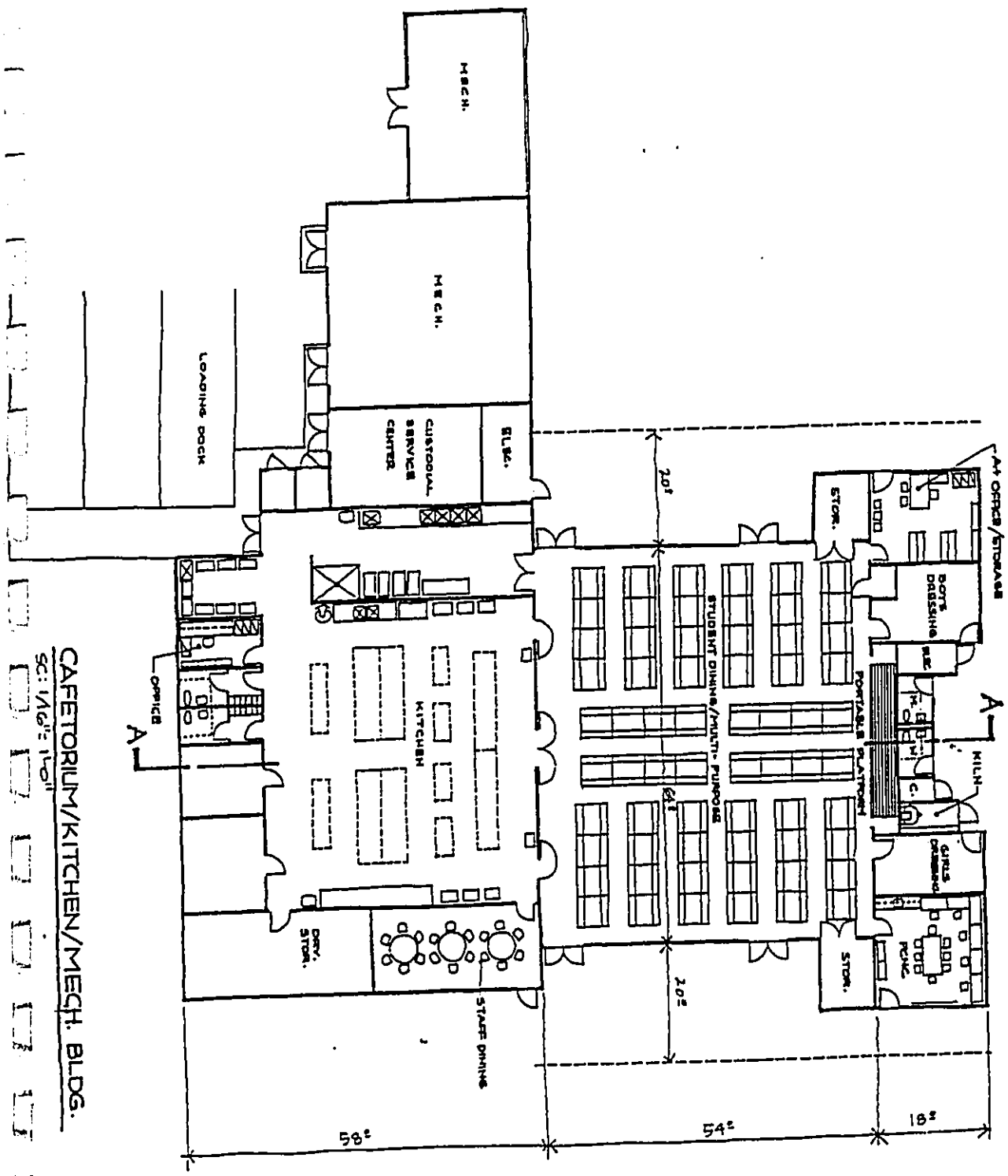
A2.0
3 of 3



CAFETORIUM/KITCHEN/MECH. BLDG.
SCALE: 1/8" = 1'-0"

PROPOSED DESIGN

DEC 05 1995

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VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. A3.0
ITEM: Administration Building		SHEET NO. 1 of 3

ORIGINAL DESIGN: (Attach sketch where appropriate)

0% design classroom building was a concept modified from a recently designed school. Administration Building includes offices for Principle and Assistant principle, clerical staff, counselors, and the Health Center. Building has a gross area of 4,645 SF and a programmed space of 4,147 SF.

PROPOSED DESIGN:

Building area and layout refined to address DOE/DAGS issues. Signal Processing Room relocated here from Library and PCNC office moved to Cafetorium. Building has a gross area of 3,411 SF and a programmed space of 3,330 SF.

ADVANTAGES:

- Meets DOE needs

DISADVANTAGES:

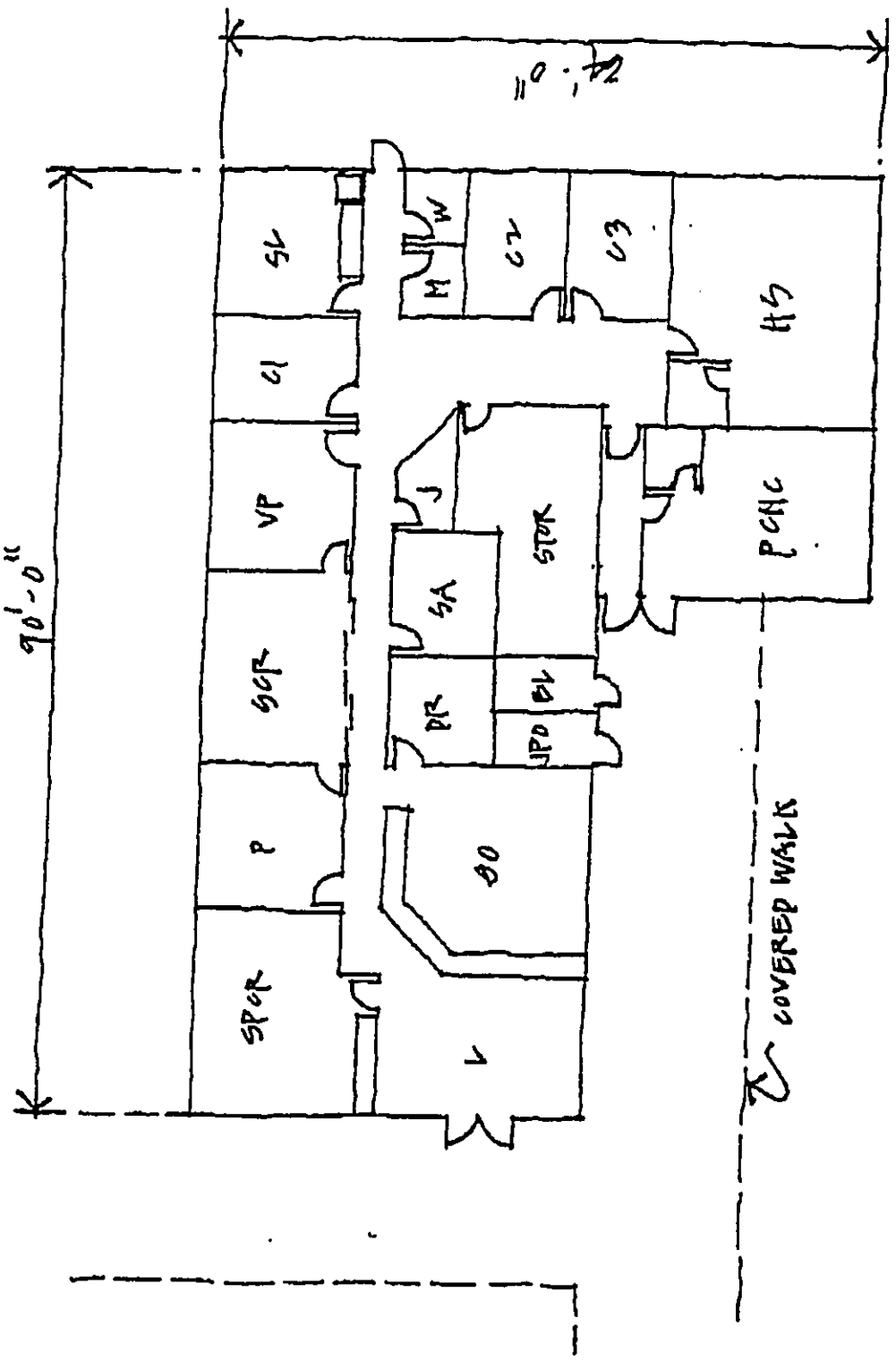
- None apparent.

DISCUSSION / JUSTIFICATION:

During the FACD several concepts for the Administration Building were developed. This concept was the result of the other design iterations for this building and DOE/DAGS feedback. This design meets the operational and educational needs established by DOE.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 596,001	$	$ 596,001
RECOMMENDED CHANGE	$ 429,786	$	$ 429,786
SAVINGS			$ 166,215

A3.0
2 of 3



ORIGINAL DESIGN

WAIKELE ELEMENTARY SCHOOL

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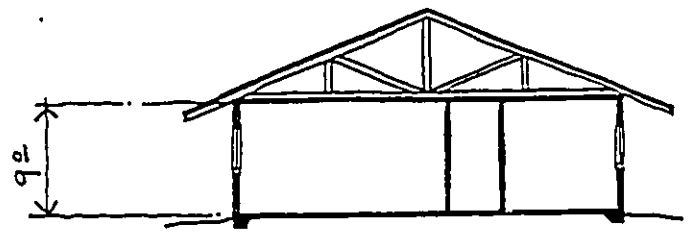
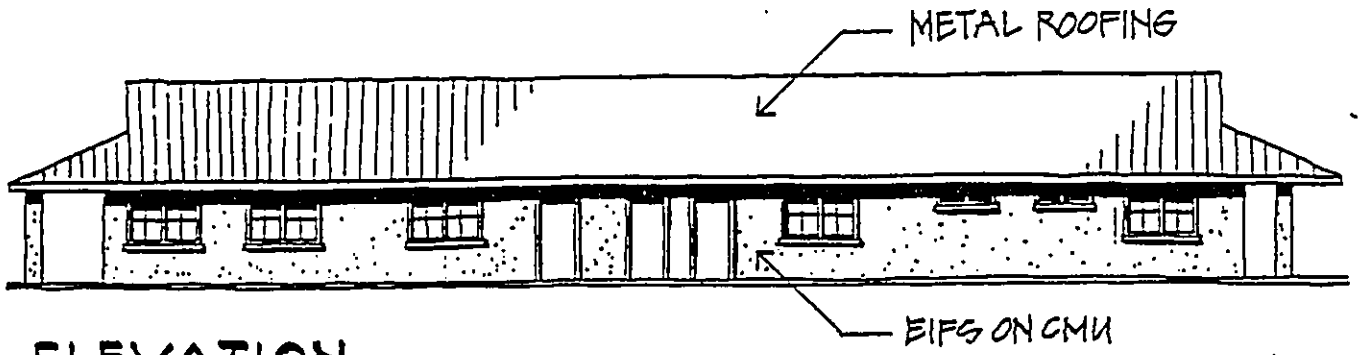
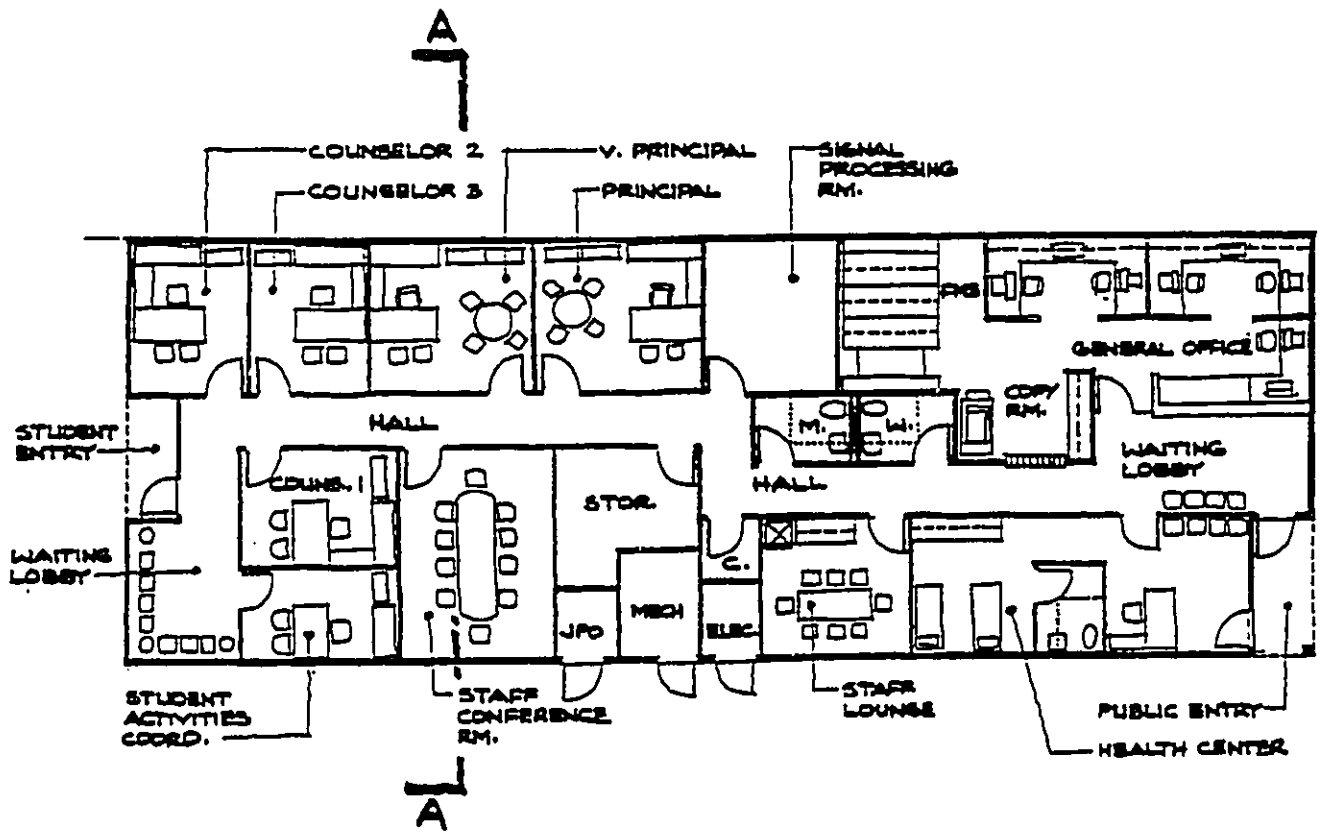


SECTION "A"



ELEVATION



ADMINISTRATIVE CENTER

SC: 1/16"= 1'-0"

PROPOSED DESIGN

DEC 05 1995

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VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. A4.0
ITEM: Library		SHEET NO. 1 of 4

ORIGINAL DESIGN: (Attach sketch where appropriate)

0% design classroom building was a concept modified from a recently designed school. Library area for bookstacks, reading/study, story telling, librarian offices, workroom/production room, media control center, conference room and video room. Building has a gross area of 6,313 SF and a programmed space of 5,845 SF. This building is part of Phase 2 and a cost estimate has not been developed..

PROPOSED DESIGN:

Building area and layout refined to address DOE/DAGS issues. Signal Processing Room relocated to *Administration Building. Building has a gross and a programmed area of 5,328 SF.*

ADVANTAGES:

- Meets DOE needs

DISADVANTAGES:

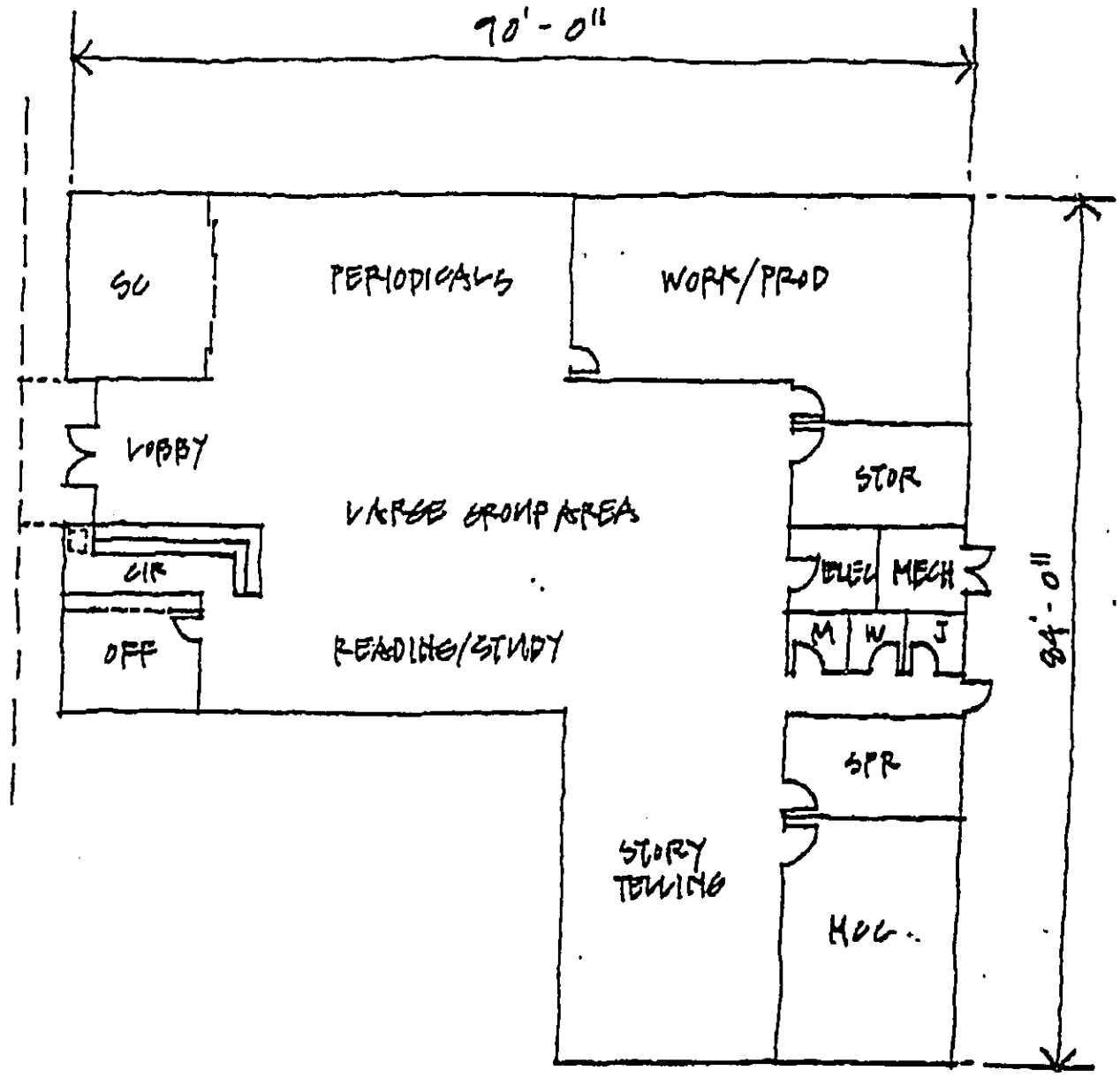
- None apparent.

DISCUSSION / JUSTIFICATION:

During the FACD several concepts for the Library were developed. This concept was the result of the other design iterations for this building and DOE/DAGS feedback. This design meets the operational and educational needs established by DOE. An estimate for this facility was not developed as it is part of Phase 2. Using a cost per square foot factor of $100.00 (a conservative number) this design should be ~$98,500 less expensive than the original concept ([6313-5328] x 100).

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 98,500

A4.0
2 of 3



LIBRARY MEDIA CENTER
1/16"
ORIGINAL DESIGN

WAIKELE ELEMENTARY SCHOOL
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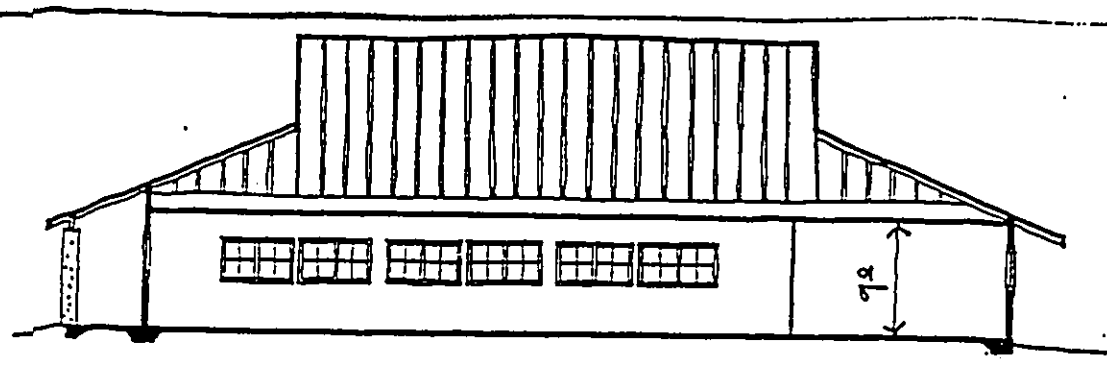
A 4.0
3 of 3



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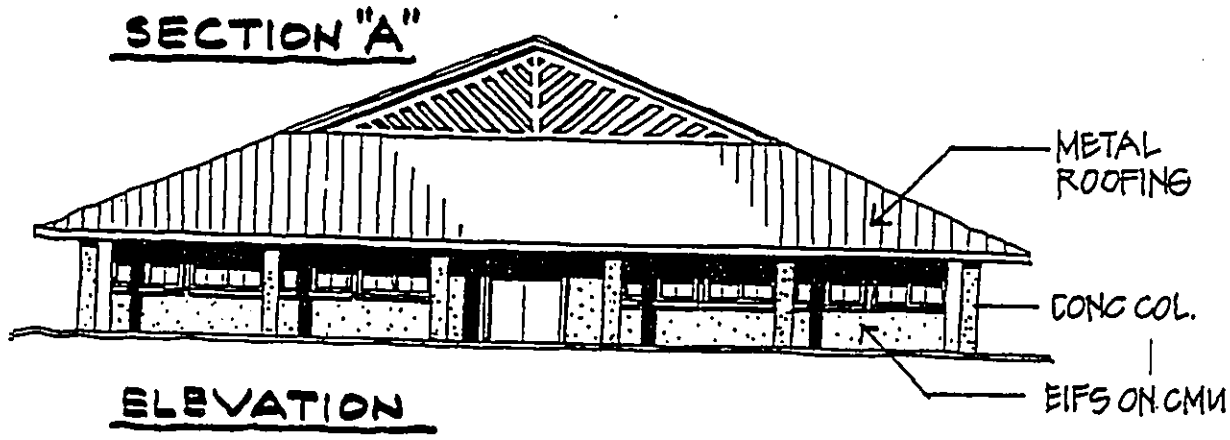
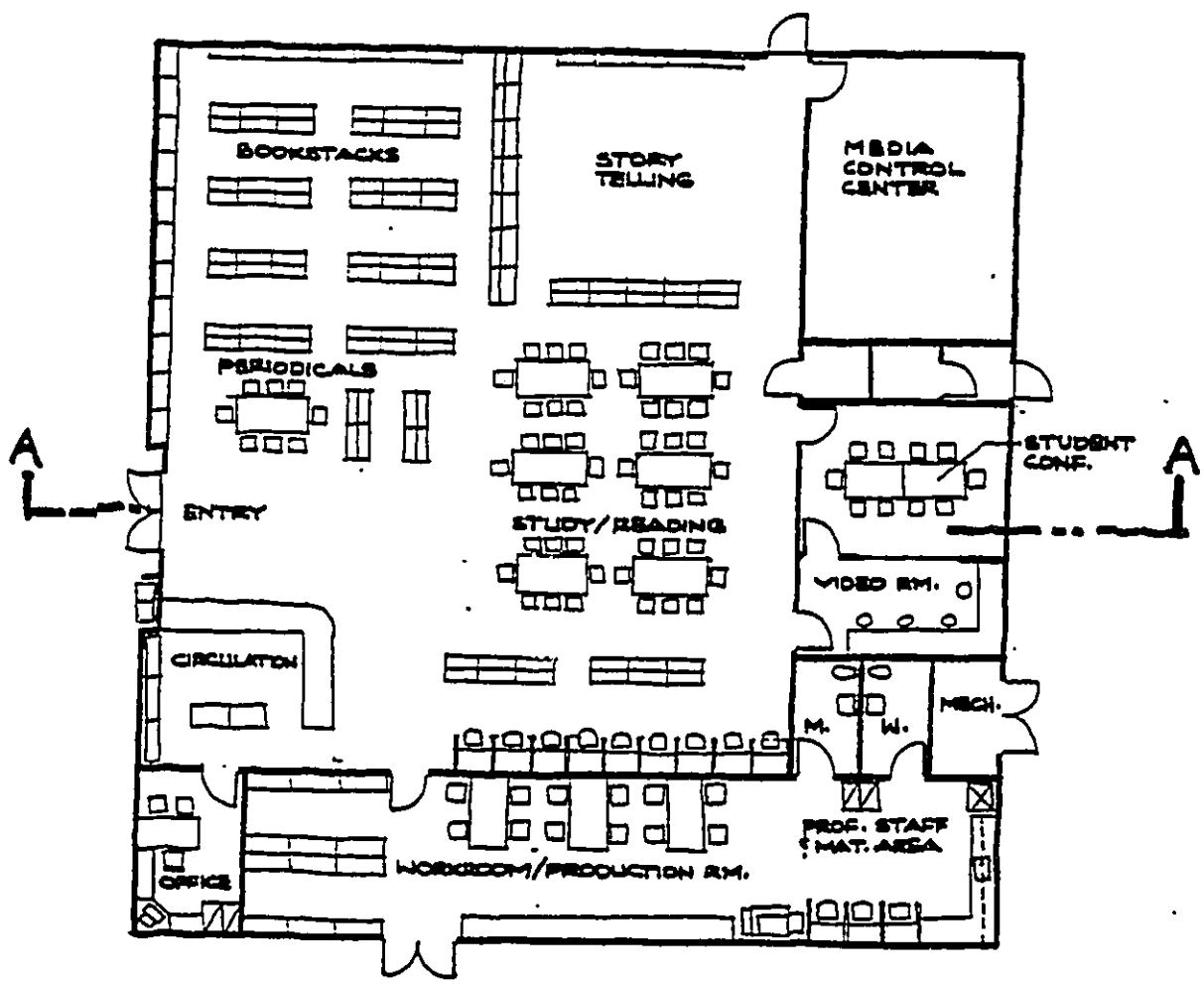


ELEVATION



LIBRARY MEDIA CENTER
SC: 1/16" = 1'-0"

PROPOSED DESIGN

DEC 05 '95

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WAIKELE ELEMENTARY SCHOOL

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VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. M1.0
ITEM: Classroom Ventillator		SHEET NO. 1 of 1

ORIGINAL DESIGN: (Attach sketch where appropriate)

Air conditioning is ducted into the classroom.

PROPOSED DESIGN:

Use a classroom ventillator to convert the chilled water to air conditioning..

ADVANTAGES:

- Reduced costs
- Eliminates ductwork in the classrooms

DISADVANTAGES:

- Requires wall and floor space.
- Distribution of air in room may not be as well balanced

DISCUSSION / JUSTIFICATION:

This proposal was implemented. The system performance will be acceptable and the cost savings significant (~$15,000/classroom). .

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 240,000

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. M1.0
ITEM: Classroom Ventillator		SHEET NO. 1 of 1

ORIGINAL DESIGN: (Attach sketch where appropriate)

Air conditioning is ducted into the classroom.

PROPOSED DESIGN:

Use a classroom ventillator to convert the chilled water to air conditioning..

ADVANTAGES:

- Reduced costs
- Eliminates ductwork in the classrooms

DISADVANTAGES:

- Requires wall and floor space.
- Distribution of air in room may not be as well balanced

DISCUSSION / JUSTIFICATION:

This proposal was implemented. The system performance will be acceptable and the cost savings significant (~$15,000/classroom). .

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ 240,000

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S1.1
ITEM: 8" Thick Concrete Walls		SHEET NO. 1 of 1

ORIGINAL DESIGN: (Attach sketch where appropriate)

Exterior walls, bearing walls and shear walls will be CMU.

PROPOSED DESIGN:

Use 8" thick poured in place concrete walls.

ADVANTAGES:

- Increased strength.
- Concrete is more durable and water resistant than CMU
- Concrete is more versatile than CMU, allowing greater flexibility in the design.

DISADVANTAGES:

- Increased cost

DISCUSSION / JUSTIFICATION:

This proposal was not implemented due to budget constraints.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ Increase

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S1.2
ITEM: Structural Steel Framed Building		SHEET NO. 1 of 10

ORIGINAL DESIGN: (Attach sketch where appropriate)

Classroom building structure will be CMU exterior walls, bearing walls and shear walls with 12" x 12" concrete columns.

PROPOSED DESIGN:

Steel columns will be used to support the beams and girders. Exterior walls will be 18 gauge steel studs with gypsum board interior and plywood sheathing exterior..

ADVANTAGES:

- Reduced costs
- Lighter structure
- Smaller footings
- Reduced time to erect structure

DISADVANTAGES:

- Structural framing needs to be covered to achieve the desired finished product.
- Fireproofing of structure
- Increased structural flexibility and deflections
- Architectural finish not as vandal proof

DISCUSSION / JUSTIFICATION:

This proposal was not implemented. The reduced resistance to damage and vandalism is not worth the slight cost savings.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,086,029	$	$ 1,086,029
RECOMMENDED CHANGE	$ 1,018,156	$	$ 1,018,156
SAVINGS			$ 67,873

FLOOR FRAMING:

LOADS:

L.L.:	CLASSROOM	40. PSF
D.L.:	1½" x 22 GA METAL DECK	2. PSF
	5" CONC. TOPPING	49.
	MECH / ELEC	5.
	CEILING	3.
	PART. / FURN.	20.
		79. PSF

total = 119. PSF

METAL DECKING:

USG VERCO TYPE 'B' FORMLOK
1½" DEEP x 22 GA.
3½" CONC. TOPPING (5" TOTAL)

$l_{MAX} = 6'$
$W = 300.$ PSF

DESCRIPTION: FLOOR STEEL	Mitsunaga & Associates, Inc.	BY: EO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE Nov '95	

FLOOR FRAMING:

JOISTS:

SPACING = 6' o.c.

$w = .12\ KSF \times 6' = .72\ K/LF$

SPAN = 24'

$+M = .72 \times 24^2/8 = 51.8\ ^{'K}$

$S_{REQ'D} = 51.8 \times 12/22 = 28.3\ IN.^3$

$\Delta = \ell/360$

$I = \frac{5 \times .72 \times 24^4 \times 1728}{384 \times 29 \times 10^3} \times \frac{360}{24 \times 12} = 232.\ IN^4$

W14x26
S = 35.3
I = 245

W12 x 30
S = 38.6
I = 238

6' CANTILEVER

$-M = (.18 \times 6) \times 6^2/2 = 19.4\ ^{'K}$

$S_{REQ'D} = 19.4 \times 12/22 = 10.6\ IN^3$

USE 18

W8x15
S = 11.8
I = 48.0

$\Delta = \ell/360$

$I = \frac{(.18 \times 6) \times 6^4 \times 1728}{8 \times 29 \times 10^3} \times \frac{360}{2 \times 6 \times 12} = 26.1\ IN^4$

BEAMS - INTERIOR:

SPACING = 24'

$w = .12\ KSF \times 24' = 2.9\ K/LF$

SPAN = 32'

$+M = 2.9 \times 32^2/8 = 371.2\ ^{'K}$

$S = 371.2 \times 12/22 = 202.5\ IN^3$

W27 x 84
S = 213
I = 2850

$\Delta = \ell/360$

W24 x 94
S = 212
I = 2212

$I = \frac{5 \times 2.9 \times 32^4 \times 1728}{384 \times 29 \times 10^3} \times \frac{360}{32 \times 12} = 2212.\ IN^4$

6x6
S = 1/2

DESCRIPTION: FLOOR STEEL	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE 11-9-	

FLOOR FRAMING:

BEAMS - EXTERIOR

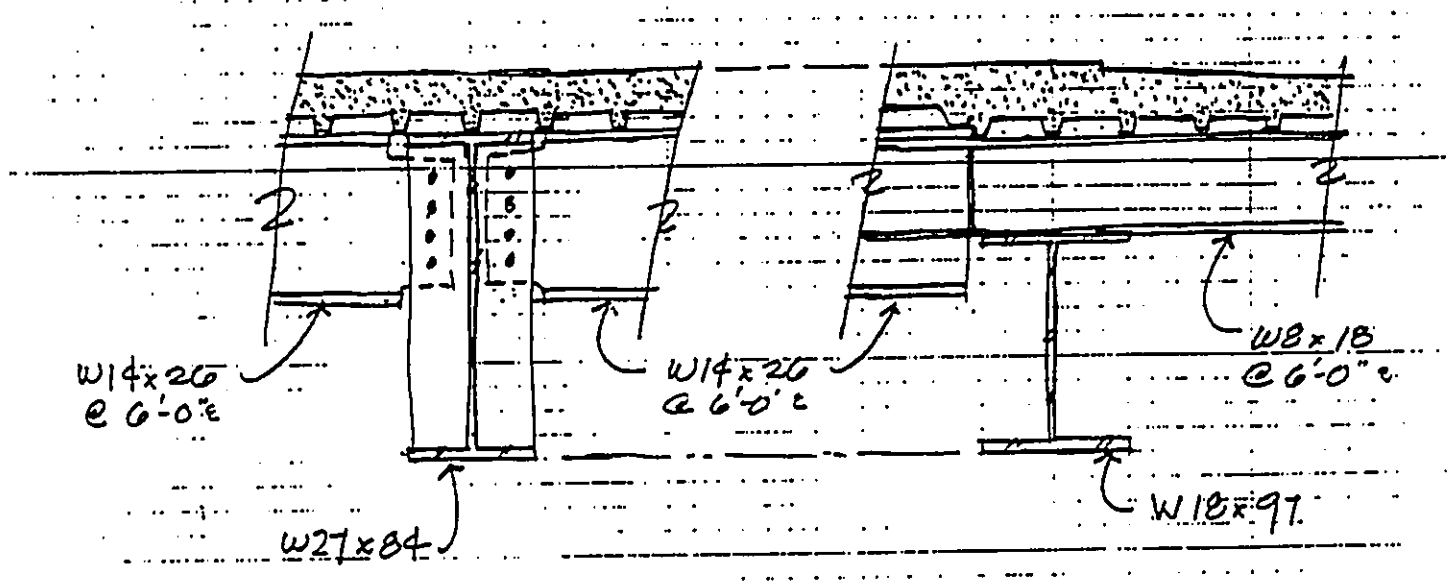
W = .12 KSF x 24/2 = 1.44 K/ft
.18 x 6 = 1.08
2.52 K/ft

SPAN = 32'
M = 2.52 x 32²/8 = 322.6 ft-k
S = 322.6 x 12/22 = 175.9 in³

W18 x 77
S = 188
I = 1750

Δ = ℓ/360

$$I = \frac{5 \times 2.52 \times 32^4 \times 1728}{384 \times 29 \times 10^3} \times \frac{360}{32 \times 12} = 1922.1 \text{ in}^4$$



DESCRIPTION: FLOOR STEEL	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE Jan. 2-	

S1.2
5 of 10

STRUCTURAL FRAME ALTERNATIVE

ZONE SUMMARY

Page LS/1

Net Cost

Zone	GFA SF	Cost /SF	Total Cost
A CONCRETE FRAME (Baseline)	31,872	34	1,086,029
B STEEL FRAME OPTION	31,872	32	1,018,156

SC3536-3
Printed 02 Dec 1995

Hawaii

D1.2
6 of 10

STRUCTURAL FRAME ALTERNATIVE

Page ZS/1

ZONE AND LEVEL SUMMARY

Net Cost

Zone Level	GFA SF	Cost /SF	Total Cost
A CONCRETE FRAME (Baseline)			
A1 Level 1	15,936	11	181,063
A2 Level 2	15,936	57	904,966
	31,872	$34	$1,086,029
B STEEL FRAME OPTION			
B1 Level 1	15,936	11	180,948
B2 Level 2	15,936	53	837,208
	31,872	$32	$1,018,156

Hawaii

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STRUCTURAL FRAME ALTERNATIVE

Page ID/1

ITEM DETAILS

A CONCRETE FRAME (Baseline) — GFA 15936 SF
A1 Level 1 — Cost/SF $11

Item	Description	Unit	Qty	Rate	$
SB	SUBSTRUCTURE				
1	BTB beneath slab	SF	296	85.00	25,160
2	Slab on grade	SF	15936	5.20	82,867
3	Perimeter wall footing	LF	580	35.00	20,300
4	CMU foundation wall, ave. 2' high	SF	1160	11.50	13,340
5	Slab thickenings	LF	508	12.00	6,096
6	Column pad	No	36	280.00	10,080
7	Elevator pit	No	1	4500.00	4,500
	Element SB total				162,343
CL	COLUMNS	LF	468	40.00	18,720
	Element CL total				18,720
	Total				181,063

SCS536-5
Printed 02 Dec 1995

Hawaii

STRUCTURAL FRAME ALTERNATIVE

Page ID/2

ITEM DETAILS

A CONCRETE FRAME (Baseline) — GFA 15936 SF
A2 Level 2 — Cost/SF $57

Item	Description	Unit	Qty	Rate	$
CL	COLUMNS	LF	468	40.00	18,720
	Element CL total				18,720
UF	UPPER FLOORS				
1	Concrete suspended slab (incl. w/way)	SF	15936	12.90	205,574
2	Concrete beam (perimeter) w/upstand curb	LF	544	50.00	27,200
3	Concrete beam (internal)	LF	312	65.00	20,280
4	Concrete joist	LF	832	40.00	33,280
	Element UF total				286,334
RF	ROOF				
1	Concrete perimeter ring beam	LF	544	35.00	19,040
2	Steel roof frame	Lb	199200	1.10	219,120
3	Metal deck	SF	20160	4.10	82,656
4	Fireproofing to steelwork	SF	30240	3.20	96,768
5	Standing seam roofing, battens, insul.	SF	20160	8.30	167,328
6	Roof drainage	Item			15,000
	Element RF total				599,912
	Total				904,966

Hawaii

S1.2
9 of 10

STRUCTURAL FRAME ALTERNATIVE

Page ID/3

ITEM DETAILS

B STEEL FRAME OPTION — GFA 15936 SF
B1 Level 1 — Cost/SF $11

Item	Description	Unit	Qty	Rate	$
SB	SUBSTRUCTURE				
1	BTB beneath slab	SF	296	85.00	25,160
2	Slab on grade	SF	15936	5.20	82,867
3	Perimeter wall footing	LF	580	35.00	20,300
4	CMU foundation wall, ave. 2' high	SF	1160	11.50	13,340
5	Slab thickenings	LF	508	12.00	6,096
6	Column pad	No	36	280.00	10,080
7	Elevator pit	No	1	4500.00	4,500
	Element SB total				162,343
CL	COLUMNS	Lb	9792	1.90	18,605
	Element CL total				18,605
	Total				180,948

SC3536-5
Printed 02 Dec 1995

Hawaii

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STRUCTURAL FRAME ALTERNATIVE

Page ID/4

ITEM DETAILS

B STEEL FRAME OPTION — GFA 15936 SF
B2 Level 2 — Cost/SF $53

Item	Description	Unit	Qty	Rate	$
CL	COLUMNS	Lb	9792	1.90	18,605
	Element CL total				18,605
UF	UPPER FLOORS				
1	1-1/2" Metal deck	SF	15936	4.50	71,712
2	3-1/2" Concrete topping	SF	15936	3.40	54,182
3	Concrete curb at perimeter	LF	544	20.00	10,880
4	W27x84 Steel beam	Lb	57658	1.20	69,190
5	W18x97 Steel beam	Lb	22193	1.20	26,632
6	W14x26 Steel joist	Lb	3088	1.20	3,706
7	W27x84 Steel joist	Lb	951	1.20	1,141
8	W8x18 Outrigger	Lb	240	1.20	288
	Element UF total				237,731
RF	ROOF				
1	Steel roof frame	Lb	199200	1.10	219,120
2	Metal deck	SF	20160	4.10	82,656
3	Fireproofing to steelwork	SF	30240	3.20	96,768
4	Standing seam roofing, battens, insul.	SF	20160	8.30	167,328
5	Roof drainage	Item			15,000
	Element RF total				580,872
	Total				837,208

Hawaii

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S1.3
ITEM: Pre-engineered Steel Rigid Frame Building		SHEET NO. 1 of 1

ORIGINAL DESIGN: (Attach sketch where appropriate)

Classroom building structure will be CMU exterior walls, bearing walls and shear walls with 12" x 12" concrete columns.

PROPOSED DESIGN:

Pre-engineered steel rigid frame structure with parallel legs at 20' -0" to 25' -0" O.C. Exterior walls will be 18 gauge steel studs with gypsum board interior and plywood sheathing exterior..

ADVANTAGES:

- Reduced costs
- Lighter structure
- Smaller footings
- Reduced time to erect structure

DISADVANTAGES:

- Structural framing needs to be covered to achieve the desired finished product.
- Fireproofing of structure
- Increased structural flexibility and deflections
- Architectural finish not as vandal proof

DISCUSSION / JUSTIFICATION:

The re-engineered steel rigid frame system was not implemented for the same reasons as the structural steel framing system.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$	$	$
RECOMMENDED CHANGE	$	$	$
SAVINGS			$ N/A

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S2.1
ITEM: 8" Thick Cast In Place Concrete Floor Slab		SHEET NO. 1 of 6

ORIGINAL DESIGN: (Attach sketch where appropriate)

The concrete floor slab is 6" minimum thickness between 14" x 30" cast in place concrete joists placed 16' O.C. to span between the exterior and interior girder lines.

PROPOSED DESIGN:

Use 8" thick cast in place slab with 20" x 32" cast-in-place concrete beams spaced at 24' - 0" O.C.

ADVANTAGES:

- Reduced number of joists and beams
- Reduced conflicts with Mechanical and Electrical equipment within classrooms due to the reduced number of beams.
- Reduced cost

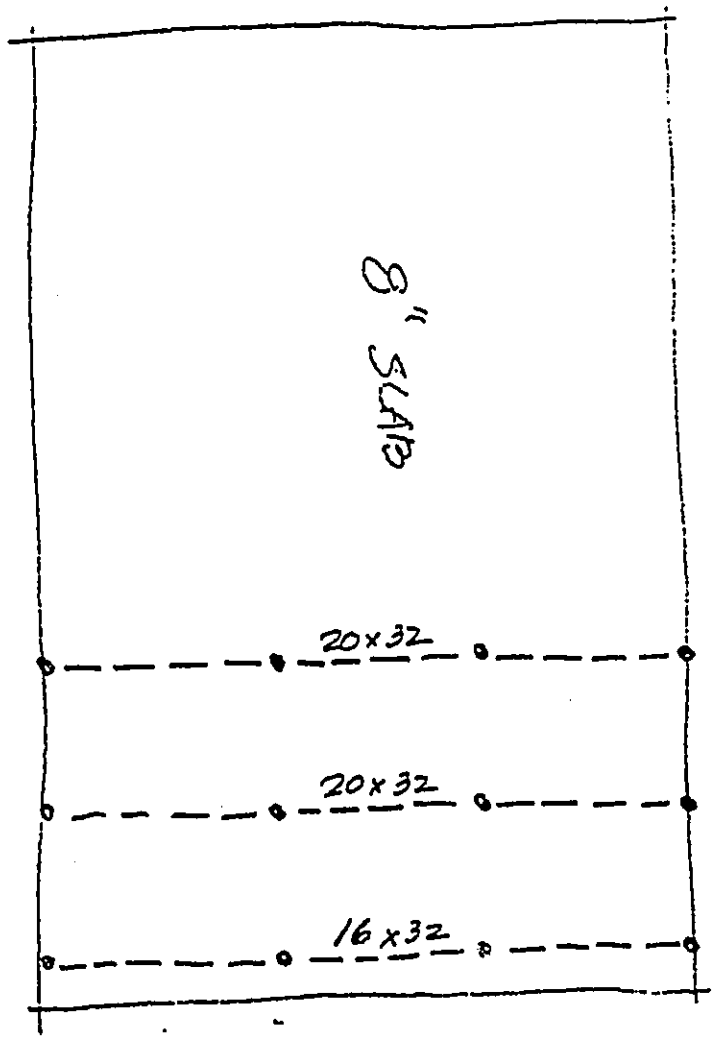
DISADVANTAGES:

- The larger beam running across the interior work spaces will interfere with the main longitudinal mechanical duct and electrical conduit lines.

DISCUSSION / JUSTIFICATION:

This proposal was implemented. A change with the Mechanical System design eliminated the interference concerns. Aligning the beams over the interior classroom partitions creates a structural item for the partition to attach at a lower height, therefore reducing partition cost.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 305,054	$	$ 305,054
RECOMMENDED CHANGE	$ 291,805	$	$ 291,805
SAVINGS			$ 13,149


8" Slab
20x32
20x32
16x32

FLOOR FRAMING:

LOADS:

L.L:	CLASSROOM	40. PSF	x 1.7 = 68. PSF
D.L:	8" SLAB	100. PSF	
	MECH/ELEC	5.	
	CEILING	3.	
	PART./FURN	20	
		128. PSF	x 1.4 = 179. PSF

Total = 168. PSF

w_u = 247. PSF

DESCRIPTION: FLOOR 3" C-I-P

Mitsunaga & Associates, Inc.

PROJECT: WAIKELE ELEMENTARY SCHOOL

BY: SO | CHECKED

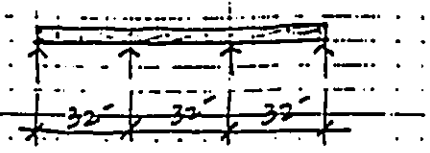
JOB NO. | SHEET OF

DATE NOV. '95

FLOOR FRAMING:

BEAMS - INTERIOR:

W_u = .25 KSF x 1.15 x 24' = 6.9 k/lf
1.4 x .15 x 1.67 x 2.0 = .7
7.6 k/lf



EXTERIOR SPAN:

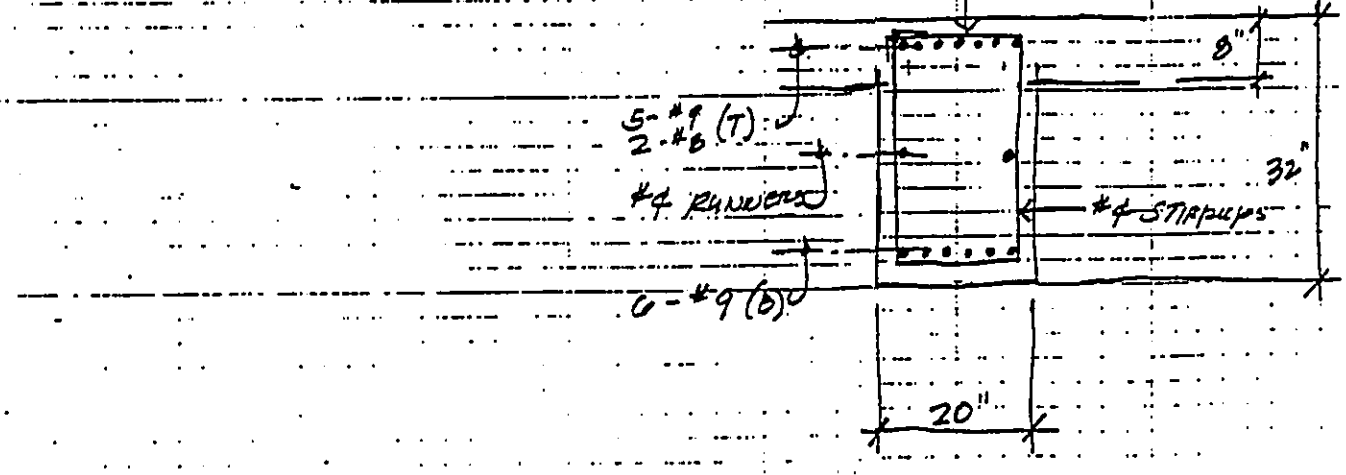
$+M_u$ = 7.6 x 32²/11 = 707.5 'k
Ku = 489 b = 20 d = 32 - 2½ = 29½
Ju = 4.10
A_s = 707.5 / 4.10 x 29.5 = 5.85 in² ⟹ 6 - #9 (E)

$-M_u$ = 7.6 x 32²/10 = 778.2 'k
Ku = 536 b = 20 d = 29½
Ju = 4.06
A_s = 778.2 / 4.06 x 29.5 = 6.5 in² ⟹ 5 - #9 (T)
2 - #8 (T)

V_u = 7.6 x 1.15 x 32/2 = 139.2 E
v_u = 139.2 / .85 x 20 x 29.5 = .279 ksi
A_v = (.279 - .126) x 20 x 5/40 = .076 x 5

A_v	S
#4 → .40	5.2"

⟹ #4; 12 s/ @ 4"
6 @ 8"
BAL @ 12" o.c.



DESCRIPTION	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
FLOOR 9' C-1-P	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE JAN. '95	

FLOOR FRAMING

BEAMS - EXTERIOR:

W_u = .25 x 24/2 + .35 x 6 = 5.1 k/ft
1.4 x .15 x 1.33 x 2 = .6
5.7 k/ft

EXTERIOR SPAN:

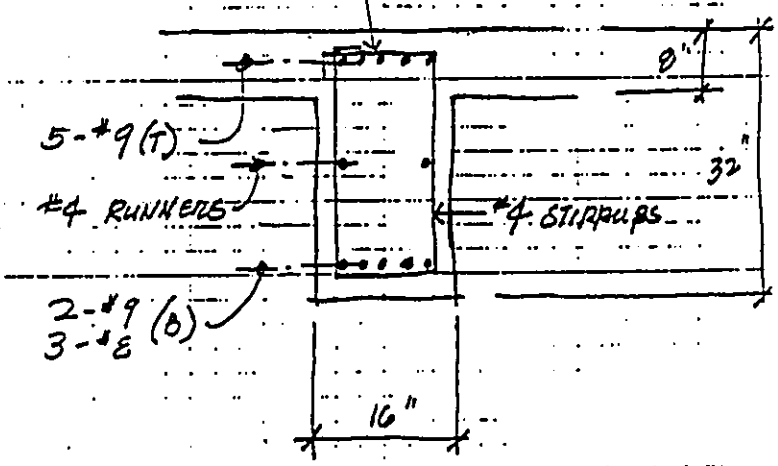
$+M_u = 5.7 \times 32^2/11 = 530.6$ ft-k
$K_u = 457$ b = 16 d = 32 - 2½ = 29½"
$J_u = 4.13$
$A_s = 530.6/4.13 \times 29.5 = 4.36$ in² → 2 - #9
3 - #8 (B)

$-M_u = 5.7 \times 32^2/10 = 583.7$ ft-k
$K_u = 503$ b = 16 d = 29½
$J_u = 4.09$
$A_s = 583.7/4.09 \times 29.5 = 4.84$ in² → 5 - #9 (T)

$V_u = 5.7 \times 1.15 \times 32/2 = 104.9$ k
$v_u = 104.9/.85 \times 16 \times 29.5 = .261$ ksi
$A_v = (.261 - .126) \times 16 \times 5/40 = .054 \times s$

A_v	s
#4 → .40	14"

→ #4: 2 sp @ 6" = 4'
6 sp @ 8" = 4'
BALANCE @ 12"



DESCRIPTION: FLOOR 9" C-I-P	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE Nov '87	

S2.1
6 of 6

UPPER FLOOR FRAMING ALTERNATIVES

ITEM DETAILS

D Cast-in Place - 8" option

GFA 15936 SF
Cost/SF $18

Item	Description	Unit	Qty	Rate	$
CL	COLUMNS	LF	468	40.00	18,720
	Element CL total				18,720
UF	UPPER FLOORS				
1	Concrete suspended slab (incl. w/way)	SF	15936	14.30	227,885
2	Concrete curb	LF	544	20.00	10,880
3	12x32 Concrete beam	LF	208	45.00	9,360
4	18x32 Concrete beam	LF	624	40.00	24,960
	Element UF total				273,085
	Total				291,805

Hawaii

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S2.2
ITEM: 6 ½" Thick Post Tensioned Concrete Floor Slab		SHEET NO. 1 of 6

ORIGINAL DESIGN: (Attach sketch where appropriate)

The concrete floor slab is 6" minimum thickness between 14" x 30" cast in place concrete joists placed 16' O.C. to span between the exterior and interior girder lines.

PROPOSED DESIGN:

Use 6 ½" thick post tensioned, cast in place slab spanning 24' with 18" x 32" cast-in-place concrete beams spaced at 24' - 0" O.C.

ADVANTAGES:

- Reduced number of joists and beams
- Reduced conflicts with Mechanical and Electrical equipment within classrooms due to the reduced number of beams.
- Reduced cost
- Earlier stripping of slab formwork

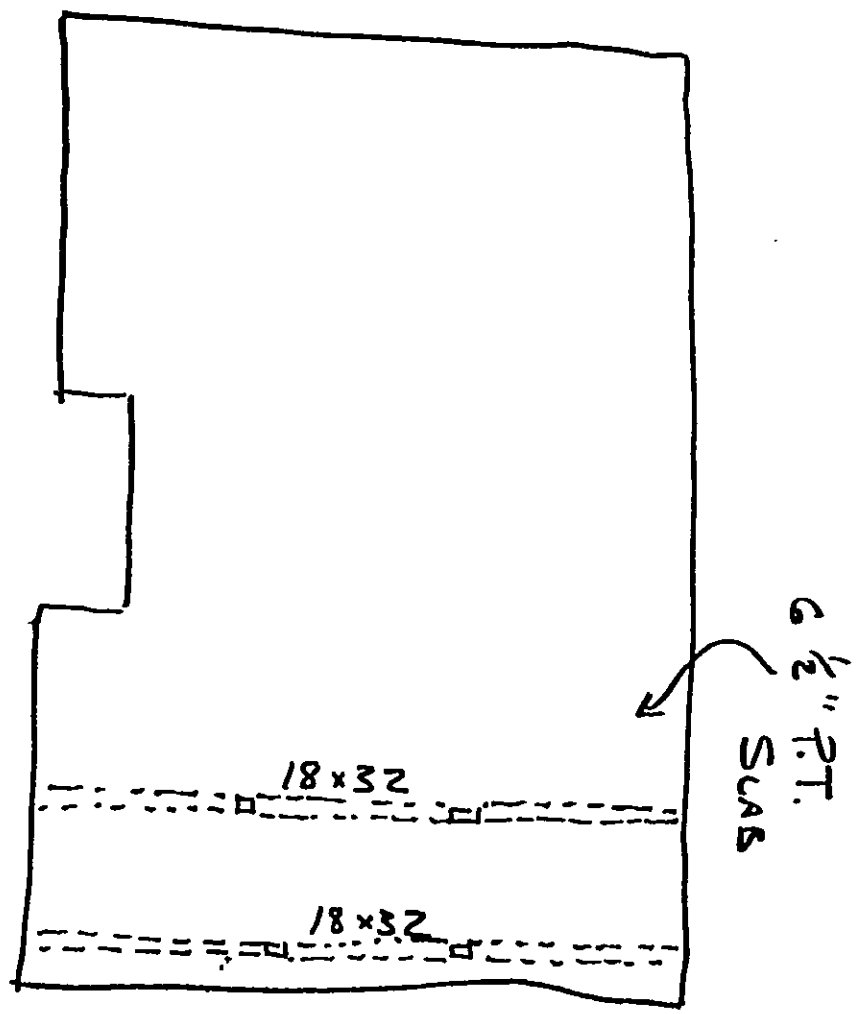
DISADVANTAGES:

- Increased shrinking of concrete slab, causing cracking in CMU walls and partitions
- Future renovations difficult due to tension in tendons
- Anchor and fasteners need to be monitored to insure tendon integrity

DISCUSSION / JUSTIFICATION:

This proposal was not implemented even though it was less costly. The disadvantages outweighed the cost savings. Any future renovations would require careful planning and consider the tendon layout which would be difficult to determine. It is common practice to use drilled anchors to attach elements to a structural slab and unless everyone is aware of the danger, including maintenance personnel, a potentially serious accident may occur.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 305,054	$	$ 305,054
RECOMMENDED CHANGE	$ 269,959	$	$ 269,959
SAVINGS			$ 35,095



S2.2
2 of 6

FLOOR FRAMING:

LOADS: (P.T.)

L.L.:	CLASSROOM	40. PSF	x 1.4 =	68. PSF
D.L.:	6 1/2" SLAB	81. PSF		
	MECH/ ELEC.	5.		
	CEILING	3.		
	PART./FURN.	20.		
		109. PSF	x 1.7 =	153. PSF
	total =	149. PSF	Wu =	221. PSF

SLAB:

$t \approx \ell/44 = 24 \times 12/44 = 6.5"$ USE 6 1/2" THICK SLAB

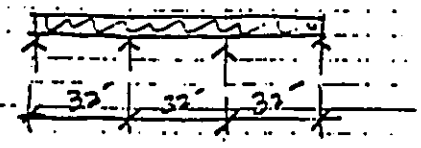
DESCRIPTION: FLOOR P.T.	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE Nov '95	

S2.2
4.f.6

FLOOR FRAMING:

BEAMS = INTERIOR:

$W_u = 1.15 \times .22 \times 24 = 6.07$ k/lf



EXTERIOR SPAN

$+M_u = 6.07 \times 32^2/11 = 565.1$ ft-k

$K_u = 433$ $\quad b = 18"$ $\quad d = 32 - 3\frac{1}{2} = 29\frac{1}{2}"$

$J_u = 4.15$

$A_s = 565.1/4.15 \times 29.5 = 4.62\ in^2 \Rightarrow$ 6 - #5 (B)

$-M_u = 6.07 \times 32^2/10 = 621.6$ ft-k

$K_u = 476$ $\quad b = 18$ $\quad d = 29\frac{1}{2}$

$J_u = 4.11$

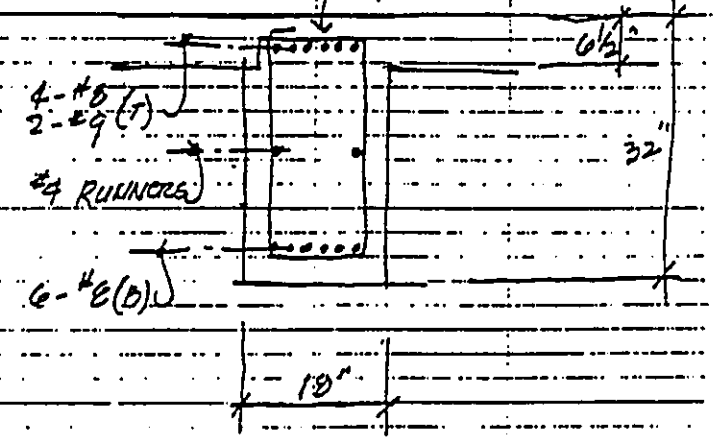
$A_s = 621.6/4.11 \times 29.5 = 5.13\ in^2 \Rightarrow$ 4 - #8 + 2 - #4 (T)

$V_u = 1.15 \times 6.07 \times 32/2 = 111.7$ k

$v_u = 111.7/.85 \times 18 \times 29.5 = .248$ ksi

$A_v = (.248 - .120) \times 18 \times 5/40 = .055 \times S$

	A_v	S	
#4 ⇒	.40	7.3 in	USE 8 sp. @ 6"
			6 sp. @ 4"
			Rest @ 12"



DESCRIPTION: FLOOR F.T.	Mitsunaga & Associates, Inc.	BY: SO	CHECKED
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE: 1.	

FLOOR FRAMING:

BEAMS = EXTERIOR:

$W_u = .22 \times 24/2 + .32 \times 6/2 = 3.6$ k/ft

EXTERIOR SPAN:

$+M_u = 3.6 \times 22^2/11 = 335.1$ ft-k

$K_u = 385$ $\quad b = 12$ $\quad d = 32 - 2\frac{1}{2} = 29\frac{1}{2}$

$\partial_u = 4.23$

$A_s = 335.1/4.23 \times 29.5 = 2.68$ in^2 $\Rightarrow$ 3-#9 (B)

$-M_u = 3.6 \times 32^2/10 = 368.6$ ft-k

$K_u = 424$

$\partial_u = 4.15$

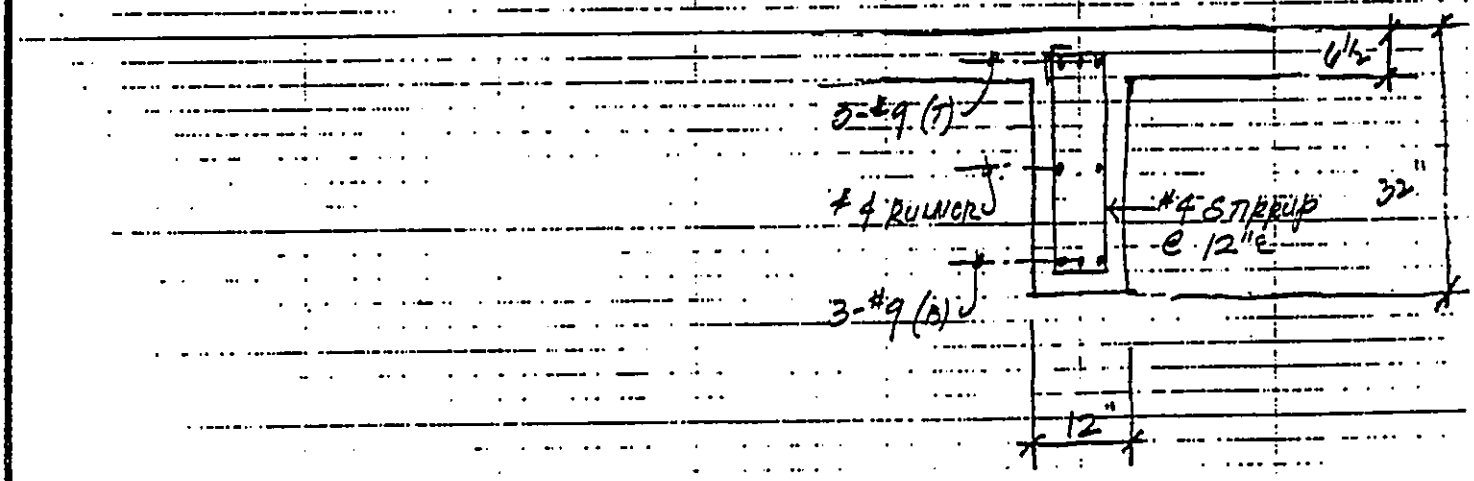
$A_s = 368.6/4.15 \times 29.5 = 3.01$ in^2 $\Rightarrow$ 3-#9 (T)

$V_u = 1.15 \times 3.6 \times 22/2 = 66.2$ k

$v_u = 66.2/.85 \times 12 \times 29.5 = .220$ ksi

$A_v = (.220 - .126) \times 12 \times S/40 = .028 \times S$

A_v	S
#4 $\Rightarrow$ .40	14.1" $\rightarrow$ 04 / 12"c



DESCRIPTION: FLOOR F.T.

Mitsunaga & Associates, Inc.

PROJECT: WAIKOLO ELEMENTARY SCHOOL

BY: SO | CHECKED

JOB NO. | SHEET OF

DATE Nov. '93

S2.2
6.f6

UPPER FLOOR FRAMING ALTERNATIVES

ITEM DETAILS

B Post Tensioned Slab

GFA 15936 SF
Cost/SF $17

Item	Description	Unit	Qty	Rate	$
CL	COLUMNS	LF	468	40.00	18,720
	Element CL total				18,720
UF	UPPER FLOORS				
1	Post tensioned slab, 6-1/2"	SF	15936	13.20	210,355
2	Concrete curb at perimeter	LF	544	20.00	10,880
3	18x32 Concrete beam	LF	312	65.00	20,280
4	12x32 Concrete beam	LF	208	45.00	9,360
	Element UF total				250,875
	Total				269,595

rh Hawaii

VALUE ENGINEERING RECOMMENDATION		Value Management Strategies, Inc.
PROJECT: Waikele Elementary School	DATE: Nov. 27-Dec. 6	RECOMMENDATION NO. S2.3
ITEM: 3 ½" Precast Plank with 3" Concrete Topping		SHEET NO. 1 of 6

ORIGINAL DESIGN: (Attach sketch where appropriate)

The concrete floor slab is 6" minimum thickness between 14" x 30" cast in place concrete joists placed 16' O.C. to span between the exterior and interior girder lines.

PROPOSED DESIGN:

Use 3 ½" precast, prestressed concrete planking spanning 24' - 0" to 24" x 32" cast in place concrete beams spaced at 24' - 0" O.C. at the interior partition walls. Place a 3" cast in place concrete topping over the precast planks. The topping is poured integrally with the concrete beams.

ADVANTAGES:

- Reduced number of joists and beams
- Reduced conflicts with Mechanical and Electrical equipment within classrooms due to the reduced number of beams.
- Reduced cost
- Reduced slab formwork

DISADVANTAGES:

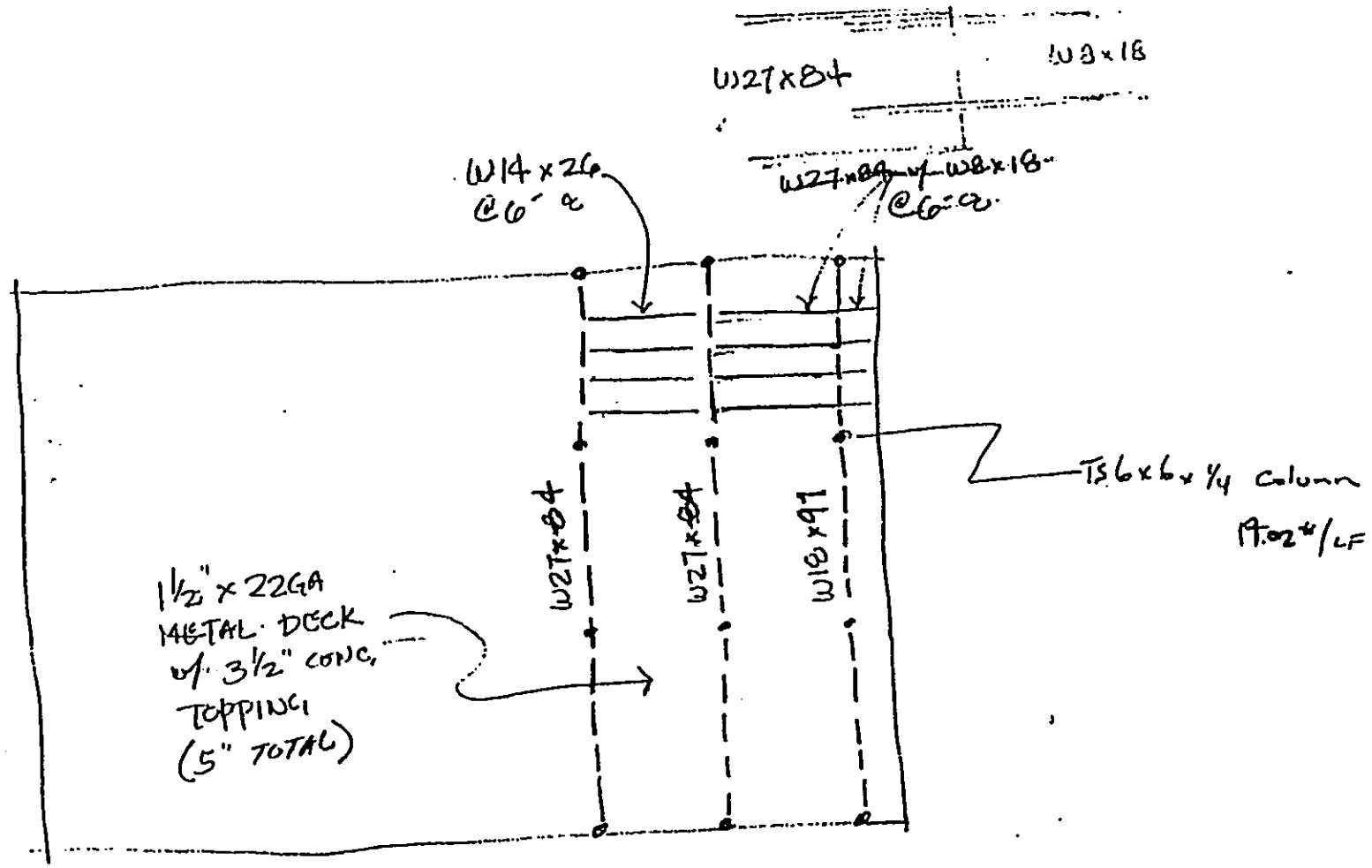
- Wider beams for bearing area
- Careful coordination of plank penetration required
- Potential for shrinkage cracks
- Depressed floor areas may still require the use of poured in place section causing increased thickness and wasted material

DISCUSSION / JUSTIFICATION:

This proposal was not implemented even though it was less costly than the original design. The disadvantages made it less desirable than alternative S2.1 which was implemented.

COST SUMMARY	INITIAL COST	O&M COST	LIFE-CYCLE COST
ORIGINAL DESIGN	$ 305,054	$	$ 305,054
RECOMMENDED CHANGE	$ 257,750	$	$ 257,750
SAVINGS			$ 47,304

S2.3
2 of 6


W27x84
W8x18
W14x26
@6'-0"
W27x84 w/ W8x18
@6'-0"
TS 6x6x1/4 Column
19.02#/LF
1½" x 22GA
METAL DECK
w/ 3½" CONC.
TOPPING
(5" TOTAL)
W27x84
W27x84
W16x91

FLOOR FRAMING:

LOADS:

L.L.:	CLASSROOM	40. psf	x 1.7 = 68. psf
D.L.:	3" TOPPING	38. psf	
	3½" PRECAST	44.	
	MECH./ELEC	5.	
	CEILING	3.	
	PART./FURN.	20.	
		110. psf	x 1.4 = 154 psf
	total:	150. psf	W_u = 222. psf

DESCRIPTION: FLOOR PLANK

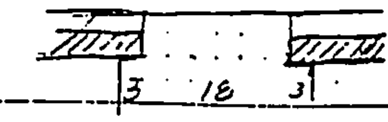
Mitsunaga & Associates, Inc.

PROJECT: WAIKELE ELEMENTARY SCHOOL

BY: SO | CHECKED

JOB NO. | SHEET OF

DATE 11/94 '95



FLOOR FRAMING:

BEAMS – INTERIOR

$w_u = 1.15 \times .22 \times 24 = 6.07$ k/ft
$1.4 \times .15 \times 2 \times 2.17 = .91$
6.98 k/ft

EXTERIOR SPAN:

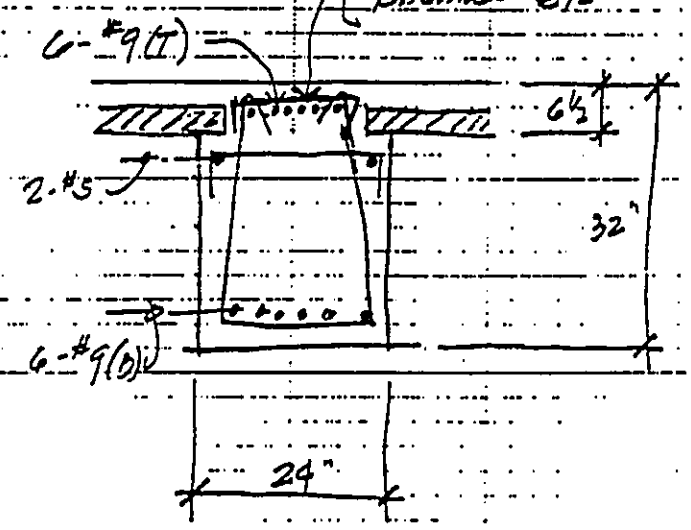
$+M_u = 6.98 \times 32^2/11 = 649.8$ 'k
$K_u = 498$ $b = 18$ $d = 32 - 2\frac{1}{2} = 29\frac{1}{2}$
$a_u = 4.10$
$A_s = 649.8/4.10 \times 29.5 = 5.37$ in^2 ⟹ 6-#9(B)

$-M_u = 6.98 \times 32^2/10 = 714.8$ 'k
$K_u = 411$ $b = 24$ $d = 29\frac{1}{2}$
$a_u = 4.17$
$A_s = 714.8/4.17 \times 29.5 = 5.81$ in^2 ⟹ 6-#9(T)

$V_u = 1.15 \times 6.98 \times 32/2 = 128.4$ k
$v_u = 128.4/.85 \times 18 \times 29.5 = .285$ ksi
$A_v = (.285 - .126) \times 18 \times s/40 = .071 \times s$

	A_v	s
#4 ⟹	.40	5.6

⟹ #4: 9 @ 5"
6 @ 8"
BALANCE @ 12"



DESCRIPTION		BY:	CHECKED
FLOOR PLANK	Mitsunaga & Associates, Inc.	SO	
	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE	

FLOOR FRAMING:

BEAMS - EXTERIOR

$W_u = .22 \times 24/2 + .32 \times 6/2 = 3.6^{k/ft}$
$1.4 \times .15 \times 1.25 \times 2.17 = .57$
$4.17^{k/ft}$

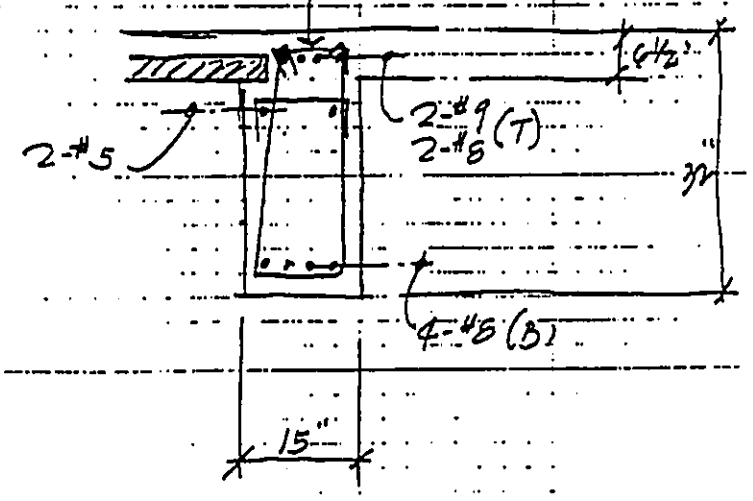
EXTERIOR SPAN:

$+M_u = 4.17 \times 32^2/11 = 388.2^{ft\text{-}k}$
$K_u = 446$ $\quad b = 12$ $\quad d = 32 - 2\tfrac{1}{2} - .5 = 29\tfrac{1}{2}$
$\phi_u = 4.14$
$A_s = 388.2/4.14 \times 29.5 = 3.17\ in^2 \Rightarrow$ 4-#8 (B)

$-M_u = 4.17 \times 32^2/10 = 427.^{ft\text{-}k}$
$K_u = 393$
$\phi_u = 4.18$
$A_s = 427/4.18 \times 29.5 = 3.46\ in^2 \Rightarrow$ 2-#9 (T), 2-#8 (T)

$V_u = 1.15 \times 4.17 \times 32/2 = 76.7^{k}$
$v_u = 76.7/.85 \times 12 \times 29.5 = .255\ ksi$
$A_v = (.255 - .126) \times 12 \times S/40 = .039 \times S$

A_v	S
#4 $\Rightarrow$ .40	10" $\Rightarrow$ #4 - { 1 @ 9", BALANCE @ 12" }



DESCRIPTION	Mitsunaga & Associates, Inc.	BY:	CHECKED
FLOOR PLANK	PROJECT: WAIKELE ELEMENTARY SCHOOL	JOB NO.	SHEET OF
		DATE Jan. 75	

52.3
6 of 6

UPPER FLOOR FRAMING ALTERNATIVES

ITEM DETAILS

C: Precast Plank — GFA 15936 SF
Cost/SF $17

Item	Description	Unit	Qty	Rate	$
CL	COLUMNS	LF	468	40.00	18,720
	Element CL total				18,720
UF	UPPER FLOORS				
1	3-1/2" Precast plank	SF	15936	8.50	135,456
2	3" Concrete topping	SF	15936	2.90	46,214
3	Concrete curb at perimeter	LF	544	20.00	10,880
4	15x32 Concrete beam	LF	208	55.00	11,440
5	24x32 Concrete beam	LF	624	85.00	53,040
	Element UF total				257,030
	Total				275,750

rh Hawaii

FUNCTION ANALYSIS CONCEPT DEVELOPMENT (FACD) PROCESS

INTRODUCTION

The Department of Accounting and General Services (DAGS), will be using an improved design process for the design of your new facility. This process is called Function Analysis Concept Development (FACD). The process will help to better define the project's function requirements and provide everyone involved a better understanding of them. The design team will work to translate the function requirements into a facility construction that is functional, easy to maintain, and can be constructed within authorized funds.

The purpose for using the FACD process is to improve upon the planning and conceptual design process and aid in the identification and timely resolution of potential problems. This will help to ensure the project design will meet the users requirements and avoid costly, time consuming changes from occurring during design execution. The FACD process brings key decision makers from all agencies/groups that can impact the design, together with the design team at the on-set of the project to identify and resolve the issues critical to the project. It also allows for key decision and agreements to be made early in the process with full knowledge of the impacts, both financial and non-financial.

Successful completion of the function analysis concept development process is the major milestone in the successful design and construction of a new facility. It is imperative that DAGS, DOE and other involved groups actively participate in the process and be prepared to make decisions and commitments. The decisions made during the functional design process will determine how well this facility meets your operational needs in the future and how well budget and schedule can be maintained through design.

At the end of the FACD process and Executive Summary Report (ESR) will be produced. The ESR will document the design concept and resolution of critical issues. This document will be signed-off by representatives of the various agencies involved to signify acceptance of the concept by DOE and DAGS, and that the other agencies involved concur with the concept as it impacts their areas of responsibility. Changes after approval of the project scope and design concept can be incorporated in the project, but will waste scarce construction design funds and can delay completion of your facility.

FACD PROCESS

The work will be done in concentrated on-site work sessions with the design team, facility operator, base engineering, and PACDIV representatives. This process takes roughly ten days for each project. The projected schedule for the on-site work sessions follows this section.

Prior to the start of the start of the FACD the design team will identify and obtain available published data on the project, conduct any background investigation and analysis as necessary, meet with the user, develop an initial concept for the project to serve as a baseline for the study, and develop a preliminary cost estimate for the project based on the scope of work identified in the program document.

The function design process starts out with an informational meeting with the representatives from DAGS, DOE and other effected agencies to explain the FACD process, schedule and responsibilities. This meeting also provides the user to discuss their operational activities with the team. To stimulate the discussion the design team will review the 0% design.

Throughout the process there are regular meetings with the DAGS, DOE and other involved groups regarding the concept. The purpose of these meetings is to get feedback regarding the concept to ensure the design is acceptable to all and to receive direction on any necessary changes. Meetings the first week are generally informal reviews. As a result of these reviews, the design is modified to incorporate the user and base suggestions or resolve their concerns. In addition to these reviews, separate meetings may be held by individual team members with agency personnel to ensure the design has concurrence for such items as: utility connections, fire safety, security, architectural compatibility, environmental considerations, facility maintainability, and conformance to base master plans. This is an iterative process, the result of which is an agreement between the DAGS, DOE, other involved groups and designer on the final scope and concept.

The final recommended project scope and design concept is presented early on the second week. This presentation includes graphics showing site development, floor plans, exterior building appearance, and a description of engineering systems and materials that will be used. The presentation will also discuss function relationships, work flow, and function alternates investigated and their economic and functional impacts.

Following the formal presentation, any final adjustments to the design concept are made. The Executive Summary Report of the agreed project scope and design concept is prepared the following day, and distributed to allow review and comments at the out-brief session.

On the final day of the FACD, an out-brief meeting is conducted. Everyone responsible to sign-off and approve the Executive Summary will provide the facilitator with their comments regarding the document. Each comment will be discussed and resolved at the meeting. The comments and their resolution will become part of the Executive Summary. Each person responsible to sign-off on the design concept will do so. After this meeting the ESR will be edited to reflect the resolution of the comments. Copies of the sign-off sheet will be added and Final Executive Summary Reports Distributed. This agreed scope and design concept will be used to prepare the Concept Design Report by the designer. The facilitator will prepare an FACD Report that documents the activities that occurred during the process and the alternatives that were developed during the analysis. This document not only shows the decisions that resulted in the final design, but alternatives that were considered, rejected and why.

FACD Schedule

Day	Activity	Participants
Monday AM **Nov. 28**	◆ Opening session: **(9:00-12:00)** ◆ Review FACD process, schedule and responsibilities ◆ Review 0% design ◆ Discuss customer criteria, desires, operations, concerns and issues. ◆ Discuss issues and concerns for other agencies	DAGS, DOE Design Team Other Agencies VE Facilitator
Monday PM Nov. 28	◆ Review new data ◆ Model Project Function Requirements ◆ *Show Function Relationships (Bubble Diagram)* ◆ Generate Ideas	Design Team VE Facilitator
Tuesday & Wed. AM Nov. 29-30	◆ Develop Site Concepts, Floor Plans and Lay-outs ◆ Develop System Alternates ◆ Identify Cost Impact of Alternatives	Design Team VE Facilitator
Wednesday PM **Nov. 29**	◆ Review Initial Concept Alternatives with User **(2:00-4:00)** ◆ Identify new issues/concerns ◆ Refine Concept Based on User Meeting	DAGS, DOE Design Team Other Agencies VE Facilitator
Thursday & Friday AM Nov 30 & Dec. 1	◆ Continue Analysis and Concept Development ◆ Refine and Update Concept Cost Estimate ◆ Document Alternative Ideas ◆ Prepare Presentation Graphics of Proposed Concept	Design Team VE Facilitator
Friday PM **Dec. 1**	◆ Present Concept and System Details **(1:30pm-4:00pm)** ◆ Discuss Issues and Possible Solution(s) ◆ Refine/Finalize Concept ◆ Develop Design Narratives	DAGS, DOE Design Team Other Agencies VE Facilitator

Day	Activity	Participants
Saturday Dec. 2	◆ Refine/Finalize Concept (Cont) ◆ Start Executive Summary Report ◆ Finalize Graphics ◆ Finalize Documentation of Alternative Concepts ◆ Finalize Cost Estimate	Design Team VE Facilitator
Sunday & Monday Dec. 3 & 4	◆ Finalize, Print and Distribute Draft Executive Summary Report	VE Facilitator
Tuesday ***Dec. 5***	◆ Formal Concept and ESR Review **(8:30-10:30)** ◆ Resolve Executive Summary Comments ◆ Sign-off ESR - Approve Concept ◆ Finalize Executive Summary Editing to Reflect Resolution of Comments and Distribute by VE Facilitator	DAGS, DOE Design Team Other Agencies VE Facilitator

TEAM CONFIGURATION

The concept design team for the development of this project, including designers and consultants, are listed below:

Terry Hays	Value Management Strategies, Inc.	Facilitator
Richard Balcom	CDS International, Inc.	Architect - Project Manager
Marcelino Raza	CDS International, Inc.	Architect
Stuart Otake	Mitsunage & Associates	Structural Engineer
Ben Notkin	Ben S. Notkin/Hawaii, Ltd.	Mechanical Engineer
Charlie Carlson	Moss Engineering, Inc.	Electrical Engineer
Craig Luke	R. M. Towill Corporation	Civil Engineer
Reece Smith	Rider Hunt Limited	Cost Estimating

DOE representatives involved with the project were:

Naomi Inouye	Leeward District Office
Gene Fong	Facilities
Anthony Chun	Educational Specialist - Carriculum
Ed Hasegawa	Leeward District - Facilities
Gene Kaneshiro	School Food Services
Jack Burian	Facilities
Lester Chuck	Facilities Director
Nick Nichols	Facilities Planner

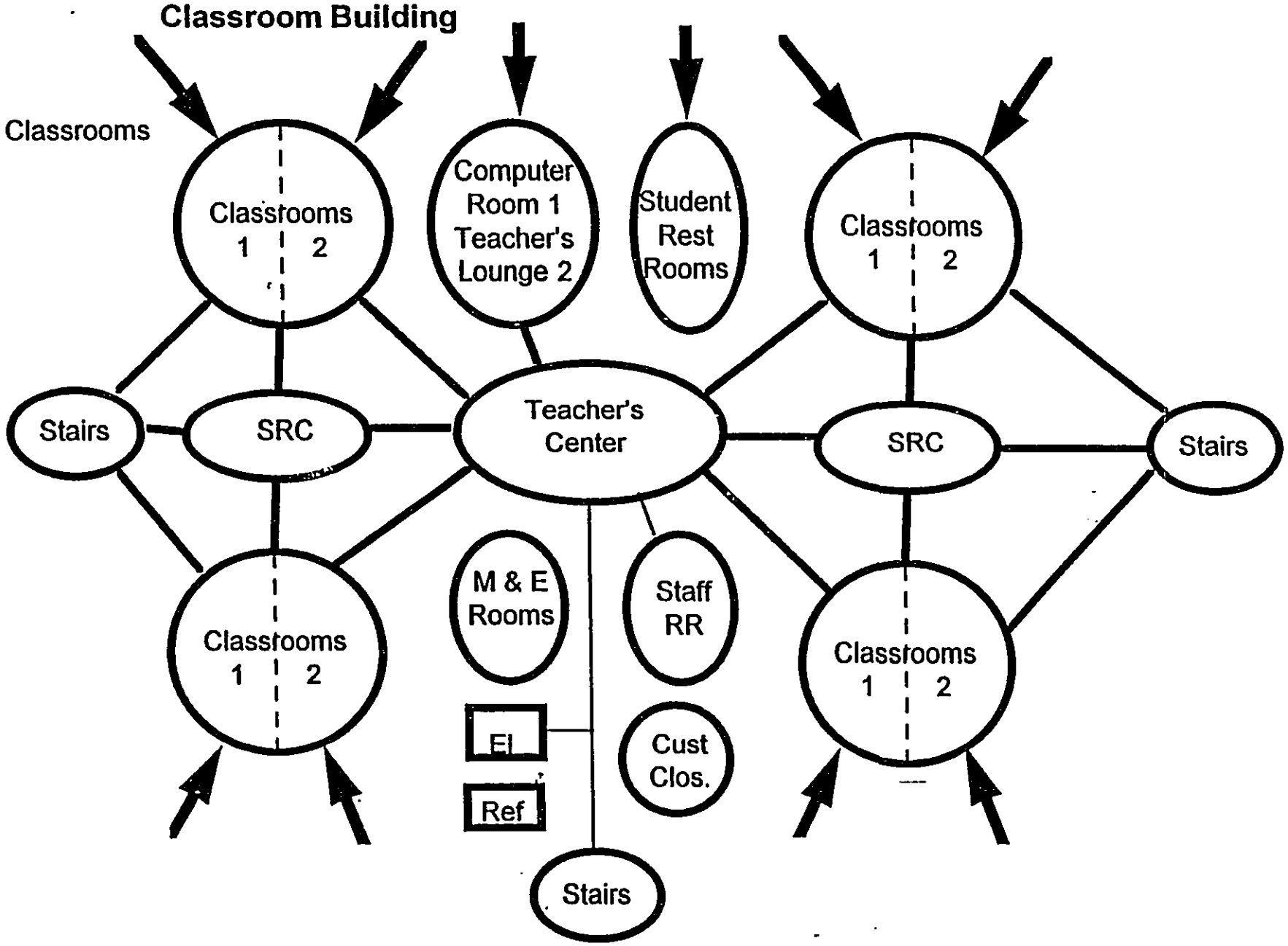
DAGS representatives involved with and supporting the FACD process include:

Daniel Jandoc	Project Management
Norman Hayashida	Project Management
Ralph Morita	Planning
Blaise Caldeira	Quality Control
Roy Tanji	Quality Control
Larry Uyehara	Quality Control
Gordon Matsuoka	PW

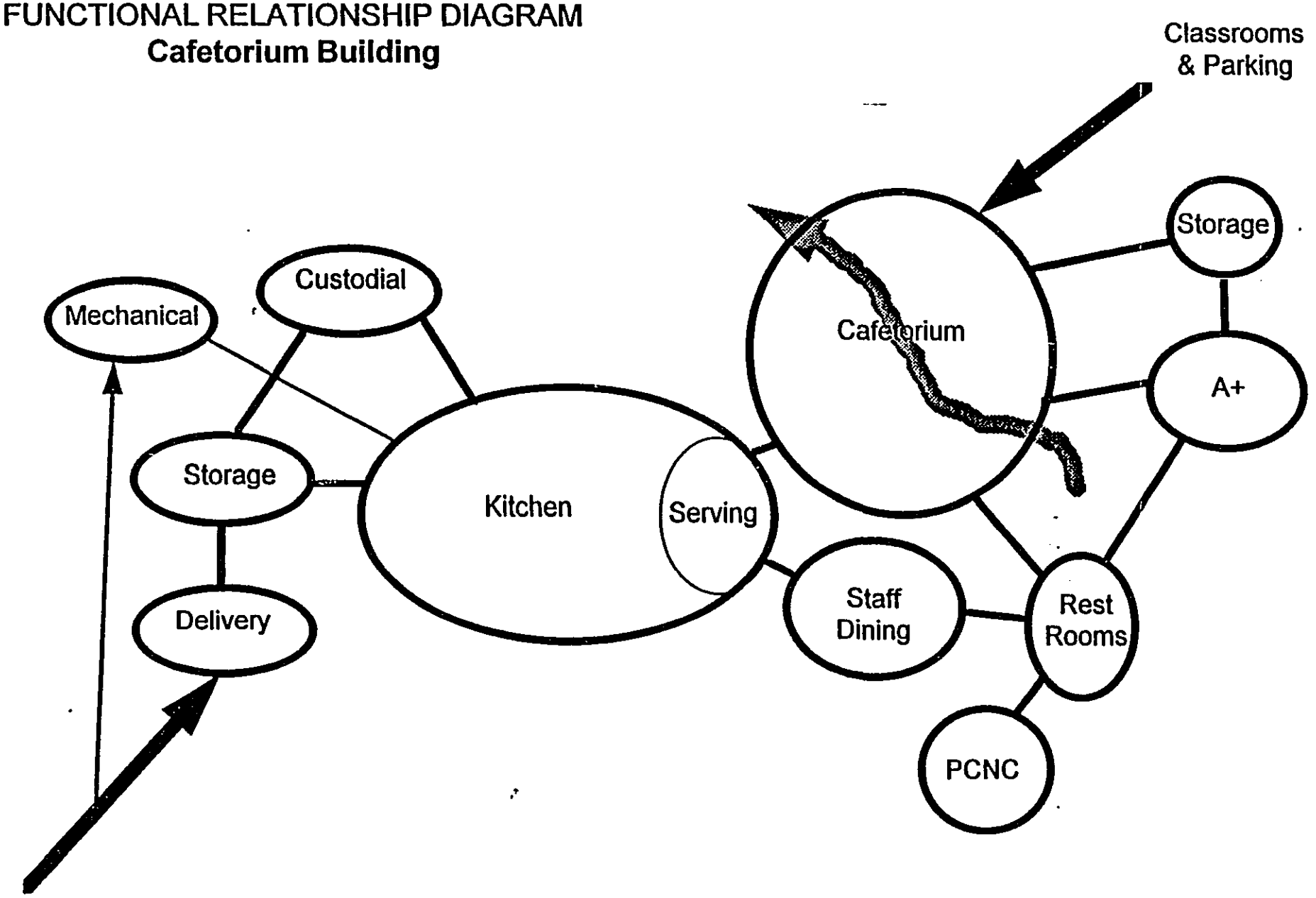
Other personnel providing supporting information for this project include:

Ben Gorospe Jr.	State CPP - Plan Review Coordinator

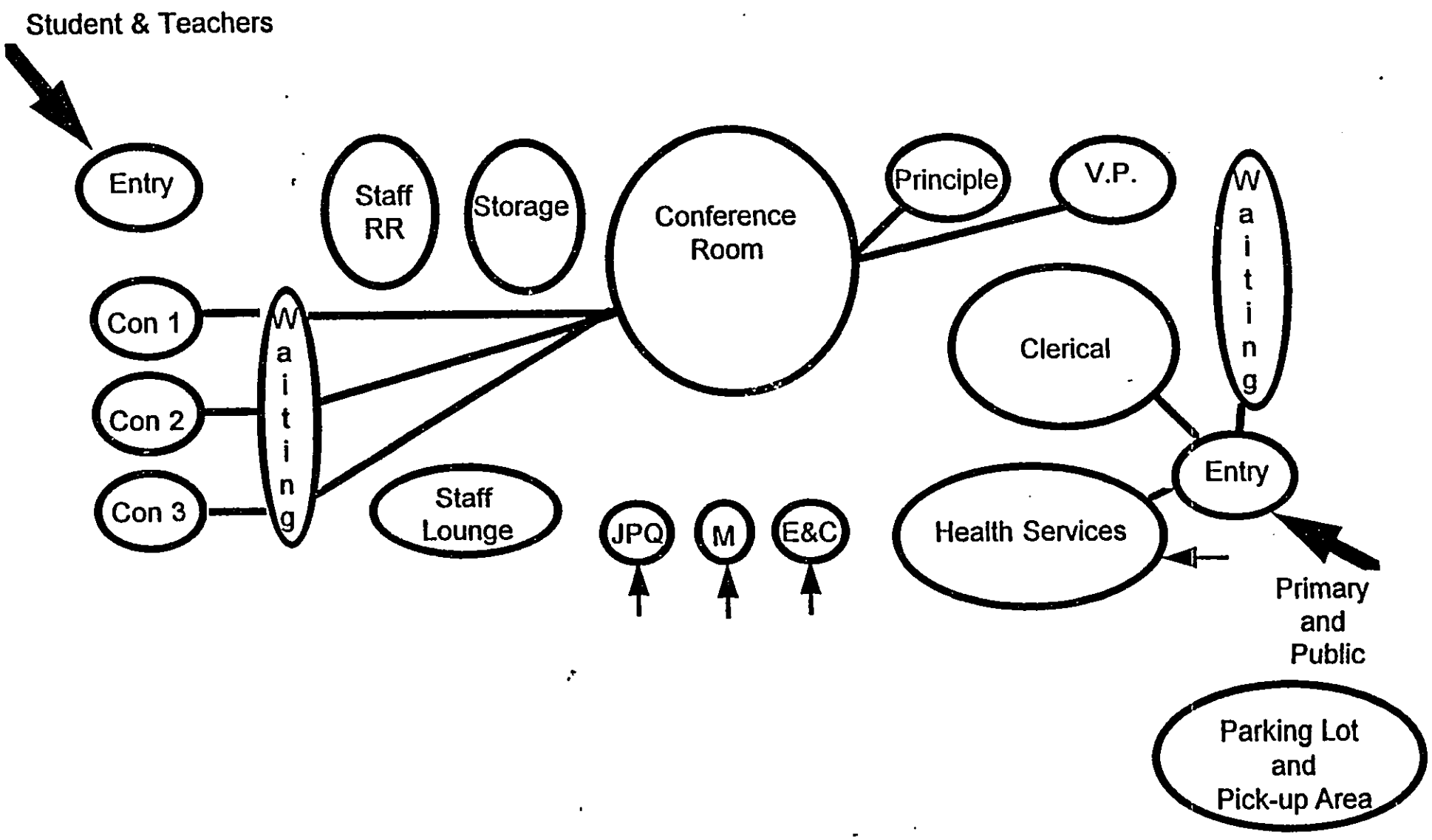
FUNCTIONAL RELATIONSHIP DIAGRAM



FUNCTIONAL RELATIONSHIP DIAGRAM
Cafetorium Building



FUNCTIONAL RELATIONSHIP DIAGRAM
Administration Building



FUNCTIONAL RELATIONSHIP DIAGRAM
Library Building