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TELECOMMUNICATIONS ANTENNAS

Final Environmental Assessment

for

Proposed Coral Wireless LLC
Kuykendall Hall Office Tower Rooftop Antenna Site
University of Hawai`i at Mānoa

Honolulu, O`ahu, Hawai`i

Submitted Pursuant to Chapter 343, Hawai`i Revised Statutes (HRS), as amended

Applicant:
Coral Wireless LLC

Approving Agency:
University of Hawai`i at Mānoa

Prepared by:
Environmental Planning Solutions, LLC

September 2005

Final Environmental Assessment

Proposed Coral Wireless Antenna Facility
Kuykendall Hall Office Tower Rooftop
University of Hawai`i at Mānoa
Tax Map Key No. 2-8-023:003

Prepared Pursuant to Chapter 343, HRS, as amended

Applicant:
Coral Wireless LLC
Seven Waterfront Plaza
500 Ala Moana Blvd., Suite 230
Honolulu, HI 96813

Approving Agency:
University of Hawai`i at Mānoa
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September 2005

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SUMMARY INFORMATION

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FINAL ENVIRONMENTAL ASSESSMENT

Project Name:	Proposed Antenna Facility University of Hawai`i at Mānoa (UHM) Kuykendall Hall Office Tower Rooftop
Applicant:	Coral Wireless LLC Seven Waterfront Plaza 500 Ala Moana Blvd., Suite 230 Honolulu, HI 96813
Approving Agency:	University of Hawai`i at Mānoa 2444 Dole Street Honolulu, Hawai`i 96822
Prepared by:	Colette M. Sakoda Environmental Planning Solutions LLC 945 Makaīwa Street Honolulu, Hawai`i 96816
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Project Description:	6 panel antennas 6'(h) x 8"(w) are to be mounted vertically on the north, south and west walls of the rooftop elevator shaft. Total space required on rooftop will be about 100 sq.ft.
Land Owner:	University of Hawai`i 2444 Dole Street Honolulu, Hawai`i 96822
Location:	Kuykendall Hall Office Tower, UHM, Mānoa, Honolulu District, O`ahu

Site Address:	Kuykendall Hall Office Tower UHM Dept. of English 1733 Donaghho Road Honolulu, Hawai`i 96822-2275
TMK No.:	2-8-023:003
Land Use Classifications:	State Land Use District: Urban County Development Plan: Institutional County Zoning: R-5 Residential
Lot Area:	4,507,676 square feet (103.482 acres)
Special Management Area:	No
Flood Zone:	AE & X
Existing Use:	Kuykendall Hall Office Tower, a 7-story building, houses the English Department faculty offices.
Surrounding Land Uses:	Kuykendall Hall Office Tower is located in the center of the UHM campus. It is surrounded by Kuykendall classroom building to the northwest, Hawai`i Institute of Geophysics to the east, and Sakamaki Hall to the south, and the Art Building to the north.

I. INTRODUCTION

Hawai`i's newest wireless telecommunications company, Coral Wireless (CWI) will be launching commercial service to provide wireless voice and data coverage on O`ahu in 2005. CWI is licensed by the FCC to broadcast in the 1900 Megahertz band. The service to be offered by CWI is similar to existing cellular providers, but is modeled to provide unlimited access with flat rate pricing to O`ahu subscribers.

CWI will be launching a CDMA network using state of the art equipment. This improved technology means better, more secure communications to its customers, and smaller, less visible installations to its landlords. CDMA is an acronym of a digital standard for cellular communications, Code Division Multiple Access. In the United States, Verizon Wireless and Sprint PCS are the largest wireless communications providers utilizing this standard. CDMA is a method of allowing higher use of a given amount of frequency by digitally encoding each transmission with a unique code, then using spread spectrum technology to transmit that signal to and from mobile handsets. Other competing digital standards include GSM (Global System for Mobility) and TDMA (Time Division Multiple Access).

Company policy is to attach to existing structures wherever possible in order to minimize visual impacts. Coral Wireless plans to install its University of Hawai`i at Mānoa facility on the rooftop of Kuykendall Hall Office Tower in the center of campus. The antenna facility will consist of the following:

- 6 panel type antennas flush mounted to the north, south and west faces of the elevator shaft. Each panel antenna measures about 6'(h) x 8"(w) and will be painted to blend in with the building's existing color.

- One (1) self-contained, weatherproof BTS equipment cabinet that measures approximately 55" (h) x 52" (l) x 30" (w) and will sit on a wall mounted rack that is bolted to the south face of the elevator shaft 2 feet clear of the roof to ensure adequate space for rooftop maintenance. The BTS is connected to a utility demarcation/power protection cabinet that measures approximately 66" (h) x 30" (l) x 10" (w).

- Total space required on rooftop will be about 100 sq.ft. This installation will be regulated by the Federal Communications Commission and requires additional zoning and building permits from the City & County of Honolulu.

- Coral Wireless' installation is classified as a Utility Installation, Type B, in the R-5 zoning district, and requires a minor modification to the Plan Review Use (PRU) from the Department of Planning and Permitting, City and County of Honolulu.

The Draft Environmental Assessment (DEA) was prepared to identify and evaluate the existing conditions and potential impacts of the installation of an antenna installation at the top of Kuykendall Hall Office Tower on the natural and human environment. Prepared in accordance with the provisions of Chapter 343, HRS and Title 11, Chapter 200 of the State Department of Health's Administrative Rules, as the proposed action involves the use of State land, the DEA was published in the August 23, 2005 issue of the Environmental Notice for the official 30-day public review period. See Figures 1 and 2 for Vicinity and Building Location.

1.1 IDENTIFICATION OF APPLICANT

CWI, is a wireless telecommunications service provider proposing to implement this project.

1.2 IDENTIFICATION OF APPROVING AGENCY

The University of Hawai`i is the designated approving agency because it is the landowner. A minor modification to the University's Plan Review Use (PRU) File No. 88/PRU-3 is required by the City and County of Honolulu. Thus, the DEA prepared in accordance with Chapter 343, HRS, is a supplemental document to the minor modification to the PRU application.

1.3 IDENTIFICATION OF AGENCIES AND ORGANIZATIONS CONSULTED IN MAKING THE ASSESSMENT

Listed below are the agencies and organizations consulted in the preparation and review of the DEA.

Federal Government:
1. U.S. Army Corps of Engineers Pacific Ocean Division
   Regulatory Branch
2. U.S. Department of Interior U.S. Fish & Wildlife Service
3. Environmental Protection Agency—PICO
4. Directorate of Facilities Engineer U.S. Army Support Command Hawai`i

State of Hawai`i:
5. Department of Education
6. State Department of Land and Natural Resources
   Historic Preservation Division
7. State Department of Land and Natural Resources Land Division
8. Office of Hawai`ian Affairs
9. Office of Planning

10. UHM Environmental Center
11. University of Hawai`i Mānoa Facilities Planning and Management Office
12. State Department of Health Environmental Management Division
13. State Department of Transportation Highways Division

City and County of Honolulu:
14. Board of Water Supply
15. Department of Parks and Recreation
16. Department of Planning and Permitting
17. Department of Environmental Services
18. Department of Transportation Services
19. Fire Department
20. Police Department

Utilities:
21. Verizon Hawai`i Inc.
22. Hawai`ian Electric Company
23. Oceanic Time Warner Cable of Hawai`i
24. The Gas Company

Other Organizations:
25. Nature Conservancy
26. Sierra Club
27. Mānoa Neighborhood Board No. 7
28. Ann Kobayashi, Councilmember, District 5

1.4 SUMMARY OF MAJOR IMPACTS AND MITIGATING MEASURES

D. SHORT TERM IMPACTS

TRAFFIC AND PARKING. Minor traffic impacts will occur as a result of construction related traffic and the operation of construction equipment which may, on occasion, impede traffic in the immediate vicinity of Kuykendall. In addition, the proposed project may inhibit the use of the east end of Donaggho Road between Kuykendall Hall and Krauss Annex while a boom truck is parked to unload the bulk of the panel antenna and equipment cabinet hardware. This is expected to be up to a 3-day period.

NOISE. Construction activities will result in an increase in noise levels during the 5- to 8-week installation period. However, disruption to existing activities is anticipated to be minimal as the proposed project will not involve major earthmoving, pile driving or heavy demolition work.

AIR QUALITY. During construction, fugitive dust generation and on-site emission from construction and installation activities may affect air quality in the immediate vicinity of

the project. However, these impacts are anticipated to be minor due to the short construction period and small size of the actual exterior equipment installation.

To mitigate potential short-term impacts associated with construction activities, the installation of the equipment should be coordinated with the university to minimize disruption of classes and use of the building's elevator. Construction drilling will be on weekends or off-hours when the university is not in session. Materials will be hoisted to the roof from the exterior or moved by elevator after class and office hours.

B. LONG TERM IMPACTS

TRAFFIC AND PARKING. The proposed project will not result in any loss of parking spaces. Neither will it result in an increase in parking demand. The antenna facility will be unmanned and monitored from an offsite location. It will be visited once a month by a maintenance engineer whose normal length of stay on the site will be one hour. The project will not result in an increase in traffic volumes because it will be unmanned.

NOISE. The installation of electrical switching equipment in the 1 cabinet and 6 panel antennas will not result in any increase in noise levels in the long term at the rooftop or in the Kuykendall Hall Office Tower.

VISUAL RESOURCES. The placement of 6 panel antennas on the north, south and west sides of the building's rooftop elevator shaft will have limited impact on ground level views in the vicinity of the building as the view angle from the ground limits views to the outer portions of the roof. Visual impacts will mainly occur to view from the upper floors of adjacent buildings or from distant ground level viewpoints. However, these impacts are anticipated to be minimal because the overall size of the antennas and related accessories in comparison to the building itself will result in changes to portions of the building roof, but will not result in a significant alteration to the overall form. The antennas will be painted to blend in with the building paint color.

The installation of 1 electrical equipment cabinet on the rooftop will not impact ground level views because this part of the roof is recessed from the edges of the building. The equipment cabinets may be visible from upper floors of adjacent buildings, but should not significantly impact the overall visual quality of views from these buildings.

ELECTROMAGNETIC RADIATION (EMF). The rooftop of the Kuykendall Hall Office Tower is restricted to public access. Only campus maintenance, contractors and CWI personnel will have access to the rooftop. These personnel will be aware of the facility and knowledgeable of the potential for exposure and can exercise control over their exposure. In the event that UH workers will be in close proximity to the antennas for prolonged periods, UH personnel will make prior arrangements with CWI . Coral Wireless will work with the UH personnel to mitigate any concerns including education

of RF safety and use of RF monitor devices. If it is determined that work will be unsafe, CWI will work with UH on reducing the power level of the antennas possibly remotely powering down the antennas. UH personnel are aware that powering down the antennas will affect service and will be possible for rare and short periods of time. Caution or warning signs related to radiation safety will be posted on the locked roof access door and the exterior walls of the north, south and west facing walls.

CWI is licensed by the Federal Communications Commission (FCC) and complies with very strict emission guidelines. Coral Wireless radio engineers conducted an electromagnetic radiation (EMR) hazards analysis for the proposed installation of the CWI CDMA PCS base station site on Kuykendall Hall Office Tower. The CWI report dated July 2005 in its entirety is included in the Appendix of this DEA. Analysis of the potential for RF hazards to personnel at the facility, conducted using an MPE analysis software application widely used in the wireless telecommunications industry, Roofview V4.15, revealed that personnel on the rooftop or in the rooms directly below the rooftop will not be exposed to the power densities exceeding the FCC Office of Engineering Technology (OET) Bulletin 65 Maximum Permissible Exposure (MPE) limits. Furthermore, personnel located in offices on the lower floors of the building and at ground level will not be exposed to power densities exceeding the FCC MPE limits. Therefore transmission from the proposed antennas will not be hazardous to personnel (CWI RF Engineering, July 2005).

Professor Vincent Z. Petersen, an expert in the field of radiation and radio transmission at the UHM Department of Physics, was asked by the Associated Students of the University of Hawai`i (ASUH), to determine whether a higher intensity KTUH antenna on Saunders Hall would result in a radiation hazard to occupants of the building. Dr. Petersen prepared a paper entitled, "Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission" in 1995. Calculations prepared by Dr. Petersen concluded that the FM radiation from the KTUH antenna with 3000 watt total radiated power, does not constitute a radiation hazard to occupants at the top floor (or any floor) of the Social Sciences Building. The maximum intensity on the rooftop was projected as 30 times lower than FCC-acceptable radiation levels of 1.0 mW/cm^2. Please refer to a copy of Dr. Petersen's paper in the Appendix.

Coral Wireless's antenna would be radiating at a significantly lower level than the KTUH site.

SOCIO-ECONOMIC. Wireless technology provides high quality, safe and secure communication services to the community. To be effective, the necessary infrastructure must be built so that the convenience, mobility and connectivity of wireless communication devices are easily and readily available to all residents. In addition to improving public safety and providing new jobs, Coral Wireless is helping build a communications infrastructure that will support economic growth and additional tax

revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a cellular telecommunications system that will help fulfill this need.

1.5 SUMMARY OF ALTERNATIVES CONSIDERED

Other buildings on campus that have existing facilities were considered but were ruled out either mainly because they are either not suitable for RF purposes or lack adequate infrastructure for additional antenna facilities, such as Saunders Building where there are existing antennas. Bilger, Campus Center, The Art Building and the Physical Sciences Building were evaluated as potential antenna sites. Bilger, located at the northeast corner of Kuykendall was the first candidate but since another wireless carrier is already on the rooftop, UHM's policy of one-carrier-per-building would not allow a second carrier. The Art building was too low, Physical Sciences was too far east; and Campus Center leasing procedure would be to directly deal with Campus Center rather than through the UHM Facilities coordinator. CWI decided to work through the UHM Facilities coordinator who had established a procedure with wireless telecommunications carriers.

1.6 DETERMINATION

Based upon the findings presented in the DEA and supporting technical studies, the potential impacts of the installation and operation of the CWI antenna facility have been sufficiently examined and discussed. After reviewing the significance criteria outlined in Section 11-200-12, EIS Rules, Contents of Environmental Assessments, the University of Hawaii at Manoa has determined that the action is not expected to result in significant adverse effects on the natural environment. The DEA was circulated for public review and comment for a period of 30 days between August 23 and September 21, 2005. As the approving agency, the University of Hawai`i has reviewed all written comments received at the end of the review period, and found the project impacts would be minimal. Therefore, the University of Hawaii is issuing a Finding of No Significant Impact (FONSI) for this project.

2.0 PROJECT DESCRIPTION

2.1 PURPOSE AND NEED FOR THE PROJECT

Coral Wireless is seeking to expand telecommunication service to its customers on the University of Hawai`i Mānoa campus. The purpose of the transmitter/antenna facility is to provide a large coverage zone over the University of Hawai`i campus, Mānoa, and particularly improve in-building service throughout the campus. Increasingly, PCS systems are being used to transmit data allowing callers to communicate with other telephones, computers, faxes and pagers around the world. This has greatly increased usage and demand for efficient coverage. PCS uses "cells" or geographic areas that

resemble a honeycomb pattern. Located within each cell area, an antenna and a base station comprised of switching equipment. The signal travels from the wireless phone to the base station and is relayed to the switching equipment. The call is then connected to the local phone network or to other wireless users on the system.

Wireless technology provides high quality, safe and secure communication services to the community. To be effective, the necessary infrastructure must be built so that the convenience, mobility and connectivity of wireless devices are easily and readily available to all residents. In addition to improving public safety and providing new jobs, Coral Wireless is helping build a communications infrastructure that will support economic growth and additional tax revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a wireless telecommunications system that will help fulfill this need.

2.2 LOCATION, OWNERSHIP AND SURROUNDING LAND USES

The site for the proposed Coral Wireless antenna facility is located on the University of Hawai`i, Mānoa (UHM) campus in Honolulu on the island of O`ahu. See Figure 1. The University of Hawai`i is a multi-campus system of post-secondary educational institutions serving the State of Hawai`i. The UHM is the system's major comprehensive graduate and research campus with more than 18,700 students and is commonly referred to as the Mānoa Campus.

The University of Hawai`i Long Range Development Plan (UHLRDP) divides the Mānoa campus into four subareas: the Central campus, the Upper/Central campus, the Mauka campus, and the Makai campus. Kuykendall Hall Office Tower is centrally located within the Central campus on less than an acre of land. The building occupies a portion of Tax Map Key: 2-8-023:003 which is owned by the University of Hawai`i. See Figure 2.

Kuykendall Hall Office Tower which is faculty and administrative extension of Kuykendall Hall classroom building which houses the University's English Department, is bordered by Kuykendall Hall classroom building on the northwest corner, Art Building, Correa Road, and Bilger to the north and northeast, Sakamaki Hall to the south, HIG Building on the east, and Krauss Hall and Annex to the south- southwest.

2.3 EXISTING FACILITY

The English Department administrative office and English Department faculty are housed in the 7-story Kuykendall Hall Office Tower building. Departmental classes are held in Kuykendall Hall which is connected to the project building by a fourth floor covered walkway. A single elevator which services both buildings is located in Kuykendall Hall Office Tower. The rooftop of Kuykendall Hall Office Tower houses the elevator shaft on the western portion and the stairwell on the eastern portion. A small decommissioned antenna sits on the northeast corner of the rooftop. At its highest point the Kuykendall Hall Office Tower building measures 112.5 feet.

2.4 PROPOSED PROJECT

The project proposes a CDMA PCS Nortel Networks 6S3C Compact Metrocell base transceiver station (BTS) consisting of one equipment cabinet and 6 panel antennas on the elevator/mechanical room located on the rooftop of the 7-story Kuykendall Hall Office Tower building. All in all, the facility will occupy approximately 100 s.f. on the roof of the building. The installation, which will operate 24 hours a day, 7 days a week, is unmanned, and requires only monthly maintenance by the carrier's personnel.

Coral Wireless facility details are:

- BTS cabinet measures approximately 55" (h) x 52" (l) x 30" (w) and will be mounted on a short platform 2' clear of the roof to ensure adequate maintenance access. If any penetration of the roofing material is required, all work will be done in conjunction with approved roofing contractors so as not to void any existing warranties. The BTS cabinet is connected to a utility demarcation/power protection cabinet that measures approximately 66" (h) x 30" (l) x 10" (w). Coaxial cables will run from the radios housed in the BTS cabinet to six (6) panel type antennas mounted on the rooftop as well.
- Each panel antenna measures about 6'H x 8"W. Two of these antenna panels are to be mounted vertically on the north, south and west sections of the elevator room walls. The tops of the panels will not extend above the top of elevator room's walls. Equipment specifications are included as Exhibits in this application. See Exhibit A zoning drawings, photos and photo simulation.

. The proposed UH facility will help to bridge the gap in coverage throughout the University campus and meet user demand for better coverage.

2.5 PROJECT SCHEDULE AND COSTS

The construction of the project will take approximately 5 to 8 weeks. Scheduling of construction will be closely coordinated with the UH Mānoa Facilities Planning and Management Office to minimize potential noise and traffic impact concerns in and around Kuykendall Hall Office Tower. It is scheduled to start upon receipt of all zoning and building permit approvals. The estimated construction cost of the installation of the antenna facility is $85,000.00.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT, ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

3.1 CLIMATE

A. Existing Conditions

Average daily minimum and maximum temperatures range from the low 70s (degrees Fahrenheit) to the low 90s, depending on the time of day and the season. Average daily temperatures vary by about 6.5 degrees between winter and summer seasons, and 15 to 20 degrees between day and night.

Precipitation is seasonal, with most rainfall occurring between the months of December through April. The adjusted median annual rainfall for this location is approximately 30 inches.

B. Anticipated Impacts and Mitigative Measures

The proposed project will have no effect on climatic conditions.

3.2 TOPOGRAPHY

A. Existing Conditions

The site is essentially flat. The elevation is approximately 70 feet above mean sea level (msl). The proposed project will not require alterations to existing grades as the project involves primarily installation of new fixtures to an existing structure without ground alterations or grading activities.

B. Anticipated Impacts and Mitigative Measures

The proposed project will have no effect on topographic conditions.

3.3 SOILS

A. Existing Conditions

According to the U.S. Soil Conservation Service, the soils on the property are comprised of Makiki Stony Clay Loam (MIA). This series consists of well-drained soil, and this particular soil type is found on slopes of 0 to 3 percent. Stones make up about 15 percent of this soil type by volume. The depth of the underlying bedrock or ash varies from 20 to 60 inches.

B. Anticipated Impacts and Mitigative Measures

The proposed project will have no effect on soil character as the site is entirely urban in character and the proposed improvements (which are concentrated on the upper rooftop of the Kuykendall Hall Office Tower building) will not involve earthwork.

3.4 SURFACE WATER AND DRAINAGE

A. Existing Conditions

The proposed project is designated as Zone X, defined as "areas determined to be outside the 500-year flood plain" by the National Flood Insurance Program, Flood Insurance Rate Map (FIRM). The site is urban in character with concrete pavement and landscaping. The bulk of work on the proposed project will be concentrated on the upper roof of the existing building.

B. Anticipated Impacts and Mitigative Measures

The proposed project is not anticipated to have any impacts on existing drainage patterns or volumes because the site is already highly urban. Ground level activity will involve trucking in the panel antennas, cabinet and associated facility hardware to the southeast side of the building, with construction workers carrying the bulk of the hardware to the rooftop via the elevator. Because most of the installation hardware will be delivered to the rooftop in the same manner as office equipment, little to no impact is expected even during construction. The exception would be the delivery and boom-lifting of the 55" (h) x 52" (l) x 30" (w) cabinet to the southeast side of the building.

3.5 FLORA AND FAUNA

A. Existing Conditions

The vegetation and wildlife on the project site are entirely urban in character. No threatened or endangered species presently reside on the project site. Existing vegetation in the vicinity of the ground floor improvements include shower trees on the western side of the building, palm trees on the north, and a courtyard with ornamental plants and trees on the east. Other vegetation includes grass and shrubs on the south side of the building facing Donaggho Road. Some birds observed at the site include the Barred Dove, the Common English Sparrow, and the Mynah. Other animal species likely to occur are feral cats and mice.

B. Anticipated Impacts and Mitigative Measures

Neither construction activity nor operation of the proposed antenna facility will result in disturbance or removal of existing vegetation in the vicinity of the ground floor improvements. Wildlife species currently utilizing the site will most likely be displaced into adjacent areas during facility hardware installation.

3.6 ARCHAEOLOGICAL /HISTORICAL RESOURCES

A. Existing Conditions

There are no known archaeological or historic sites on the project site. Kuykendall Hall Office Tower is not on the National or State Historic Register.

Act 50, enacted by the Legislature of the State of Hawai'i (2000) requires state agencies and other developers to assess the effect of proposed land use or shoreline developments on the "cultural practices of the community and State as part of the HRS Chapter 343 environmental review process (2001). Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawai'ians and other ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are...contrary to the State's environmental policies...or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000).

As suggested in the "Guidelines for Assessing Cultural Impacts" (OEQC 1997), consultation with organizations familiar with cultural practices and features associated with the project area is permissible in the process of determining the project's impacts on cultural practices in the area. According to the OEQC (1997), a "good faith effort" is required to investigate the potential cultural impact on a property. In the case of the present site, limited archival research was conducted, and letters of inquiry during the Pre-Assessment period were sent to the O'ahu Office of Hawai'ian Affairs and the State Historic Preservation Division. The responses obtained, included in Appendix A, provide a good faith level of effort.

The University of Hawai'i at Mānoa began in 1907 as a land-grant college of agriculture and mechanic arts called the College of Hawai'i. The first classes were held at a temporary site in downtown Honolulu. In 1912, the school moved to its permanent site in Mānoa Valley. Since 1912, the University of Hawai'i Mānoa campus has grown to encompass 304 acres as a major educational institution in urban Honolulu. The project area has not been used for traditional cultural purposes within the last 93 years.

B. Anticipated Impacts and Mitigative Measures

Because the proposed project does not require earthwork, no archaeological or historically significant resources are anticipated to be encountered during the construction and installation period. The State Historic Preservation Division (SHPD) concluded that the project would have a "no historic properties affected" determination (September 12, 2005). Additionally, in letters from the Office of Hawai'ian Affairs dated May 31, 2005 and September 16, 2005, the agency concluded that no changes will be made to the surrounding physical environment and visual impacts will be minimal. Please see letters in the Appendix. Based on historical research and in particular the response from OHA, it is reasonable to

conclude that Hawai`ian rights related to gathering, access or other customary activities will not be affected and there will be no direct adverse effect upon cultural practices or beliefs.

Therefore, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawai`ian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by the proposed antenna installation on the property. Because there were no activities identified, there are no adverse effects.

B. Anticipated Impacts and Mitigative Measures

Because the proposed project does not require earthwork, no archaeological or historically significant resources are anticipated to be encountered during the construction and installation period. The State Historic Preservation Division (SHPD) was consulted regarding archaeological and historic resource impacts by the proposed installation, and stated by letter dated September 12, 2005, that "no historic properties will be affected."

3.7 TRAFFIC AND PARKING

A. Existing Conditions

Students, faculty and employees access the project site in a variety of ways: ride-sharing, motorcycles, mopeds, bicycles, City bus service, shuttle service, private vehicles, and on foot. Parking on campus nearest the project site is allowed by permit only. There is an open area where trucks can park for short periods at a time, in the between Kuykendall and Krauss Annex or maintenance personnel and deliveries.

B. Anticipated Impacts and Mitigative Measures

Short-term impacts on parking between Kuykendall and Krauss Annex will probably occur as a result of construction related traffic entering and exiting the project site. Traffic generated by construction workers will occur during normal working hours and between 7:30 a.m. and 4:30 p.m. However, construction activity will have very little impact on traffic entering and leaving the campus because the number of project workers is expected to be small. Operation of construction/installation equipment and trucks may, on occasion, impede traffic and short-term parking in the immediate area of Kuykendall Hall Office Tower during construction which is expected to occur between 5 to 8 weeks.

No long-term impacts on traffic or parking are expected because the proposed project is an unmanned facility that will operate 24 hours a day 7 days a week, with a once-per-month visit by the carrier's maintenance technician.

While the proposed project will have minimal impact on the existing traffic and parking conditions on the Mānoa campus, the contractor should be expected to do pro-active planning to avoid any short-term delays or parking problems during construction. Such measures would include notifying the UHM facilities planning and management office, Kuykendall Hall Office Tower faculty and administrative staff, and the security office of its construction schedule well in advance prior to commencement of activities, and to have a worker monitoring traffic and parking in the immediate vicinity of Kuykendall Hall Office Tower during the peak construction/installation period.

3.8 UTILITIES

A. Water and Wastewater

UHM water and wastewater infrastructure systems are owned, operated and maintained by City and County of Honolulu agencies. Like the other buildings on the campus, Kuykendall Hall Office Tower is served by these existing systems. The proposed project will not require water or wastewater system services because it is an unmanned facility. Therefore, this section does not include further discussion of water and wastewater systems.

B. Electrical and Telephone Systems

a. Existing Conditions

Electrical power for Kuykendall Hall Office Tower is provided by Hawai'ian Electric Company (HECO) while the electrical power distribution system for the entire campus including Kuykendall Hall Office Tower is owned and managed by the University. Telephone service is provided by Hawai'ian Telcom. The proposed project will require electrical power and telephone service for its operations on the Kuykendall Hall Office Tower rooftop.

b. Anticipated Impacts and Mitigative Measures

According to past demand charts from the UHM Facilities Planning and Management office, the capacity required for the antenna facility would be available from the existing electrical power and telecommunications systems.

3.9 NOISE

A. Existing Conditions

Noise levels in the vicinity of the project site's ground floor through the upper floors are affected by faculty and office workers, students and vehicular noise. Air conditioning equipment is located on the south lawn of Kuykendall Hall between it and Krauss Hall Office Tower. The elevator/mechanical room, located on the building's rooftop contributes to the ambient noise level of the project area. Traffic

noise in the immediate area is generally not disruptive because vehicle speeds are low.

B. Anticipated Impacts and Mitigative Measures
The construction activities of the Coral Wireless antenna facility will result in an increase in noise levels during the 5- to 8-week installation period. Construction related noise may affect faculty and staff offices in Kuykendall. However, disruption to these activities is anticipated to be minor as the proposed project will not involve major activities such as earthmoving, pile driving or demolition work. At most, disruption may be limited to about 4 weeks. Construction related noise should not seriously affect the teaching and learning processes in the neighboring Kuykendall Hall, HIG Building, or Sakamaki Hall as these buildings are either substantially enclosed or air conditioned, or both. The anticipated increase in noise level will be limited to the contractor's allowed work hours of weekdays, 7:30 a.m. to 4:30 p.m.

There will be a brief two-to-three day period during which flatbed trucks will deliver the panel antennas, reels of coax cable, and the BTS equipment cabinet to the rooftop. Most equipment, except the BTS cabinet, coax cable and support beams, is small enough to be carried via the elevator to the rooftop. The trucks will likely be parked on the south side of the building to get equipment onto the building elevator in the most efficient way and to minimize disruption to the building's normal daily activities. The work can be performed on a weekend, if necessary, to minimize impact to the English Department faculty, administration and students..

No long-term noise impacts are anticipated by the operations of the unmanned antenna facility. After installation of the panel antennas and equipment cabinets is complete, noise generated from the rooftop will be practically unchanged from the current situation due to the fact that the proposed project is not a noise-generating facility. No emergency generator or air conditioner is planned for the antenna facility, which is sometimes included in telecommunications facilities.

3.10 AIR QUALITY

A. Existing Conditions

Overall the air quality in the vicinity of the project area is generally good. There are no major sources of pollution near the project site. The site is upwind from all major transportation corridors. Present air quality in the project area is mostly affected by air pollutants from motor vehicles, with carbon monoxide being the most abundant of the air pollutants emitted.

B. Anticipated Impacts and Mitigative Measures

1. Short-Term Impacts

There will be two types of short-term air quality impacts that will result from the proposed project: 1) fugitive dust generation and 2) on-site emissions from construction equipment. Fugitive dust emissions may arise from exterior site preparations and construction activity. On-site mobile and stationary construction equipment will emit some air pollutants in the form of engine exhausts. However, these impacts are anticipated to be minimal due to the short construction period and the small size and scale of the proposed project.

Contractor construction equipment will be required to comply with State and County standards with respect to maintaining equipment so that trucks and heavy equipment will be operating in good condition. Best management practices such as this will help minimize any on-site emissions of air pollutants during the brief construction period. Additionally, if the most disruptive phase of the installation involves a boom truck lifting supporting beams, coax cable and BTS equipment cabinet to the rooftop can be accomplished over a single weekend, air quality impacts would be substantially minimized.

2. Long-Term Impacts

Long-term air quality impacts will remain at current levels from normal, day-to-day operations after the construction of the proposed project since, 1) the capacity of the parking lot next to Kuykendall Hall Office Tower will remain unchanged. As stated in Section 3.7 Traffic and Parking, this facility will be unmanned with a Coral Wireless technician expected to visit the project site once a month to maintain the equipment and antennas.

3.11 VISUAL RESOURCES

A. Existing Conditions

The Ko'olau mountains, Wa'ahila Ridge and Tantalus (Pu'u-'ōhi'a) serve as a backdrop for views in the vicinity of Kuykendall Hall Office Tower. However, opportunities for experiencing these views are limited due to a number of multi-story structures surrounding the building. There are mechanical room/elevator shaft and stairwell extension as well as a decommissioned antenna located on the roof of Kuykendall Hall Office Tower.

B. Anticipated Impacts and Mitigative Measures

The installation of the proposed antennas will have limited impacts on ground level views as the view angle from the ground limits views to the outer portion of the roof. Visual impacts will mainly occur to views from the upper floors of adjacent buildings looking toward Kuykendall Hall Office Tower. However, these impacts are anticipated to be

minimal because: (1) views are urban in character and are already impacted by the existing built environment; (2) the overall size of the antennas in comparison to the building as well as the elevator shaft will result in changes to a portion of the building roof, but will not result in a significant alteration to the overall form.

Mitigation Measures: The planned surface mounting of the panel antennas to the walls of the elevator shaft and painting of the panels to blend in with the existing color of the building will help minimize any potential impact to the existing view. See photo simulation in photos section. The BTS cabinets and support framing and all cables and conduits will be painted to match the walls.

3.12 LAND USE DESIGNATIONS

A. Existing Conditions

The project site is located within the State's Urban land use district, as is all of the surrounding area. The project site is comprised of lands that are designated as R-5 single-family residential. There is a height limit of 25 feet for R-5 districts, but this limit is amended by City Council-approved Plan Review Use/Long Range Development Plan (PRU-LRDP) which sets different heights in different locations. Although no specific height is set for Kuykendall Hall Office Tower, the general rule of thumb used in the UH LRDP is the relationship to surrounding facilities.

B. Anticipated Impacts and Mitigative Measures

No changes in land use classification or zoning are required to implement the proposed action.

3.13 SOCIO-ECONOMIC CHARACTERISTICS

A. Existing Conditions

The Mānoa community surrounding the UH Mānoa campus is an older, stable neighborhood of predominantly single family residences. Most homes were built in the first quarter of the twentieth century, and are still maintained in good condition. The neighborhood gets its name from the valley formed by two mountain ridges of the Ko'olau mountain chain. Wa'ahila Ridge borders UHM on the east, and residential properties and private educational institutions border much of the rest of the perimeter. Mānoa is generally regarded as a very desirable place to live, and hence, home values are high. Many University students, faculty and staff live in the surrounding community.

Kuykendall Hall and the Office Tower, built in or around 1960, is bordered by Correa Road and Kuykendall Hall on the north, Hawai`i Institute of Geophysics (HIG) building to the east, Sakamaki Hall to the south, and Krauss Hall and Annex on the southwest, a

single-story portable wood structure immediately west, and the Campus Center to the far west. Kuykendall Hall and Office Tower house the English Department, Digital Media Center and Center for Teaching Excellence of the UH Mānoa campus.

B. Potential Impacts and Mitigation Measures

In the short-term, construction of the proposed facility will create a slight increase in employment opportunities for construction related jobs. In the long-term, the new telecommunications facility would be expected to not only improve the quality of Coral Wireless on-air service but could increase the customer base. In addition to improving public safety and providing new jobs, Coral Wireless is creating a communications infrastructure that will support economic growth and additional tax revenues. Efficient and reliable communication is an essential requirement for people in any community. This installation is a part of a cellular telecommunications system that will help fulfill this need.

3.14 Police and Fire

The proposed project is not expected to result in increased demand for police and fire protection. The antenna facility will not require employees except for one technician who would need to visit the Kuykendall Office Tower rooftop facility on a monthly basis to check equipment and maintain the hardware.

3.15 EMF

A. Existing Conditions

Electromagnetic fields exist wherever electricity is used. Bilger Addition has existing equipment and antennas that produce various levels of EMF at the present time.

In August 1996 the Federal Communication Commission (FCC) adopted new guidelines for evaluating the environmental effects of radiofrequency (RF) energy from transmitters on wireless communication sites. While there is no scientific evidence that RF emissions from these sites operating within established safety guidelines pose a health risk, fields close to antennas on transmitter sites must be understood and care must be taken to assure safe operation during maintenance. The guidelines adopted by the FCC provide considerable margins of protection from any known health risk.

The Telecommunications Act of 1996 mandated that the FCC implement regulations to protect public and workers from potentially hazardous exposure to non-ionizing radiation. The Act of Congress was driven by the National Environmental Policy Act (NEPA) of 1969, which requires agencies of the federal government to evaluate the effects of their actions on the quality of the human environment. In addition, recent studies indicated

existing standards did not adequately protect workers and the general public from continuously increasing presence of Emissions associated with radio frequency transmissions.

In response to this mandate, the FCC passed law 96-326 in August 1996. The new guidelines implement more recent scientific studies of the biological effect of RF emissions and were recommended for adoption by the American National Standards Institute (ANSI), the Institute of Electrical and Electronic Engineers (EEE), and the National Council on Radiation Protection and measurements (NCRP). The FCC received favorable support for these stricter standards from the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA), as well as from a number of nongovernmental groups and companies.

Exposure limits in the new guidelines adopted by the FCC are specified in terms of Maximum Permissible Exposure (MPE) as a function of frequency; MPEs are given in units of electric and magnetic field strength and power densities. For exposure to multiple frequencies, the fraction (or percentage) of the MPE produced by each frequency is determined and these fractions (or percentages) must not exceed unity (or 100 percent).

Coral Wireless LLC conducted an electromagnetic radiation (EMR) hazards analysis for the proposed CDMA PCS base station on Kuykendall Hall Office Tower. Based on the FCC Office of Engineering Technology (OET) Bulletin 65 guidelines, a two-tier Maximum Permissible Exposure (MPE) limits criteria for occupational/controlled and general population/uncontrolled exposure was used for the analysis. The complete report is included in the Appendix.

The project will install a Nortel Networks 6S3C Compact Metrocell base transceiver station (BTS) and six panel antennas on the elevator/mechanical room located on the rooftop of Kuykendall Hall Office Tower. Three of the six panel antennas are receive (RX) only and will therefore not transmit any RF energy.

B. Anticipated Impacts and Mitigative Measures

The prediction analysis conducted by CWI RF engineers in July 2005 concludes that the cellular panel antennas at the proposed rooftop locations at Kuykendall Hall Office Tower would not expose personnel to EME levels above the occupational/controlled MPE standard on the rooftop. Therefore, it is concluded that the Coral Wireless rooftop installation will not be hazardous to personnel. Personnel on the lower floors of Kuykendall Hall Office Tower, and at ground level will not be exposed to power densities exceeding the general population/uncontrolled MPE limits. Upon completion of installation of the facility, Coral Wireless will conduct an EMR hazards survey of the actual site to supplement the predicted analysis.

As a precautionary measure, the CWI transmitters should be silenced if maintenance is performed on the transmitting antennas or cables. An RF radiation hazard warning sign should be posted on the door leading to the roof where transmit antennas are to be located.

Professor Vincent Z. Petersen, an expert in the field of radiation and radio transmission at the UHM Department of Physics, was asked by the Associated Students of the University of Hawai`i (ASUH), to determine whether a higher intensity KTUH antenna on Saunders Hall would result in a radiation hazard to occupants of the building. Dr. Petersen prepared a paper entitled, "Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission" in 1995. Calculations prepared by Dr. Petersen concluded that the FM radiation from the KTUH 4-bay antenna with 3000 watt total radiated power, does not constitute a radiation hazard to occupants at the top floor (or any floor) of the Social Sciences Building. The maximum intensity on the rooftop was projected as 30 times lower than FCC-acceptable radiation levels of 1.0 mW/cm^2. Please refer to a copy of Dr. Petersen's paper in the Appendix. An EMF survey and report will be undertaken by Coral Wireless LLC before the equipment is installed and after it is in full operation to verify the accuracy of the calculated EMF.

4.0 UNAVOIDABLE ADVERSE IMPACTS

The construction of the antenna facility will have only minimal adverse environmental impacts which cannot be fully mitigated by the measures planned to be implemented. The following list includes those short-term and long-term impacts that are expected to be unavoidable.

1. Negligible releases of air contaminants will occur from construction equipment. Emissions of fugitive dust may occur during dry periods as a result of construction operations despite efforts to control dust per State Department of Health (DOH) regulations.

2. In the short-term, the visual character of the area will be affected by construction activities and by the presence and operation of construction equipment.

3. Short-term increases in noise levels will result from construction activities. Noise and construction may cause minor disruptions to floors directly below the proposed activity.

5.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction and operation of the Coral Wireless antenna facility will involve the irretrievable commitment of certain physical and fiscal resources. The major resource

commitment will be the loss of utility infrastructure space on the upper roof of Kuykendall Hall Office Tower for the development of the project. Financial resources, construction materials, manpower, and energy will be expended by Coral Wireless to construct and operate the facility.

The impact of utilizing these resources should, however, be weighed against the benefits of providing upgraded, expanded, and improved Coral Wireless service on the University of Hawai`i at Mānoa campus.

6.0 ALTERNATIVES

Alternative sites that were considered are discussed in Section 1.6 of this DEA.

The no-action alternative would result in Coral Wireless not proceeding with necessary physical upgrades of its existing service level for the Mānoa area. This alternative would result in no change to the present environmental characteristics of the project site; to employment, to government expenditures, to infrastructure services, and to traffic conditions. However, the existing capacity is diminishing and continued operations without improvements will make it difficult for Coral Wireless to maintain expected quality service to its present customers on the UHM campus. A potential scenario that may result from the no-action alternative is: For any customer who is in need of emergency assistance or able to respond to an emergency situation, lack of reliable broadband PCS service at a critical moment could mean a lost opportunity to save a life.

7.0 RELATIONSHIP TO EXISTING PLANS, POLICIES

This section includes a discussion of the relationship of the project to the following policies and plans: Hawai`i State Plan, State Land Use Law, University of Hawai`i, Mānoa Campus Long Range Development Plan (LRDP), the County Development Plan, and the Land Use Ordinance.

7.1 The Hawai`i State Plan

This section includes an assessment of the proposed facility to the applicable goals, objectives, and policies of the Hawai`i State Plan, Chapter 226, HRS.

Section 6(a): Objectives and policies for the economy-general:
Section 6(b): Applicable policies:

"(9): Foster greater cooperation and coordination between the public and private sectors in developing Hawai`i's employment and economic growth opportunities."

Discussion: By working out an amenable leasing arrangement with Coral Wireless, both Coral Wireless and the UH Mānoa administration are an example of public and private sector partnerships which are beneficial to the State's economic growth and diversification. The facility will be under lease from the State of Hawai`i and will provide a source of revenue to the State.

Section 18(a): Objectives and policies for facility systems—energy/telecommunications:
Section 18(b): Applicable policies:
Section 18(d): Applicable telecommunication objectives:

"(2): Encourage public and private sector efforts to develop means for adequate, ongoing telecommunication planning."

Discussion: By working with Coral Wireless, the UH Mānoa offices of Facilities Planning and Management and Procurement Real Estate and Risk Management are actively participating in the planning process to help achieve the State's objectives of gaining dependable, efficient, and economical statewide telecommunication systems capable of supporting the needs of residents and businesses. By facilitating Coral Wireless's plans to expand and improve its telecommunication system, this action should spur this carrier's competitors to either improve or expand their services in this area as well.

7.2 STATE LAND USE LAW

The proposed project is presently classified within the State Land Use Urban District. Public and private utility system facilities and research institutions are compatible in the Urban District. Thus, the project is consistent with the State Land Use District classification.

7.3 UNIVERSITY OF HAWAI`I, MĀNOA CAMPUS LONG RANGE DEVELOPMENT PLAN (LRDP)

In 1987, the University of Hawai`i Board of Regents adopted the LRDP for the University of Hawai`i Mānoa Campus, to guide campus development through the year 2010. The Kuykendall Hall Office Tower is part of the English Department component of the Central Campus layout. Kuykendall Hall Office Tower was built in or around 1960 and capital improvements to the Kuykendall complex are a part of the LRDP's Kuykendall Hall's second phase of development, according to the LRDP.

Because the roof level of Kuykendall Hall Office Tower houses mechanical and electrical systems and other equipment appurtenant to the mechanical systems of the building, the proposed use is similar and compatible with current uses. The proposed project is consistent with the University of Hawai`i, Mānoa Campus LRDP.

7.4 CITY AND COUNTY OF HONOLULU GENERAL PLAN

The 1992 edition of the General Plan is a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of O`ahu's citizens. These objectives contain both statements of desirable conditions to be sought over the long run and statements of desirable conditions which can be achieved within an approximate 20-year time horizon. The General Plan is also a statement of broad policies which facilitate the attainment of the objectives of the Plan. The following discussion provides an assessment of how the proposed project implements the objectives and policies for Education in the General Plan.

Objective C To make Honolulu the center of higher education in the Pacific.

Discussion: The proposed project is located at the Mānoa campus of the University of Hawai`i thereby facilitating the objective to focus on Honolulu as the center of higher education.

Policy 1
Encourage continuing improvement in the quality of higher education in Hawai`i.

Discussion: The project proposes to improve the quality of higher education locally by helping to upgrade wireless communication systems on the Mānoa campus.

Policy 2
Encourage the development of diverse opportunities in higher education.

Discussion: By enabling the upgrade of the University's telecommunications system, the project proposes to strengthen the physical infrastructure that can facilitate diversification and expansion of opportunities to faculty, students and administration.

The proposed facility is appropriately located on the Kuykendall Hall Office Tower rooftop because the hardware is proposed to be non-intrusive on existing views while expanding and improving the quality of high tech broadband PCS communications services to Coral Wireless customers. Equally important to note, antenna facilities such as the proposed project are clean and nonpolluting state-of-the-art installations.

7.5 THE CITY AND COUNTY OF HONOLULU PRIMARY URBAN CENTER DEVELOPMENT PLAN

The City and County of Honolulu Primary Urban Center Development Plan (PUC DP), approved on June 21, 2004 (Ordinance No. 04-14), presents a vision for the PUC's future development consisting of policies, guidelines and conceptual schemes that will serve as a

policy guide for more detailed zoning maps and regulations and for public and private sector investment decisions. The PUC-East Land Use Map designates the University of Hawai`i parcel as Institutional. Since the proposed project is accessory to the university's infrastructure as a technical, non-intrusive improvement to the existing telecommunication system, it would be consistent with the existing Institutional land use designation.

7.6 LAND USE ORDINANCE – ZONING

The existing zoning is R-5 Residential. University uses are permitted in the R-5 Residential District with an approved Plan Review Use (PRU). An antenna installation such as this is defined by the Land Use Ordinance (LUO) as a Utility Installation Type B which is an allowed use in residential zoning districts, subject to conditions. However, the University of Hawai`i at Mānoa is operating under a Plan Review Use (PRU) File No. 88/PRU-3 (City and County of Honolulu Department of Planning and Permitting (DPP)). According to the DPP (December 2004) instead of a Conditional Use Permit-minor (CUPm) for a utility installation, a minor modification to the PRU will be required. Section 7.7 Plan Review Use below contains a detailed discussion. Development standards related to permitted uses and the maximum height of structures for the university are regulated under the PRU. A building permit is also required.

7.7 PLAN REVIEW USE

Plan Review Use (PRU) approval is required for a number of public and private uses including colleges and universities. In December 1989, a PRU was approved for the Five-Year master plan 1988-1993 University of Hawai`i, Mānoa Campus. As a result, the University of Hawai`i at Mānoa is operating under a Plan Review Use File No. 88/PRU-3.

On December 13, 1989, a PRU File No. 88/PRU-3 (Resolution No. 89-411, CD-2) was approved by the Honolulu City Council to expand the University of Hawai`i Mānoa campus. A major modification to the PRU was approved on March 10, 1993 (Resolution No. 92-286) to increase the seating capacity of the Physical Education Facilities Phase II and to redesignate the facility as the Special Events Arena (DPP, December 2004). The proposed Coral Wireless antenna facility is necessary to expand and improve broadband PCS communication service for the university campus. The proposed project is consistent with the uses approved in the PRU, and therefore can be reviewed as a minor modification to the PRU.

8.0 FINDINGS AND REASONS FOR SUPPORTING THE DETERMINATION

Based upon the findings presented in the DEA and review of the seven (7) comment letters received during the August 23 to September 21, 2005 public review period, the potential

impacts of installation and operation of the proposed telecommunications antenna facility have been sufficiently examined and discussed. After reviewing the significance criteria in Section 11-200-12, EIS Rules, Contents of the Environmental Assessment, the University of Hawaii at Manoa, the approving agency for the EA has determined that the action is not expected to result in significant adverse effect on the natural environment.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resources.
Development of the proposed project is not expected to impact natural or cultural resources, as the project site is located in a developed, urbanized area and the rooftop is already populated with similar mechanical and electrical facility hardware. Consultation with the Office of Hawai'ian Affairs (OHA) indicates that no known cultural resources were identified at the project site. The State Historic Preservation Division (SHPD) of DLNR has also issued its determination that "no historic properties will be affected," in a letter dated September 12, 2005. Correspondence from OHA and SHPD are included in the Appendix for reference.

2. Curtails the range of beneficial uses of the environment.
The proposed project will be compatible with the existing uses of the surrounding area and will have minimal disturbance to the UHM campus and surrounding community as it is located on the Kuykendall Hall Office Tower roof with other similar mechanical and electrical facilities.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344 HRS.
The proposed project is consistent with the State's long-term environmental policies as well as the State's Land Use Plan because the proposed location is an urban, developed part of campus designated for scientific and research activity.

4. Substantially affects the economic or social welfare of the community or State.
Short-term construction related activities may result in negative impacts, as well as positive economic impact through increased work for a selected contractor and design engineers during implementation of the project. Long-term adverse effects are not foreseeable, as the economic and social welfare of the community should not be affected.

5. Substantially affects public health.
Short-term construction related activities will not impact public health as they are temporary in nature. In addition, construction activities will be regulated by State and County standards to minimize noise, dust, and exhaust emissions.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

The proposed project does not directly result in secondary impacts, and will only increase capacity of the communications systems to serve O`ahu's citizens in conformance with the County General Plan.

7. Involves a substantial degradation of environmental quality.
The proposed project is located on a rooftop of a 7-story concrete building, therefore the environmental quality of the surrounding campus will be essentially unaffected.

8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.
The proposed project does not have any cumulative effect upon the environment, and no larger commitments are required for the proposed antenna facility.

9. Substantially affects a rare, threatened, or endangered species, or its habitat.
There are no known rare, endangered, or threatened species or habitat associated with the project site. The area has been urbanized and the ground on which Kuykendall Hall Office Tower is located has undergone a relatively sufficient level of disturbance over the years with its subsequent improvements.

10. Detrimentally affects air or water quality or ambient noise levels.
Negative effects on environmental quality will be short-term due to construction and be limited to the areas adjacent to the project. These short-term impacts will be mitigated to meet project plans approvals and specification regulations.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.
The project site is not located in an environmentally sensitive area that would be vulnerable to flooding because it is outside the 500-year flood plain. It is far removed from the tsunami zone, coast, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters. Therefore, the project will not affect environmentally sensitive areas.

12. Substantially affects scenic vistas and view planes identified in county or states plans or studies.
The six 72-inch tall panel antennas are being installed on the walls of the elevator/mechanical room of the building's rooftop to avoid causing any disruption to existing vistas and view planes. The panel antennas are also being painted to match the color of the structure. Therefore, the proposed project is not expected to having an adverse affect on existing views on campus or surrounding areas.

13. Requires substantial energy consumption.

Energy consumption will consist of short-term construction activities, in which diesel or gas powered equipment will be used. Once completed, the antenna facility will require electrical power and telephone service at levels that UHM infrastructure and utilities systems have capacity enough to supply. Thus, the proposed project would not be a burden on the existing facilities in terms of energy requirements.

9.1 CONSULTED PARTIES

Listed below are the agencies and organizations consulted in the preparation as well as review of the DEA. Nine (9) comment letters were received during the 30-day public review period of the DEA. They were: State Historic Preservation Division (SHPD), State Department of Transportation, Office of Hawaiian Affairs (OHA), City and County of Honolulu Fire Department, City and County of Honolulu Department of Planning and Permitting (DPP), Department of Transportation Services, Office of Environmental Quality Control, Board of Water Supply, and Hawaiian Telcom. Copies of the letters and responses are included in the Appendix.

Federal Government:
1. U.S. Army Corps of Engineers Pacific Ocean Division
   Regulatory Branch
2. U.S. Department of Interior U.S. Fish & Wildlife Service
3. Environmental Protection Agency—PICO
4. Directorate of Facilities Engineer U.S. Army Support Command Hawai`i

State of Hawai`i:
5. Department of Education
6. State Department of Land and Natural Resources
   Historic Preservation Division
7. State Department of Land and Natural Resources Land Division
8. Office of Hawai`ian Affairs
9. Office of Planning
10. UHM Environmental Center
11. University of Hawai`i Mānoa Facilities Planning and Management Office
12. State Department of Health Environmental Management Division
13. State Department of Transportation Highways Division

City and County of Honolulu:
14. Board of Water Supply
15. Department of Parks and Recreation
16. Department of Planning and Permitting
17. Department of Environmental Services
18. Department of Transportation Services
19. Fire Department
20. Police Department

Utilities:
21. Verizon Hawai`i Inc.
22. Hawai`ian Electric Company
23. Oceanic Time Warner Cable of Hawai`i

24. The Gas Company

Other Organizations:
25. Nature Conservancy
26. Sierra Club
27. Mānoa Neighborhood Board No. 7
28. Ann Kobayashi, Councilmember, District 5

University of Hawai`i Mānoa Campus Facilities Maintenance and Faculty/Administration Consultation:

A project presentation was made on the rooftop of Kuykendall Hall Office Tower on Thursday, July 21, 2005 at a project coordination and consultation meeting. See meeting summary minutes in the Appendix. At the meeting, UH Facilities Planning and Management staff, administration and Kuykendall Hall Office Tower tenant's questions were answered. UH personnel in attendance represented the affected parties in this project, and attendees indicated that they had no objection to the proposed installation on the Kuykendall Hall Office Tower rooftop.

9.2 REFERENCES

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Petersen, Professor Vincent Z. Department of Physics, UHM. May 1995. Statement Regarding Electromagnetic Radiation Levels Associated with Proposed KTUH FM Radio Transmission. Honolulu, Hawai`i.

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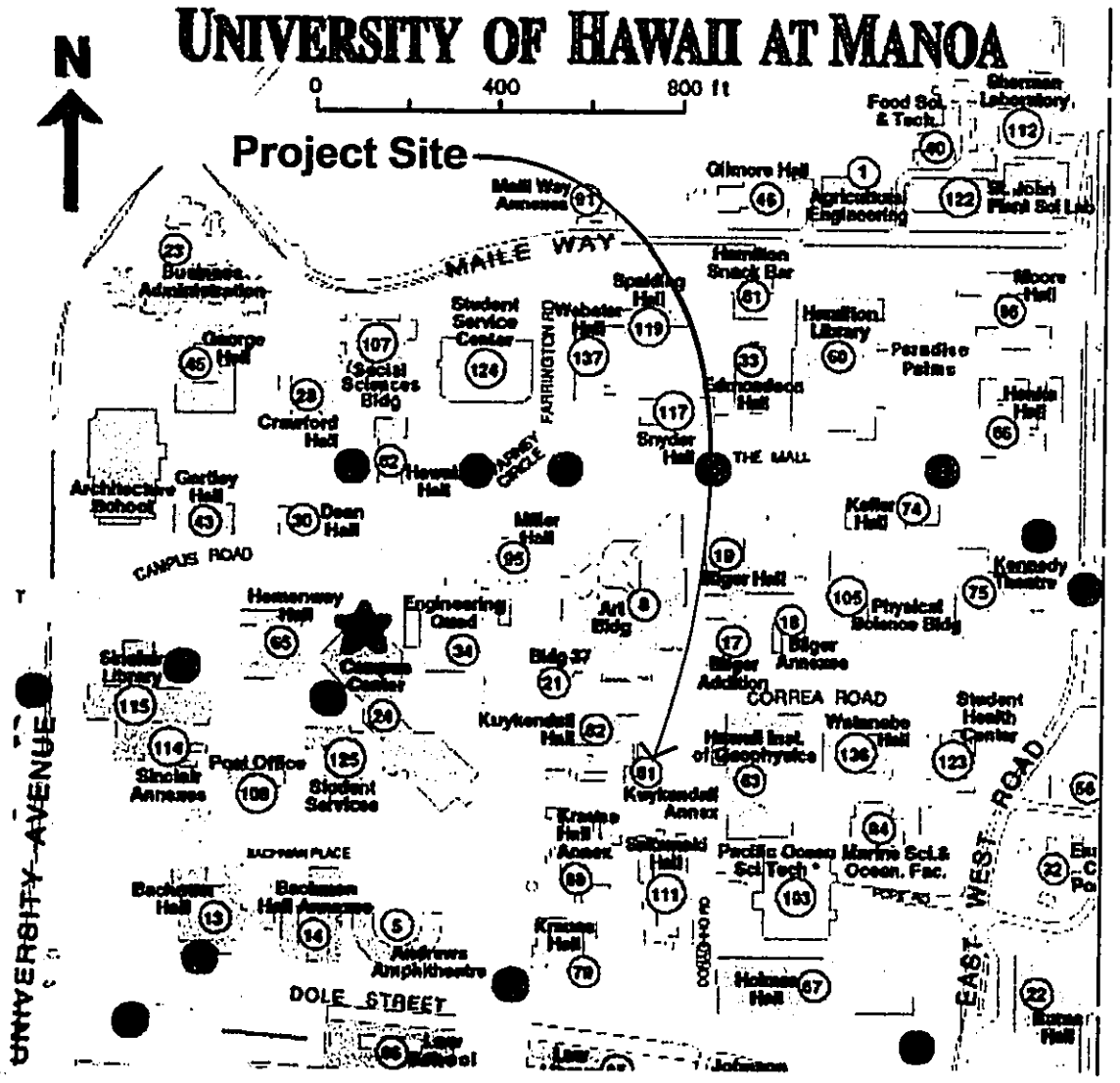
U.S. Department of Agriculture. August 1972. *Soil Survey of Islands of Kauai, O`ahu, Maui, Moloka'i and Lāna'i; State of Hawai`i*; Soil Conservation Service, in cooperation with the University of Hawai`i Agricultural Experiment Station. Washington, D.C.

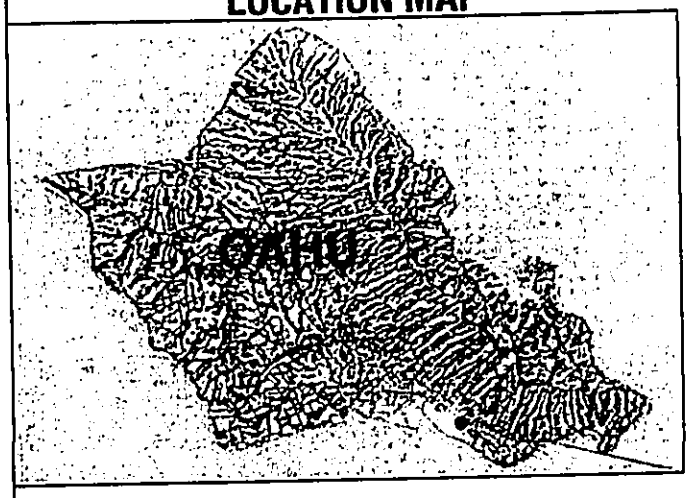
Figures



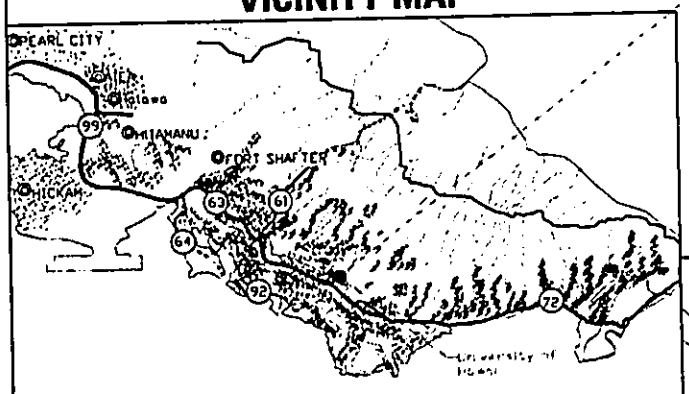
Source: University of Hawaii

CORAL WIRELESS
SITE No. OH25
KUYKENDALL HALL OFFICE TOW
UNIVERSITY OF HAWAII AT MANO
1733 Donaghho Road
Honolulu, HI 96822
TMK: 2-8-023:003

LOCATION MAP



VICINITY MAP



HONOLULU, HAWAII

SITE LOCATION

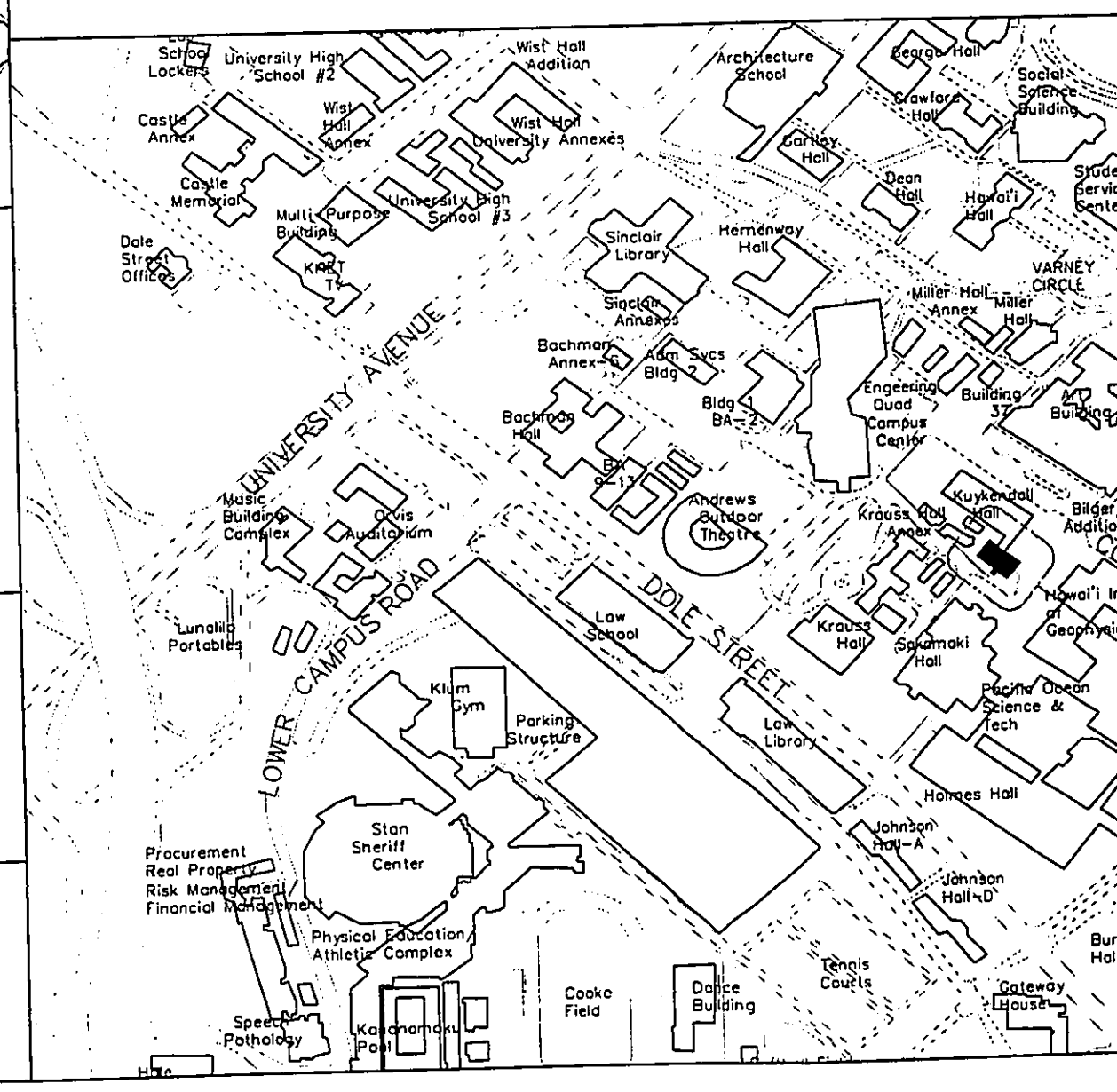
INDEX OF SHEETS

PROJECT DATA

Site Number: OH25
Rank (A-C) : A
TMK: 2-8-023 : 003
Latitude (NAD 83): 21° 29.81' N
Longitude (NAD 83): 157°81.73' W
Proposed antenna centerline: 90'
Proposed Antenna Azimuths: 40°, 220°, 310°
Ground Elevation: 62'

CODE DATA

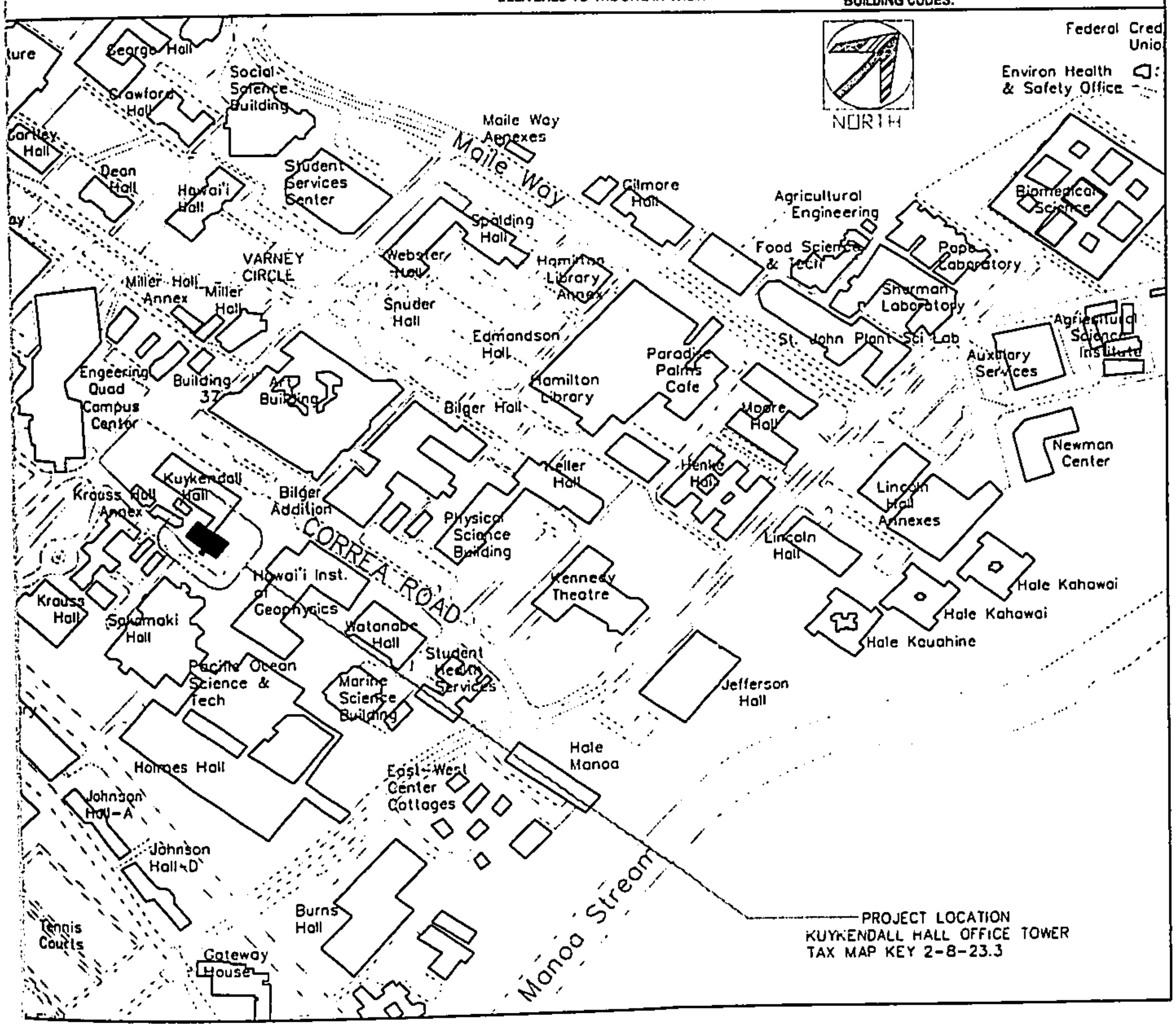
State Zone: Urban
County Zone: R-5
Height Limit: 25'
Special Design District: N/A
Existing Use: School



:ELESS
OH25
OFFICE TOWER
VAII AT MANOA
ıho Road
II 96822
23:003

GENERAL NOTES

1. CONTRACTOR TO VERIFY ALL EXISTING FIELD CONDITIONS AND EXISTING DIMENSIONS. NOTIFY ARCHITECT IF EXISTING CONDITIONS DONT MATCH THOSE SHOWN ON PLANS.
2. ALL WORK TO COMPLY WITH THE 1997 UBC & HAWAII COUNTY AMMENDMENTS AND WITH APPLICABLE PLUMBING AND ELECTRICAL CODES.
3. CONTRACTOR TO COORDINATE WITH APPROPRIATE UTILITIES & GOVERNMENT AGENCIES WHEN PERFORMING WORK AFFECTING WATER, SEWER OR ELECTRICAL SERVICE.
4. CONTRACTOR TO PROTECT FROM DAMAGE EXISTING PROPERTY AND ITEMS WHICH REMAIN ON THE PROJECT SITE.
5. CONTRACTOR TO REMOVE ALL DEBRIS AND TRASH RESULTING FROM CONSTRUCTION FROM THE PROJECT SITE FOLLOWING CONSTRUCTION.
6. CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITES WITH THE LAND LORD
7. ALL CONTRACTOR FURNISHED MATERIALS ORIGINAL CONTAINERS. DELIVERED TO THE SITE IN THEIR
8. CONTRACTOR SHALL SUBMIT THE FOLLOWING TO THE SITE CONSTRUCTION MANAGER:
   a. CONTRACTOR CERTIFICATE OF INSURANCE (TO BE SUBMITTED WITHIN 5 DAYS AFTER NOTICE OF AWARD OF CONTRACT).
   b. CHANGE ORDERS (TO BE SUBMITTED AND APPROVED PRIOR TO THE EXECUTION OF THE CHANGE ORDER WORK).
   c. BROCHURES, MANUALS, TEST REPORTS, ETC. (TO BE SUBMITTED AS PART OF THE CLOSING DOCUMENTS).
   d. SHOP DRAWINGS: (TO BE SUBMITTED AND APPROVED PRIOR TO THE INSTALLATION OF THE SHOP DRAWING ITEM).
9. THE MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 ohms. TESTING SHALL BE PERFORMED BY USING FALL POTENTIAL METHOD.
10. EACH CONDUCTOR OF ALL SYSTEMS SHALL BE PRMANENTLY LABELED / TAGGED IN EACH PANELBOARD, PULLBOX, J-BOX, ETC.
11. CONTRACTOR SHALL SECURE ALL NECESSARY BUILDING PERMITS.
12. ALL WORK SHALL BE GUARANTEED FOR 1 YEAR.
13. PENETRATIONS IN FIRE WALLS SHALL BE FIRE STOPPED IN ACCORDANCE WITH APPLICABLE BUILDING CODES.

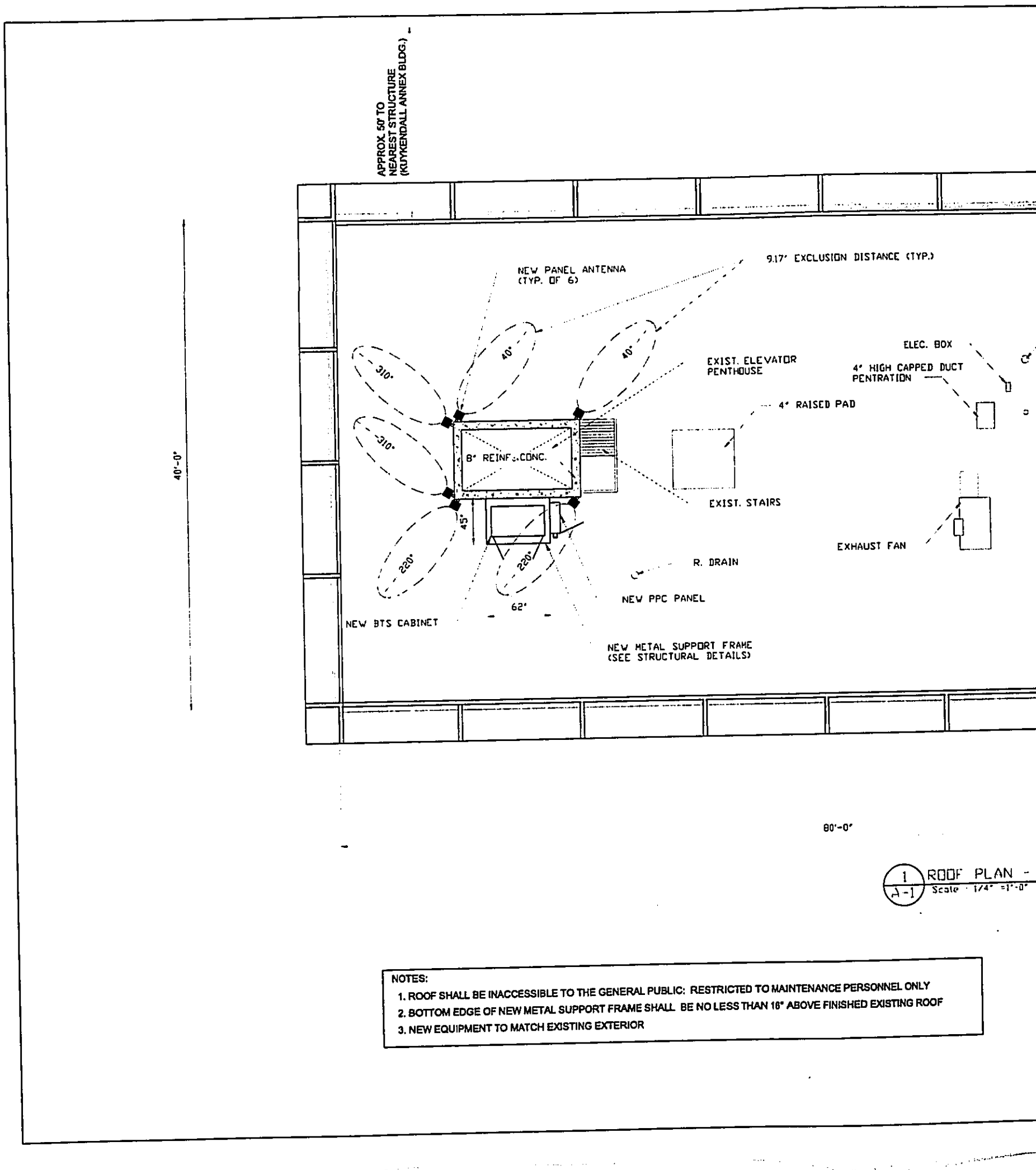


PAUL F. MORGAN LICENSED PROFESSIONAL ARCHITECT HAWAII, USA

CORAL WIRELESS SITE No. 0H25
1733 Donaghho Road Honolulu, Hawaii 96822
TMK: 2-8-023.003

TITLE SHEET

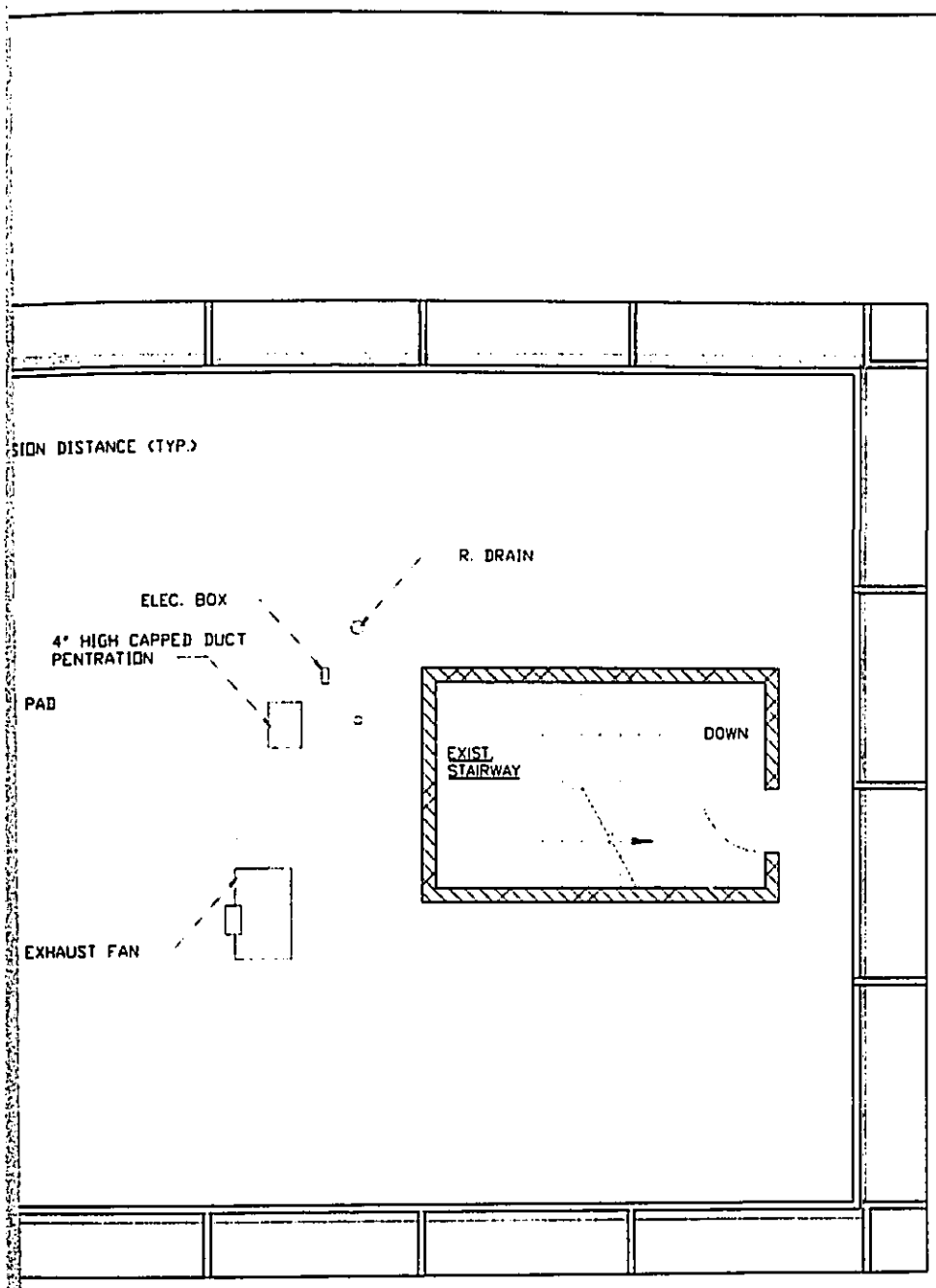
Date 20 JUL 05
Scale AS NOTED
Drawn pdc
Job OH25
Sheet Number T-1
Sheet 1 of 7



1 / A-1 ROOF PLAN
Scale : 1/4" =1'-0"

NOTES:

1. ROOF SHALL BE INACCESSIBLE TO THE GENERAL PUBLIC: RESTRICTED TO MAINTENANCE PERSONNEL ONLY
2. BOTTOM EDGE OF NEW METAL SUPPORT FRAME SHALL BE NO LESS THAN 18" ABOVE FINISHED EXISTING ROOF
3. NEW EQUIPMENT TO MATCH EXISTING EXTERIOR



1/A-1 ROOF PLAN - KUYKENDALL OFFICE TOWER
Scale : 1/4" = 1'-0"

Project Title	CORAL WIRELESS SITE No. OH25 1733 Donaghho Road Honolulu, Hawaii 96822 TMK: 2-8-023:003
Sheet Contents	ROOF PLAN
Date	20 JUL 05
Scale	AS NOTED
Drawn	pdc
Job	OH25
Sheet Number	A-1
Sheet 2 of 7	

PAUL F. MORGAN LICENSED PROFESSIONAL ARCHITECT NO. 6975 HAWAII, USA

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116 South Hotel Street, Suite 202A
Honolulu, HI 96813
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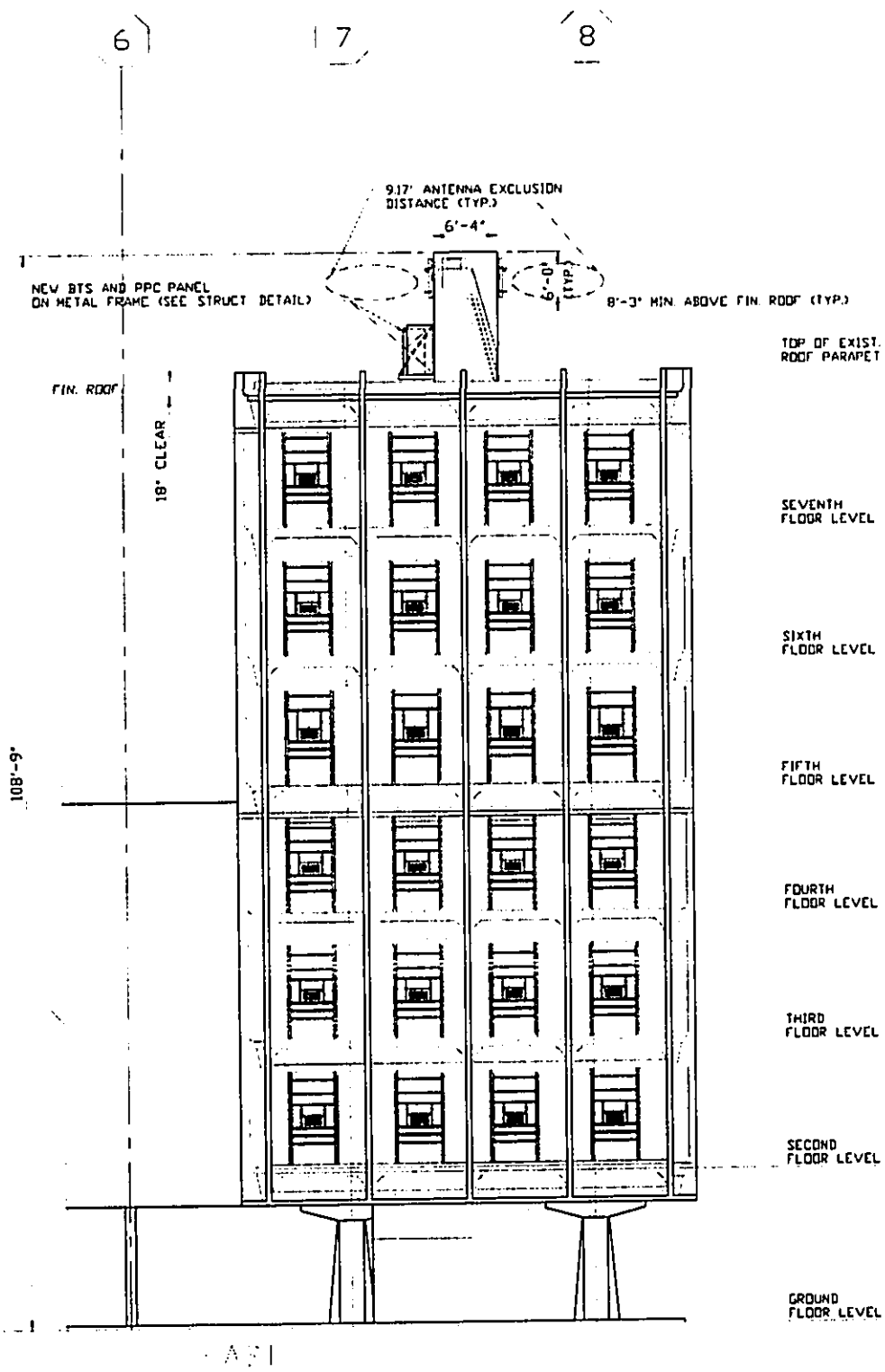
PO Box 6226
Kamuela, HI 96743
808-885-0523

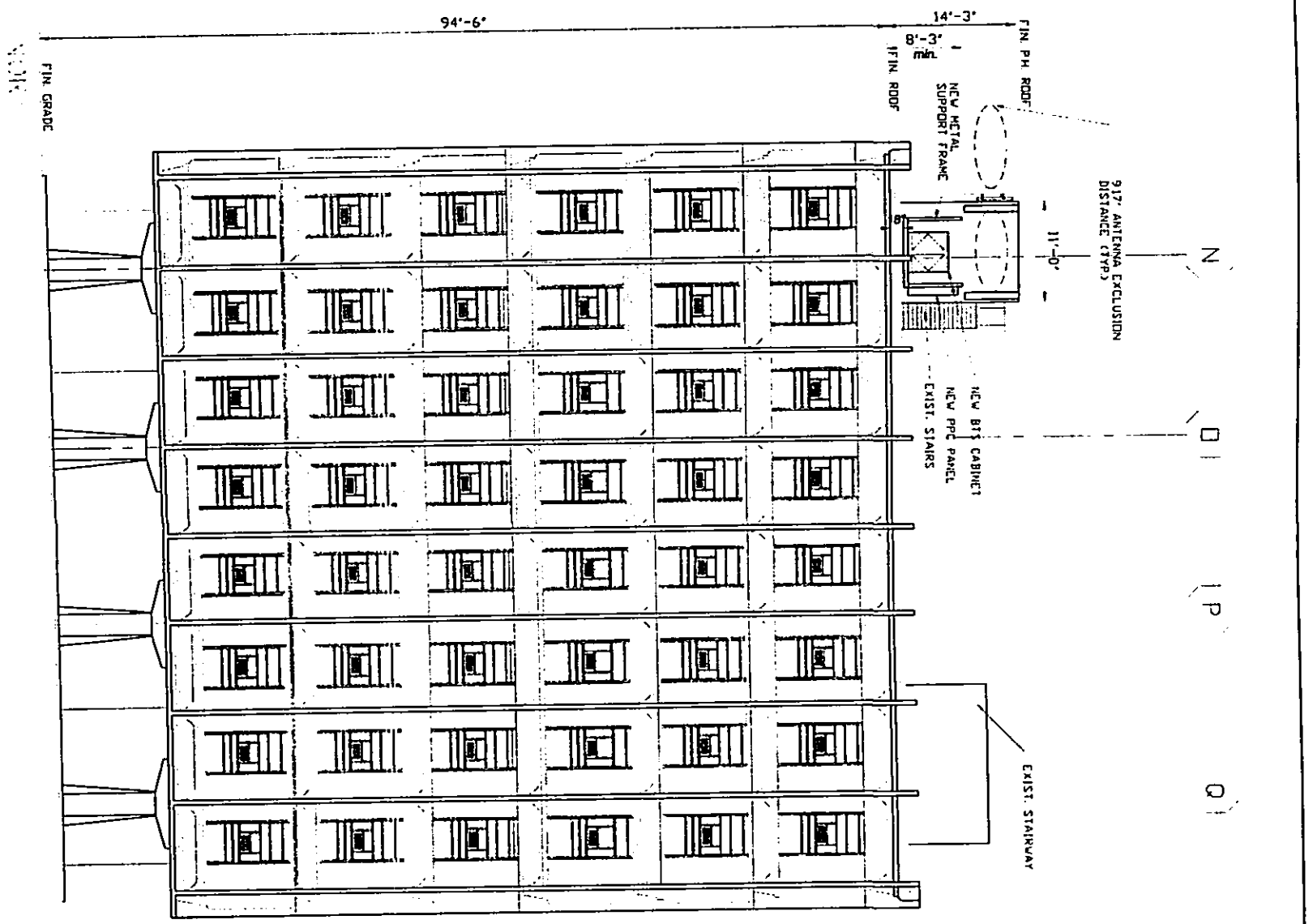


1 / A 2 EXTERIOR ELEVATION KUYKENDALL OFFICE TOWER

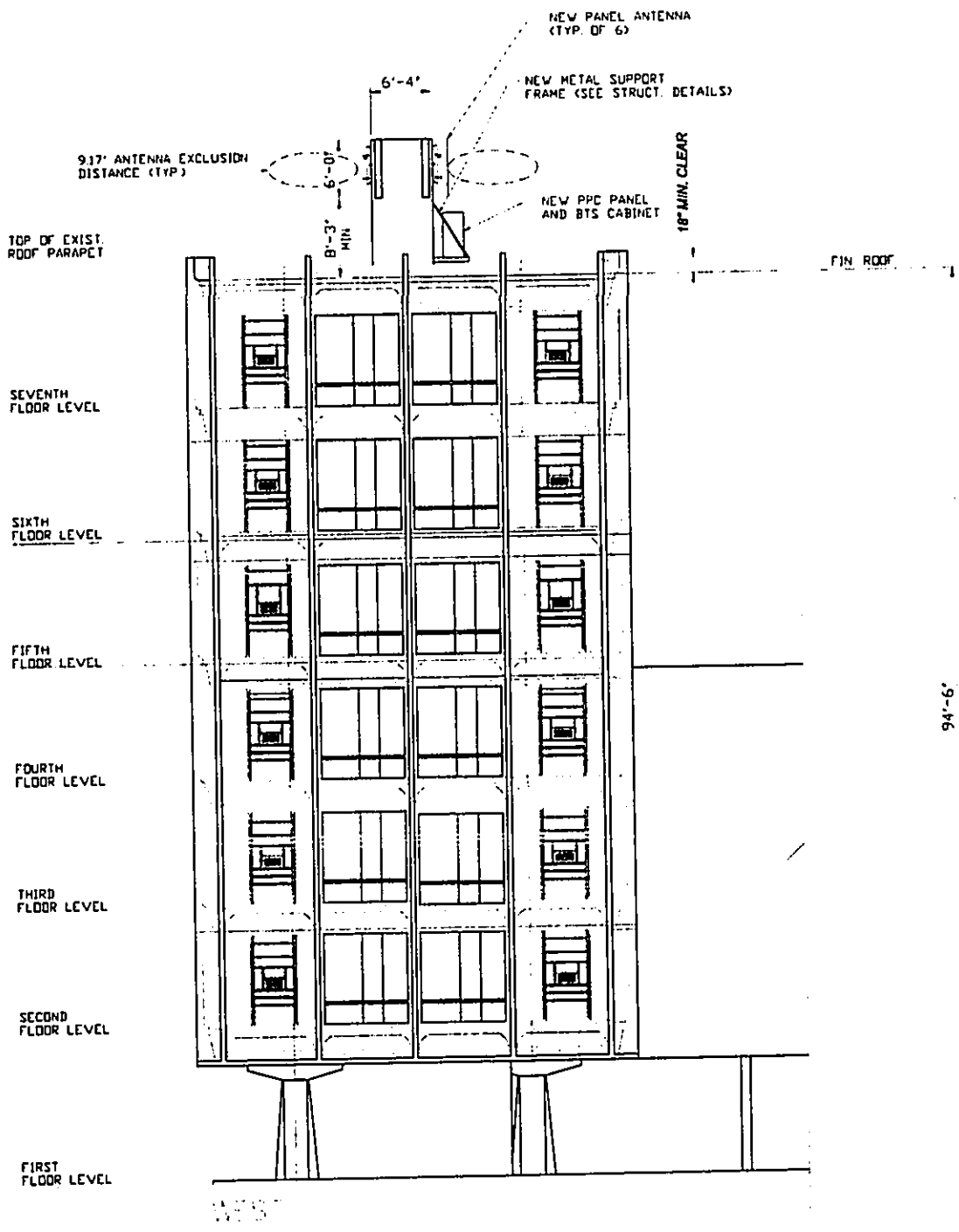
Scale 1/8" = 1'-0"

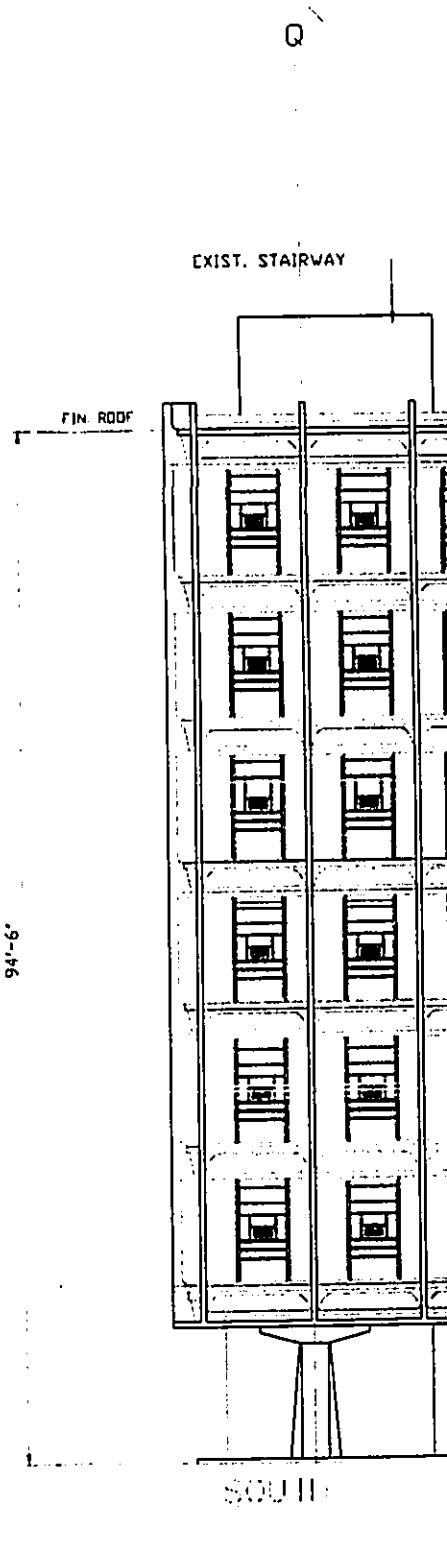
0 1' 4' 8' 16'

GRAPHIC SCALE



Sheet 3 of 7 — A-2	Sheet Contents: EXTERIOR ELEVATION	Project Title: CORAL WIRELESS SITE NO. OH25 1733 Donaghho Road Honolulu, Hawaii 96822 TMK: 2-8-023:003	SUZUKI/MORGAN ARCHITECTS, LTD 136 South Hotel Street, Suite 202A Honolulu, HI 96813 808-528-1169 PO Box 6226 Kamuela, HI 96743 808-885-0523	THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY SUPERVISION	PAUL F. MORGAN LICENSED PROFESSIONAL ARCHITECT No. 8478 HAWAII, USA
Project Number: OH 25	Drawn: pdc	Scale: AS NOTED	Date: 20 JULY 05		

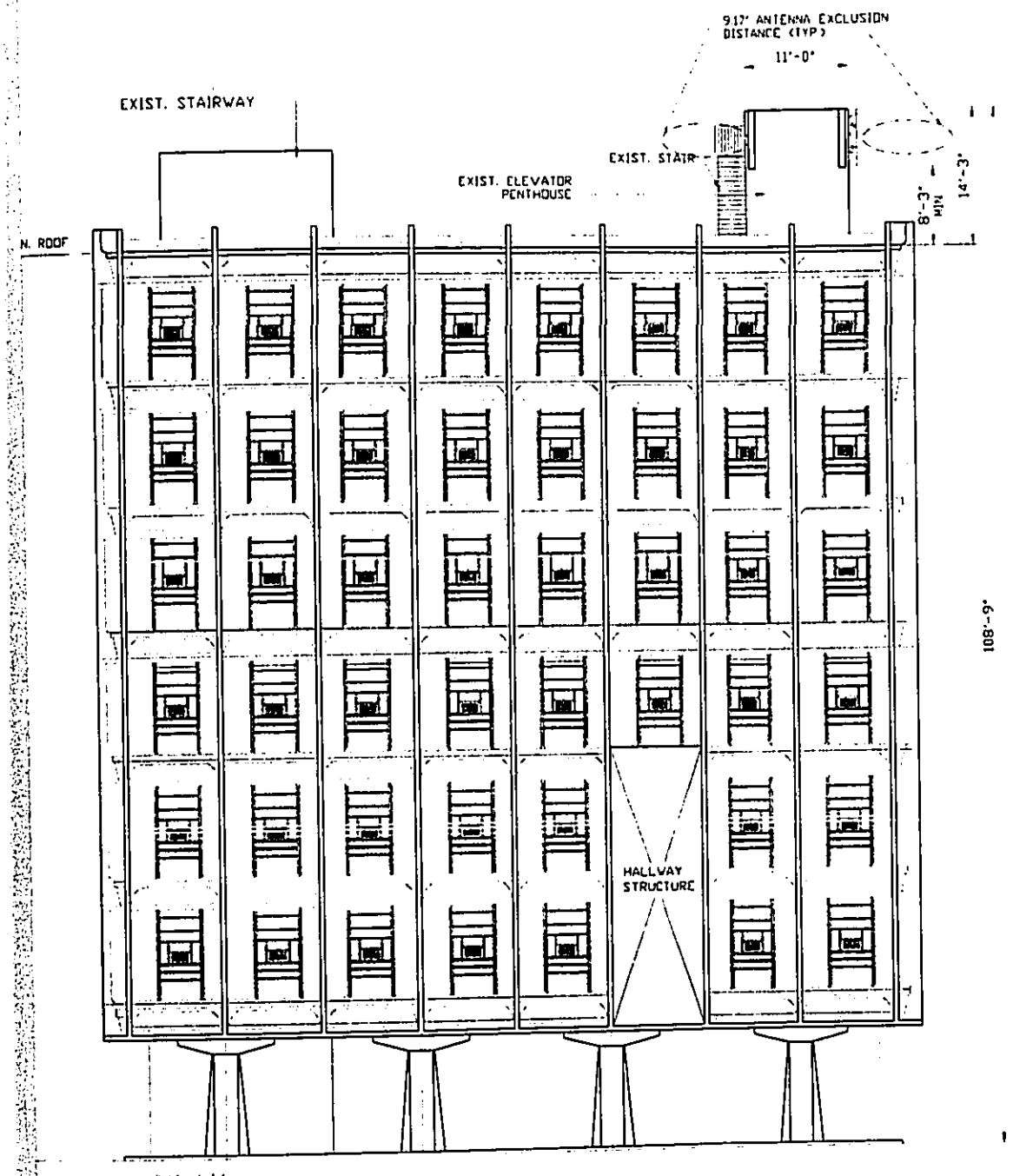




1/A-3 EXTERIOR ELEVATION KUYKENDALL OFFICE TOWER
Scale 1/8" = 1'-0"

0 1' 4' 8' 16'
GRAPHIC SCALE

Q P N M



PAUL F. MORGAN LICENSED PROFESSIONAL ARCHITECT No. 8478

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PO Box 4226
Pahoa, HI 96749
808-965-0923

This work was prepared by me or under my supervision and construction of this project will be under my supervision.

CORAL WIRELESS SITE No. 0H25
1733 Donaghho Road Honolulu, Hawaii 96822
TMK: 2-8-023:003

EXTERIOR ELEVATION

20 JULY 05

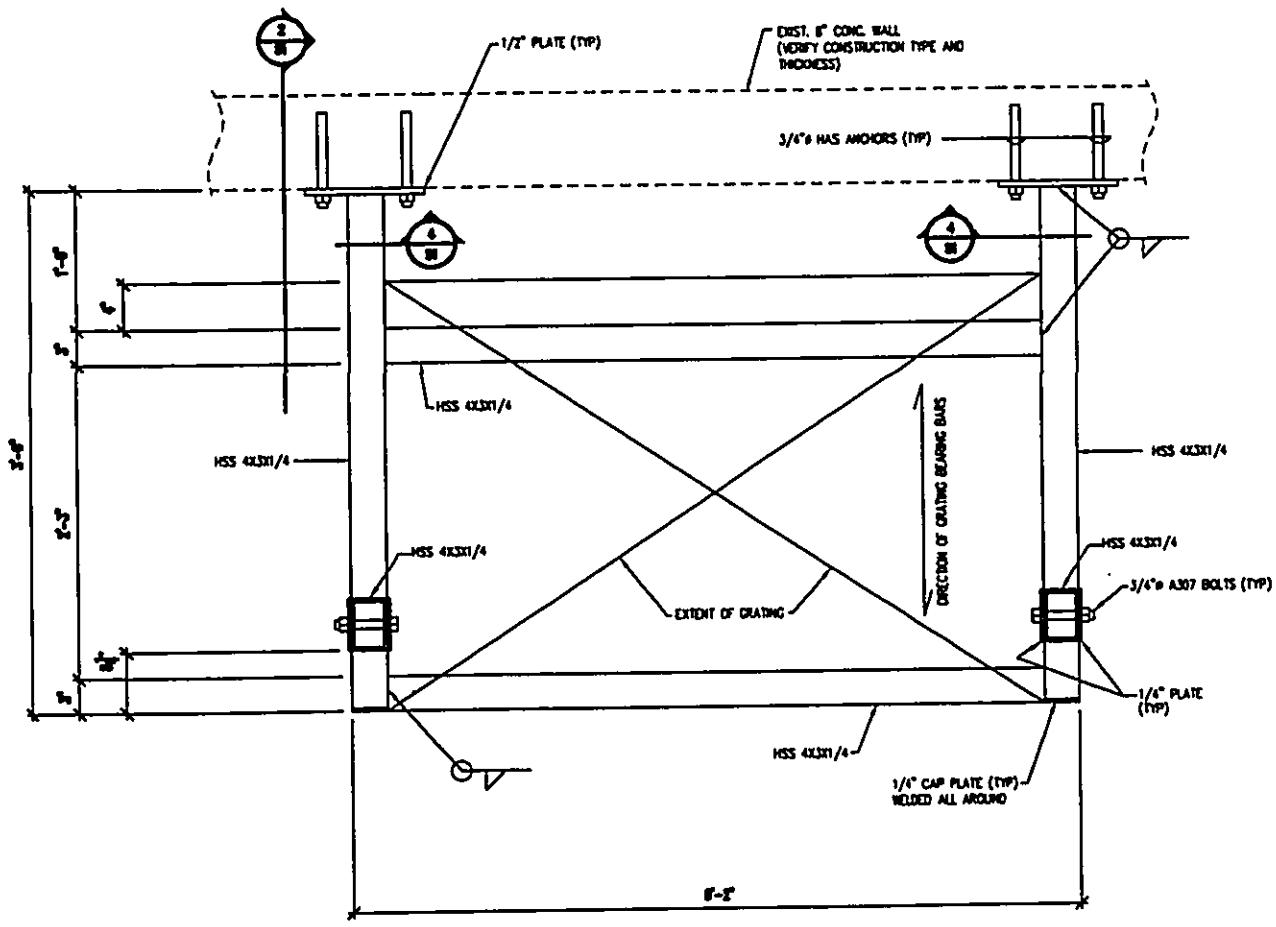
AS NOTED

pdc

OH25

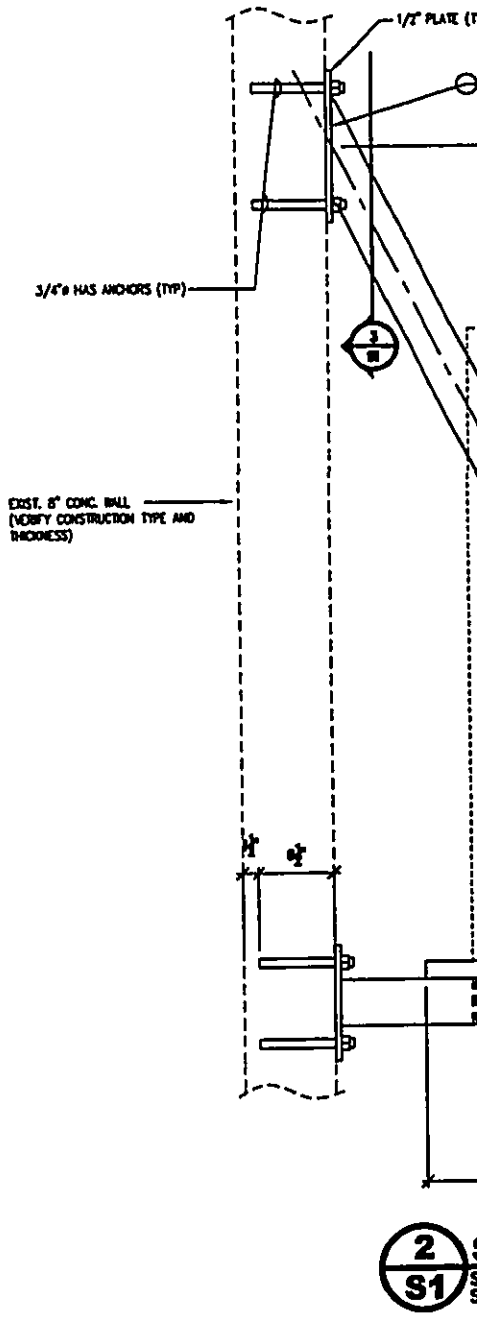
A-3

Sheet 4 of 7

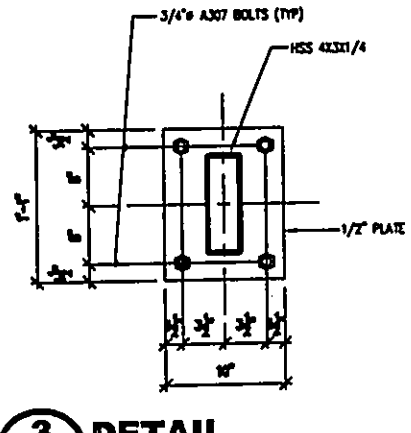


1/S1 CMO SUPPORT FRAME - PLAN

SCALE: 1-1/2" = 1'-0" (22 x 34 SHEET)
SCALE: 3/4" = 1'-0" (11 X 17 SHEET)

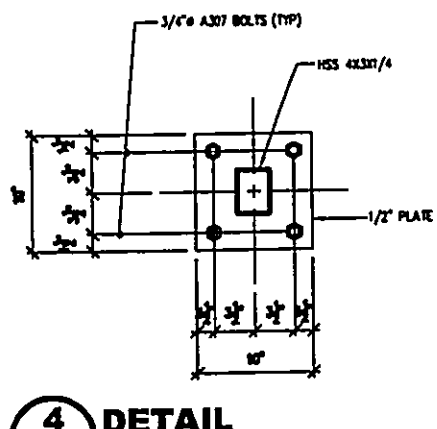


2/S1



3/S1 DETAIL

SCALE: 1-1/2" = 1'-0" (22 x 34 SHEET)
SCALE: 3/4" = 1'-0" (11 X 17 SHEET)

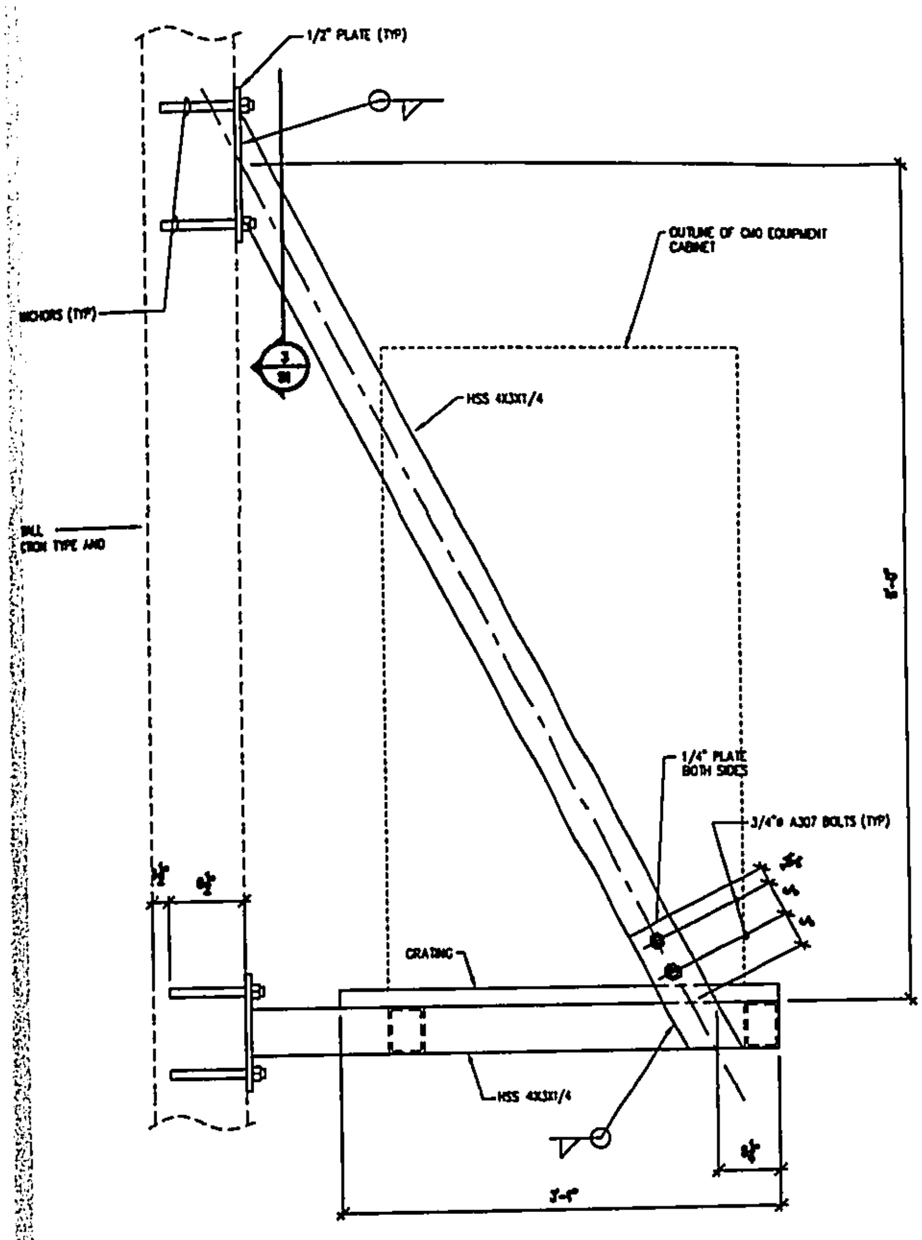


4/S1 DETAIL

SCALE: 1-1/2" = 1'-0" (22 x 34 SHEET)
SCALE: 3/4" = 1'-0" (11 X 17 SHEET)

STRUCTURAL NOTES:

1. MATERIALS:
   1) STRUCTURAL PLATES: ASTM A36
   2) HSS SECTIONS: ASTM A500, GRADE B
   3) BOLTS: ASTM A307, HOT DIPPED GALVANIZED
   4) GRATING: 1-1/2"X3/16" BEARING BARS SPACED AT 1-3/16" O.C., CROSS MEMBER
   5) WELDING ELECTRODES: E70XX
   6) ADHESIVE ANCHOR SYSTEM: HILTI HAS ANCHORS (GALV) WITH HIT HY150 INJECTION
2. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS, CONDITION AND DIMENSIONS OF ALL EX
   CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN
   FABRICATION AND/OR CONSTRUCTION OF THE NEW WORK SHALL NOT START UNTIL DISCRE
3. ALL NEW STEEL WORK SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. GALVANIZ
   COMPOUND.
4. GRATING SHALL BE BANDED ON ALL EDGES. GRATING SHALL BE WELDED TO ALL SUPPOR
   WELDS, TYPICAL).
5. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS. NEW STEEL WORK SHALL



2 SECTION
S1
SCALE: 1-1/2" = 1'-0" (22 x 34 SHEET)
SCALE: 3/4" = 1'-0" (11 X 17 SHEET)

ADE B
) GALVANIZED
G BARS SPACED AT 1-3/16" O.C., CROSS MEMBERS AT 4" O.C., GALVANIZED

LTI HAS ANCHORS (GALV) WITH HIT HY150 INJECTION ANCHOR SYSTEM

LOCATIONS, CONDITION AND DIMENSIONS OF ALL EXISTING WORK PRIOR TO FABRICATION AND/OR CONSTRUCTION OF ANY NEW WORK.
EER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL EXISTING CONDITIONS AND EXISTING CONDITIONS INDICATED ON THE PLANS.
OF THE NEW WORK SHALL NOT START UNTIL DISCREPANCIES ARE RESOLVED.

DIPPED GALVANIZED AFTER FABRICATION. GALVANIZED AREAS DAMAGED DURING TRANSPORT SHALL BE COATED WITH TWO COATS OF COLD GALVANIZING

DGES. GRATING SHALL BE WELDED TO ALL SUPPORTING FRAMING MEMBERS AT EACH CORNER AND INTERMEDIATELY AT 8" ON CENTER (1-INCH LONG FILLET

Y AWS CERTIFIED WELDERS. NEW STEEL WORK SHALL BE FABRICATED BY AN AWS CERTIFIED WELDING SHOP.

Revisions:	By:

SUZUKI/MORGAN ARCHITECTS, LTD.
116 South Hotel Street, Suite 202A
Honolulu, HI. 96313
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PO Box 6226
Kamuela, HI 96743
808-889-0523

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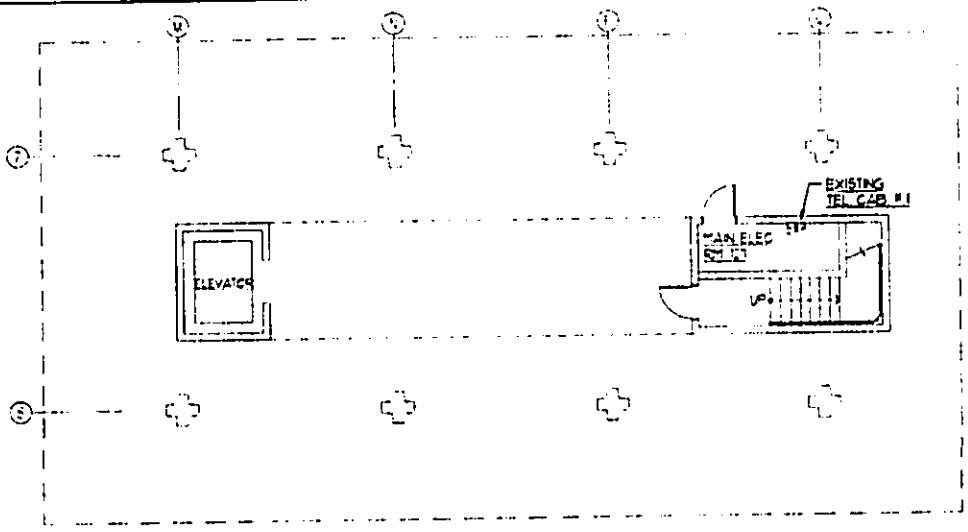
Project Title:
CORAL WIRELESS
UHM KUYKENDALL HALL OFFICE TOWER
1753 Donaghho Road Honolulu, Hawaii
TMK: 2-8-023:003

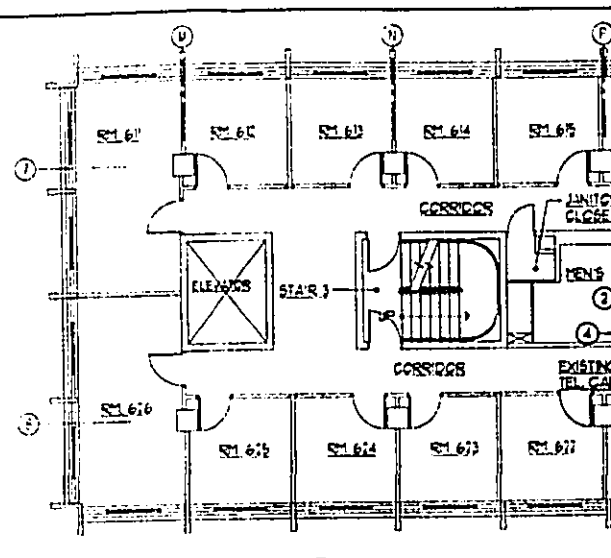
Sheet Contents:
PLAN, SECTION, DETAILS

Date: 20 JUL 05
Scale: AS INDICATED
Drawn: RC
Job: OH89
Sheet Number: S-1
Sheet. Of



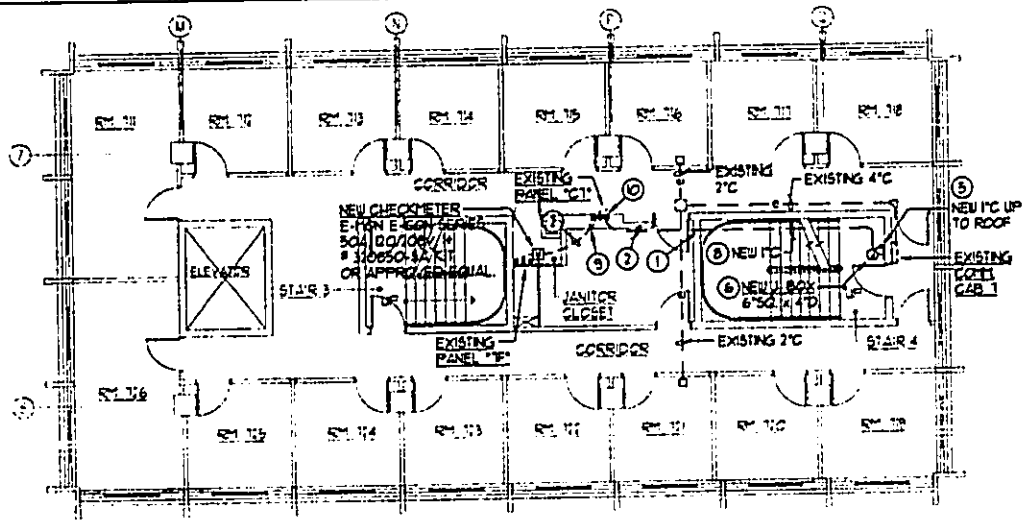
NORTH

1 / E-1 1ST. FLOOR ELECTRICAL PLAN
SCALE: ⅛" = 1'-0"



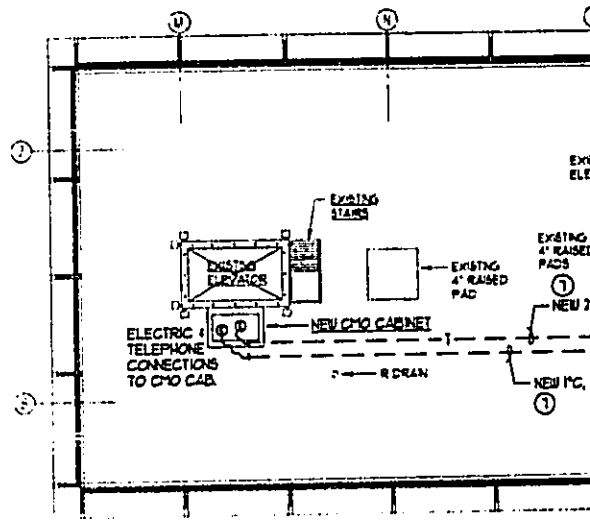
NORTH

2 / E-1 6TH. FLOOR ELECTR
SCALE: ⅛" = 1'-0"



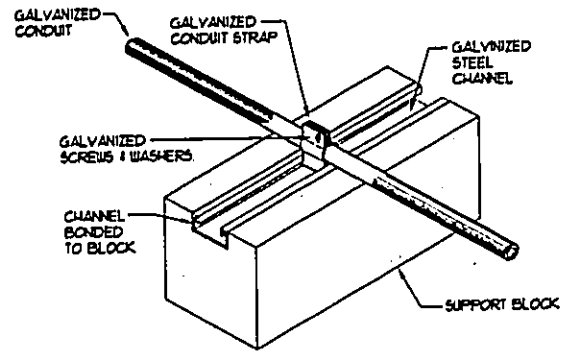
NORTH

3 / E-1 7TH. FLOOR ELECTRICAL PLAN
SCALE: ⅛" = 1'-0"



NORTH

4 / E-1 ROOF ELECT
SCALE: ⅛" = 1'-0"



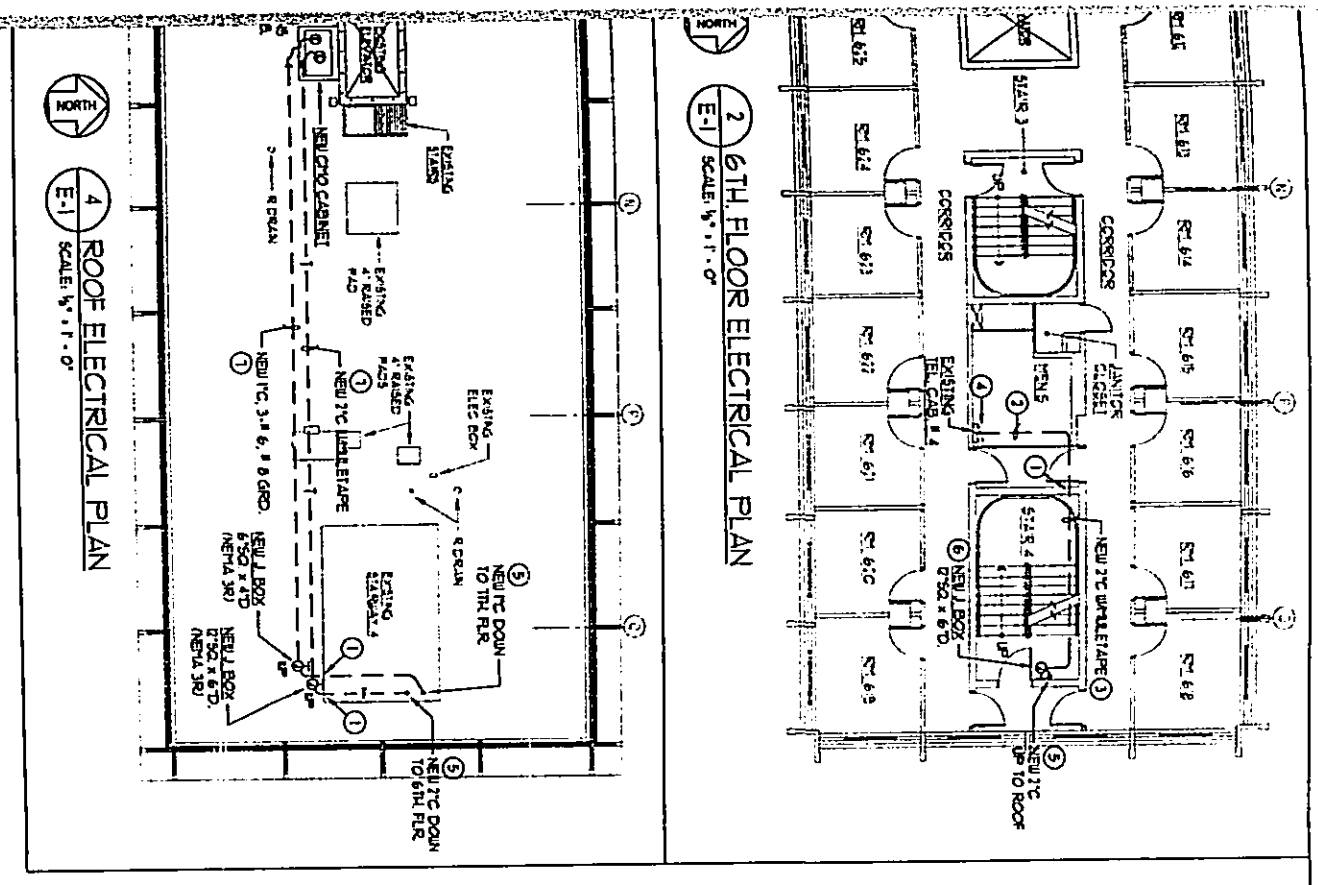
SUPPORT BLOCK SHALL BE MADE OF UV. RESISTANT MEDIUM DENSITY BLACK POLYETHYLENE FOAM OR RUBBER.

MANUFACTURER:
PIPE PIER
PP50-4
B-LINE "C-PORT" OR APPR. EQUAL

5 / E-1 DETAIL - TYPICAL RACEWAY SECURED ON SUPPORT BLOCK
NOT TO SCALE

ELECTRICAL NOTES:

1. DRILL THROUGH WALL TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. PROVIDE WATERTIGHT SEAL AT EXTERIOR WALLS.
2. MOUNT NEW EXPOSED RACEWAY ON CEILING. PROVIDE HANGERS AND SUPPORTS AS REQUIRED.
3. MOUNT NEW EXPOSED RACEWAY ON WALL AT HEIGHT TO MATCH 6TH. FLR. CEILING.
4. CUT WALL AS REQUIRED TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. CONNECT NEW RACEWAY TO EXISTING TELEPHONE CABINET.
5. DRILL THROUGH SLAB TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION.
6. MOUNT NEW JUNCTION BOX ON WALL NEAR CEILING.
7. MOUNT NEW EXPOSED RACEWAYS ON SUPPORT BLOCKS.
8. MOUNT NEW EXPOSED RACEWAY ON WALL AT HEIGHT TO MATCH 7TH. FLR. CEILING.
9. CONNECT NEW RACEWAY TO EXISTING STUBBED RACEWAY. PULL IN NEW WIRES.
10. CUT WALL AS REQUIRED TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. CONNECT NEW RACEWAY TO EXISTING ELECTRIC PANEL.



Sheet Contents: 1ST., 6TH., 7TH. and ROOF ELECTRICAL PLANS

Date: 14 JUL 05

Scale: AS NOTED

Drawn: PDC

Job:

Sheet Number: E-1

Sheet 02 of —

Project Title: UHM KUYKENDALL HALL OFFICE TOWER
CORAL WIRELESS
1753 Donaghho Road Honolulu, Hawaii
TMK: 2-8-023: 003

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Kamuela, HI 96743
808-885-0523

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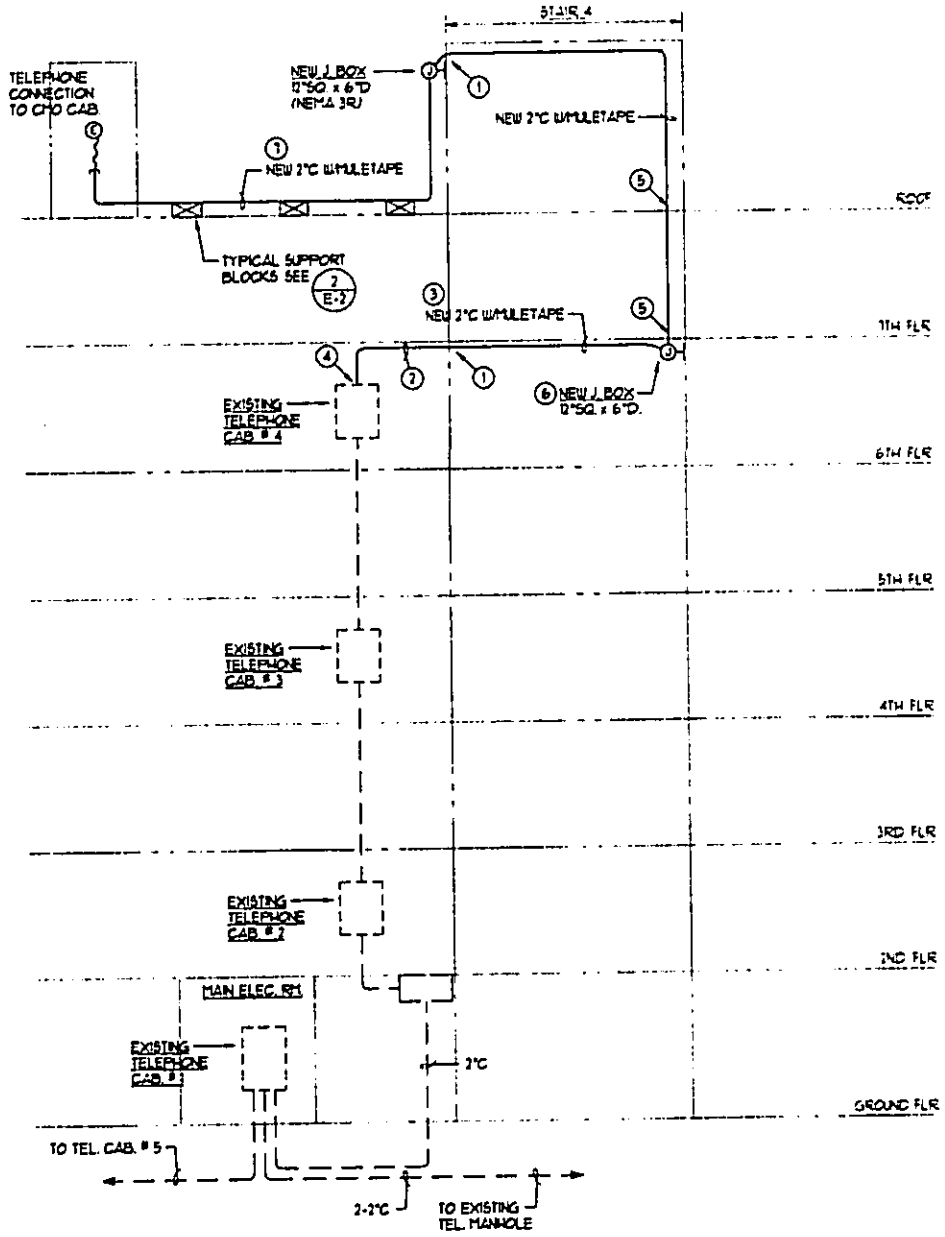
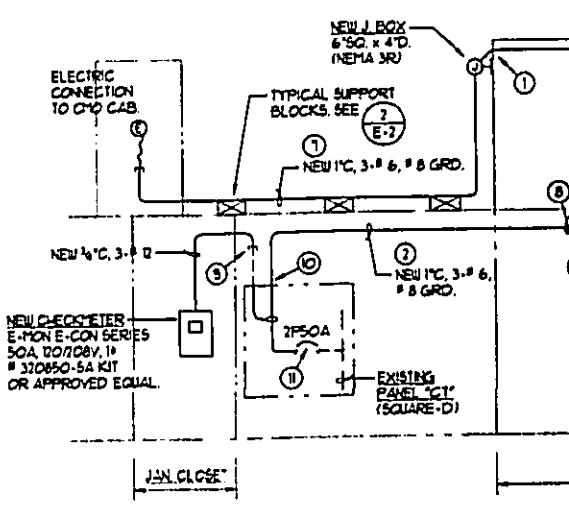
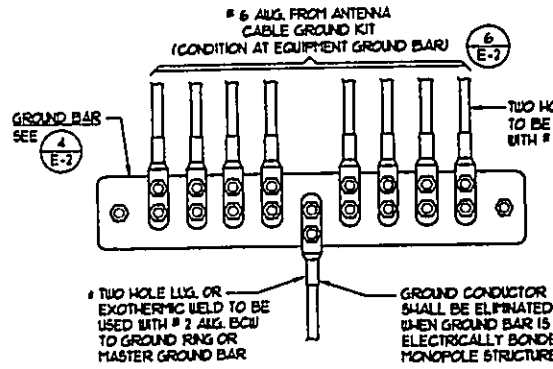
BRIAN T. ITOZAKI LICENSED PROFESSIONAL ENGINEER No. 9058-E HAWAII, U.S.A.



1/E-2 TELEPHONE RISER DIAGRAM
NOT TO SCALE



2/E-2 ONE LINE DIAGR
NOT TO SCALE

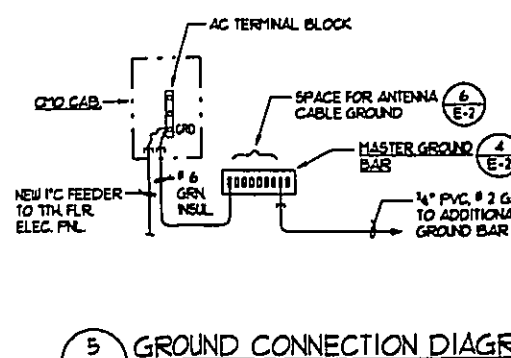


GROUND BARS AT THE BOTTOM OF MONOPOLE SHALL ONLY USE EXOTHERMIC (CADWELD) WELDS.

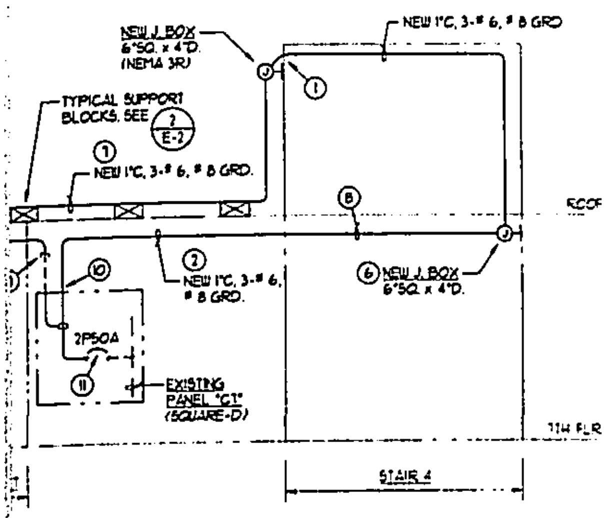
3/E-2 DETAIL - ANTENNA CABLE GROUND WIRE TO GROUND BA
NOT TO SCALE

ELECTRICAL NOTES:

1. DRILL THROUGH WALL TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. PROVIDE WATERTIGHT SEAL AT EXTERIOR WALLS.
2. MOUNT NEW EXPOSED RACEWAY ON CEILING. PROVIDE HANGERS AND SUPPORTS AS REQUIRED.
3. MOUNT NEW EXPOSED RACEWAY ON WALL AT HEIGHT TO MATCH 6TH. FLR. CEILING.
4. CUT WALL AS REQUIRED TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. CONNECT NEW RACEWAY TO EXISTING TELEPHONE CABINET.
5. DRILL THROUGH SLAB TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION.
6. MOUNT NEW JUNCTION BOX ON WALL NEAR CEILING.
7. MOUNT NEW EXPOSED RACEWAYS ON SUPPORT BLOCKS.
8. MOUNT NEW EXPOSED RACEWAY ON WALL AT HEIGHT TO MATCH 7TH. FLR. CEILING.
9. CONNECT NEW RACEWAY TO EXISTING STUBBED RACEWAY. PULL IN NEW WIRES.
10. CUT WALL AS REQUIRED TO INSTALL NEW RACEWAY. PATCH TO MATCH EXISTING CONDITION. CONNECT NEW RACEWAY TO EXISTING ELECTRIC PANEL.
11. PROVIDE NEW CIRCUIT BREAKER IN EXISTING SPACE.



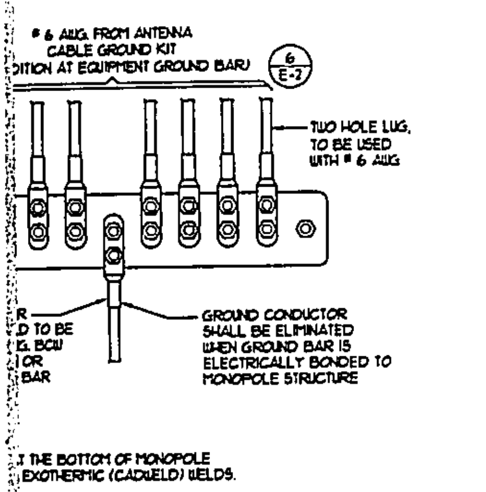
5/E-2 GROUND CONNECTION DIAGR
NOT TO SCALE



2 ONE LINE DIAGRAM
E-2 NOT TO SCALE

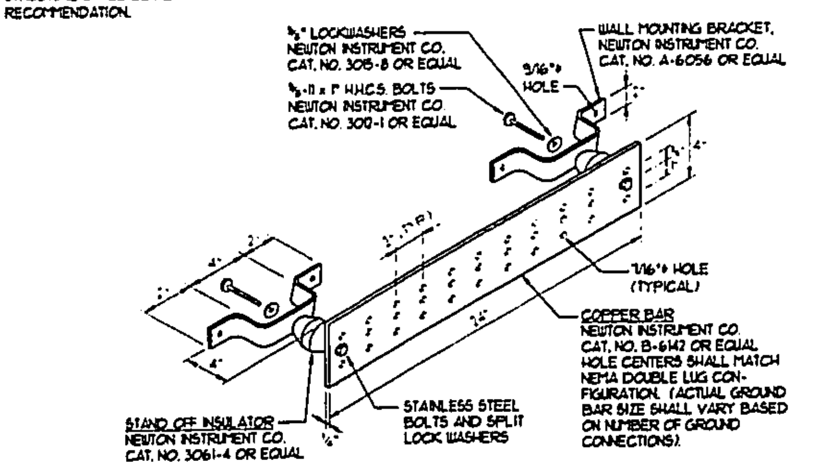
GENERAL ELECTRICAL NOTES:

1. THE SUBCONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS PRIOR TO BIDDING. BID SUBMISSION SHALL BE CONSIDERED AS CONFIRMATION THAT THE SUBCONTRACTOR HAS VISITED THE SITE AND HAS RESOLVED ALL DISCREPANCIES AND QUESTIONS REGARDING THE WORK. NO EXTRA PAYMENT WILL BE GIVEN FOR WORK MADE NECESSARY BY THE SUBCONTRACTORS FAILURE TO VISIT THE SITE.
2. ALL RACEWAYS ROUTING ARE SCHEMATIC, SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT IMPEDED.
3. CONDUIT SIZES INDICATED ON THE DRAWINGS ARE NOT NECESSARILY BASED ON THE MINIMUM SIZE ALLOWED BY THE NATIONAL ELECTRICAL CODE AND MAY BE PURPOSELY OVERSIZED FOR FUTURE CONTRACTOR OR TO AVOID CONDUIT HEATING. CONDUIT SIZES NOT CALLED OUT ON THE DRAWINGS SHALL BE SIZED BY THE SUBCONTRACTOR, BASED ON THE ACTUAL NUMBER OF CONDUCTORS TO BE INSTALLED, USING THE NATIONAL ELECTRICAL CODE AS A GUIDE. IN NO CASE SHALL CONDUIT SIZES BE SMALLER THAN ¾" DIAMETER.
4. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND INSTALLATIONS AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
5. THE SUBCONTRACTOR SHALL PROVIDE AND INSTALL ALL JUNCTION AND PULL BOXES REQUIRED FOR THE INSTALLATION OF ELECTRICAL DEVICES AND EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED ON THE PLANS. SIZING OF THESE BOXES SHALL BE PER THE NATIONAL ELECTRICAL CODE.
6. ALL ELECTRICAL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND ALL APPLICABLE LOCAL CODES AND REGULATIONS. ELECTRICAL SERVICE WILL BE 120/208 VOLTS, SINGLE PHASE, 3 WIRE, 30A CAPACITY.
7. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
8. PROJECT CONDITIONS MAY REQUIRE REARRANGEMENT OF ELECTRICAL WORK, THE SUBCONTRACTOR SHALL INDICATE SUCH CHANGES ON THE AS-BUILT DRAWINGS. WHERE CHANGES REQUIRE ALTERNATE METHODS TO THOSE SPECIFIED IN THE CONTRACT DOCUMENTS, THE SUBCONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED METHOD FOR APPROVAL. THE SUBCONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED. REARRANGEMENT OF WORK FOR THE PURPOSE OF COORDINATION BETWEEN TRADES SHALL NOT BE CONSIDERED A REASON FOR EXTRA COST.
9. EXISTING CONDITION SHOWN ON DRAWINGS ARE TAKEN FROM PAST DESIGN DRAWING AND MAY NOT REPRESENT ACTUAL FIELD CONDITIONS. PRIOR TO STARTING NEW WORK, SUBCONTRACTOR SHALL VERIFY AND LOCATE ALL EXISTING CONDITIONS SHOWN. DEVIATIONS SHALL BE SHOWN ON AS-BUILT DRAWINGS.

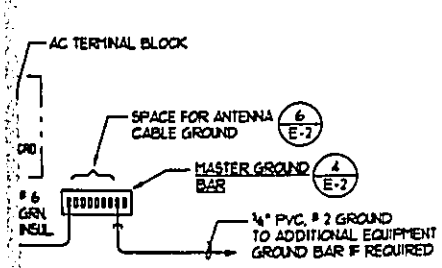


...TAIL - ANTENNA CABLE ...UND WIRE TO GROUND BAR
...SCALE

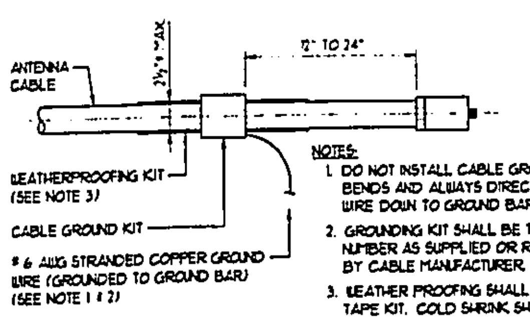
NOTE:
INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATION.



4 DETAIL - MASTER GROUND BAR
E-2 NOT TO SCALE (EQUIPMENT GROUND BAR SIMILAR)

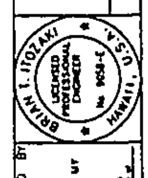


...UND CONNECTION DIAGRAM
...SCALE



NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT BENDS AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

6 DETAIL - ANTENNA CABLE GROUND KIT TO GROUND BAR
E-2 NOT TO SCALE



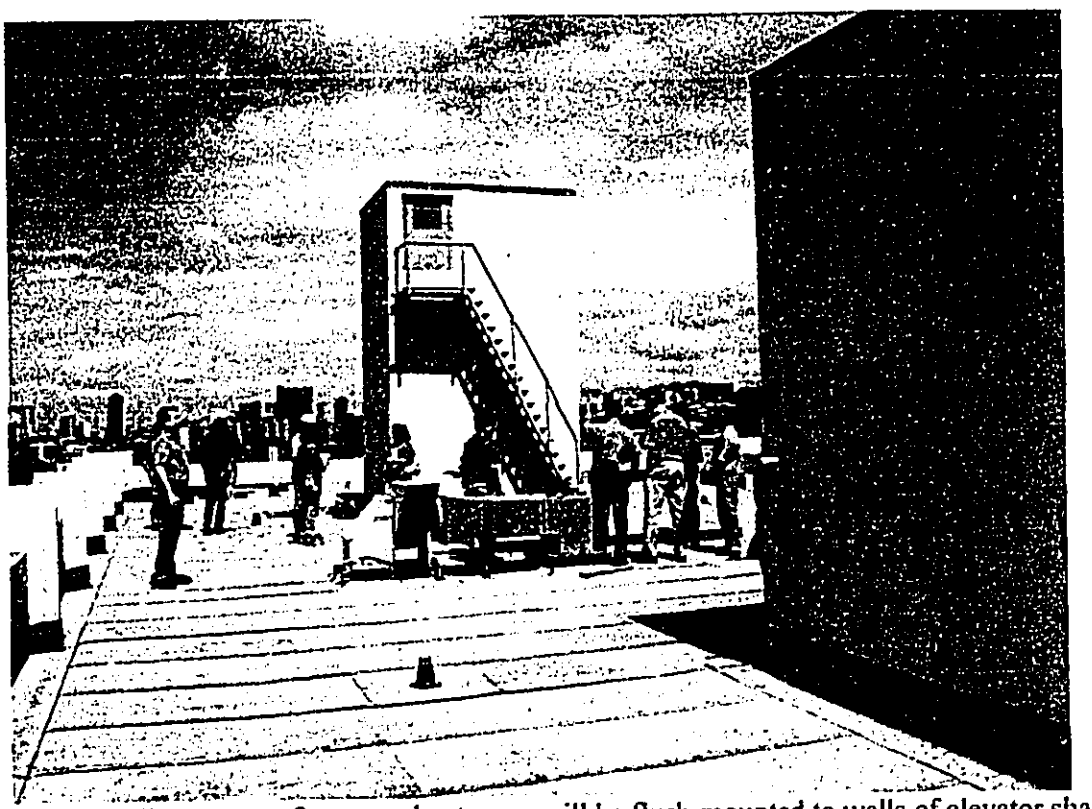
SUZUKI/MORGAN ARCHITECTS, LTD.
116 South Hotel Street, Suite 202A, Honolulu, HI 96813, 808-528-1189
PO Box 6226, Kamuela, HI 96743, 808-883-0523

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY SUPERVISION

Project Title: UHM KUYKENDALL HALL OFFICE TOWER
CORAL WIRELESS
1753 Donaghho Road, Honolulu, Hawaii
TMK: 2-8-023: 003

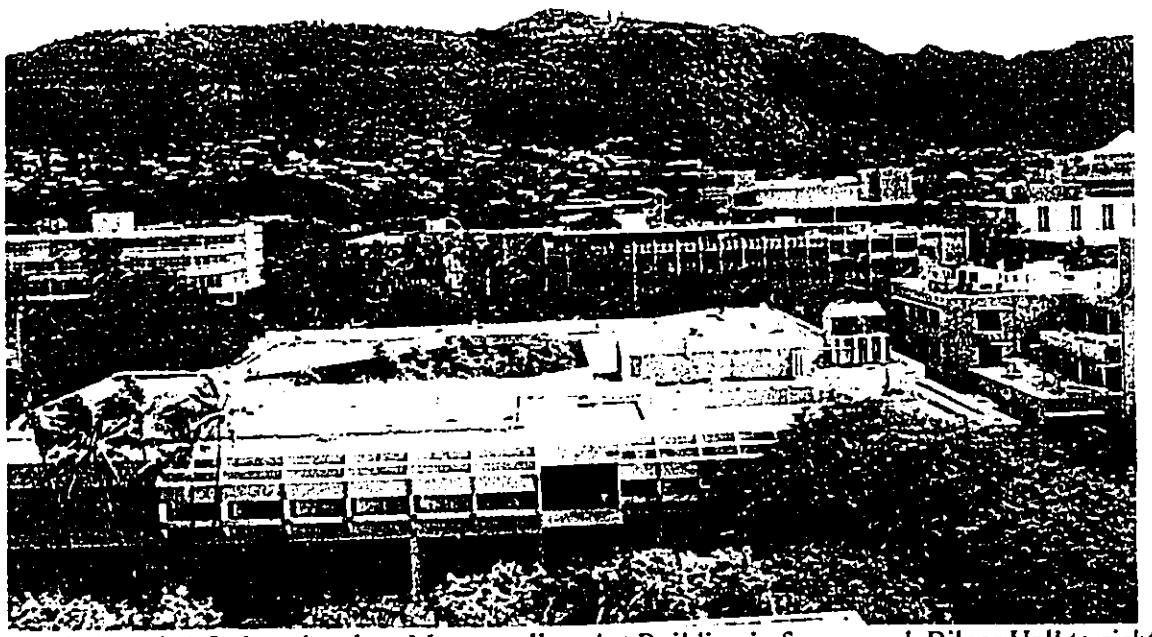
Sheet Contents: TELEPHONE RISER & ONE LINE DIAGRAMS, ELECTRICAL DETAILS

Date:	14 JUL 05
Scale:	AS NOTED
Drawn:	PDC
Job:	
Sheet Number:	E-2

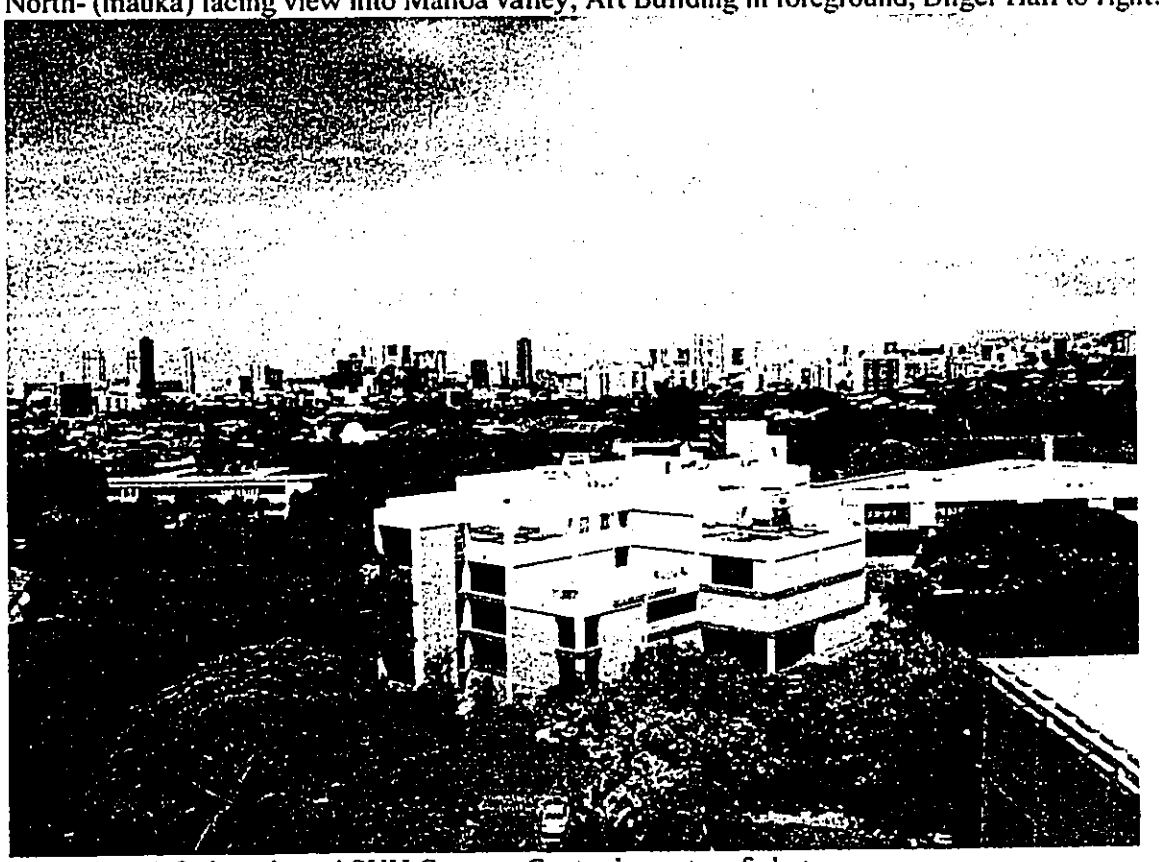


Kuykendall Annex rooftop: panel antennas will be flush-mounted to walls of elevator shaft, in foreground.

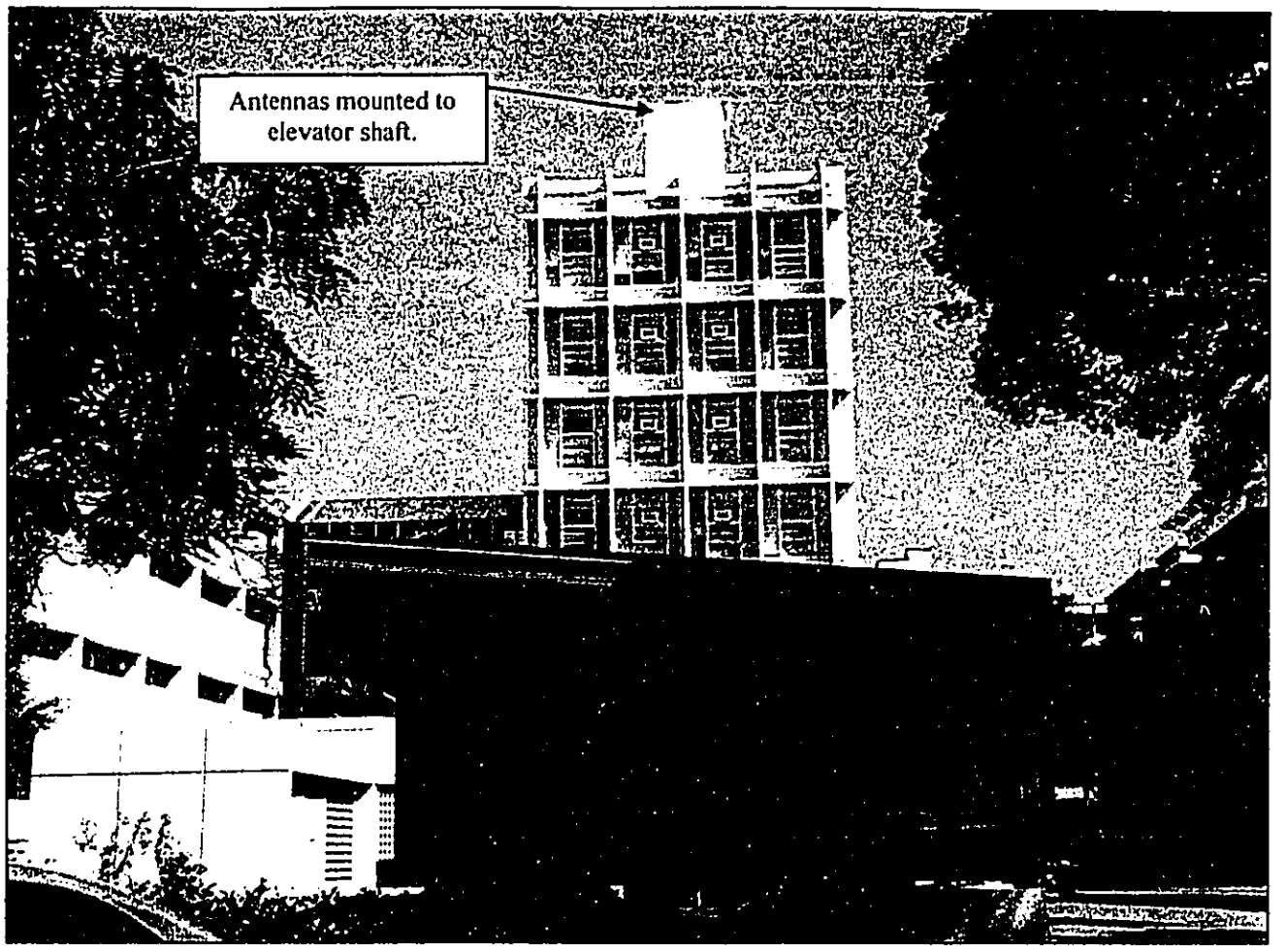
View of Kuykendall Annex rooftop from ground level.



North- (mauka) facing view into Manoa valley; Art Building in foreground, Bilger Hall to right.



West- (Ewa) facing view; ASUH Campus Center in center of photo.


Antennas mounted to
elevator shaft.

Appendices

Appendix A

- Pre-Assessment Phase: Agency Correspondence
- Summary of On-site Meeting of 7/21/05
- DEA Comments and Responses

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

June 21, 2005

Regulatory Branch

Ms. Colette Sakoda
Environmental Planning Solutions, LCC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

This letter responds to your request for written comments dated June 9, 2005 for the following proposed FCC telecommunications site evaluation of a proposed facility on the University of Hawaii at Manoa Kuykendall Annex building rooftop.

Based on the information provided, I have determined there are no waters of the U.S., including wetlands, impacted by this cell phone antenna and therefore a Department of the Army (DA) permit will not be required. This does not relieve you from obtaining other authorizations from the State of Hawaii, or County of Honolulu.

If you have any questions concerning this determination, please contact Ms. Paulette Choy of my staff at 438-2303 and reference File Number POH-2005-366.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD05/1904

July 1, 2005

Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, HI 96816

RE: Pre-Assessment Consultation for the Proposed Coral Wireless Antenna Project at Kuykendall Annex, University of Hawaii Campus, Mānoa, O'ahu, TMK: 2-8-023:003.

Dear Ms. Sakoda,

The Office of Hawaiian Affairs (OHA) is in receipt of your June 9, 2005 request for comment on the above listed proposed project, TMK: 2-8-023:003. Coral Wireless proposes to place 9 panel antennas measuring 6 feet tall atop the Kuykendall Annex Antenna Site. No changes will be made to the surrounding physical environment and visual impacts will be minimal, therefore OHA has no comment at this time.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck at (808) 594-0239 or jessev@oha.org.

'O wau iho nō,

Clyde W. Nāmu'o
Administrator

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

July 6, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: Coral Wireless Pre-assessment Consultation for the Proposed University of Hawaii Kuykendall Annex Antenna Site Honolulu, Oahu TMK: 2-8-023:003

The Department of Education (DOE) has no comment or concern about the proposed Coral Wireless telecommunications facility on the campus of the University of Hawaii at Manoa.

If you should have any questions, please call Rae Loui, Assistant Superintendent of the Office of Business Services, at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:hy

cc: Rae Loui, Asst. Supt., OBS
Ronn Nozoe, CAS, Farrington/Kaiser Complex Area

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
BARRY FUKUNAGA
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1831

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

July 18, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: New Coral Wireless Antenna Site
Pre-Assessment Consultation
TMK: 2-8-023: 003

Thank you for your transmittal requesting our review on the subject application.

The proposed telecommunications facility will not have any impact on our State facility.

We appreciate the opportunity to provide our comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 692-5561 • Fax: (808) 692-5131
Website: www.honolulu.gov

MUFI HANNEMANN
MAYOR

LESTER K. C. CHANG
DIRECTOR

DANA L. TAKAHARA-DIAS
DEPUTY DIRECTOR

IN REPLY REFER TO:

July 7, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Thank you for your letter of June 9, 2005, requesting comments on the proposed Coral Wireless Antenna Site at the University of Hawaii.

We have no comments as we do not foresee this project causing any impact on City and County park properties.

Should you have any questions, you may contact Ms. Toni Robinson, East Honolulu District Manager, at 973-7250.

Sincerely,

LESTER K. C. CHANG
Director

LKCC:fe
(108167)

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
TELEPHONE (808) 523-4529 • FAX (808) 523-4730 • INTERNET www.co.honolulu.hi.us

MUFI HANNEMANN
MAYOR

EDWARD Y. HIRATA
DIRECTOR

TP6/05-107917R

July 11, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: Coral Wireless' Proposed University of Hawaii Kuykendall Annex Antenna Site

Thank you for your June 9, 2005 letter requesting our comments related to the subject project. At this time, we have no comments to offer for your consideration as you prepare the draft environmental assessment.

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

Sincerely,

EDWARD Y. HIRATA
Director

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

July 6, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: Your Letter of June 9, 2005, on the Environmental Assessment for Coral Wireless Antenna Site, Kuykendall Annex Site, TMK: 2-8-23:3

Thank you for the opportunity to comment on the proposed project.

We do not have any comments to offer.

If you have any questions, please contact Joseph Kaakua at 748-5443.

Very truly yours,

K. Shida

KEITH S. SHIDA
Principal Executive
Customer Care Division

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: www.honolulufire.org

MUFI HANNEMANN
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

June 24, 2005

Ms. Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Subject: Pre-Assessment Consultation
Proposed Telecommunications Facility
University of Hawaii
Kuykendall Annex Antenna Site
Honolulu, Oahu, Hawaii
Tax Map Key: 2-8-023: 003

We received your letter dated June 9, 2005, requesting our comments on the above-mentioned subject.

The proposed project will not adversely impact services provided by the Honolulu Fire Department.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI
Fire Chief

AKL/SK:bh

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 · AREA CODE (808) 529-3111
http://www.honolulupd.org
www.honolulu.gov

MUFI HANNEMANN
MAYOR

BOISSE P. CORREA
CHIEF

GLEN R. KAJIYAMA
PAUL D. PUTZULU
DEPUTY CHIEFS

OUR REFERENCE BS-KP

June 22, 2005

Ms. Colette Sakoda, President
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

Dear Ms. Sakoda:

Thank you for the opportunity to review and comment on the Pre-Assessment Consultation for the Coral Wireless' Proposed University of Hawaii Kuykendall Annex Antenna Site at Manoa.

This project should have no significant impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major Bart Huber of District 7 at 529-3796 or Mr. Brandon Stone of the Executive Bureau at 529-3644.

Sincerely,

BOISSE P. CORREA
Chief of Police

By
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

Serving and Protecting with Aloha

July 21, 2005

Re: Summary of Site Visit to Kuykendall Office Tower
University of Hawaii at Manoa
Coral Wireless Antenna Site

In Attendance:

From UH - Mark Heberle, English Department Administrator; Lynn Nakamasu, OPRPM; Emily Jorgensen, OPRPM; Irene Sakimoto, Radiation Safety; Steve Goto, ITS Telecom; Dennis Kamite, Facilities Electrical; Steve Goto, Facilities Electrical, Wally Gretz, UHM Planning Office.

From Coral Wireless – Matt Tobias, Site Acquisitions; Colette Sakoda, Environmental Consultant; Eric Schatz, Director Site Acq. & Development; Jim Seminara, Construction Manager; Dan Kodama, RF Engineer; Derek Govaert, Architect; Brian Itozaki, Electrical Engineer; Randy Chu, Structural Engineer.

All parties met at 10:00 am on Thursday, July 21, 2005 on the ground floor of Kuykendall Office Tower on the Manoa Campus, University of Hawaii. Coral Wireless prepared a handout containing a photo simulation of the proposed site; an MPE report explaining the exposure limits on the rooftop; Antenna, BTS Equipment and PPC specification sheets showing dimensions of equipment to be installed on the rooftop; and lastly, Construction drawings of the proposed site which were handed out to all UH attendees.

We then proceeded to the rooftop of Kuykendall where a brief explanation of the proposed design was given by Matt Tobias. Several issues were raised and are described as follows:

1) The power and telco conduits run on top the roof on foam blocks. A concern was raised about the cost of roofers having to move and lift up these conduits which UH would prefer not to pay. (ERS) Contract may include provision to have reproofing costs that are directly attributable to the presence of the CW equipment paid for by CW.

2) The height of the BTS cabinet rack mount should be at least 24" (ERS) clear of the rooftop.

3) UH would like the site turned down or powered off in the event maintenance workers had to work in front of the antennas.

4) A sign will be required on the wall near the BTS equipment cabinet with a name and number to contact in the event of an emergency or a contact for maintenance workers who need to work on the rooftop.

5) Need to lessen the visual impact of the antennas, coax and equipment cabinet as much as possible. (ERS) Paint antennas, coax, and BTS equipment and frame to match building conditions.

6) Noise from construction needs to be kept at an absolute minimum during classroom/office hours.

7) No helicopter lifts are allowed. A crane can only be used to lift equipment to the rooftop.

8) During construction, elevator usage shall not prevent or disrupt students and faculty, especially the handicapped, from using the elevator as it is the only elevator servicing Kuykendall Hall and Annex.

9) If a check meter is installed for power, Coral will need to pay Procurement, Real Property & Risk Management for the power bill and the monthly rent will be paid to the Facilities Department.

10) Will the Neighborhood Board need to be notified and a presentation done?

Lastly, everyone proceeded to the 7th and 6th floors to assess the conduit runs for power and telco. The meeting ended back on the ground floor.

As a result, Construction Drawings will be revised and forwarded to Wally Gretz for UH's review and approval; Lynn Nakamasu will review Coral's comments to the License Agreement; and Colette Sakoda will work to finalize the Draft EA.

LINDA LINGLE
GOVERNOR

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

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE V. WATSUI
BARRY FUKUNAGA
BRENNON T. MORIOKA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1889

September 20, 2005

Mr. Eric Schatz
Coral Wireless, LLC
Seven Waterfront Plaza, Suite 230
500 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Mr. Schatz:

Subject: Proposed Coral Wireless Kuykendall Annex
Rooftop Antenna Site, University of Hawaii at Manoa
Draft Environmental Assessment

Thank you for your transmittal requesting our review on the subject application.

The proposed telecommunications facility is not expected to have an adverse impact on any of our State transportation facilities.

We appreciate the opportunity to provide comments.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

c: Ms. Genevieve Salmonson, OEQC
Mr. Wallace Gretz, University of Hawaii
Ms. Colette Sakoda, Envinronmental Planning Solutions, LLC

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96818 Phone: 732-8602 Fax: 538-3168

September 26, 2005

Mr. Rodney K. Haraga, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Mr. Haraga:

We have received your letter dated September 20, 2005 regarding the subject project. This acknowledges your conclusion that the proposed telecommunications facility is not expected to have an adverse impact on any of the State transportation facilities.

Thank you for participating in the planning phase of this project.

Sincerely,

Colette Sakoda

cc: Genevieve Salmonson, OEQC
Wallace Gretz, UHM

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 12, 2005

Ms. Colette Sakoda
Environmental Planning Solutions LLC
945 Makaiwa Street
Honolulu, Hawaii 96816

LOG NO: 2005.1846
DOC NO: 0508ST15
Architecture

Dear Ms. Sakoda:

SUBJECT: Chapter 343 (HRS) Review
Proposed Coral Wireless LLC
Kuykendall Annex Rooftop Antenna Site
University of Hawaii at Manoa
Honolulu, Hawaii
TMK: (2) 2-8-023:003

SHPD staff has reviewed this application and has determined the following:

X Kuykendall Annex was built less than 50 years ago, therefore, we believe that the determination for the architectural concerns of the proposed project is: "No historic properties will be affected."

X The project may proceed.

___ Work will impact a historic structure therefore, the determination is "effect, with proposed mitigation commitments."

Should you have any questions regarding architectural concerns please call Susan Tasaki at 692-8032.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

ST:jen

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3168

September 21, 2005

Ms. Melanie A. Chinen, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Room 555
Kapolei, Hawaii 96707
Attention: Susan Tasaki

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Ms. Chinen:

We have received your letter dated September 12, 2005 regarding the subject project. This acknowledges that your office has determined that no historic properties will be affected and that the project may proceed.

Thank you for participating in the planning phase of this project.

Sincerely,

Colette Sakoda

cc: Wallace Gretz, UHM

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD05/1998

September 16, 2005

Eric Shatz
Coral Wireless, LLC
Seven Waterfront Plaza
500 Ala Moana Blvd., Ste. 230
Honolulu, HI 96813

RE: Draft Environmental Assessment for the Proposed Coral Wireless LLC University of Hawai'i Mānoa Kuykendall Annex, Mānoa, Hawai'i, TMK (1) 2-8-023: 003.

Dear Mr. Shatz,

The Office of Hawaiian Affairs (OHA) is in receipt of your August 16, 2005 request for comment on the above listed proposed project, TMK (1) 2-8-023: 003.

OHA has no comment specific to the Draft Environmental Assessment at this time. Our staff was initially concerned with the issue of Electromagnetic Radiation Levels in the Kuykendall Hall vicinity, but the issue appears to be mitigated on Page 7 of the document.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck at (808) 594-0239 or jesseyr@oha.org.

'O wau iho nō,

Clyde W. Nāmu'o
Administrator

CC: ✓ Colette Sakoda
Environmental Planning Solutions, LLC
945 Makaiwa Street
Honolulu, HI 96816

Wallace Gretz
University of Hawaii at Mānoa
2444 Dole Street
Honolulu, HI 96789

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax 538-3168

September 21, 2005

Mr. Clyde W. Namuo, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813
Attention: Jesse Yorck

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023.003

Dear Mr. Namuo:

We have received your letter dated September 16, 2005 regarding the subject project. This acknowledges the fact that your office has no comment specific to the DEA at this time, and that your initial questions regarding Electromagnetic Radiation levels have been answered by information provided in the DEA.

Thank you for participating in the planning phase of this project.

Sincerely,

Colette Sakoda

cc: Wallace Gretz, UHM

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

September 20, 2005

Kathleen Cutshaw
Acting Vice Chancellor for Administration, Finance and Operations
University of Hawaii at Manoa
2500 Campus Road
Honolulu, Hawaii 96822

Subject: Draft EA for the UH Kuykendall Annex Telecommunications Antennas, Oahu

Thank you for the opportunity to review the subject document. We do not have any comments.

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

Sincerely,

Genevieve Salmonson
Director

c: EPC

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3188

September 22, 2005

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813
Attention: Jeyan Thirugnanam

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Ms. Salmonson:

We have received your letter dated September 20, 2005 regarding the subject project. This acknowledges that you had the opportunity to review the document and your office has no comments.

Thank you for participating in the planning phase of this project.

Sincerely,

Colette Sakoda

Colette Sakoda

cc: Wallace Gretz, UHM

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7781 • FAX: (808) 831-7750 • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARE
DEPUTY FIRE CHIEF

September 8, 2005

Mr. Eric Schatz
Coral Wireless, LLC
Seven Waterfront Plaza
500 Ala Moana Boulevard, Suite 230
Honolulu, Hawaii 96813

Dear Mr. Schatz:

Subject: Draft Environmental Assessment
Proposed Coral Wireless, LLC
Kuykendall Annex Rooftop Antenna Site
University of Hawaii at Manoa
Honolulu, Oahu, Hawaii
Tax Map Key: 2-8-023: 003

We received a letter dated August 16, 2005, from Ms. Colette Sakoda of Environmental Planning Solutions, LLC, requesting that our comments on the above-mentioned project be submitted to you.

The proposed project will not adversely impact services provided by the Honolulu Fire Department.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI
Fire Chief

AKL/SK:bh

cc: Ms. Genevieve Salmonson, Director
State of Hawaii, Department of Health, Office of Environmental Quality Control
Mr. Wallace Gretz, Architect
University of Hawaii at Manoa, Facilities Planning and Management
Ms. Colette Sakoda, Planner
Environmental Planning Solutions, LLC

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3168

September 21, 2005

Honorable Attilio K. Leonardi, Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869
Attention: Battalion Chief Lloyd Rogers, Fire Prevention Bureau

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Fire Chief Leonardi:

We received your letter dated September 8, 2005 regarding the subject project in which you stated that the proposed project will not adversely impact services provided by the Honolulu Fire Department.

Thank you for your participation in the planning phase of this project.

Sincerely,

Colette Sakoda

Colette Sakoda

cc: Ms. Genevieve Salmonson, OEQC
Mr. Wallace Gretz, UHM

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. INTERNET: www.honolulu.gov • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2005/ELOG-1949 (NA)

September 19, 2005

Mr. Eric Schatz
Coral Wireless, LLC
Seven Waterfront Plaza
500 Ala Moana Boulevard, Suite 230
Honolulu, Hawaii 96813

Dear Mr. Schatz:

Re: Draft Environmental Assessment
Coral Wireless, LLC Telecommunications Facility
University of Hawaii at Manoa
Kuykendall Annex Rooftop
1733 Donaghho Road - Manoa
Tax Map Key 2-8-23: 3

We have reviewed the Draft Environmental Assessment (DEA) for Coral Wireless LLC's telecommunications antenna facility at the Kuykendall Annex Rooftop and offer the following comments:

Summary Information

1. Page 2 of the DEA states that Tax Map Key 2-8-23: 3 consists of 88,760,400 square-feet (103.482 acres). Please correct the lot area to 4,507,676 square-feet.

Section 1 Introduction

1. The DEA states (page 3) that Coral Wireless will be launching a CDMA network using state of the art equipment. Please provide background information on a CDMA network.

Section 1.4.B Long Term Impacts

1. On page 6 under "Electromagnetic Radiation (EMF)" (Line 7), please change "RF safely" to "RF safety."

Section 2.1 Purpose and Need for the Project

On page 8, the DEA states that Coral Wireless is seeking to expand telecommunication service to its customers on the University of Hawaii campus, and that the purpose of the transmitter/antenna facility is to provide a large coverage zone over the Manoa Campus and to improve in-building service throughout the campus.

As the project is needed to improve telecommunication service at the University of Hawaii at Manoa, we confirm that the proposal can be reviewed as a minor modification to Plan Review Use (PRU) File No. 88/PRU-3. A Conditional Use Permit-minor for a utility installation and a height waiver will not be required. Please note that the fee for processing a minor modification to a PRU is $300.

Section 2.3 Existing Facility

1. The DEA on page 9 states that the Kuykendall Annex Office Building consists of seven stories. Please specify the height of that building in the text of the DEA. The exterior elevation drawings in the Figures Section of the DEA appear to indicate the Kuykendall Annex Office Building has a total height of 108'-9". Please verify that this is the correct building height and include that height in the DEA text.

Please contact Nelson Armitage of our staff at 527-6274 if you have any questions.

Very truly yours,

Henry Eng, FAICP, Director
for Department of Planning and Permitting

HE:cs

Q:\LandUse\PostsWorkingDirectory\Nelson\Requests for Comments\coral wireless kuykendall dea.doc

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3168

September 21, 2005

Mr. Henry Eng, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813
Attention: Ms. Kathy Sokugawa

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Oahu, TMK No. (2) 2-8-023:003

Dear Mr. Eng:

We have received you letter dated September 19, 2005 regarding the subject project. The following has been prepared in response to your comments.

Summary Information:

The lot area indicated on Page 2 of the FEA now states the correct size of 4,507,676 square feet.

Section 1 Introduction:

The FEA now includes background information on a CDMA network.

Section 1.4.B Long Term Impacts:

Reference made to "RF safely" has been changed in the FEA to state "RF safety."

Section 2.1 Purpose and Need for the Project:

We note your confirmation that a minor modification to the PRU File no. 88/PRU-3 will be required. As with recently completed antenna sites by Nextel Partners Inc. and Cingular Wireless of Hawaii on the UH Manoa campus, the University of Hawaii submitted the minor modification requests. Therefore the University plans to do the same with the proposed Coral Wireless site.

Section 2.3 Existing Facility:

This section of the FEA now includes information regarding the height of Kuykendall Annex Office building which has been determined to be 112.5 feet at its highest point.

Thank you for your participation in this important planning phase of the project.

Sincerely,

Colette Sakoda

Colette Sakoda

cc: Wallace Gretz, UHM

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 527-6529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

MUFI HANNEMANN
MAYOR

EDWARD Y. HIRATA
DIRECTOR

ALFRED A. TANAKA, P.E.
DEPUTY DIRECTOR

TP8/05-117075R

September 19, 2005

Mr. Eric Schatz
Coral Wireless, LLC
Seven Waterfront Plaza
500 Ala Moana Boulevard, Suite 230
Honolulu, Hawaii 96813

Dear Mr. Schatz:

Subject: Coral Wireless LLC University of Hawaii at Manoa
Kuykendall Annex Rooftop Antenna Facility

Thank you for the August 16, 2005 letter from Environmental Planning Solutions LLC, requesting our review of and comments on the draft environmental assessment for the subject project. We reviewed the document and do not have any comments to submit for your consideration.

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

Sincerely,

EDWARD Y. HIRATA
Director

cc: Mr. Wallace Gretz
University of Hawaii at Manoa

Ms. Colette Sakoda
Environmental Planning Solutions LLC

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3168

September 22, 2005

Mr. Edward Y. Hirata, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813
Attention: Faith Miyamoto

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Mr. Hirata:

We received your letter dated September 19, 2005 regarding the subject project. This acknowledges that you have reviewed the document and have no comments to submit.

Thank you for your participation in the planning phase of this project.

Sincerely,

Colette Sakoda

cc: Ms. Genevieve Salmonson, OEQC
Mr. Wallace Gretz, UHM

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

September 8, 2005

Mr. Eric Schatz
Coral Wireless, LLC
Seven Waterfront Plaza
500 Ala Moana Boulevard
Suite 230
Honolulu, Hawaii 96813

Dear Mr. Schatz:

Subject: The Draft Environmental assessment for Coral Wireless LLC University of Hawaii Manoa Kuykendall Annex, TMK: 2-8-23:3

Thank you for the opportunity to comment on the subject document.

Our comments of July 6, 2005, which are included in the document, are still applicable.

If you have any questions, please contact Joseph Kaakua at 748-5443.

Very truly yours,

K. Shida

KEITH S. SHIDA
Principal Executive
Customer Care Division

Cc: Office of Environmental Quality Control
Mr. Wallace Gretz, University of Hawaii
Ms. Colette Sakoda, Environmental Planning Solutions LLC

Water for Life . . . Ka Wai Ola

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96816 Phone: 732-8602 Fax: 538-3168

September 26, 2005

Mr. Keith S. Shida, Principal Executive
Customer Care Division
Board of Water Supply
City and County of Honolulu
630 So. Beretania Street
Honolulu, Hawaii 96843

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Mr. Shida:

We received your letter dated September 8, 2005 regarding the subject project. This acknowledges that the Board of Water Supply's comments in your July 6, 2005 letter are still applicable.

Thank you for your participation in the planning phase of this project.

Sincerely,

Colette Sakoda

Colette Sakoda

cc: Ms. Genevieve Salmonson, OEQC
Mr. Wallace Gretz, UHM

Hawaiian Telcom

August 24, 2005

Coral Wireless, LLC
Eric Schatz
Seven Waterfront Plaza
500 Ala Moana Blvd., Ste. 230
Honolulu, Hawaii 96813

Subject: New Coral Wireless Services at UH of Manoa

Dear Mr. Schatz:

Thank you for the opportunity to review the above project. We have the following comments to make:

- As far as Hawaiian Telcom is concern, providing telephone service should not negatively impact the environment.
- All electrical work shall conform to all electrical codes.
- Telephone service connection shall be determined once electrical drawings are submitted.

Should you have any questions, please call Noel Remigio at 840-5847.

Sincerely,

Jill Lee
Manager – OSP Engineering, East & West Oahu

Cc: File (Punahou)
N. Remigio
Wallace Gretz — UH at Manoa, 2444 Dole Street, Honolulu, Hawaii 96822
Colette Sakoda — Environmental Planning Solutions, LLC, 945 Makaiwa Street, Honolulu, Hawaii 96816

ENVIRONMENTAL PLANNING SOLUTIONS, LLC
945 Makaiwa Street, Honolulu, HI 96818 Phone: 732-8602 Fax: 538-3168

September 21, 2005

Ms. Jill Lee, Manager
OSP Engineering, East and West Oahu
Hawaiian Telcom
P. O. Box 2200
Honolulu, Hawaii 96841

Subject: Draft Environmental Assessment for Coral Wireless Kuykendall Annex Rooftop Antenna Site, University of Hawaii at Manoa, Honolulu, Island of Oahu, TMK No. (2) 2-8-023:003

Dear Ms. Lee:

We have received your letter dated August 24, 2005 regarding the subject project in which you stated that the project should not negatively affect the environment; project-related electrical work shall conform to all electrical codes; and telephone service connection shall be determined once electrical drawings are submitted to Hawaiian Telcom.

Your participation in the planning phase of this project is appreciated.

Sincerely,

Colette Sakoda

cc: N. Remigio, Hawaiian Telcom
Wallace Gretz, UHM

Appendix B

Coral Wireless RF Engineering Electromagnetic Radiation Hazards Analysis

Coral Wireless

1. EXECUTIVE SUMMARY:

As requested by the University of Hawaii Facilities Department, Coral Wireless LLC conducted an electromagnetic radiation (EMR) hazards analysis for the proposed installation of the Coral Wireless CDMA PCS base station site at Kuykendall Annex, University of Hawaii at Manoa, Honolulu, Hawaii. In this review, we analyzed the potential for RF hazards to personnel at the proposed Coral Wireless Facility.

The analysis of the Kuykendall Annex rooftop was completed using an MPE analysis software application widely used in the wireless telecommunications industry, Roofview V4.15, created by Richard Tell and Associates, Inc. Based on the analysis provided in the EMR Hazards report, it can be assumed that personnel on the rooftop or in the rooms directly below the rooftop will not be exposed to the power densities exceeding the Federal Communications Commission (FCC) Office of Engineering Technology (OET) Bulletin 65 Maximum Permissible Exposure (MPE) limits. Furthermore, personnel located on the lower floors of Kukendall Annex, and at ground level will not be exposed to power densities exceeding the FCC MPE limits.

2. CONCLUSIONS

The transmission from the proposed Coral Wireless antennas will not be hazardous to personnel.

3. RECOMMENDATIONS:

As a precautionary measure, the Coral Wireless transmitters should be silenced if maintenance is performed on the transmitting antennas or cables. As shown in Figure 6 of enclosure (1), a "BEYOND THIS POINT" RF radiation hazard warning sign should be posted on door leading to roof where transmit antennas are located. It is recommended that an actual EMR hazards survey of the site be taken to supplement this analysis report.

Coral Wireless

Electromagnetic Radiation Hazards Analysis

University of Hawaii at Manoa
Kuykendall Annex

Coral Wireless Communications Site HIC025

July 25, 2005

Coral Wireless RF Engineering
(808) 748-8337

TABLE OF CONTENTS

ILLUSTRATIONS

TABLES

1. INTRODUCTION:

As requested by the University of Hawaii Facilities Department, Coral Wireless LLC conducted an electromagnetic radiation (EMR) hazards analysis for the proposed installation of the Coral Wireless CDMA PCS base station site at Kuykendall Annex, University of Hawaii at Manoa, Honolulu, Hawaii. Figure 1 shows the location of the proposed Coral Wireless facility. In this review, we analyzed the potential for RF hazards to personnel at the proposed Coral Wireless Facility.

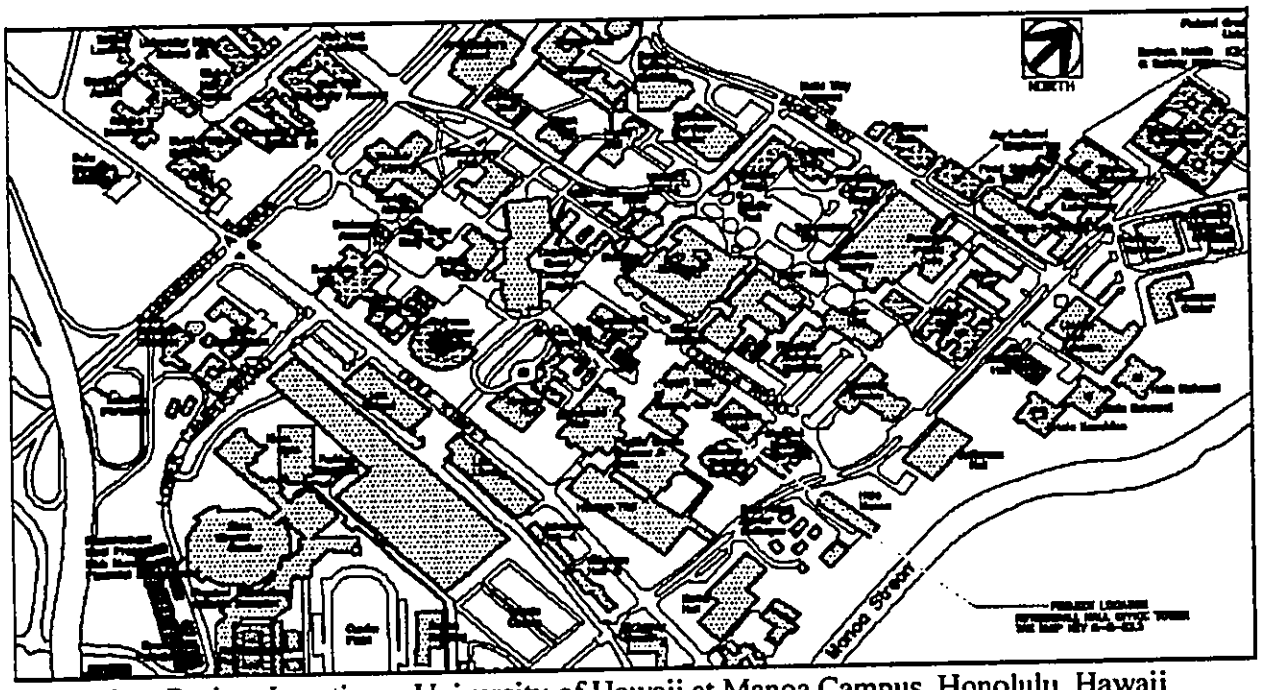


Figure 1. Project Location – University of Hawaii at Manoa Campus, Honolulu, Hawaii

2. PROJECT DESCRIPTION:

This project will install a Nortel Networks 6S3C Compact Metrocell base transceiver station (BTS)and six panel antennas on the elevator/mechanical room located on the rooftop of Kuykendall Annex, University of Hawaii at Manoa, Honolulu, Hawaii. The locations of the six panel antennas are shown in Figure 2. Note that three of the six panel antennas are receive (RX) only and will therefore not transmit any RF energy. Locations of the three transmit (TX) antennas are highlighted in red.

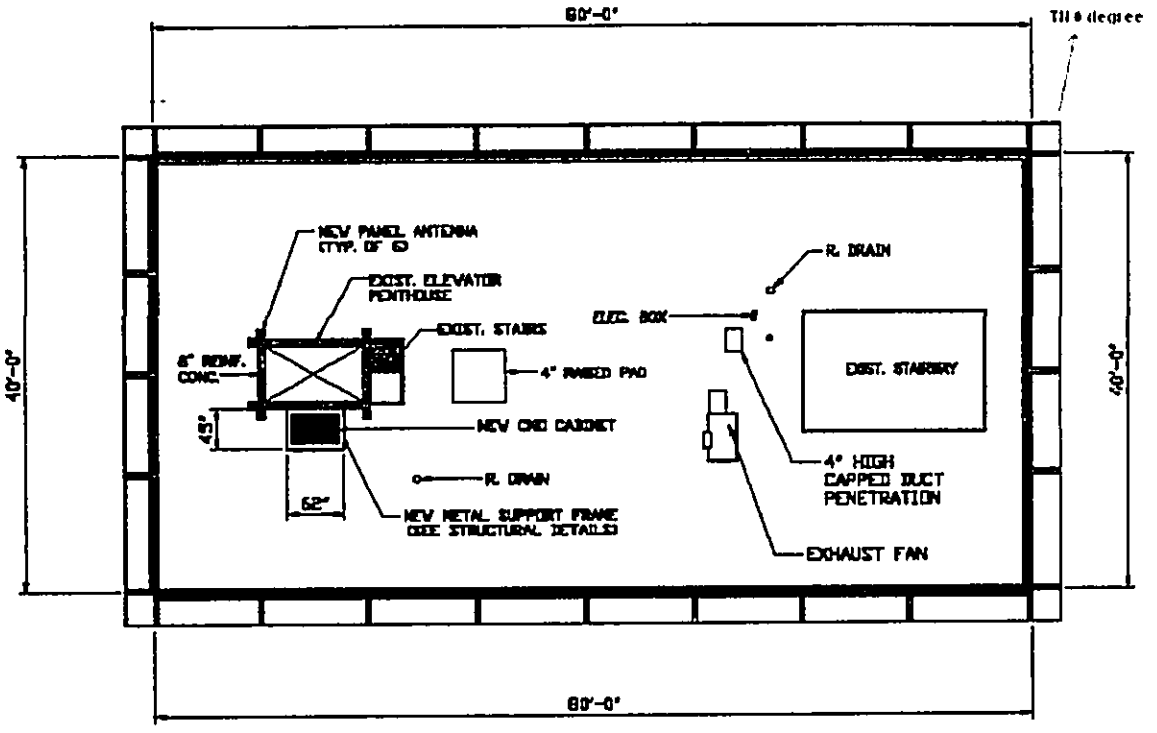


Figure 2. Roof Plan – Kuykendall Annex

The transmitter and antenna specifications are listed in the following tables.

TABLE 1. TRANSMITTER SPECIFICATIONS

Transmitter Nomenclature	Quantity	Frequency (MHz)	Max Power @ Antenna *
Nortel 6S3C	1	1975 - 1990	12W

* Maximum RF power at the input to the transmit antennas, assumes no cable or connector losses.

TABLE 2. ANTENNA SPECIFICATIONS

Antenna Nomenclature	Quantity	Polarization	Maximum Gain (dBi)	Beamwidth (H)
EMS RV-65-18-0	2	Vertical	17.5	65°
EMS RV-65-19-2	2	Vertical	18.5	65°
EMS RV-65-18-4	2	Vertical	17.5	65°

3. ELECTROMAGNETIC RADIATION HAZARDS ANALYSIS:

Based on the Federal Communications Commission (FCC) Office of Engineering Technology (OET) Bulletin 65 guidelines, a two-tier Maximum Permissible Exposure (MPE) limits criteria for occupational/controlled and general population/uncontrolled exposure was used for the analysis.

Occupational/Controlled limits apply in situations where exposure may be incurred by personnel who are aware of the potential for RF exposures as a consequence of employment, exposure of individuals who knowingly enter areas where higher RF levels can reasonably be anticipated to exist, and exposure that may occur incidental to transient passage through such areas. Since access to the roof of Kuykendall Annex is secured, the roof area is considered an Occupational/controlled area.

General population/uncontrolled exposures apply in situations such as in public areas where individuals have no knowledge or control of their exposure. Such areas include living areas, workplaces, or public areas where there are no expectations that higher RF levels should exist. The workplaces within Kuykendall Annex as well as the ground floor areas surrounding Kuykendall Annex may be considered as general population/uncontrolled areas.

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time E^2, H^2 or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time E^2, H^2 or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

Table 3. Limits for Maximum Permissible Exposure (MPE)

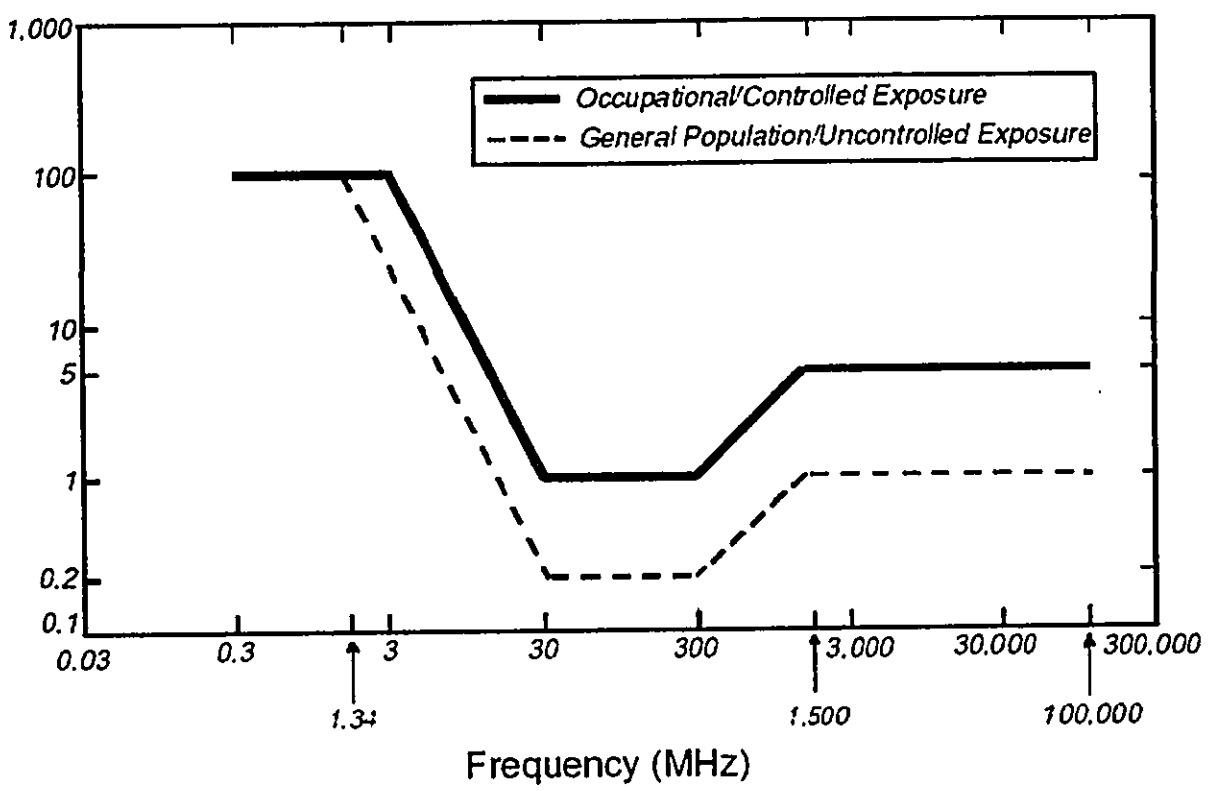


Figure 3. FCC limits for Maximum Permissible Exposure

The analysis of the Kuykendall Annex rooftop was completed using an MPE analysis software application widely used in the wireless telecommunications industry, Roofview V4.15, created by Richard Tell and Associates, Inc. For purposes of this study, the more stringent general population/uncontrolled area MPE limits were used in the analysis. Figure 4 shows that 99.81% of the rooftop area will have power density levels at less than 5% of the general public/uncontrolled limits. This is visually represented in Figure 5. Further, the highest power density level predicted on this rooftop will not exceed 10.0% of the general population/uncontrolled MPE limits. Figure 5 shows this small area (highlighted red) directly in front of the west facing transmit antenna.

As shown in Table 3, an averaging time is included as part of the occupational/controlled and general population/uncontrolled MPE criteria. The instantaneous average power density may exceed the 100% MPE limit provided that the average exposure over any averaging time is equal to or below the corresponding 100% MPE limit. The averaging time for occupational/controlled exposures is 6 minute while the general population/uncontrolled exposures are 30 minutes. As an illustration of the application of time averaging using the general population/uncontrolled exposure limits, consider the following. The relevant general population/uncontrolled exposure averaging time are 30 minutes at 100% of the MPE limit. This means that a person may be

exposed to two times the MPE limit for a period of 15 minutes provided that he or she was not exposed for the preceding or following 15 minutes. Similarly, a person could be exposed to 10% of the limit for a period of 300 minutes provided that he or she was not exposed for the preceding or following 300 minutes. Table 4 illustrates this example further.

TABLE 4. AVERAGING TIME

% of MPE Limit	Averaging Time at 100% MPE (general population/uncontrolled)	Averaged Exposure Time (Minutes)	Averaged Exposure Time (Hours)
5	30	600	10
10	30	300	5
50	30	60	1
100	30	30	0.5
200	30	15	0.25
400	30	7.5	0.125

Based on the Roofview V4.15 analysis, 99.81% of the rooftop area will have power density levels at less than 5% of the general public/uncontrolled limits and the highest power density level predicted on this rooftop, will not exceed 10.0% of the general population/uncontrolled MPE limit. Therefore, based on Table 4, a person may remain on 99.81% of the rooftop area for at least 10 hours provided that he or she was not exposed for the preceding or following 10 hours. Further, a person may remain directly in front of the transmitting antenna (at the height of the antenna) for at least 5 hours provided that he or she was not exposed for the preceding or following 5 hours.

Therefore, based on the above analysis, it can be assumed that personnel on the rooftop or in the rooms directly below the rooftop will not be exposed to the power densities exceeding the general population/uncontrolled limits. Personnel on the lower floors of Kuykendall Annex, and at ground level will not be exposed to power densities exceeding the general population/uncontrolled MPE limits.

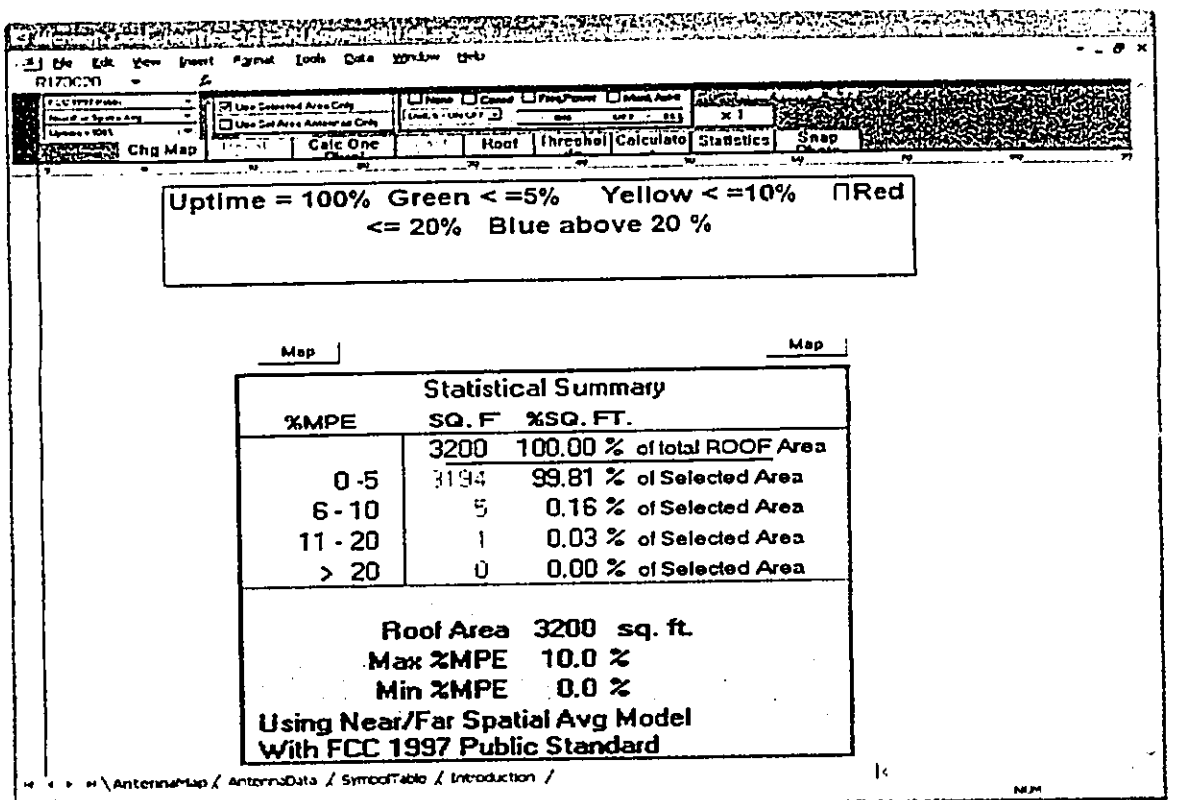


Figure 4. RoofView 4.15 - Statistical summary, Roof Area %MPE

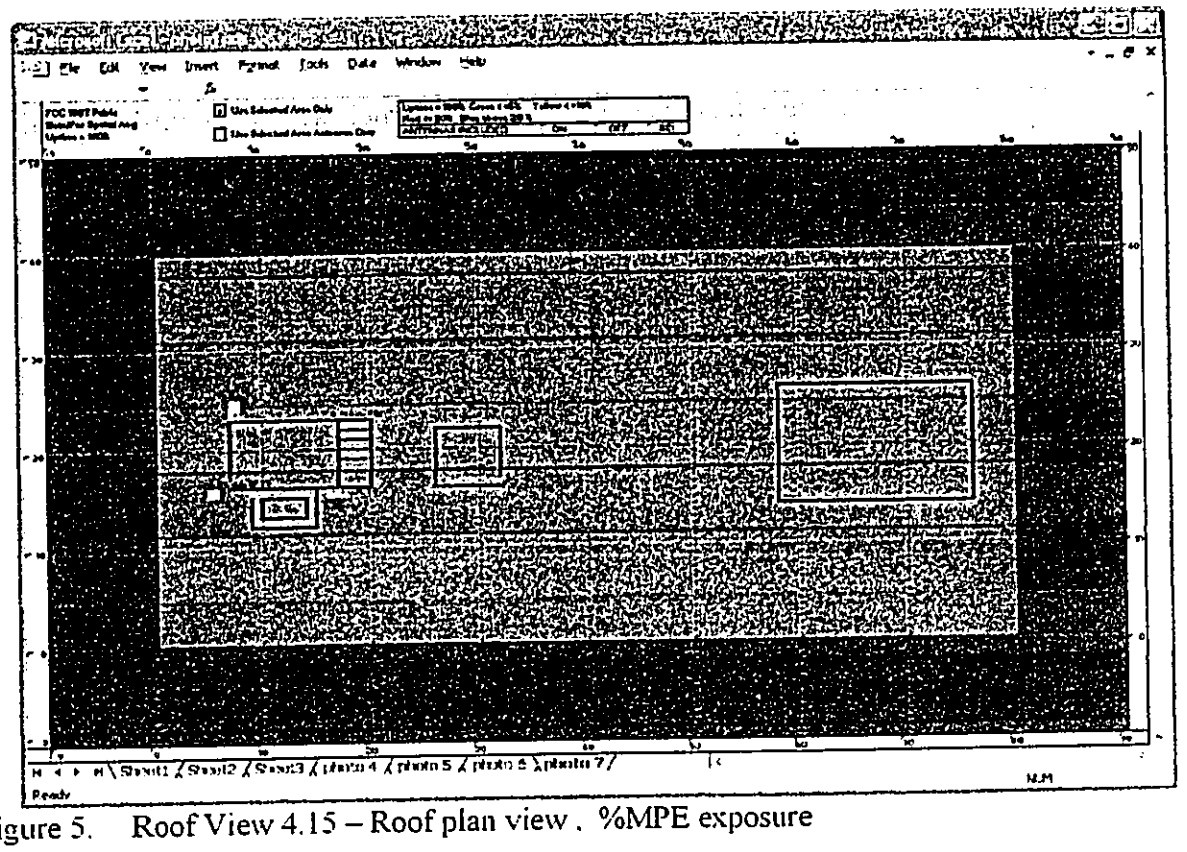


Figure 5. Roof View 4.15 – Roof plan view , %MPE exposure

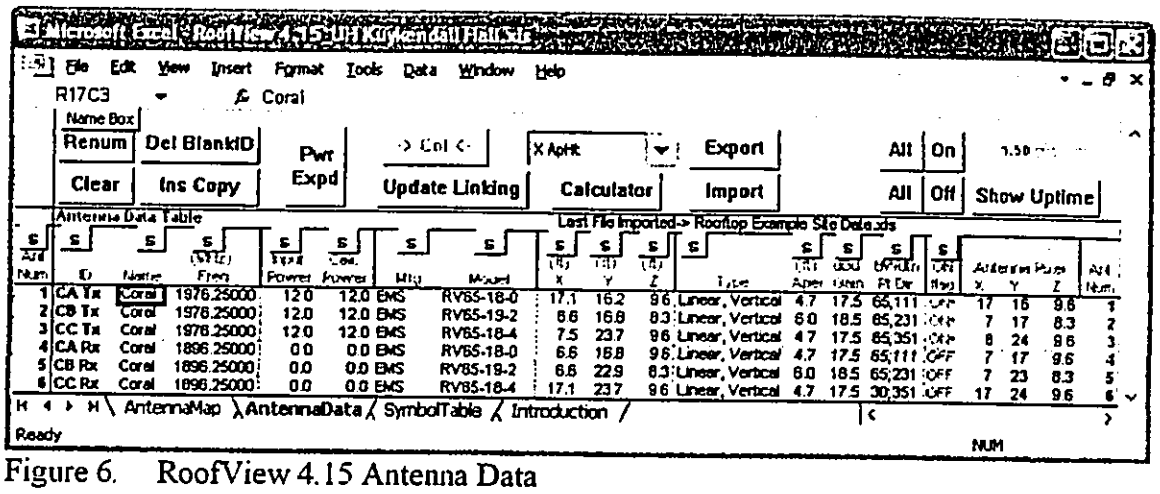


Figure 6. RoofView 4.15 Antenna Data

4. CONCLUSIONS:

EMR Hazards: The transmission from the proposed Coral Wireless antennas will not be hazardous to personnel.

5. RECOMMENDATIONS:

As a precautionary measure, the Coral Wireless transmitters should be silenced if maintenance is performed on the transmitting antennas or cables. As shown in Figure 6, a "BEYOND THIS POINT" RF radiation hazard warning sign should be posted on the door leading to roof where transmit antennas are located. It is recommended that an actual EMR hazards survey of the site be taken to supplement this analysis report.

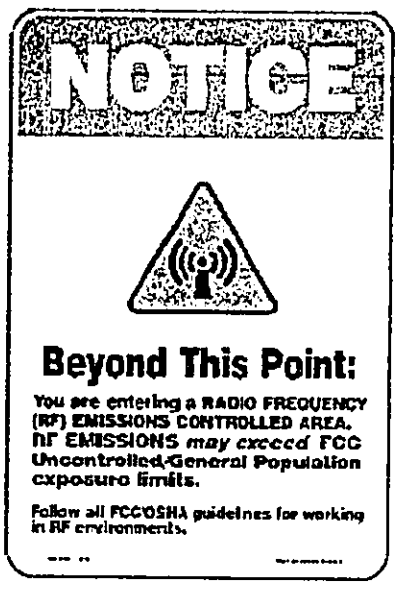


Figure 6. RF Safety Sign

CERTIFICATE FOR TELECOMMUNICATIONS ANTENNA

This form is to be submitted along with building permit applications for telecommunication antennas. It shall be signed by the building permit applicant who shall be responsible for meeting the exclusion distance (setbacks) required by the Land Use Ordinance (LUO), and the veracity of information submitted herein.

Building permit plans shall include a delineation of the exclusion distance, and shall provide any additional information to demonstrate that fencing or other measures are being taken to restrict public access within this distance.

Please type or print legibly all required information.

Tax Map Key: 2-8-023:003 (OH25 UH)

Applicant: Coral Wireless, LLC
(If company, list company name)

Brief Description of the Type of Antenna: Broadband PCS
(E.g. land-mobile, paging service; mast antenna, dish. If antenna is an independent operational fixed-point microwave or receiving-only antenna, that does not qualify as an accessory use, please note this here; no other additional information is required for these antennas.)

Effective Radiated Power (ERP) of Antenna(s): 100 watts
(If more than one antenna is being proposed, or if an antenna is being added to a site where there are already other antennas, indicate combined ERP)

Computation of Exclusion Distance (ED) in feet:

$$\text{Exclusion Distance (in feet)} = .0325\sqrt{796ERP}$$

Using the above formula, the Exclusion Distance is 9.17 feet.

Applicant (If company, authorized signature) — Date: 5/19/05

0166L.6.13.88

CERTIFICATION OF CATEGORICAL EXCLUSION FOR ANTENNA INSTALLATIONS

This certification shall be submitted with all Land Use Permit applications for antenna-related *utility installations* (see LUO Sec. 21-10.1). It shall be signed by the applicant who shall be responsible for the veracity of the information submitted, herein.

Tax Map Key: 2-8-023:003 (0H25GH)

Applicant: Coral Wireless LLC
(If company, list company name)

Signature: _____ 6-22-05
Applicant Date

PART I.

The proposed utility installation will be operated in the Multi-point Distribution Service, Paging and Radiotelephone Service, Cellular Radiotelephone Service, Narrowband or Broadband Personal Communications Service, Private Land Mobile Radio Services Paging Operations, Private Land Mobile Radio Service Specialized Mobile Radio, Local Multi-point Distribution Service, or service regulated under CFR Part 74, Subpart I:

☑ Yes (Circle the applicable service, above) ☐ No _____
Indicate the type of service

The proposed antenna will be a *freestanding antenna structure* (see LUO Sec. 21-10.1): ☐ Yes ☑ No

The lowest point of any antenna associated with the proposed utility installation will be at least 10 meters (~33 feet) above the ground: ☑ Yes ☐ No

If the response to ALL three of these questions is "Yes", then the proposed utility installation IS categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines. You do not need to complete Parts II, III or IV of the certification.

If the response to ANY of the three questions is "No", then you must complete Part II of the certification.

Part II.

The *transmitting antennas* (see LUO Sec. 21-10.1) associated with the proposed utility installation will be inaccessible to the public:
☑ Yes ☐ No

Locked roof access prohibits public access to antennas.

_____

Briefly describe how the antennas will be rendered inaccessible to the public

If the response is "Yes", then the proposed utility installation IS categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines. You do not need to complete Parts III or IV of the certification.

If the response is "No", then you must complete Part III of the certification.

PART III.

This is a:
☐ Single facility site (the site contains ONLY ONE antenna array). Please complete Part III of the certification.
☐ Multiple facility site (the site contains MORE THAN ONE antenna array). Please skip the remainder of Part III of the certification and proceed to Part IV.

Please provide the following information and calculations.

A. Enter the power threshold for categorical exclusion for this service from the attached Table 1 in watts ERP or EIRP [note: EIRP = (1.64) x ERP]: _____

B. Enter the total number of channels if this will be an omnidirectional antenna(s), or the maximum number of channels in any sector if this will be a sectored antenna: _____

C. Enter the ERP or EIRP per channel using the same units as in "A": _____

D. Multiply the answer from "B" by the answer from "C": _____

The response to "D" is less than or equal to the value for "A": ☐ Yes ☐ No

If the response is "Yes", then the utility installation IS categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines. You do not need to complete Part IV of the certification.

If the response is "No", the utility installation is NOT categorically excluded and you must complete Part IV of the certification.

PART IV.

Estimate the "worst case" horizontal distance which must be maintained.

A. This is a:
☐ Single facility site (the site contains ONLY ONE antenna array). Enter the ERP or EIRP for the proposed antenna array: _____
☐ Multiple facility site (the site contains MORE THAN ONE antenna array). Enter the TOTAL ERP or EIRP for ALL antenna arrays at the site, including the proposed antenna installation: _____

B. Based on the ERP or EIRP from "A", enter the estimated "worst case" horizontal distance (in feet) that should be maintained for the service from the attached Appendix B: _____

The estimated "worst case" horizontal distance MUST be indicated on the plans submitted with your Land Use Permit application. The plans MUST also indicate how public access will be prevented within this distance.

If the estimated "worst case" horizontal distance cannot or will not be maintained, then your application MUST include adequate documentation demonstrating how the proposed antenna installation has otherwise complied with the FCC's exposure guidelines, or the application will not be accepted as "complete" for processing purposes.

Appendix C

V. Peterson Statement Regarding Electromagnetic Radiation Levels

STATEMENT
Regarding Electromagnetic Radiation Levels
Associated with Proposed KTUH FM Radio Transmission
by
Prof. Vincent Z. Peterson
Department of Physics, UHM

INTRODUCTION:

At the request of ASUH I agreed to review the proposed increase in power of KTUH's FM radio CW (continuous-wave) transmission in order to calculate the expected FM radiation power levels in the top-floor offices of Porteus Hall.

I agreed to do this, on a "pro-bono" basis, since I am impressed with the dedication and hard work of the students concerned, who hope to have KTUH reach a wider audience than can now be reached with the present power limitation (100 watts). Although the proposed increase in radiated power (to 3000 watts) may seems major (30x factor), it is really quite modest --in comparison with power radiated by commercial FM stations. Yet it is also prudent to be concerned with possible effects of electromagnetic radiation on nearby members of the campus community. Since I've been involved in advising the State Department of Health, and the National Weather Service/FAA, on the effects of electromagnetic radiation, ASUH asked me --- as a member of the Physics faculty at UHM -- to calculate the expected maximum radiation intensity which KTUH might project, and compare that with accepted standards.

Since ASUH already has competent electronic engineering advice from Mr. Dale Machado of KSSK (knowledgeable on FCC regulations for FM radio) I will confine my remarks to the "physics and biophysics" of electromagnetic radiation in the FM radio band (specifically, at about 90 Megaherz, or 90 MHz).

Standards of permissible radiation exposure of human to electromagnetic fields (EMF) are determined by ANSI (American National Standards Institute) for a wide range of frequencies, including FM radio. The Federal Communications Commission (FCC) had adopted the ANSI standards. The FCC OST-Bulletin No. 65 "Evaluating Compliance with FCC-Dpecified Guidelines for Hkuman Exposure to Radiofrequency Radiation") also included useful graphs and tables for determining the minimum height of antenna.

MY QUALIFICATIONS AS AN "EXPERT" ON ELECTROMAGNETIC RADIATION:

Besides a PhD in Physics (UC-Berkeley, 1950), I have 38 years of experience in teaching physics courses, at CalTech and (since 1964) at UHM. I have taught the full range of courses in Electricity and Magnetism (E&M), including the most advanced physics courses in Electromagnetic Fields (EMF). Radiation of electromagnetic waves is a prime topic in these courses. While involved with research at the Caltech Electron Synchrotron (1950-1962) I served part-time as Radiation Safety Officer. I also was a member of the CalTech campus Health and Safety Committee, chaired by George Beadle (Nobel prize in genetics).

In recent years, a series of articles in the New Yorker aroused public concern over "Does EMF cause cancer?". The UH School of Public Health was asked (by the Hawaii Legislature) to convene a Symposium on "Electromagnetic Fields: Scientific Facts and Community Concerns". I was asked to participate, as a physicist with expertise on EMF. In 1993 Dr. Bruce Anderson (State Board of Health Deputy Director for Environmental Health) asked me to serve on an Advisory Committee concerned with possible health effects of powerline frequency EMF. Other members of the panel included medical doctors, two EEs, a HECO official, and community group representatives. My role was nominally as a physicist but it turned out I was the only member with personal contact with scientists directly involved in setting national radiation exposure standards. The data obtained covered potential medical effects of radiation over a wide range of frequencies. Our panel achieved unanimous agreement on the lack of convincing evidence that ordinary powerline frequency EMFs provide a serious hazard to human health. This advice was accepted by the Legislature.

Later on (in 1994) I was asked to serve as a Consultant to a group of National Weather Service/FAA officials in charge of explaining the impact of installing the new "NEXRAD" Weather radars (pulsed Doppler radars) at four different sites in the State of Hawaii. My role was to explain the "physics of electromagnetic radiation (and its relationship to biophysical parameters)" to the Boards of Supervisosrs of the Counties of Maui/Molokai, Kauai, and the Big Island. (My testimony was complementary to that of a medical radiologist from the East Coast.) Despite some initial concerns about the possible health effects of NEXRAD's pulsed radar by various Supervisors, and after substantial discussion, all the Boards of Supervisors declared themselves satisfied that NEXRAD radar would not pose a danger to human health in their communities.

Although I am NOT a medical doctor, I've been stimulated to learn more about the potential effects on the human body by EMFs at various frequencies and power levels. Fortunately, several of my close friends in physics and biophysics are national figures in Radiation Protection and I have corresponded regularly with them regarding the basis for the ANSI (American National Standards Institute) radiation levels for "maximum permissible exposures". For example, Dr. E. Adair of Yale Biophysics is co-chairperson of COMAR (Committee on Man and Radiation) which included representaatives from ANSI, NCRP (National Committee on Radiation Protection) and the EPA. Dr. Adair has provided me with detailed information on these matters, for EMF frequencies extending from 60 Hz to ultra-high frequencies (radar).

ELECTROMAGNETIC RADIATION EFFECTS ON HUMANS: (simplified summary)

There are two major aspects to consider:

(a) Damage caused by ionizing radiation (radiation able to ionize atoms knocking electrons free from their atomic bonds). Ionization is the most direct way electromagnetic fields (of sufficient strength) can cause biological damage and is capable of modifying DNA in the human body.

(b) The local heating of human flesh, such that local body temperatures are raised beyond acceptable limits (i.e., beyond the range which natural body mechanisms can control, a few degrees Fahrenheit from 98.6)

Let us consider each aspect in turn.

Ionization of atoms in the body: Fortunately, in dealing with EMFs at FM-radio frequencies (KTUH operates at 90.3 Megaherz), we don't need to worry about KTUH radiation ionizing any atom: KTUH's frequency is much too low to ionize even the least tightly-bound electron. (The energy of the smallest "packet" of EMF -- called the "photon" -- is given by E = hf, where f = frequency, and h = Planck's constant.) Since electromagnetic waves can be labelled by wavelength (λ) as well as by frequency (f), it is useful to write down the simple formula relating the two:

$$f \times \lambda = c = \text{velocity of light} = 186{,}300 \text{ miles/second}$$
$$= 300{,}000{,}000 \text{ meters per second.}$$

Thus, 90 MHz frequency corresponds to a wavelength of 3.3 meters = 330 cm.
In general, high frequencies (short wavelengths) pack more "power" into each photon. (Example: in sunbathing, UV photons can be dangerous and cause skin cancer directly (by ionization), whereas IR (infrared) photons are not dangerous unless incident at high intensity (lots of photons/second per unit area of skin)).

To illustrate the frequency (or wavelength) dependence of EMF, Figure 1 displays the of various bands of frequencies, on a logarithmic scale (linear in powers of 10), with labels for various types ofB radiation.

(Project Figure 1 at this point, and explain the Figure,
pointing out where KTUH frequency lies relative to UV, IR, etc).

In particular, note that all ionizing radiations have frequencies above about 10^{15} Herz (or cycles/second), the lowest ionizing frequency corresponding to the least tightly-bound electron.

Since KTUH's frequency is ~~100,000~~ > 10,000 times lower than the threshold frequncy for ionizing radiation, we can dismiss any worry about direct (ionizing) damage to human flesh from KTUH radiation.

Local heating of human flesh: from thorough studies of the effects of EMF on human biology, all other (non-ionizing) effects on mammalian flesh (human or otherwise) can be attributed to local heating, which raises the local temperature of the body more than a critical amount (ΔT_c). For the human body it is well known

that a fever of more than a few degrees Fahrenheit can be serious, since it causes the body's natural heat-regulating system to lose control. The (very conservative) ANSI standards for Maximum Permissible radiation intensity, in the non-ionizing EMF range, roughly correspond to $\Delta T = 0.1$ deg. Fahrenheit, for exposures sustained for at least 6 minutes. (The body can handle higher intensity radiation for shorter exposures, since the body fluids distribute the heat fairly rapidly over a large volume.)

One example (from NEXRAD radar, whose frequency closely matches those of microwave ovens, yet is non-ionizing): It is the average power/unit area, averaged over some seconds exposure, which is important. Microwave ovens (HIGH power consumption of 300 watts) can "cook" meat very efficiently by raising the meat's temperature by hundreds of degrees. Yet the NEXRAD radar, pulsed at high power (450,000 watts in a narrow beam) for very short time intervals (a few microseconds for about 1000 times per second), has very low average power, even in the main beam. The radiation intensity (in milliwatts per square centimeter) is less than one milliwatt/square centimeter at the nearest accessible distance. (The radiation from a home "nightlight", used to illuminate the hallway at night, is more dangerous than NEXRAD radiation outside the perimeter fence around the transmitter/antenna).

The FCC regulations for radiated power levels include the ANSI limits on radiation intensity levels wherever humans are involved. Thus, the radiation intensity from KTUH must be less than 1.0 mW/cm^2 (one milliwatt per square centimer) at all regions where humans might possibly occupy.

ESTIMATE OF RADIATION INTENSITY FROM THE PROPOSED KTUH ANTENNA (on top of Porteus Hall), at a power level of 3000 watts:

The present KTUH transmitting, located on top of Porteus hall, radiates a maximum of 100 watts of electromagnetic power. It is proposed to increase the power to 3000 watts (a factor of 30). A new "4-bay" FM antenna would be installed, to emit FM power in a relatively narrow beam pattern (vertically) but distributed over all azimuthal directions in a horizontal plane.

A rough sketch (not to scale) of the KTUH antenna, mounted on top of Porteus, is shown in Figure 2. Dimensions are in meters. Note that the center of the antenna would be 15.75 meters (52 feet) above the roof of Porteus.The smallest vertical angle of radiation which would impact any portion of the top floor of Porteus Hall would be about 45-degrees.

The angular distribution (in the vertical plane) of the electric field (E) from a 4-bay antenna is shown in Figure 3. Note that the value of the E-field in the secondary peaks does not exceed 0.25 of the maximum value of the E-field in the main beam. Since the power (or intensity) in the beam varies as the square of the electric field, this means that the intensity reaching Porteus' to floor will always be less than (0.25)-squared times that in the main beam, or 1/16th the main beam power.

The radiation intensity in the main beam can be calculated from the standard antennae formula,

$$S = \frac{K \cdot P\ G}{4\pi R^2}$$

where P = total radiated power (in watts), R = radial distance from antenna to observation point, G = antenna "gain" (r.m.s. value), and "K" takes into account beam polarization and time-averaging effects. For KTUH the power is 3000 watts, and R = 16 to 24 meters (various distances from Antenna midpoint to Porteus rooftop points). If the power were radiated in an exactly spherical pattern, and if K = 1, the radiation intensity over a spherical surface of radius R would be just $P/(4\pi R^2)$ ~~R²~~) --- "isotropic radiation".

The antenna concentrates the radiation in a fairly narrow horizontal plane, in order to reach greater distances with a detectable signal. The "antenna gain factor, G" is a measure of this concentration of power into the main beam; i.e., G is how much more intense the FM intensity is at zero degrees than a completely isotropic radiation pattern. A detailed calculation for this 4-bay turnstile antenna yields G= 2.1, so that the main beam intensity is 2.1 times greater than it would be for an isotropic radiation pattern.

The factor K/4 = 0.64, so that the formula for the radiation intensity (power per unit area) in the main beam becomes:

$$S = 0.64\ \frac{P\ G}{\pi R^2}$$

showing that the intensity falls off as the square of the distance from the antenna (if R is at least several wavelengths). For a nominal distance of R = 15 meters, P = 3000 watts, and G = 2.1, the FM radiation intensity in the main beam calculates to be:

$$S\ (0\ deg) = 0.57\ mW/cm^2,$$

FCC permissible radiation intensity (for 24-hr. continuous exposure of humans) is 1.0 mW/cm^2, so that even in the main beam (15 meters distant) the KTUH beam is within the FCC limit of "maximum permissible intensity".

The angular distribution (in the vertical plane) of the electric field (E) from a 4-bay antenna is shown in Figure 3. Note that the value of the electric-field in the secondary peaks does not exceed 0.25 of the maximum value of the E-field in the main beam. Since the power (or intensity) in the beam varies as the square of the electric field, this means that the intensity reaching Porteus' to floor will always be less than (0.25)-squared times that in the main beam, or 1/16th the main beam power. Thus the maximum intensity on Porteus' roof wil be"

$$S\ (max,\ roof) = (0.57/16) = 0.035\ mW/cm^2$$

Which is 30x lower than FCC-acceptable radiation levels of 1.0 mW/cm^2.

I conclude, therefore, that the FM radiation from KTUH 4-bay antenna as described, with 3000 total radiated power, does NOT constitute a radiation hazard to occupants of the top floor (or ANY floor) of Porteus Hall.

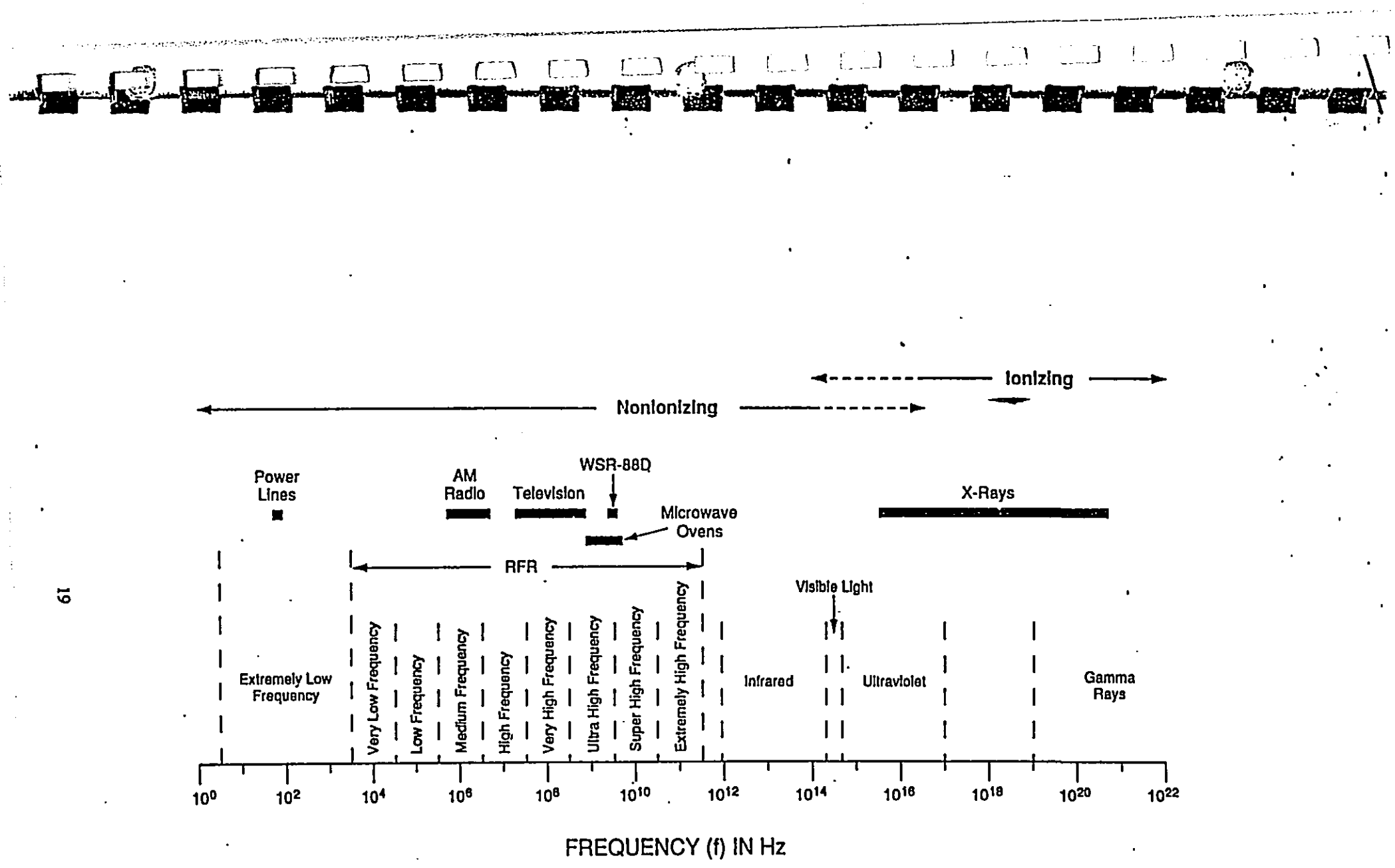


FIGURE ~~1-1~~ 1 The Electromagnetic Spectrum

PROPOSED INSTALLATION OF KTUH ANTENNA ON PORTEUS HALL

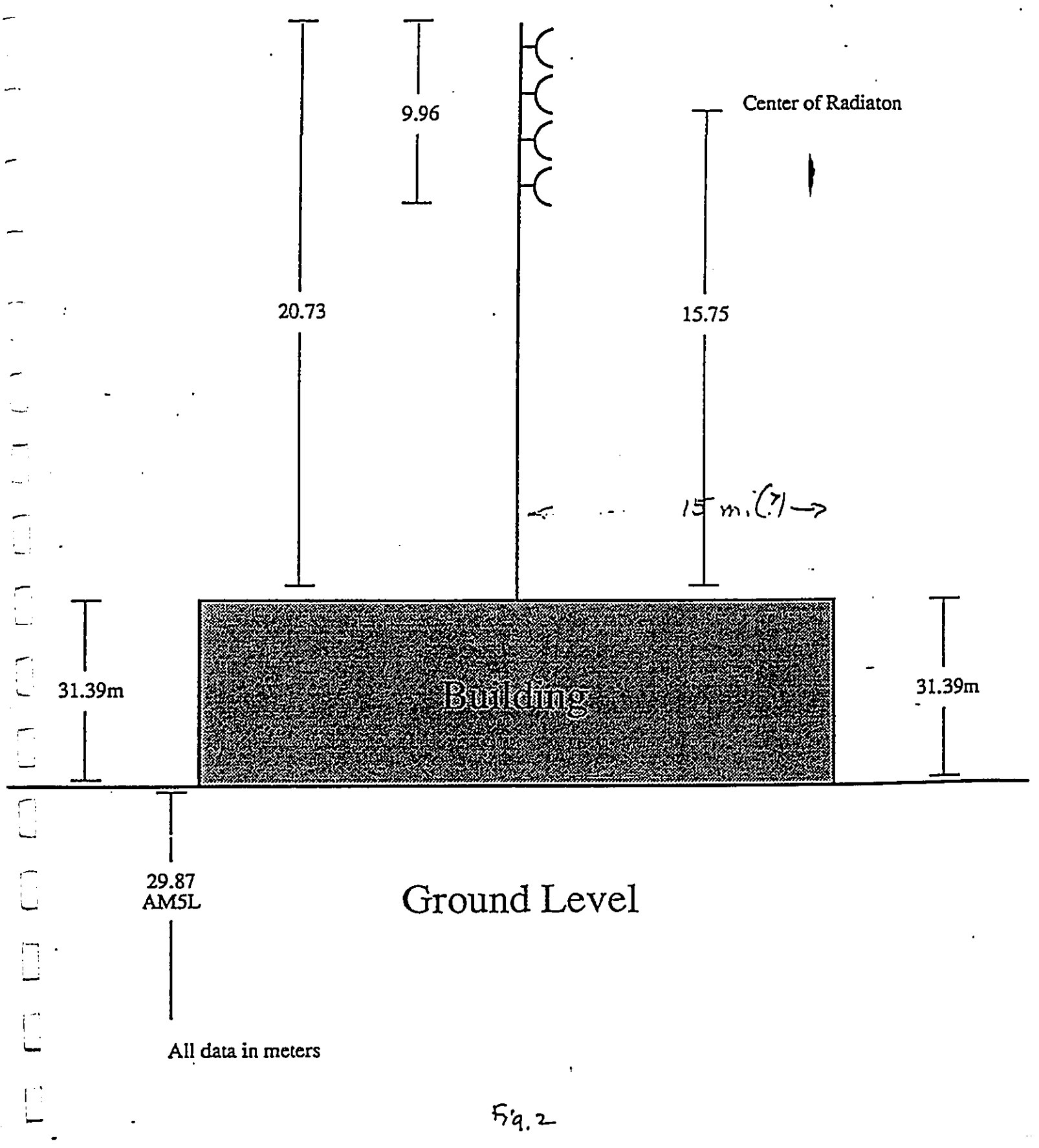


Fig. 2

Cetec Antennas

ELEVATION PATTERN
JSCP - 4

DATE: 9/1/79
RMS GAIN= 2.1

BEAM TILT= 0
NULL FILL= 0%

FIELD	ELEVATION	.1	.2	.3	.4	.5	.6	.7	.8	.9	1
.236	20.00	:									
.188	18.00	:	*								
.095	16.00	:	*								
.039	14.00	:	*								
.205	12.00	:		*							
.389	10.00	:			*						
.575	8.00	:				*					
.745	6.00	:					*				
.881	4.00	:						*			
.970	2.00	:							*		
1.000	0.00	:								*	
.970	-2.00	:								*	
.881	-4.00	:								*	
.745	-6.00	:							*		
.575	-8.00	:						*			
.389	-10.00	:					*				
.205	-12.00	:				*					
.039	-14.00	:	*								
.095	-16.00	:	*								
.188	-18.00	:		*							
.236	-20.00	:			*						
.243	-22.00	:			*						
.213	-24.00	:			*						
.156	-26.00	:		*							
.082	-28.00	:	*								
.004	-30.00	:	*								
.068	-32.00	:	*								
.128	-34.00	:		*							
.169	-36.00	:		*							
.189	-38.00	:		*							
.187	-40.00	:		*							
.165	-42.00	:		*							
.128	-44.00	:		*							
.079	-46.00	:	*								
.024	-48.00	:	*								
.034	-50.00	:	*								
.090	-52.00	:		*							
.142	-54.00	:		*							
.186	-56.00	:			*						
.223	-58.00	:				*