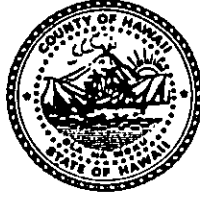


Stephen K. Yamashiro
Mayor



William G. Davis
Managing Director

RECEIVED
Henry Cho
Deputy Managing Director

County of Hawaii '96 SEP 24 P3:30

25 Aupuni Street, Room 215 • Hilo, Hawaii 96720-4252 • (808) 961-8211 • Fax (808) 961-6553
KONA: 75-5706 Kuakini Highway, Suite 103 • Kailua-Kona, Hawaii 96740
(808) 329-5226 • Fax (808) 326-5663
QUALITY CONTR.

September 23, 1996

Mr. Gary Gill, Director
Office of Environmental Quality Control
220 South King Street
Central Pacific Plaza, Suite 400
Honolulu, HI 96813

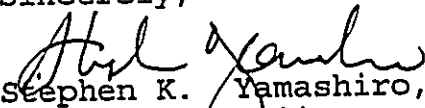
Dear Mr. Gill:

Subject: Finding of No Significant Impact (FONSI) for
Waikalua Fire Station, South Kohala Puna District,
County of Hawaii, TMK (3rd) 6-8-003:013

The Hawaii County Mayor's Office has reviewed the comment letters received during the 30-day public comment period that began on July 23, 1996. We have determined that this project will not have significant environmental effects and hereby issue a Finding of No Significant Impact. Please publish this notice in the October 8, 1996 edition of the OEQC Environmental Notice.

We have enclosed a completed OEQC Environmental Notice Publication Form and four copies of the Final EA. Please contact Norman Olesen, Deputy Planning Director, at 961-8565 if you have any questions.

Sincerely,


Stephen K. Yamashiro, Mayor
County of Hawaii

attachments:

cc: Planning Director
Fire Department

123

1996-10-08-HI-FAI-Waikoloa Fire Station

09/08/96

FILE COPY

**FINAL ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT
WAIKOLOA FIRE STATION**

ENVK (Ord.) 6-3-003-013
Waikoloa, South Kohala, Hawaii Island, State of Hawaii

September 1996

County of Hawaii
25 Airport Street
Hilo, Hawaii 96720

1996-00-08-HI-FAA-Waikoloa Fire Station

OCT 8 1996

FILE COPY

**FINAL ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT
WAIKOLOA FIRE STATION**

TMK (3rd): 6-8-003:013
Waikoloa, South Kohala, Hawaii Island, State of Hawaii

September 1996

County of Hawaii
25 Aupuni Street
Hilo Hawaii 96720

**FINAL ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT
WAIKOLOA FIRE STATION**

TMK (3rd): 6-8-003:013
Waikoloa, South Kohala, Hawaii Island, State of Hawaii

September 1996

APPLICANT:

County of Hawaii
25 Aupuni Street
Hilo Hawaii 96720

CONSULTANT:

Ron Terry Ph.D.
HCR 9575
Keaau, Hawaii 96749

APPROVING AGENCY:

Office of the Mayor
25 Aupuni Street
Hilo, Hawaii, 96720

CLASS OF ACTION:

Use of County funds and County lands

This document is prepared pursuant to the Hawaii Environmental Protection Act,
Chapter 343, Hawaii Revised Statutes (HRS), and
Title 11, Chapter 200, Hawaii Department of Health Administrative Rules (HAR).

TABLE OF CONTENTS

PART 1:	ACTION DESCRIPTION	1
1.1	Project Location	1
1.2	Project Description	1
1.3	Background, Purpose and Objectives of Action	5
1.4	Alternatives	6
1.4.1	No Action	6
1.4.2	Alternative Site Locations	6
1.5	Ownership	6
1.6	Land Use Designation and Controls	6
1.7	Agency and Public Consultation	7
PART 2:	ENVIRONMENTAL SETTING	8
2.1	Basic Geographic Setting	8
2.2	Physical Environment	8
2.2.1	Drainage	8
2.2.2	Lava Flow and Earthquake Hazards	8
2.2.3	Flora, Fauna and Ecosystems	9
2.2.4	Air and Water Quality, Noise and Scenic Resources	9
2.3	Socioeconomic and Cultural	10
2.3.1	Socioeconomic	10
2.3.2	Archaeology and Historic Sites	13
2.4	Public Facilities and Services	13
2.4.1	Roads and Traffic	13
2.4.3	Utilities	13
2.4.2	Public Services	14
2.5	Required Permits and Approvals	14
PART 3:	SUMMARY OF ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES	14
3.1	Short Term Impacts	14
3.2	Long Term Impacts	14
PART 4:	DETERMINATION	14
PART 5:	FINDINGS AND REASONS	15
REFERENCES	16

LIST OF FIGURES

FIGURE 1	GENERAL LOCATION MAP	2
FIGURE 2	DETAILED LOCATION MAP	3
FIGURE 3	SITE PLAN	4

LIST OF TABLES

TABLE 1	FIRE DEPARTMENT CALL TYPES, 1994-1995, BY STATION ...	4
TABLE 2	SELECTED SOCIOECONOMIC CHARACTERISTICS	11

LIST OF APPENDICES

APPENDIX 1	COMMENT LETTERS FROM AGENCIES AND ORGANIZATIONS IN RESPONSE TO PRE-CONSULTATION
APPENDIX 2	SIGN-IN SHEET AND SUMMARY OF QUESTIONS AND ANSWERS FROM MAY 17, 1996 PUBLIC MEETING
APPENDIX 3	COMMENTS TO DRAFT EA AND RESPONSES

PART 1: ACTION DESCRIPTION

1.1 Project Location

The proposed project is located at TMK (3rd): 6-8-003:013, in Waikoloa Village, South Kohala District, Hawaii County. The site is on the corner of Pu'u Melia Street and Waikoloa Road, and is also identified by the Waikoloa Land Company as Lot 119 (Figures 1-2). The latitude and longitude for the site are 19° 55.7' N. Lat., 155° 47.8' W. Long.

1.2 Project Description

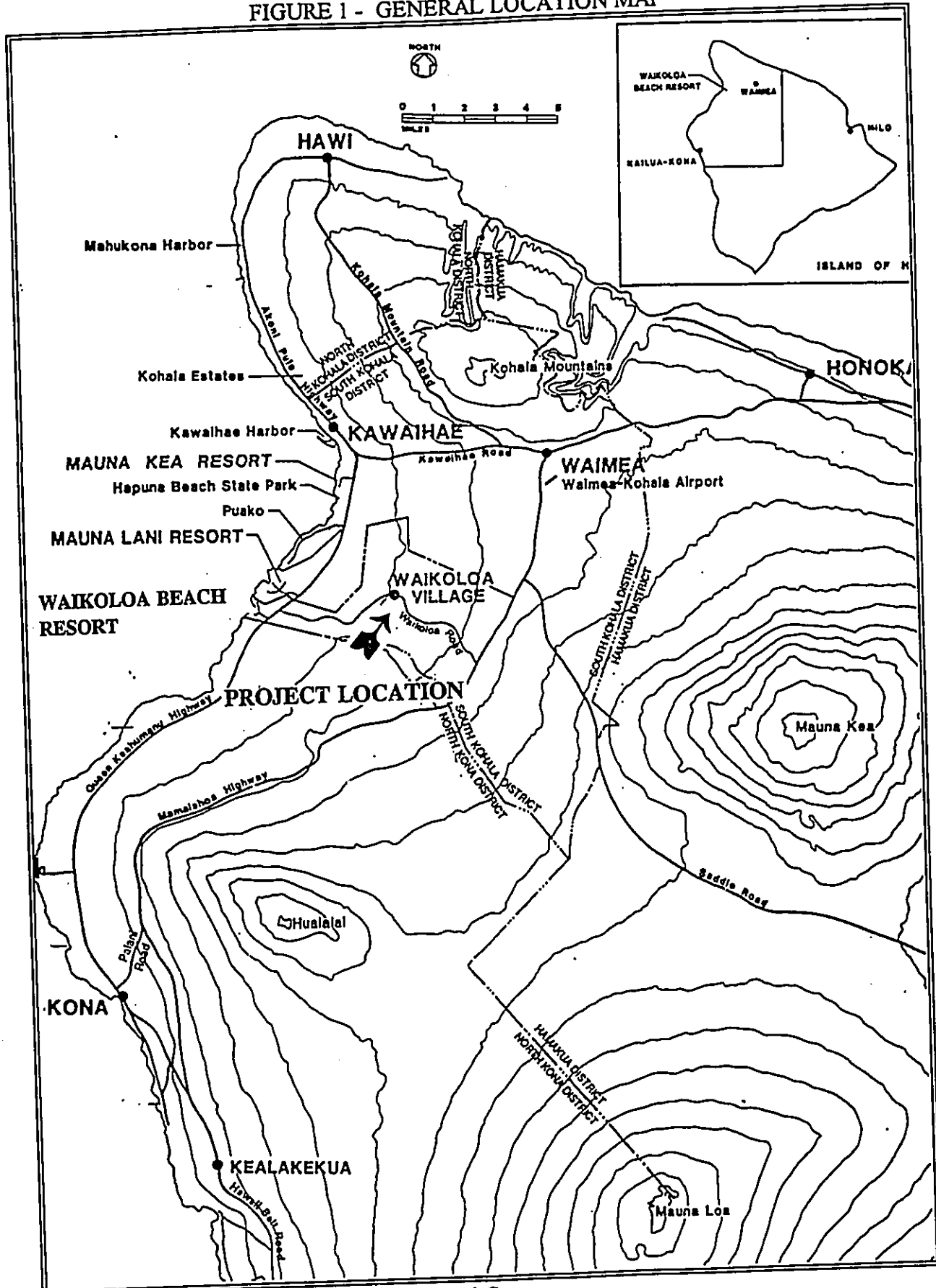
The proposed project is to construct a fire station on County land at Waikoloa Village to replace the current temporary station, which is located approximately one-half mile away on Pu'u Melia Street near its intersection with Paniolo Avenue and Waikoloa Road. The lease for the site of the current station will expire in December of 1997, and the site and buildings will no longer be available.

The new fire station would occupy 1.5 acres of the 3.0 acre parcel (Figure 3). The remainder of the parcel would be reserved for future community uses (e.g., library, meeting hall) to be determined through community planning at a future date.

The fire station would be similar in design to the existing South Kohala Station on Queen Kaahumanu Highway. The station would enclose 4,768 sq. ft. in a one-story structure with a maximum height of 24 feet (Figure 3). A three-bay apparatus room for vehicles (one for the Volunteer Fire Department), rooms for equipment storage and maintenance, utility rooms, offices, a kitchen, a dining room, bathing facilities and a dormitory would be present. The exterior would be a combination of metal siding and concrete block. Landscaping would be provided through planters skirting much of the building and at various locations around the station yard. Outdoor facilities include driveways, a paved recreation area, a fuel tank area, and fifteen parking stalls.

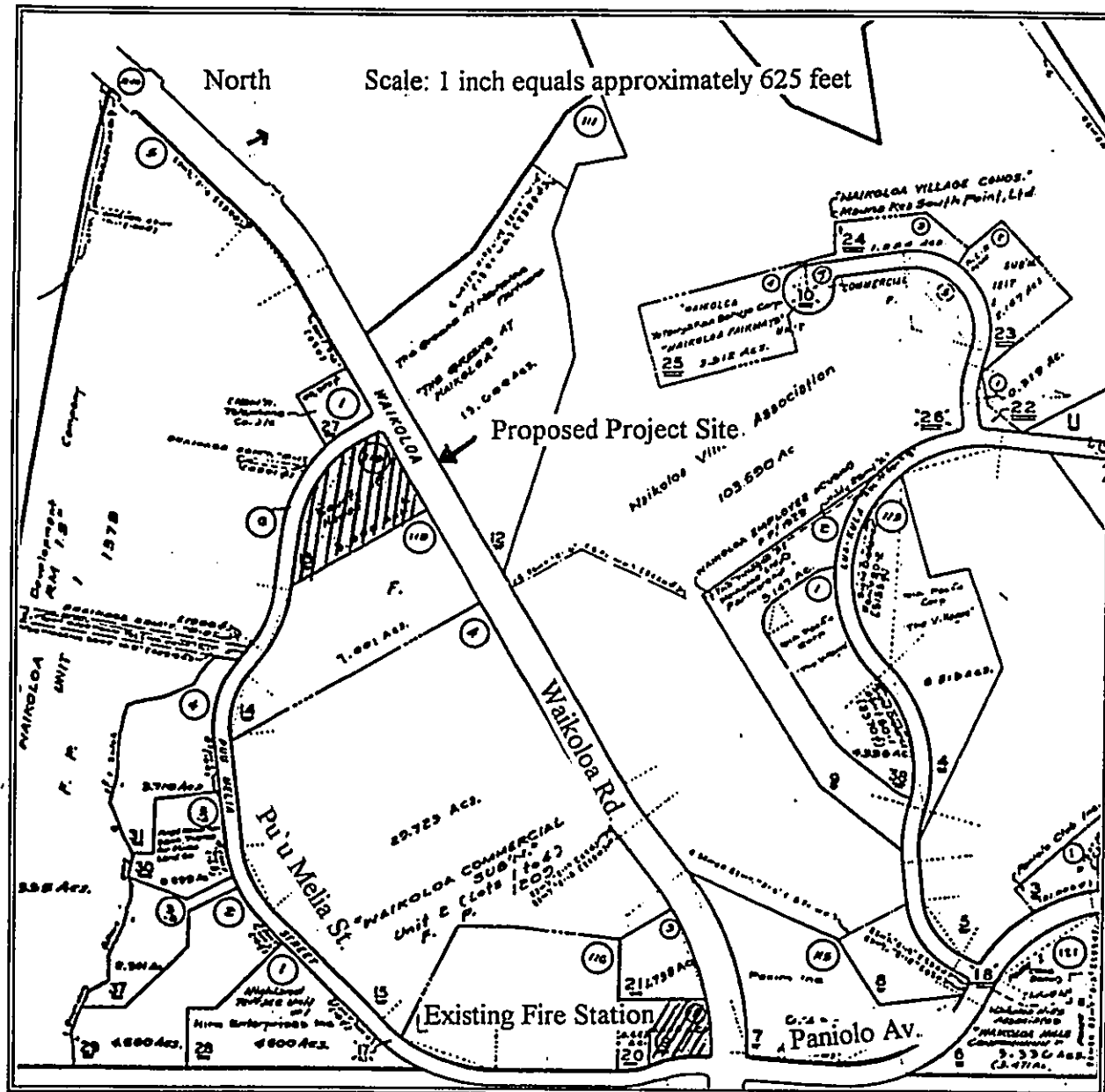
Funding for the fire station would come from General Obligation bonds issued by the County of Hawaii. The current cost estimate is \$1.45 million. The funds have been appropriated by the Hawaii County Council and allocated by the Hawaii County Mayor.

FIGURE 1 - GENERAL LOCATION MAP



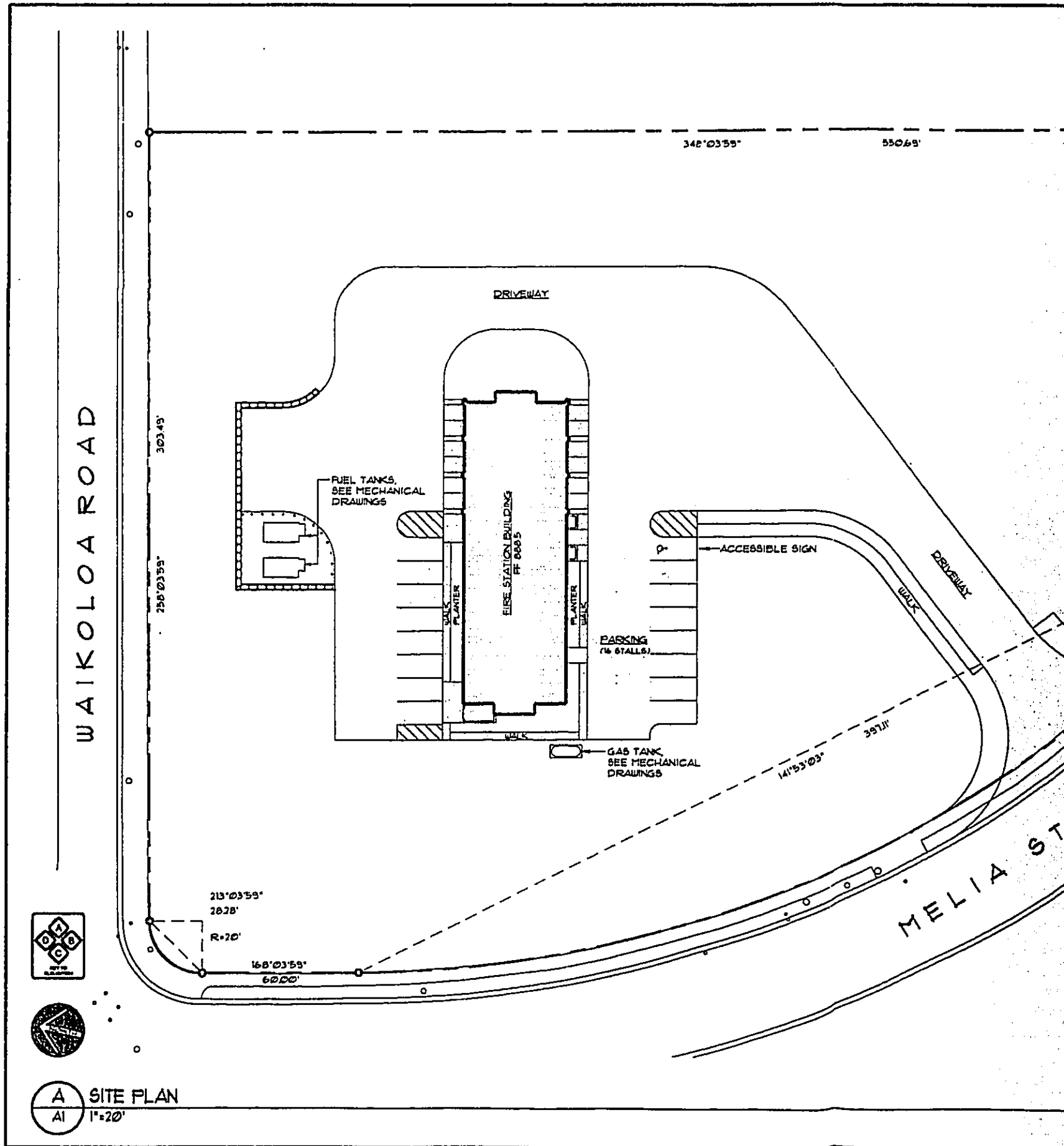
Source: Map courtesy of Waikoloa Land Company

FIGURE 2 - DETAILED LOCATION MAP

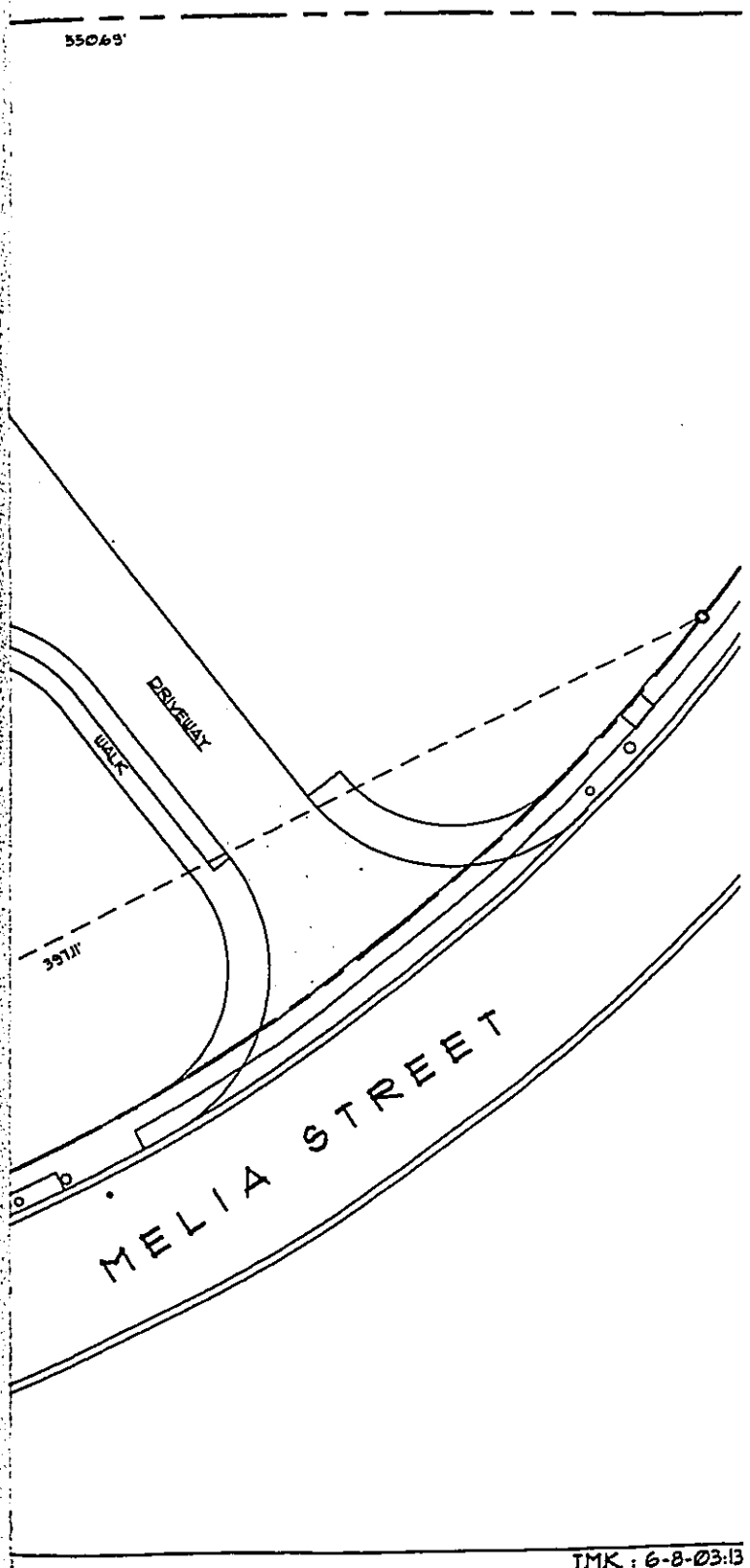




Source: Hawaii County Tax Maps, 6-8-003

FIGURE 3 SITE PLAN



ENERGY CODE CALCULATIONS



	DEPARTMENT OF PUBLIC WORKS COUNTY OF HAWAII HONOLULU		
	WAIKOLOA FIRE STATION WAIKOLOA, SOUTH KOHALA, HAWAII FOR COUNTY OF HAWAII FIRE DEPARTMENT		
REVISION:			
ODA/McCARTY ARCHITECTS LIMITED <small>1410 KALANANAKU AVENUE, SUITE 200, HONOLULU, HAWAII 96813</small>			
DRAWN: IKK	DATE:		SHEET: A1

1.3 Background, Purpose and Objectives of Action

As part of the Hawaii County General Plan Amendment for the Waikoloa development, the civic center was dedicated to the County for "future development of fire stations, police stations, health facilities, library, etc., in the center of the commercial area." The 3-acre site was conveyed to the County on April 2, 1976 by First Hawaiian Bank as Trustee for Boise Cascade and was formally accepted by the County Council on April 30, 1996.

The rapid growth of Waikoloa Village over the last two decades has brought with it a need for fire protection. Until 1993, service was available only through the South Kohala and Waimea Fire Stations, at road distances of approximately 10 and 17 miles, respectively. In response to this need, a lease for an Interim Fire Station was executed in April 1993 with the Waikoloa Land Company for land and buildings on TMK 6-8-003:019.

Since that time, the fire station has operated round-the-clock with a crew of one firefighter and two Mobile Intensive Care Technicians (MICT). A list of calls by type for the Waikoloa Station is presented in Table 1. The South Kohala and Waimea stations are included for comparison.

Table 1
Fire Department Call Types, 1994-1995, by Station

Station/ Year	Emergency Medical	Hazardous Condition	Rescue	Building Fires	Brush/ Outdoor	Vehicle Fires	Total*	
Waikoloa	1994	148	1	2	1	6	3	175
	1995	140	4	3	1	8	1	180
Waimea	1994	648	6	10	3	3	2	757
	1995	523	7	14	2	2	7	636
South Kohala	1994	419	9	8	2	25	3	525
	1995	428	5	8	1	15	8	514

Source: Hawaii County Fire Department. *Note: Total includes miscellaneous calls.

As illustrated by Table 1, the greatest call demand at the Waikoloa fire station is for emergency medical services and brush fires.

1.4 Alternatives

1.4.1 No Action

The lease for the fire station expires during 1997. If no action is taken to find an alternative site for the fire station, the quality and response time for fire and emergency medical service for Waikoloa will be substantially degraded. Response time would increase because calls would have to be answered from the South Kohala and Waimea Stations, which are 10 and 17 miles distant, respectively.

1.4.2 Alternative Site Locations

The project site has been identified for over twenty years as the future site of the fire station. Unlike other potentially suitable parcels, it currently belongs to the County. For these reasons, the County has not considered other sites.

1.5 Ownership

The parcel is owned in fee simple by the County of Hawaii.

1.6 Land Use Designation and Controls

The parcel is zoned CV-10 (Village Commercial, 10 acres) and is in the State Land Use Urban District. The County General Plan Land Use Allocation Guide Map (LUPAG) designates the area for Medium Density Urban uses. The fire station is consistent with these designations.

Surrounding areas are zoned Village Commercial, Open, and Multifamily Residential. All surrounding areas are in the State Land Use Urban District.

The proposed project is consistent with the Hawaii County General Plan and all other planning documents pertaining to the area.

1.7 Agency and Public Consultation

The following agencies and organizations have been consulted during the Environmental Assessment Process:

County:

Planning Department
County Council
Civil Defense Agency

Department of Public Works
Police Department

State:

Department of Land and Natural Resource,
Historic Preservation Division

Private

Waikoloa Village Association Waikoloa Land Company

Copies of replies from those agencies and organizations with substantive comments are provided as Appendix 1. Comments are discussed in the appropriate sections of the Environmental Assessment.

A public meeting was held at the Waikoloa Village Association Clubhouse on May 17, 1996 to allow County officials to update the community about the project and to gather comments and information for this EA. Appendix 2 contains the sign-in sheets from this meeting and a summary of the issues and questions raised. Input from the meeting is discussed in the appropriate sections of the text.

Notice of the availability of the Draft EA was published by the Hawaii State Office of Environmental Quality Control (OEQC) in the *Environmental Notice* of July 23, 1996. This initiated a 30-day comment period during which the public was invited to respond to the Draft EA with comments or questions. Two comment letters were received. These letters and the responses to them are included as Appendix 3. The Final EA was revised in portions to incorporate corrections or clarifications supplied by these comment letters.

**PART 2: ENVIRONMENTAL SETTING, IMPACTS AND PROPOSED
MITIGATION MEASURES**

2.1 Basic Geographic Setting

The site is located at an elevation of approximately 780 feet above sea level. Slopes on the site vary from 2 and 10 percent. The soil is classified by the U.S. Natural Resources Conservation Service as Kawaihae Extremely Stony Very Fine Sandy Loam. This soil is formed over ancient Mauna Kea pahoehoe lava (U.S. Soil Conservation Service 1973). No streams or identified water courses are near the site.

The annual rainfall in the area is about 10 inches (Giambelucca et al 1986). Temperatures are mild, approximately 3-5 degrees cooler than the Waikoloa coastal area. Waikoloa Village is known for wind. Northeast trades often blow at speeds exceeding 25 miles per hour, with slower speed upslope winds also occurring.

2.2 Physical Environment

2.2.1 Drainage

Environmental Setting

The project site is designated "X", defined as areas outside the 500 year flood plain, on the Flood Insurance Rate maps (FIRM) (Panel 0284-C). Permeability is moderate, runoff medium, and erosion hazard moderate on the soil at the site (U.S. Soil Conservation Service 1973).

Impacts and Mitigation Measures

The site is not susceptible to flood damage. Any increase from storm runoff associated with activity on the parcel will be contained onsite as required by the 1970 Hawaii County Department of Public Works *Storm Drainage Standards*, using measures such as onsite drywells.

2.2.2 Lava Flow and Earthquake Hazards

Environmental Setting and Impacts

The Waikoloa area is rated Lava Flow Hazard Zone 8 on a scale of ascending risk 9 to 1. Zone 8 areas have had only a few percent of their surfaces covered by lava within the past 10,000 years. As such, there is little risk of lava inundation over relatively short time scales (Heliker 1990). The entire island of Hawaii is in Zone 3

on a scale of ascending risk 1 to 4 in the Seismic Probability Rating (Furumoto et al 1973:34). Major damage corresponding to a score of 7 or above on the Modified Mercalli Scale is possible.

Geologic hazards impose no constraints on the project. The fire station is designed to remain operational during severe earthquakes through adherence to structural requirements for Seismic Zone 3 and other measures such as "break-through" doors.

2.2.3 Flora, Fauna and Ecosystems

Environmental Setting and Impacts

A walk-through biological survey was performed by the author in April 1996. The vegetation of the site is dominated by the alien grasses, including fountain grass (Pennisetum setaceum). Other components include alien Sida spp, koa haole (Leucaena leucocephala), kiawe (Prosopis pallida) and the natives ilima (Sida fallax) and 'uhaloa (Waltheria indica).

No listed, candidate or proposed endangered animal or plant species are found on the property. In terms of conservation value, no biological resources requiring special protection are present. No impacts to biological resources would occur.

2.2.4 Air and Water Quality, Noise, and Scenic Resources

Environmental Setting

Human-derived air pollution in the area is minimal. Volcanic emissions of sulfur dioxide convert into particulate sulfate that causes a volcanic haze (vog). This periodically affects all areas of the Island of Hawaii when trade winds are not present. Wind in Waikoloa may generate substantial dust in construction.

No surface water features are present. No aquifers designated as Principal or Sole-Source aquifers are located in or near the project area. There are no State Wellhead Protection Plans in force in or near the project area.

The site currently generates no noise. Ambient noise is currently derived principally from traffic on Waikoloa Road. The site has little scenic value other than open space.

Impacts and Mitigation Measures

The fire station will not detrimentally impact air or water quality. After processing through an oil-water separator, water from vehicle washdown will be disposed of in the septic tank for the facility.

The fire station will generate noise during everyday operation and especially during emergency calls. The current fire station is actually closer to the heart of Waikoloa than the proposed location, and the shift will result in fewer noise impacts.

It is recommended that a dust control plan be required as a condition of the building permit in order to mitigate potential fugitive dust impacts.

2.3 Socioeconomic and Cultural

2.3.1 Socioeconomic

Environmental Setting

Table 2 displays basic socioeconomic data from the 1990 U.S. Census of Population for Waikoloa Village, the South Kohala District and County of Hawaii. Waikoloa Village is distinct from other areas in its ethnic makeup, income, poverty levels, and most other demographic measures. Much of the difference is explained by the fact that a large percentage of Waikoloa Village residents have relocated to Hawaii from the Mainland relatively recently, some as retirees.

Table 2
Selected Socioeconomic Characteristics

CHARACTERISTIC	GEOGRAPHIC AREAS		
	Hawaii Island	Waikoloa	South Kohala
Total Population	120,317	2,248	9,140
Average Household Size	2.90	2.59	2.95
Percent Caucasian	39.9	72.7	52.3
Percent Asian	37.0	12.5	20.4
Percent Pacific Islander	20.0	10.3	24.8
Percent Under 18 Years	28.7	20.9	29.7
Percent Over 65 Years	12.6	9.0	7.4
Percent Who Lived in State of Hawaii in 1985	84.5	48.7	74.9
Percent Over 25 Years With High School Diploma	77.7	94.7	88.2
Percent Adults in Labor Force	64.2	77.4	66.3
Median Family Income	\$33,186	\$44,444	\$41,805
Percent in Poverty	14.2	9.4	10.3
Percent Housing Vacant	14.1	34.1	27.0
Median Home Price	\$113,000	\$255,000	\$200,800

Source: U.S. Bureau of the Census: 1990 Census of Population and Housing. STF 1-A, STF 3-A

Waikoloa Village has experienced several periods of rapid growth since the 1970s. Growth in the last six years has outdated the population figures from the 1990 Census. The author calculated a rough estimate of 3,460 for the current population of Waikoloa Village by inventorying current housing counts and occupancy rates.¹

¹ Estimate is based on occupied units, the sum of the following:

1. 1,105 Waikoloa Village Association units (900-1,000 condominiums and 700-750 single-family homes with estimated 66 percent occupancy per 1990 census data);
2. Paniolo Estates, 167 occupied units; and
3. Kekumu Ekahi and Elua, 64 occupied units.

Sum of 1,336 occupied units then multiplied by 2.59 persons/household (1990 Census average for Waikoloa Village).

Sources: Waikoloa Village Association, Hawaii County Office of Housing and Community

In response to information presented in the Draft Environmental Assessment, a commenter presented a separate estimate of 4,000 residents, based on his familiarity with current housing stock and occupancy rates (see Appendix 3).

The socioeconomic profile of Waikoloa Village in 1996 is probably slightly closer to that of Hawaii County in general than it was in 1990 because of the subsequent addition of more than 250 affordable housing units/rentals at Paniolo Estates and Kekumu Ekahi and Elua.

Impacts and Mitigation Measures

A permanent fire station would provide fire and emergency protection for all residents of Waikoloa Village. The relatively high proportion of the population over 65 implies a greater than average need for emergency medical services.

All attending the public meeting held on May 17, 1996 expressed strong support for the fire station at the project site (see Appendix 2 for sign-in sheet and summary). The guarantee of a permanent, full-time fire station with the potential to expand services as justified was seen as a substantial benefit. The possibility of further improvements in the Fire Insurance Rating of Waikoloa Village was welcomed. Several concerns about the project were also raised.

Most strongly and widely expressed was the concern that the funding and planning for the fire station did not include other potential components of the community center for which the site was envisioned, particularly a police station. Officials from the County of Hawaii responded that the County Council appropriation was for a fire station only, and that there was no authorization or funding for a police station at this time. As the fire station would occupy only half of the three-acre site, a police station - if so desired by the community - could ultimately occupy a portion or all of the other half. County officials stated that further community planning is necessary to determine the ultimate use of the site - for a police station, library, recreation center, or other facility. The fire station represents the key in establishing the County community center facilities for the Waikoloa area.

Subsequent to the public meeting, Hawaii County Mayor Stephen Yamashiro met with the Waikoloa community to discuss options for a future police station. Under discussion is a plan to relocate a building from the old fire station to an available property near the center of Waikoloa Village for use as a "satellite" police station.

Another issue raised was the surcharge on building permits for all future construction within 5 miles of the fire station. This measure is being considered by the County Council in order to recover a portion of the funding for this and other future fire

Development, Hawaii Affordable Properties, Urban Management, U.S. Census of Population.

stations. Some community members and major landowners stated that the property taxes they had already paid should have been credited towards the fire station. County officials responded that property taxes already collected accounted for one-third of the costs and that two-thirds would be recovered over the next ten years by a building permit surcharge.

2.3.2 Archaeology and Historic Sites

Environmental Setting and Impacts

The project site was inspected by an archaeologist with the State Historic Preservation Division (SHPD) for historic sites. SHPD has determined that no historic sites are present and that no effects on historic sites would likely occur as a result of the action (see Appendix 1).

Mitigation Measures

Although such finds are not expected, if any artifacts, charcoal deposits, or human remains are discovered during construction, work will immediately cease and SHPD will be consulted to determine the appropriate mitigation.

2.4 Public Facilities and Services

2.4.1 Roads and Traffic

Existing Facilities and Impacts

The project site is at the corner of Pu'u Melia Street and Waikoloa Road. Two driveways, both fronting on Pu'u Melia Street, will serve the fire station. No direct access to Waikoloa Road would occur from the parcel. Pu'u Melia Street has very low levels of traffic, and no impact to this street, Waikoloa Road or any other public highway would result from relocating the fire station from its current location one-half mile east on Waikoloa Road.

2.4.2 Utilities

Existing Facilities and Impacts

All necessary utilities are available on-site. Electrical service is provided by the Hawaii Electric Light Company (HELCO). Telephone service is through GTE Hawaiian Telephone. West Hawaii Utilities provides water and sewer services to the site (see letter from West Hawaii Utilities, Appendix 1).

No impacts or burdens to utility services or other customers would be experienced as a result of the fire station relocation.

2.4.3 Public Services

No effect or impact on any public service would be expected as a result of the proposed action. Many residents of Waikoloa Village strongly support the establishment of a police sub-station in their community. The proposed action neither facilitates nor hinders future establishment of a police station.

2.5 Required Permits and Approvals

Hawaii County Grading Permit
Hawaii County Building Permit

PART 3: SUMMARY OF ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

3.1 Short Term Impacts

Construction Impacts and Mitigation: Landclearing and construction activities would produce short-term impacts to noise, air quality, traffic, access and scenery. Air quality concerns are centered on fugitive dust, which can be mitigated through an effective dust control plan that would be implemented by the contractor as part of the grading permit. If deemed necessary by the County of Hawaii, conditions requiring optimum construction scheduling as part of Building and Grading Permits can reduce impacts related to noise, emissions and traffic.

3.2 Long Term Impacts

No long-term adverse impacts are expected. The primary result of the project would be a long-term increase in the fire and emergency medical service experienced by the community.

PART 4: DETERMINATION

The Hawaii County Mayor's Office has determined that impacts from the proposed project will be minimal and that the project will not significantly alter the environment. Therefore, the Mayor's Office has issued a Finding of No Significant Impact (FONSI), which means that an Environmental Impact Statement is not warranted and will not be prepared (see cover letter).

PART 5: FINDINGS AND REASONS

1. The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.
2. The proposed project will not curtail the range of beneficial uses of the environment.
3. The proposed project will not conflict with the State's long-term environmental policies.
4. The proposed project will not substantially affect the economic or social welfare of the community or State. The permanent fire station will benefit the social and economic welfare of Waikoloa Village.
5. The proposed project does not substantially affect public health in any detrimental way except that would ensure continuation of and set the foundation for expansion of *adequate fire and emergency medical services*.
6. The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.
7. The proposed project will not involve a substantial degradation of environmental quality.
8. The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat. No endangered species of flora or fauna are known to exist on the project site.
9. The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.
10. The proposed project will not detrimentally affect air or water quality or ambient noise levels.
11. Although the proposed project is located in a zone exposed to some earthquake and volcanic hazard, there are no reasonable alternatives.

For the reasons above, the proposed project will not have any significant effect in the context of Chapter 343, Hawaii Revised Statutes and section 11-200-12 of the State Administrative Rules.

REFERENCES

Furumoto, A.S., N.N. Nielsen, and W.R. Phillips. 1973. *A Study of Past Earthquakes, Isoseismic Zones of Intensity, and Recommended Zones for Structural Design for Hawaii*. Honolulu: Hawaii Institute of Geophysics.

Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawaii*. 2 vols. Honolulu: University of Hawaii Press.

Giambelucca, T.W., Nullet, M.A., and T.A. Schroeder. 1986. *Rainfall Atlas of Hawaii*. Honolulu: Hawaii Department of Land and Natural Resources.

Hawaii County Department of Public Works. 1970. *Storm Drainage Standards*. Hilo.

Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawaii*. Washington: U.S. GPO.

U.S. Bureau of the Census. 1991. *1990 Census of Population, General Population Characteristics*. 1990 CP-1-13. Washington: GPO (portions electronically republished in *Hawaii Data Disc*. 1973. CD-ROM. Honolulu: Hawaii State Department of Business, Economic Development and Tourism.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawaii, State of Hawaii*. Washington: U.S.D.A.

University of Hawaii at Manoa, Dept. of Geography. 1983. *Atlas of Hawaii*. 2nd ed. Honolulu: University of Hawaii Press.

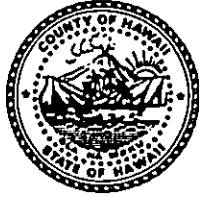
APPENDIX 1

COMMENT LETTERS

FROM AGENCIES AND ORGANIZATIONS

IN RESPONSE TO PRE-CONSULTATION

Stephen K. Yamashiro
Mayor



Virginia Goldstein
Director

Norman Olesen
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-9615

May 30, 1996

Mr. Ron Terry
Geo Metrician
HCR 9575
Keaau, HI 96749

Dear Mr. Terry:

Request for Comments Regarding the Preparation of a Draft
Environmental Assessment for the Proposed Waikoloa Fire
Station

Tax Map Key: 6-8-03:13


Thank you for your letter dated May 22, 1996, requesting preliminary comments regarding the preparation of an environmental assessment for the proposed construction of a fire station within Waikoloa Village.

The subject property, consisting of three acres, is located within an area designated for Medium Density Urban uses by the County General Plan Land Use Pattern Allocation Guide (LUPAG) Map. Such a designation would allow for village and neighborhood commercial uses, residential uses up to 35 units per acre and its related functions. The property is designated Urban by the State Land Use Commission. The proposed construction of a fire station is consistent with these land use designations. The property is zoned Village Commercial-10,000 square feet (CV-10) by the County. Section 25-51 of the Hawaii County (Zoning) Code specifies that "Community, public, and public service buildings are permitted uses provided they conform to the general plan." Since the proposed fire station is found to be consistent with the General Plan LUPAG Map designation, the fire station is considered a permitted use on the subject property pursuant to Section 25-51 of the Zoning Code. Finally, the subject property is not located within the County's Special Management Area.

Mr. Ron Terry
Page 2
May 30, 1996

We have no further comments to offer. Should you have any questions, please feel free to contact this office at 961-8288.

Sincerely,



VIRGINIA GOLDSTEIN
Planning Director

DSA:mjs
F:\WPWIN60\DARYN\LTERRY01.DSA

xc w/ltr: West Hawaii Office
Land Use Controls Division

Stephen K. Yamashiro
Mayor



Wayne G. Carvalho
Police Chief

James S. Correa
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2702

May 31, 1996

Mr. Ron Terry, Ph.D.
Geo Metrician
HCR 9575
Keaau, HI 96749

Dear Dr. Terry:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR PROPOSED WAIKOLOA FIRE
STATION ON TMK 6-8-003:013

Our interest lies with traffic issues, i.e., ingress/egress to the facility and appropriate signalization.

Staff has chosen to reserve its comments on any special environmental conditions or impacts related to the proposed Waikoloa fire station until the environmental assessment is completed.

Please send us a copy of the draft environmental assessment for the project upon its completion.

Sincerely,

Wayne G. Carvalho
WAYNE G. CARVALHO
POLICE CHIEF

JV:lk

BENJAMIN J. CAYetano
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGAPAN

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
CONSERVATION AND
ENVIRONMENTAL AFFAIRS
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

June 13, 1996

Mr. Ron Terry
Geo Metrician
HCR 9575
Keaau, Hawaii 96749

LOG NO: 17348
DOC NO: 9606PM02

Dear Mr. Terry:

**SUBJECT: Environmental Assessment for the Proposed Waikoloa Fire Station
Waikoloa, South Kohala, Hawaii Island
TMK: 6-8-003: 013**

This is in response to your letter of May 22, 1996, regarding the proposed construction of a new fire station in Waikoloa.

As you already know, Patrick McCoy made a field inspection of the 1.5 acre project area on June 3, 1996. The parcel, which is located at the corner of Waikoloa Road and Puu Melia Street, is a vacant lot covered with fountain grass, other grasses, and a few small hale koa trees. There is no evidence of historic sites on this lot. We thus believe that the proposed project will have "no effect" on historic sites.

If you should have any questions about this project please contact Patrick McCoy (587-0006).

Sincerely,

A handwritten signature in cursive script, appearing to read "Don Hibbard".

Don DON HIBBARD, Administrator
State Historic Preservation Division

PM:jk

WEST HAWAII UTILITIES

May 23, 1996

Mr. Norman F. Oleson
Deputy Director of Planning
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

RE: Waikoloa Fire Station

Dear Mr. Oleson:

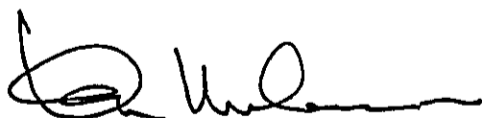
Thank you for coming to meet with the Waikoloa community last week. I hope you agree that everyone was supportive of the project and appreciative of your efforts to expedite the permitting and start of construction.

Enclosed are copies of portions of the utility plan and profile for Pua Melia Street. I've highlighted the water and sewer laterals serving the civic center site, Lot 119. This should be helpful in finalizing the construction plans for the project. When designing the sewer connection for the fire station, you'll need to include provisions to accommodate the future uses of Lot 119 to also connect to the sewer system. You should contact Hawaii Electric Light Company, Inc. and GTE Hawaiian Telephone Co. directly for their service requirements.

When the project gets closer to starting construction, you'll need to complete applications for water and sewer service and comply with the Rules and Regulations of each of the West Hawaii Water Company and West Hawaii Sewer Company prior to connections being made.

Please keep me apprised as the project progresses.

Sincerely,



Ken Melrose
Vice President/General Manager

ac
Enclosures
c: Ron Terry (w/encl.)

APPENDIX 2

SIGN-IN SHEET AND

SUMMARY OF QUESTIONS AND ANSWERS FROM

MAY 17, 1996 PUBLIC MEETING

Waikoloa fire station planned

Plans for a new fire station in Waikoloa will be discussed at a meeting 6:30 p.m. Friday at Waikoloa Golf Course. Hawaii County fire Chief Nelson Tsuji and Deputy Planning Director Norman Olesen will attend to answer questions about the county project.

Ron Terry, working under a county contract, will also attend the meeting to gather information for an Environmental Assessment being prepared for the project.

For information, call Olesen at 961-8565, Tsuji at 961-8297 or Terry at 982-5831.

WAIKOLOA FIRE STATION

PUBLIC MEETING

MAY 17, 1996

NAME

ADDRESS

~~Martin + Ruth Blitzer 68-3609 KAHILANI ST.~~

~~Beverly Brand 68-3320 Lina Hoana Rd.~~

~~Chabel Ishii WVA Box 383910 - Waikoloa~~

~~Jackie Prang Puniolo Pl. Waikoloa~~

~~Randy NAKAI - CANDIDATE FOR COUNTY COUNCIL~~

~~BILL BRADY 68-1952 LENA POE POE Waikoloa~~

~~ROGER HANSEN P.O. Box 383591, WAIKOLOA, HI.~~

~~LEMONA & WILMA WHITNEY - P.O. Box 385068 WAIKOLOA~~

~~Rosalie Freeman 68-1900 Eha-ko Pl. Waikoloa~~

~~Barbara & Ted Dahl P.O. Box 383735 Waikoloa, HI~~

~~John Bobek PO Box 384179 " "~~

~~Ken Moore 150 Waikoloa Beach Dr Waikoloa HI 885-1000~~

~~Phil Busch 1755 KAHUHI PLACE~~

~~Gil Concession POB 384155 Waikoloa~~

**SUMMARY OF QUESTIONS AND ANSWERS
CONCERNING PROPOSED WAIKOLOA FIRE STATION
MEETING OF 17 MAY 1996 AT WAIKOLOA VILLAGE ASSOCIATION**

**PRESENT: PUBLIC; REPRESENTATIVES OF HAWAII COUNTY OFFICE OF THE
MAYOR, FIRE DEPARTMENT, ENVIRONMENTAL ASSESSMENT CONSULTANT.**

QUESTIONS AND ANSWERS:

POLICE STATION

Why is a police sub-station not included?

RESPONSE FROM OFFICE OF THE MAYOR:

The County Council appropriation only included a fire station. There is no authorization and no funding for a police station. The facility only takes up half of the three-acre site. A police station - if so desired by the community - could ultimately occupy a portion or all of the other half. The community may wish, however, to use the site for other community center purposes, such as a library, recreation center, or other facility.

FIRE INSURANCE RATING DECREASE?

Will the new facility result in a decrease in the fire insurance rating for homes in Waikoloa Village?

RESPONSE FROM FIRE DEPARTMENT:

That will be up to the insurance raters. It is possible, particularly if station services expand in future, which the larger and permanent site will facilitate.

STAFF INCREASE?

Will the number of staff at the station increase?

RESPONSE FROM FIRE DEPARTMENT:

The goal is to provide at least one more staff: an officer in charge.

VOLUNTEER FIREFIGHTERS

Will the use of volunteer firefighters continue?

RESPONSE FROM FIRE DEPARTMENT:

Yes.

USE OF OLD FACILITIES

What will happen with former facilities?

RESPONSE FROM FIRE DEPARTMENT:

That is up to Waikoloa Land Company, which owns the property and facilities.

BUILDING PERMIT SURCHARGE

What is the purpose of the Building Permit surcharge? Hasn't the community already paid for the facility? Will current homeowners be charged for their homes?

RESPONSE FROM OFFICE OF THE MAYOR:

The 25 percent surcharge is necessary in order to recover costs for the facility. It will be

imposed only on future construction. Existing homeowners have contributed funds through property taxes. It is expected that the surcharge will recover approximately 80 percent of the cost of the fire station.

LANDSCAPING

Will landscaping be included?

RESPONSE FROM OFFICE OF THE MAYOR:

Yes. A landscape architect has been retained to design landscaping in keeping with the facility and project surroundings.

HELICOPTER LANDING

Will a helicopter landing pad be included?

RESPONSE FROM FIRE DEPARTMENT:

No, although a helicopter could land in the parking lot for emergencies.

APPENDIX 3

COMMENT LETTERS TO DRAFT EA

AND RESPONSES

July 15, 1996



Mr. Norman F. Olesen
Deputy Director of Planning
Planning Department, County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

RE: Waikoloa Fire Station -- Draft Environmental Assessment

Dear Mr. Olesen:

Thank you for providing us with the opportunity to review the Draft Environmental Assessment for the proposed Waikoloa Fire Station. Our comments on this document are as follows:

1. Part 1, Section 1.1, Project Description, Page 1. The existing facility is currently supplemented by the Waikoloa Volunteer Fire Department. At the public meeting, you and Chief Tsuji indicated that the new facility would have a third bay to house the Volunteer Fire Department's equipment.

2. Figure 1, General Location Map, Page 2. Why was the Waikoloa Beach Resort deleted from this map (see enclosed). Also, suggest adding the words "Project Location" and an arrow to show the approximate location of the proposed Fire Station.

3. Figure 2, Detailed Location Map, Page 3. Suggest adding the word "Interim" between the words "Existing" and "Fire Station" for clarification purposes.

4. Part 2, Section 2.3, Subsection 2.3.1., Socioeconomic:

(a) Environmental Setting, Page 10. The number of single family homes in Waikoloa Village (not counting Paniolo Estates) is between 800 and 900. Also, recent inquiries of various realtors and rental agents in the area indicate that the occupancy rate is probably closer to 70% - 75%. Using these revised numbers and the numbers given for Paniolo Estates and the two Kekumu projects and multiplying by the 2.59 persons/household figure, the population of Waikoloa would be approximately 4,000.

(b) Impacts and Mitigation Measures, Page 11. It is my understanding that the proposed police station on the Waikoloa Village Association's property in Waikoloa Village would be an interim substation only, until such time as a permanent station is constructed on the County's Lot 119. This should be clarified in the Final EA.

Your consideration of these comments is appreciated. We look forward to receiving a copy of the Final Environmental Assessment when it is published.

Sincerely,

Ken Melrose
Vice President/General Manager

ac

Enclosure

c: Ron Terry (w/encl.)

150 Waikoloa Beach Drive • Waikoloa, Hawaii 96743 • Phone (808) 885-1000 • Fax (808) 885-8896



Geo Metrician

Ron Terry, Ph.D.

HCR 9575
Keaau, Hawaii 96749
(808) 982-5831

September 16, 1996

Ken Melrose
Vice President/General Manager
Waikoloa Land Company
150 Waikoloa Beach Drive
Waikoloa, Hawaii 96743

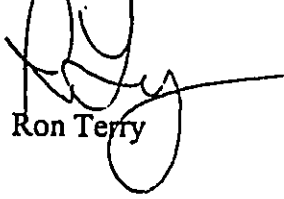
Dear Mr Melrose:

**Subject: Draft Environmental Assessment for Waikoloa Fire Station,
Hawaii Island**

Thank you for your comments on the Draft EA for the subject project. A point-by-point response to your comments follows:

1. *Project Description.* The fire station will contain a third bay to house the Volunteer Fire Department. This fact will be clarified in the Final EA.
2. *General Location Map.* The Waikoloa Beach Resort text did not fit when the map was cropped for reproduction in the EA. In recognition of your courtesy in providing us with a base map, we will add a label to the Final EA. We will also add a label indicating project location.
3. *Interim.* We believe the term "Existing Fire Station" sufficiently conveys the meaning.
- 4a. *Population.* Thank you for your analysis of population in Waikoloa. Your methodology and final figure will be included along with the ones given in the EA to provide a range of estimates.
- 4b. *Final Location of Police Station.* The final location of the Police Station in Waikoloa is yet to be determined. It has been the understanding of the Mayor's Office that the community did not necessarily want County Lot 119 designated for this purpose. It has been tentatively determined that a part-time satellite police station will be established in the near future near the center of the Waikoloa community.

Sincerely,



Ron Terry

cc: Norman Oleson, Deputy Planning Director
Hawaii County Planning Department
Nelson Tsuji, Fire Chief
Hawaii County Fire Department
Gary Gill, Director
Hawaii State Office of Environmental Quality Control

BENJAMIN J. CAYETANO
GOVERNOR



GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

August 22, 1996

Mr. Norman Olesen
Office of the Mayor
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Olesen:

Subject: Draft Environmental Assessment for the Waikoloa Fire
Station, Hawaii

Thank you for the opportunity to review the subject document. We
have the following comments.

1. The entire island of Hawaii is in a seismic zone where major earthquake damage is possible. Please list the measures that will be taken to ensure that the proposed fire station remains operational during a major earthquake event.
2. If available, please provide a site plan for the proposed fire station. The site plan should show ingress/egress, drainage patterns and fuel storage tank locations.
3. Please indicate where the water from the vehicle wash down area will be directed. Will the water from the wash down area pass through an oil-water separator before being discharged? If not, please provide the appropriate justification?
4. Please describe in detail the specifications for the fuel storage tanks. How do the specifications compare with current government and industry standards?

Should you have any questions, please call Jeyan Thirugnanam at
586-4185.

Sincerely,

Jeyan Thirugnanam
for Gary Gill
Director

c: Ron Terry



Geo Metrician

Ron Terry, Ph.D.

HCR 9575
Keaau, Hawaii 96749
(808) 982-5831

September 16, 1996

Gary Gill, Director
Hawaii State Office of Environmental Quality Control
220 South King St., Fourth Floor
Honolulu, HI 96813

Dear Mr. Gill.

**Subject: Draft Environmental Assessment for Waikoloa Fire Station,
Hawaii Island**

Thank you for your comments on the Draft EA for the subject project. A point-by-point response to your comments follows:

1. The State and County of Hawaii have response plans for natural disasters that involve coordination of police, fire and emergency medical services under the control of the State and County Civil Defense Agencies. Fire personnel are trained to respond to natural disasters such as earthquakes, fires and floods. In case of a disaster, the fire station will not only remain operational, it will be a key element in government response.

The Waikoloa Fire Station is designed in conformance with the Uniform Building Code specifications for Seismic Zone 3. In addition, the design incorporates many measures to ensure that it remains operational after even a severe earthquake. For example, the bay doors can be operated by hand and during extreme emergencies are designed to give way to a fire truck.

2. A site plan of the fire station including the details requested (ingress/egress, drainage patterns, fuel storage tanks) will be included in the Final EA as Figure 3.
3. After processing through an oil-water separator, water from vehicle washdown will be disposed of in the septic tank for the facility. This fact will be included in the Final EA.
4. The attached sheet provides specifications for the fuel tanks. Please note that the tanks meet the all relevant industrial and government standards.

Sincerely,



Ron Terry

attachments

cc: Norman Oleson, Deputy Planning Director
Hawaii County Planning Department
Nelson Tsuji, Fire Chief
Hawaii County Fire Department



4109 Zeering Rd., Denair, CA 95316
800-222-7099 209-632-7571
AXIOM FAX 209-632-4711

**SPECIFICATIONS
FOR
ABOVEGROUND STORAGE TANKS
Ref. No. 96SPC002**

1. The Insulated Secondary Containment Aboveground Storage Tank Systems for Flammable and Combustible Liquids, Protected Type: Vehicle Impact Protected, and Projectile Resistant shall be tested to and listed for the following:
 - A) UL - 142, aboveground steel tanks for flammable and combustible liquids.
 - B) UL - 2085, two hour furnace fire test and two hour simulated pool fire test for insulated and protected tank.
 - C) UL - 2085 and UFC Test Standard APPENDIX #A-II-F-1, for both Vehicle Impact Protection and Projectile Resistance.
 - D) UL - 2085, insulated aboveground tanks for flammable and combustible liquids.
 - E) UL -2085 Non-Metallic Secondary Containment protected tanks for flammable and combustible liquids with secondary containment Emergency Venting by "Form of Construction".
 - F) ULC/ORD - C 142.16, protected aboveground tank assemblies for flammable and combustible liquids.
 - G) ULC/ORD - C 142.5, concrete encased aboveground tank assemblies for flammable and combustible liquids.
 - H) ULC/ORD - 142.16, the furnace burn requirements for two hour fire rating.
 - I) ULC/ORD - 142.5, the open (pool) fire testing for two hour flammable liquid fire test.
 - J) ULC/ORD - 142.23, aboveground tanks for used oil.
 - K) The requirement for uniform fire code for two hour (fire wall) test.



2. The primary steel tank shall be rectangular in shape and have continuous welds on all exterior seams, and manufactured in accordance with U.L. 142 except for the 125 Gallon primary steel tank which shall be circular and manufactured in accordance with U.L. 142.
3. The primary steel tank shall be pressure tested at 5 psig for 24 hours.
4. The primary steel tanks shall have "emergency vent" system as per NFPA 30 Code requirements.
5. The protected and insulated AST systems shall have a thru tank leak detector tube to allow for physical checkup and monitoring capability between the primary and the secondary containment.
6. The primary steel tank shall be pressurized at 5 psig during concrete encasement.
7. The outer surface of the primary steel tank shall be covered by a minimum of 1/4" Thick (6.4 mm) Styrofoam insulation panels or equally acceptable thermal insulation.
8. The secondary containment shall consist of a 30 Mil thick (0.78 mm) polyethylene membrane, or equally acceptable material, enclosing the steel tank and insulation material.
9. The primary steel tank and the secondary containment shall be encased in six inches of monolithic reinforced concrete, with a minimum design strength of 4,000 and 5,000 psi at 28 days depending on the tank size. The concrete design shall include the following for long term durability: air entrainment, water reducing admixture, and steel reinforcement.
10. The protected and insulated AST systems shall be of concrete exterior and a continuous and visually verifiable monolithic (seamless) pour on top, bottom, ends, and sides and contain no cold joints or heat sinks (heat transfer points). The AST must be shop fabricated and tested in accordance with the UL listings.
11. No steel or insulating material shall come in contact with the concrete or other corrosive material.

12. All openings shall be from the top only.
13. All exposed metal must be powder coated to inhibit corrosion.
14. The protected and insulated AST systems shall include a minimum 5-15 gallon powder coated, U.L. listed spill containment, and shall include normally closed valve to release spilled product into the primary steel tank.
15. The protected and insulated AST systems shall have a coated concrete exterior to resist weather and reflect sunlight.
16. The protected and insulated AST systems shall have a warranty of 30 years for systems 2,000 Gallon capacity and larger and 20 years for systems 1,000 Gallon capacity and smaller with optional 30 year warranty.
17. The protected and insulated AST systems design shall have been in use for a minimum of nine (9) years. The manufacturer must stipulate no AST containment system failure in 15,000 units produced.
18. The protected and insulated AST systems shall have two (2) lugs for connecting grounding conductors for lightning protection in accordance with NFPA 78.

EMERGENCY VENTS

244

EMERGENCY VENT

Emergency Vent (pressure relief only) used on Aboveground Storage Tanks, as a code requirement, to help prevent the tank from becoming over-pressurized and rupturing if exposed to fire.

DESCRIPTION

The 244 Emergency Vent consists of a body and cover that moves up and down on a center pin. Pressure inside the tank forces the cover to lift up off the vent seat, allowing air to exhaust. The center pin guides the movement. When pressure falls, the cover lowers back down on the seat and the vent is automatically reset.

CODE COMPLIANCE

When properly sized for the tank, this vent will conform to the requirements of NFPA 30, 30A, UL 142, API 2000, and PEI RP200.

MATERIAL & CONFIGURATION OPTIONS

1. Aluminum Body or Iron Body - suffix (I) indicates Iron.
2. Metal-To-Metal Seat (brass) or Soft Seat (viton O-ring) - suffix (O) indicates O-ring.
3. Male Threads /Female Threads /Flanged Mounting Connection - (M) indicates Male, and (F) indicates Flanged.
4. Opening Pressure Setting - Settings indicated are approximate. Emergency Vent setting should be specified higher than the Normal Vent setting so the Normal Vent operates first.
5. Screened Opening - (4" & 6" only) specify "WITH SCREEN". #3 Mesh stainless steel screen used for theft control. Screen is NOT intended to function as a Flame Arrester.



FIG 244



FIG 244M



FIG 244F

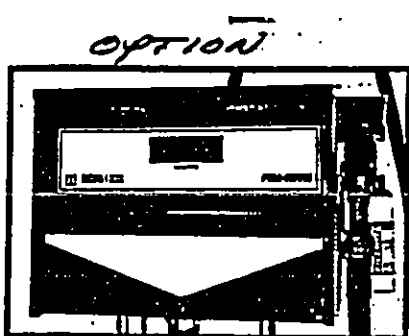
WARNING: The 244 Emergency Vent must be properly sized and selected for each specific tank application in order to meet the proper VENTING CAPACITY requirements.

WARNING: The 244 Emergency Vent is for EMERGENCY PRESSURE RELIEF only and must be used in conjunction with a "Normal Vent" or Pressure Vacuum Vent such as a Morrison Fig. No. 354, 548, 748 or 749.

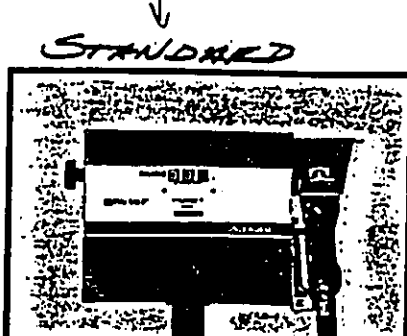
ALUMINUM BODY STYLE (O Indicates Viton O-ring Seat)

IRON BODY STYLE (O Indicates Viton O-ring Seat)

No. Options	Size	Opening Pressure Setting (oz./sq in)	Ship Wt. (lbs)	Venting Capacity (CFH) (@ 2.5 PSI)	Mounting Connection	FIG No. Options	Size	Opening Pressure Setting (oz./sq in)	Ship Weight (lbs)	Venting Capacity (CFH) (@2.5 PSI)	Mounting Connection
244 O	4"	8.0	10.65	95,000	FEMALE NPT	244I & 244 OI	4"	8.0	13.65	95,000	FEMALE NPT
		12.0	16.00	95,000	FEMALE NPT			12.0	19.00	95,000	FEMALE NPT
		16.0	21.00	90,000	FEMALE NPT			16.0	24.00	90,000	FEMALE NPT
	6"	8.0	15.50	194,000	FEMALE NPT		6"	8.0	20.63	194,000	FEMALE NPT
		10.0	21.50	194,000	FEMALE NPT			10.0	26.63	194,000	FEMALE NPT
		16.0	33.15	194,000	FEMALE NPT			16.0	38.28	194,000	FEMALE NPT
	8"	8.0	34.70	465,000	FEMALE NPT		8"	8.0	44.33	465,000	FEMALE NPT
		16.0	68.00	465,000	FEMALE NPT			16.0	77.63	465,000	FEMALE NPT
	244 OF	8"	8.0	38.50	465,000		FLANGED	244MI & 244 OMI	4"	8.0	16.26
16.0			71.50	465,000	FLANGED	12.0	21.11			95,000	MALE NPT
244OF	10"	2.5	32.00	906,000	FLANGED	6"	8.0	27.76	194,000	MALE NPT	
		8.0	71.00	576,000	FLANGED		10.0	32.31	194,000	MALE NPT	
		16.0	125.00	546,000	FLANGED		16.0	43.31	194,000	MALE NPT	
244 OM	3" (244 OM)	8.0	5.75	NA	MALE NPT	8"	8"	8.0	34.63	465,000	MALE NPT
		8.0	11.55	95,000	MALE NPT			16.0	75.35	465,000	MALE NPT
		12.0	16.30	95,000	MALE NPT						
	4"	8.0	19.45	194,000	MALE NPT		6"	8.0	27.76	194,000	MALE NPT
		10.0	24.00	194,000	MALE NPT			10.0	32.31	194,000	MALE NPT
		16.0	35.00	194,000	MALE NPT			16.0	43.31	194,000	MALE NPT
	6"	8.0	34.00	465,000	MALE NPT		8"	8.0	34.63	465,000	MALE NPT
		10.0	42.00	465,000	MALE NPT			16.0	75.35	465,000	MALE NPT
		16.0	68.00	465,000	MALE NPT						

FR702**Above Ground Pump System****FR712****Features**

- Compact, direct drive cabinet pump
- Direct mount design reduces the risk of leakage, eliminates need for additional piping
- Can be equipped to pump regular fuel, methanol or alcohol solutions, and diesel
- Interfaces with existing fuel control system formats
- Weights and Measures approved
- Electronic register features large backlit 6-digit LCD display with easy-to-read figures
- Diagnostic screen capabilities
- Explosion-proof motor
- Thermal overload protection
- Highly accurate, field-tested 4-piston meter
- Bronze rotor vanes compensate for wear and save tear-down expense
- Air eliminator vent line routes directly through union connection for optimum efficiency
- Air eliminator prevents siphoning
- Up to 20 PSI maximum outlet pressure
- 2" NPT threaded adaptor simplifies assembly
- All components designed for easy accessibility and servicing; can be disassembled/assembled with hand tools
- UL listed

**FR702****Features**

- Compact, direct drive cabinet pump
- Direct mount design reduces the risk of leakage, eliminates need for additional piping
- Can be equipped to pump regular fuel, methanol or alcohol solutions, and diesel
- Explosion-proof motor

- Thermal overload protection
- Bronze rotor vanes compensate for wear and save tear-down expense
- Up to 20 PSI maximum outlet pressure
- 2" NPT threaded adaptor simplifies assembly
- All components designed for easy accessibility and servicing; can be disassembled/assembled with hand tools
- UL listed

Specifications

Model:	FR712	FR702
Cabinet:	24"W x 17.25"D x 18"H	13"W x 12"D x 9.5"H
Inlet:	2" NPT	2" NPT
Outlet:	3/4" NPT	3/4" NPT
Rated Flow Rate:	18 GPM (68 l/m)	18 GPM (68 l/m)
Pumping Unit:	Positive displacement, direct drive; Eight (8) bronze rotor vanes	Positive displacement, direct drive; Eight (8) bronze rotor vanes
Valving:	Integral check valve with pressure relief bypass valve and thermal expansion valve	Integral check valve with pressure relief bypass valve and thermal expansion valve
Motor:	1/3 HP (115 VAC-60Hz) Explosion proof; UL listed; Sealed bearings	1/3 HP (115 VAC-60Hz) Explosion proof; UL listed; Sealed bearings
Hose/Nozzle:	UL listed 12' hose and manual nozzle	UL listed 12' hose and manual nozzle
Pulser:	Standard equipment—10:1, 100:1, 1,000:1	Optional
Totalizer:	Electronic accumulator	Mechanical accumulator
Options	A. 1/3 HP 220/240 VAC-50Hz motor (approved for 60Hz) B. Carbon vanes for pumping alcohol or methanol C. Automatic nozzle D. Stage II vapor recovery nozzle and holder E. Liter measure F. Universal tank mounting bracket G. 3" and 6" legs	A. 1/3 HP 220/240 VAC-50Hz motor (approved for 60Hz) B. Carbon vanes for pumping alcohol or methanol C. Automatic nozzle D. Stage II vapor recovery nozzle and holder E. Series 800 meter in gallons/liters F. Pulser for interface with existing fuel control formats

EUROPEAN OPERATION

TUTHILL
CORPORATION

Fill-Rite
Division

4204 Ferguson Road
Fort Wayne, Indiana USA 46809
Tel 219 747-7524 Fax 219 747-3159 Tlx 272915



TUTHILL
EUROPE S.A.

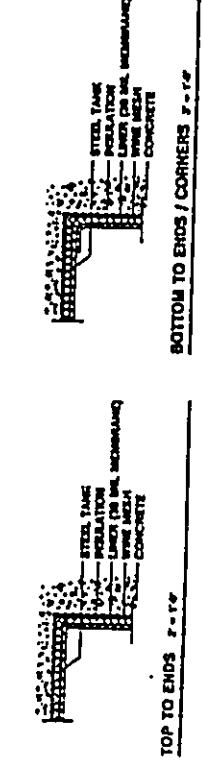
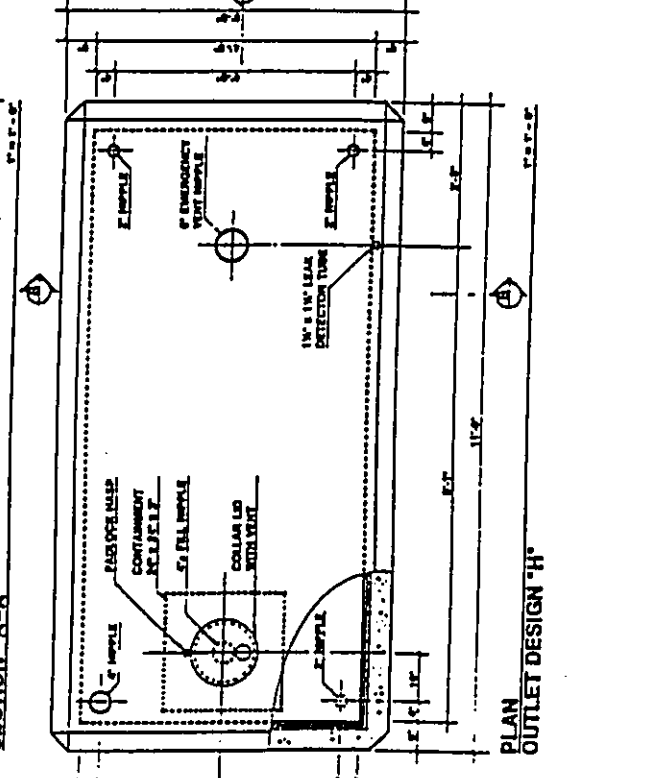
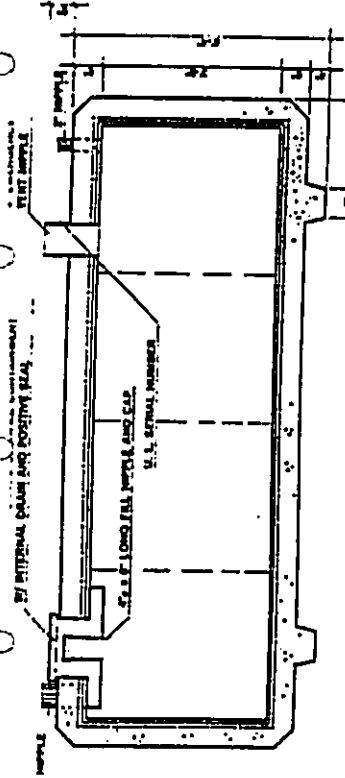
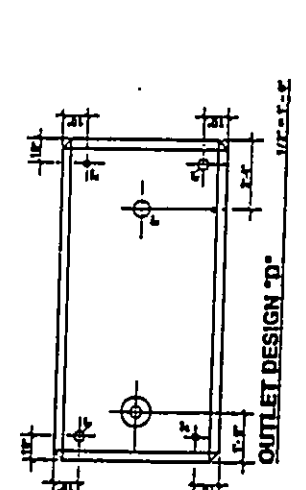
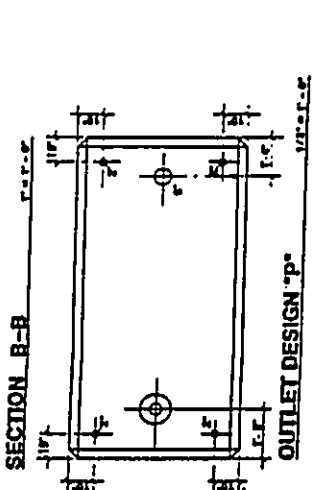
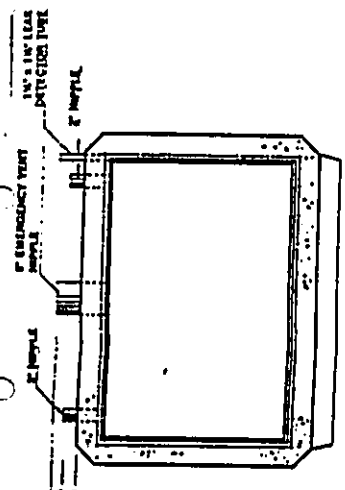
Parc Industriel Wavre Nord - Avenue Vésale 30
B-1300 Wavre Belgium
Tel 32-10/22.83.34 Fax 32-10/22.83.38

GENERAL SPECIFICATIONS

1. STEEL TANK SHALL BE MANUFACTURED IN ACCORDANCE WITH U.L. 142
2. STEEL TANK SHALL HAVE EMERGENCY VENT AS REQUIRED BY M.P.A. 30
3. STEEL TANK SHALL BE THREADED, EXCEPT FOR DETECTOR TUBE. ALL 2" P.W. IMPPLES SHALL BE SCHEDULE 40.
4. STEEL TANK SHALL BE RECTANGULAR IN SHAPE AND HAVE CONTINUOUS WELDS ON ALL SIZES, WELDS AS SHOWN ON DRAWING.
5. STEEL TANK AND SECONDARY CONTAINMENT SHALL BE ENCASED IN 6" MINIMUM OF 1,000 PSI REINFORCED CONCRETE.
6. STEEL TANK SHALL BE PRESSURE TESTED AT 150 PSI FOR 24 HOURS AND PRESSURE DROP CORRECTLY TANKS SHALL BE TESTED IN ACCORDANCE WITH U.L. STANDARD 1700 AND SHOWN TO HAVE A THROUGH PENETRATION FALL AS INDICATED BY THE UNDERFIRE CODE.
7. TANKS SHALL HAVE CAPABILITY OF PHYSICAL MONITORING BETWEEN PRIMARY AND SECONDARY CONTAINMENT.
8. TANKS SHALL HAVE THE SAME NUMBER AND SIZES OF OPENINGS AS SHOWN ON CONVAULT APPURTENANCE DRAWING.
9. TANK SHALL HAVE WARNING SIGNAL.
10. TANK SHALL BE APPROVED FOR PHASE B BALANCE RECOVERY (CALIFORNIA AND RESOURCES BOARD EXECUTIVE ORDER 0-78-111).
11. TANK SHALL HAVE 2 GALLON U.L. LISTED OVERFILL (OPTIONAL) WHICH REQUIRED.
12. TANK SHALL BE OF A MONOLITHIC (REINFORCED) CONCRETE POUR AND CONTAIN NO COUPTS OR JOINTS (GREAT TRANSFER POINTS) ON THE BOTTOM AND SIDES.
13. TANKS SHALL HAVE EXTENSIVE PROTECTIVE EPOXY COATING.
14. EARTHQUAKE RESTRAINTS SHALL BE INSTALLED AS REQUIRED BY LOCAL ADOPTIONS.

ACCESSORY PACKAGES

- 24 YEAR WARRANTY
 - 24 YEAR WARRANTY
 - 2 GALLON U.L. LISTED OVERFILL CONTAINMENT (OPTIONAL)
- THE FOLLOWING PACKAGES CONTAIN PUMPS
- #PMD1000 DIESEL PACKAGE
 - #PMD1000 GAS PACKAGE (EASER)
 - #PMD1000 GAS PACKAGE (EASER)
 - #PMD1010 PHASE I PACKAGE VAPOR RECOVERY (EASER)
 - #PMD1010 PHASE I PACKAGE VAPOR RECOVERY (EASER)
 - #PMD1020 PHASE II PACKAGE VAPOR RECOVERY BALANCE SYSTEM
- THE FOLLOWING PACKAGES DO NOT CONTAIN PUMPS
- #PMD2000 OIL PACKAGE
 - #PMD2000 DIESEL PACKAGE
 - #PMD2000 DIESEL PACKAGE WITH SUCTION TUBE
 - #PMD2000 GAS PACKAGE
 - #PMD2000 GAS PACKAGE WITH SUCTION TUBE
 - #PMD2001 PHASE I VAPOR RECOVERY GAS PACKAGE
 - #PMD2001 PHASE I VAPOR RECOVERY GAS PACKAGE WITH SUCTION TUBE
 - #PMD2001 WASTE OIL RECEPTACLE 800 AND 1,000 GALLON
 - #PMD2001 STEPS AND HANDRAIL 250 AND 500 GALLON
 - #PMD2001 STEPS AND HANDRAIL 600 AND 1,000 GALLON
 - #PMD2001 PUMP (OPTIONAL) U.L. LISTED
 - #PMD2001 PUMP (OPTIONAL) NON-LISTED



OUTLET CONFIGURATIONS
SEE TOP ELEVATIONS FOR DIMENSIONS AND SIZES

- OUTLET DESIGN H
- OUTLET DESIGN B
- OUTLET DESIGN P

* ALL UNMARKED REZER IMPPLES SHALL BE SECURELY CAPPED

TOP TO ENDS P-T-P

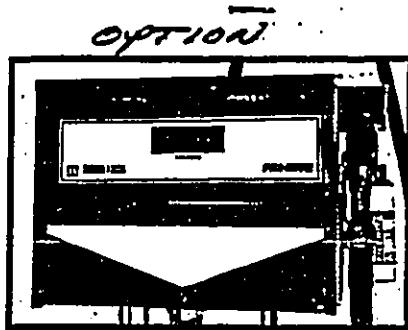
BOTTOM TO ENDS / CORNERS P-T-P



1,000 GALLON	
PATENT NUMBERS:	# 4,071,123
	# 4,071,124
	# 4,071,125
OTHER U.S. AND FOREIGN PATENTS PENDING	

FR702

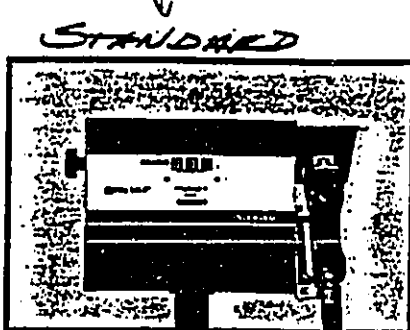
Above Ground Pump System



FR712

Features

- Compact, direct drive cabinet pump
- Direct mount design reduces the risk of leakage, eliminates need for additional piping
- Can be equipped to pump regular fuel, methanol or alcohol solutions, and diesel
- Interfaces with existing fuel control system formats
- Weights and Measures approved
- Electronic register features large backlit 6-digit LCD display with easy-to-read figures
- Diagnostic screen capabilities
- Explosion-proof motor
- Thermal overload protection
- Highly accurate, field-tested 4-piston meter
- Bronze rotor vanes compensate for wear and save tear-down expense
- Air eliminator vent line routes directly through union connection for optimum efficiency
- Air eliminator prevents siphoning
- Up to 20 PSI maximum outlet pressure
- 2" NPT threaded adaptor simplifies assembly
- All components designed for easy accessibility and servicing; can be disassembled/assembled with hand tools
- UL listed



FR702

Features

- Compact, direct drive cabinet pump
- Direct mount design reduces the risk of leakage, eliminates need for additional piping
- Can be equipped to pump regular fuel, methanol or alcohol solutions, and diesel
- Explosion-proof motor

- Thermal overload protection
- Bronze rotor vanes compensate for wear and save tear-down expense
- Up to 20 PSI maximum outlet pressure
- 2" NPT threaded adaptor simplifies assembly
- All components designed for easy accessibility and servicing; can be disassembled/assembled with hand tools
- UL listed

Specifications

Model:	FR712	FR702
Cabinet:	24"W x 17.25"D x 18"H	13"W x 12"D x 9.5"H
Inlet:	2" NPT	2" NPT
Outlet:	3/4" NPT	3/4" NPT
Rated Flow Rate:	18 GPM (68 l/m)	18 GPM (68 l/m)
Pumping Unit:	Positive displacement, direct drive; Eight (8) bronze rotor vanes	Positive displacement, direct drive; Eight (8) bronze rotor vanes
Valving:	Integral check valve with pressure relief bypass valve and thermal expansion valve	Integral check valve with pressure relief bypass valve and thermal expansion valve
Motor:	1/3 HP (115 VAC-60Hz) Explosion proof; UL listed; Sealed bearings	1/3 HP (115 VAC-60Hz) Explosion proof; UL listed; Sealed bearings
Hose/Nozzle:	UL listed 12' hose and manual nozzle	UL listed 12' hose and manual nozzle
Pulser:	Standard equipment—10:1, 100:1, 1,000:1	Optional
Totalizer:	Electronic accumulator	Mechanical accumulator
Options	A. 1/3 HP 220/240 VAC-50Hz motor (approved for 60Hz) B. Carbon vanes for pumping alcohol or methanol C. Automatic nozzle D. Stage II vapor recovery nozzle and holder E. Liter measure F. Universal tank mounting bracket G. 3" and 6" legs	A. 1/3 HP 220/240 VAC-50Hz motor (approved for 60Hz) B. Carbon vanes for pumping alcohol or methanol C. Automatic nozzle D. Stage II vapor recovery nozzle and holder E. Series 800 meter in gallons/liters F. Pulser for interface with existing fuel control formats

EUROPEAN OPERATION



TUTHILL
CORPORATION

Fill-Rite
Division

4204 Ferguson Road
Fort Wayne, Indiana USA 46809
Tel 219 747-7524 Fax 219 747-3159 Tlx 272915



TUTHILL
EUROPE S.A.

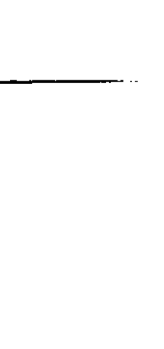
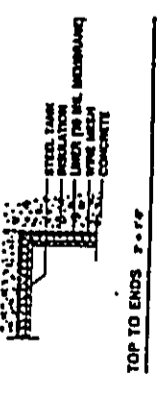
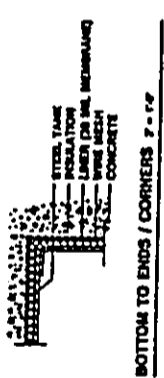
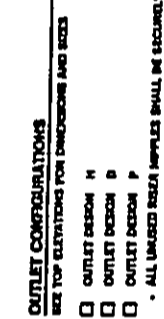
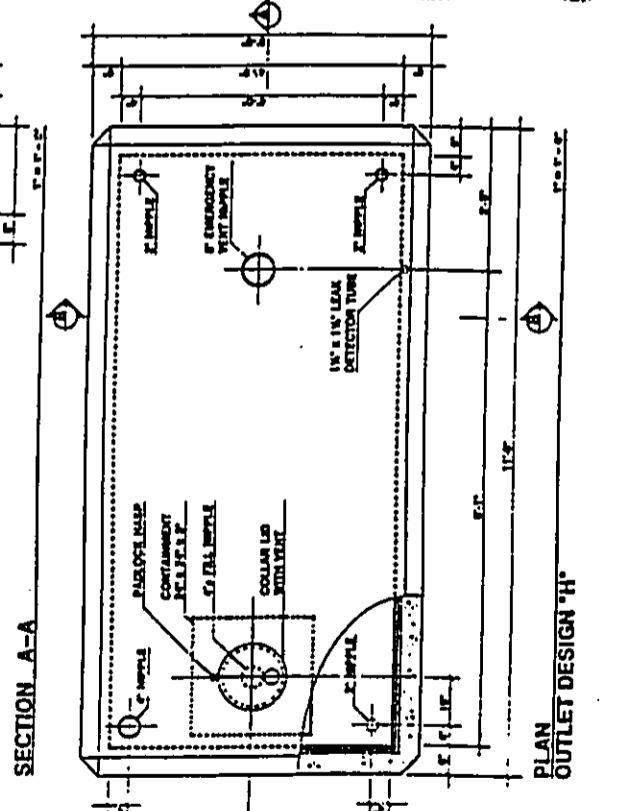
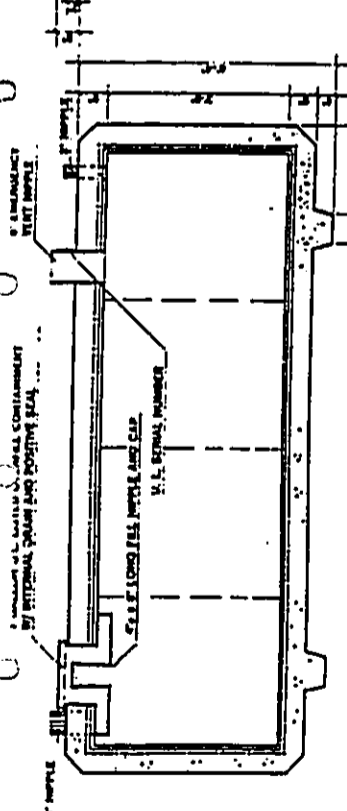
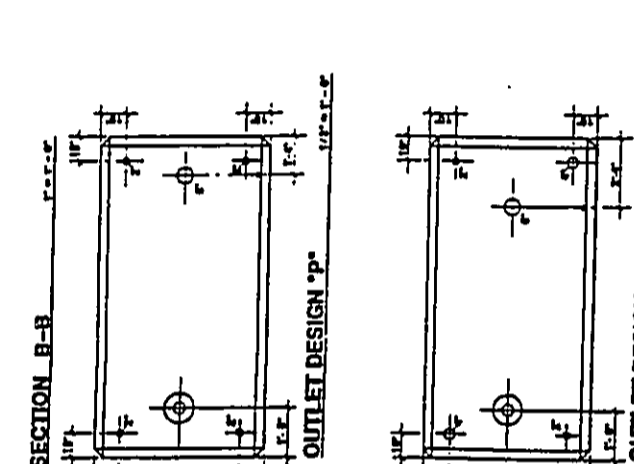
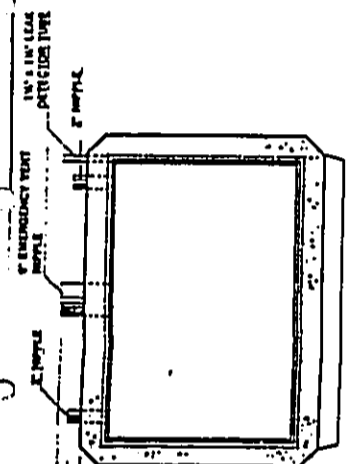
Parc Industriel Wavre Nord - Avenue Vésale 30
B-1300 Wavre Belgium
Tel 32-10/22.83.34 Fax 32-10/22.83.38

GENERAL SPECIFICATIONS

1. STEEL TANK SHALL BE MANUFACTURED IN ACCORDANCE WITH U.L. 12.
2. STEEL TANK SHALL HAVE EMERGENCY TEST AS REQUIRED BY NFPA 20.
3. STEEL TANK OPENINGS SHALL BE THREADED, EXCEPT FOR DETECTOR TUBE. ALL 2" PIPE APPLIES SHALL BE SCHEDULE 40.
4. STEEL TANKS SHALL BE RECTANGULAR IN SHAPE AND HAVE CONTINUOUS WELDS ON ALL SIZES, INSIDE AS WELL AS OUTSIDE.
5. STEEL TANK AND SECONDARY CONTAINMENT SHALL BE ENCASED IN SIX INCHES OF 3,000 PSI REINFORCED CONCRETE.
6. STEEL TANK SHALL BE PRESSURE TESTED AT 1.5 PSIG FOR 30 HOURS AND PRESSURE DROP CORRECTIVE TANKS SHALL BE TESTED IN ACCORDANCE WITH U.L. STANDARD 178 AND SHOWN TO HAVE A TWO-HOUR FIRE WALL AS MANDATED BY THE UNIFORM FIRE CODE.
7. TANKS SHALL HAVE CAPABILITY OF PHYSICAL MONITORING BETWEEN PRIMARY AND SECONDARY CONTAINMENT.
8. SECONDARY CONTAINMENT SHALL CONSIST OF A 36 IN. MONOLITHIC POLYETHYLENE GLOBE-SHEATHING.
9. TANKS SHALL HAVE THE SAME NUMBER AND SIZE OF OPENINGS AS SHOWN ON COMPLETE APPURTENANCE DRAWINGS.
10. TANKS SHALL HAVE WARNING BOARDS.
11. TANKS SHALL BE APPROVED FOR PHASE 8 BALANCE RECOVERY (CALIFORNIA 84 RESOURCES) AND PHASE 9 BALANCE RECOVERY (EXECUTIVE ORDER 045-111).
12. TANKS SHALL HAVE 7 GALLON U.L. LISTED OVERFLOW (OPTIONAL) WHERE REQUIRED.
13. TANKS SHALL HAVE A PERMANENT (REINFORCED) CONCRETE FLOOR AND CONTAIN NO COLD JOINTS OR WEAK SPOTS (PIT TRAP/SINK POINTS) ON THE BOTTOM AND SIDES.
14. VALVES SHALL BE PLACED ON A SEARCH TRICK REINFORCED CONCRETE PILE.
15. VALVES SHALL HAVE EXTENSION PROTECTIVE ENEMY COUPLERS.
16. EARTHQUAKE RESTRAINTS SHALL BE INSTALLED AS REQUIRED BY LOCAL JURISDICTIONS.

ACCESSORY PACKAGES

- 36 MONTH WARRANTY
 - 24 MONTH WARRANTY
 - 7 GALLON U.L. LISTED OVERFLOW CONTAINMENT (OPTIONAL)
- THE FOLLOWING PACKAGES CONTAIN PUMPS
- #PHG1000L DIESEL PACKAGE
 - #PHG1000L GAS PACKAGE (LEADER)
 - #PHG1000U GAS PACKAGE (UNLEADER)
 - #PHG1010L PHASE 1 PACKAGE VAPOR RECOVERY (LEADER)
 - #PHG1010U PHASE 1 PACKAGE VAPOR RECOVERY (UNLEADER)
 - #PHG1030U PHASE 8 PACKAGE VAPOR RECOVERY-BALANCE SYSTEM
- THE FOLLOWING PACKAGES DO NOT CONTAIN PUMPS
- #PHG2000 DIESEL PACKAGE
 - #PHG2000U DIESEL PACKAGE
 - #PHG3000S DIESEL PACKAGE WITH SUCTION TUBE
 - #PHG3000U GAS PACKAGE
 - #PHG3000S GAS PACKAGE WITH SUCTION TUBE
 - #PHG3000U PHASE 1 VAPOR RECOVERY GAS PACKAGE
 - #PHG3001S PHASE 1 VAPOR RECOVERY GAS Pkg. WITH SUCTION TUBE
 - #PHG3001U PHASE 1 VAPOR RECOVERY GAS Pkg. WITH SUCTION TUBE
 - #PHG3001S WASTE OIL RECEPTACLE 800 AND 1,000 GALLON
 - #PHG3001U WASTE OIL RECEPTACLE 800 AND 1,000 GALLON
 - #PHG3001S STEPS AND HANDRAILS 200 AND 1,000 GALLON
 - #PHG3001U STEPS AND HANDRAILS 200 AND 1,000 GALLON
 - #PHG3001S PUMP (UNAPPROVED) U.L. LISTED
 - #PHG3001U PUMP (UNAPPROVED) NON-LISTED



OUTLET CONFIGURATIONS
SEE TOP ELEVATIONS FOR DIMENSIONS AND SIZES

- OUTLET DESIGN H
- OUTLET DESIGN D
- OUTLET DESIGN P

* ALL UNUSED SIZES APPLIES SHALL BE SECURELY CAPPED

TOP TO ENDS P-P-P

STEEL TANK
INSULATION
1 INCH (20 MIL INSULATION)
3/4" - 3/8" WIRE MESH
CONCRETE

BOTTOM TO ENDS / CORNERS P-P-P

STEEL TANK
INSULATION
1 INCH (20 MIL INSULATION)
3/4" - 3/8" WIRE MESH
CONCRETE

1,000 GALLON

PATENT NUMBERS:
#10112
#10113
#10114
OTHER U.S. AND FOREIGN
PATENTS PENDING



END

CERTIFICATION

**I HEREBY CERTIFY THAT THE MICROPHOTOGRAPH APPEARING IN THIS REEL OF
FILM ARE TRUE COPIES OF THE ORIGINAL DOCUMENTS.**

2004

DATE

Sammy Yoshimura

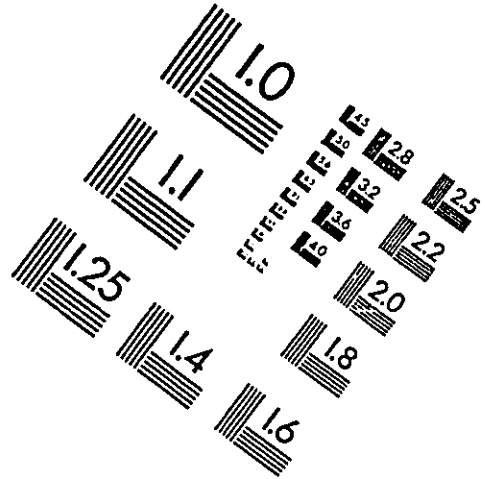
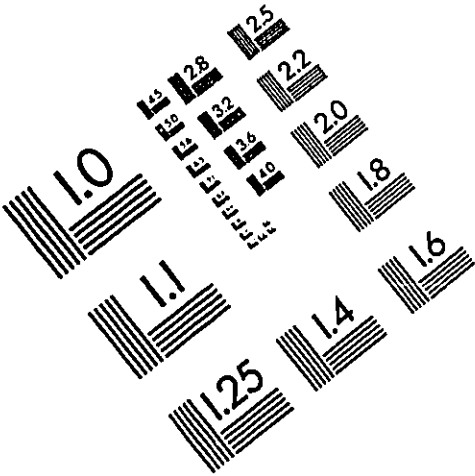
SIGNATURE OF OPERATOR



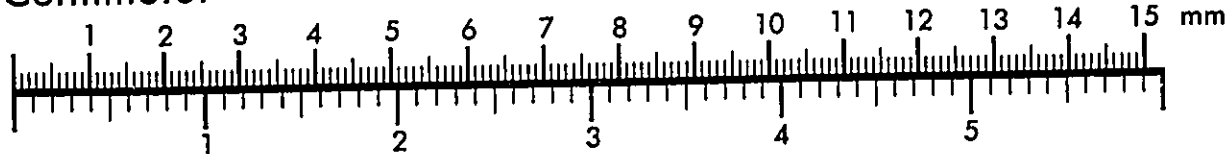
AIM

Association for Information and Image Management

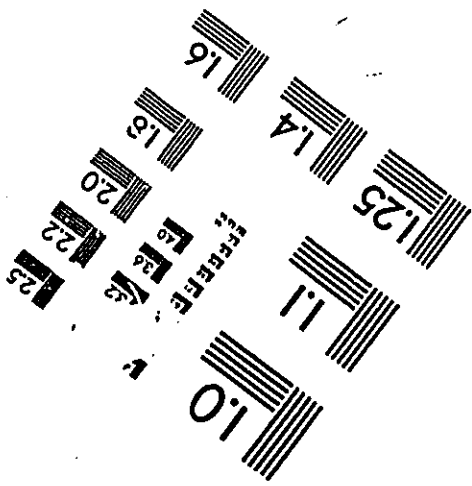
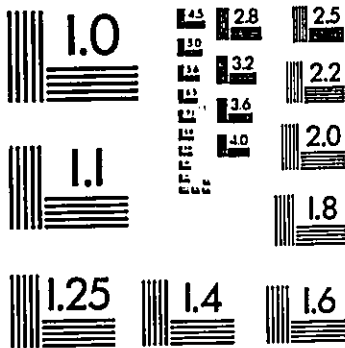
1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202



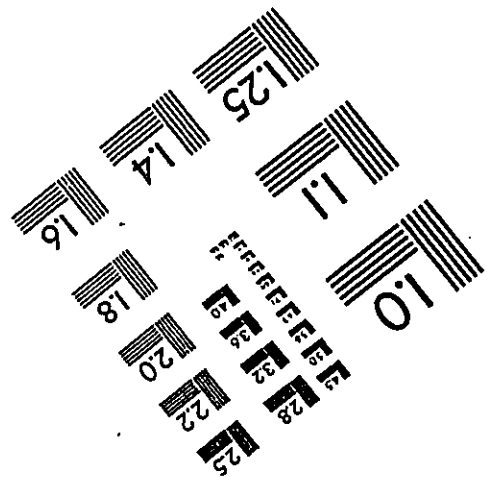
Centimeter



Inches



MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.



DENSITY TARGET



ADVANCED MICRO-IMAGE SYSTEMS HAWAII