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UNIVERSITY OF HAWAI'I

SENIOR VICE PRESIDENT FOR ADMINISTRATION

July 8, 1994

Dr. Bruce Anderson, Director
Office of Environmental Quality Control
State of Hawaii
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Subject: Final Environmental Assessment (EA) for a Weather Forecast Office at the University of Hawaii at Manoa, TMK No. 2-8-23:3 Portion, Honolulu, Oahu, Hawaii

The University of Hawaii has reviewed the final environmental assessment (final EA) for the subject project. This project is not expected to result in any significant short-term nor long-term adverse impact on the natural environment; therefore, a Negative Declaration is warranted. Please publish a notice of availability for this project in the July 23, 1994 OEQC Bulletin.

Enclosed are a completed OEQC Bulletin Form and four (4) copies of the final EA. If there are any questions, please contact Mr. George Atta or Gwen Zakahi of Group 70 International, Inc., at 523-5866.

Sincerely,

Ralph T. Horii, Jr.
Senior Vice President for Administration

Enclosures

2444 DOLE STREET • BACHMAN HALL • HONOLULU, HAWAI'I 96822 • TEL (808) 956-8903 • FAX (808) 956-9212

1994-07-23-OA-FEA- University of Hawaii Weather Forecast Office

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA

ENVIRONMENTAL ASSESSMENT

Applicant:

Fluor Daniel, Inc.
4600 Madison Avenue, Suite 900
Kansas City, MO 64112

Accepting Agency:

University of Hawaii at Manoa
2444 Dole Street
Honolulu, HI 96822

June 1994

WEATHER FORECAST OFFICE,
UNIVERSITY OF HAWAII AT MANOA

Honolulu, Hawaii

ENVIRONMENTAL ASSESSMENT

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Fluor Daniel, Inc.
4600 Madison Avenue, Suite 900
Kansas City, MO 64112

Accepting Agency:

University of Hawaii at Manoa
2444 Dole Street
Honolulu, HI 96822

Prepared by:

Group 70 International, Inc.
Architects•Planners•Interior Designers•Environmental Planners
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813
(808) 523-5866

July 1994

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PROJECT SUMMARY

Applicant/Proposing Agency:	Fluor Daniel, Inc. (Agent) 4600 Madison Avenue, Suite 900 Kansas City, MO 64112
Accepting Authority:	University of Hawaii at Manoa 2444 Dole Street Honolulu, HI 96822
Agent/Planning Consultant:	Group 70 International, Inc. 925 Bethel Street, Fifth Floor Honolulu, Hawaii 96813 George Atta, Vice President (808)523-5866
Land Owner:	State of Hawaii (Board of Regents of the University of Hawaii)
Project Location:	Hawaii Institute of Geophysics Building University of Hawaii at Manoa Honolulu, Hawaii
Tax Map Key:	(TMK) 2-8-23:3 Portion
Land Area:	The HIG building occupies a land area of about an acre.
Land Use Classifications:	State Land Use District: Urban County Development Plan: Public and Quasi-Public County Zoning: R-5
Proposed Action:	The National Oceanic and Atmospheric Administration, National Weather Service is proposing to relocate their existing Weather Forecast Office to the Hawaii Institute of Geophysics (HIG) building on the University of Hawaii, Manoa Campus. The proposed project would involve renovation of approximately 10,000 square feet of interior space on the second floor shop wing and a portion of the adjacent lab wing in the HIG building. In addition, a number of exterior improvements are proposed to the building. These improvements

include: the addition of hurricane shutters, installation of a new stairway, addition of a generator building and diesel fuel tank to the northeast corner of the building, reconfiguration of the parking area, concrete slab work, and the installation of air condition equipment and antennae on the roof of the building.

1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared to identify and evaluate the existing conditions and potential impacts of the addition of a Weather Forecast Office on the second floor of the Hawaii Institute of Geophysics (HIG) Building on the natural and human environment. This Environmental Assessment has been 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 and funds.

1.1 IDENTIFICATION OF APPLICANT

Fluor Daniel, Inc. is the national agent contracted by the National Weather Service to implement this project.

1.2 IDENTIFICATION OF ACCEPTING AGENCY

The approving agency is the University of Hawaii.

1.3 IDENTIFICATION OF AGENCIES CONSULTED IN MAKING THE ASSESSMENT

Listed below are the agencies and organizations consulted in the preparation of the Environmental Assessment.

FEDERAL AGENCIES

United States Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service

STATE AGENCIES

Office of Environmental Quality Control
Department of Accounting and General Services
Department of Business, Economic Development and Tourism
Department of Business, Economic Development and Tourism, Land Use Commission
Department of Health
Department of Health, Environmental Management Division
Department of Transportation
Office of State Planning
Department of Land and Natural Resources
Department of Land and Natural Resources, State Historic Preservation Division
University of Hawaii at Manoa, Environmental Center
University of Hawaii at Manoa, Water Resources Research Center
University of Hawaii at Manoa, Facility Planning and Management Office
University of Hawaii at Manoa, School of Ocean and Earth Science and Technology

COUNTY AGENCIES

Board of Water Supply
Planning Department
Department of Land Utilization (DLU)
Department of Public Works
Department of Transportation Services
Fire Department

OTHER AGENCIES

American Lung Association
Hawaiian Electric Company
Hawaiian Telephone Company

1.4 SUMMARY OF MAJOR IMPACTS AND MITIGATING MEASURES

A. 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 addition, the proposed project may inhibit the use of the four parking stalls directly fronting the lab wing.

NOISE. Construction activities will result in an increase in nose levels during the 8 month renovation period. However, disruption to existing activities is anticipated to be minimal as the proposed project will not involve major earthmoving, piledriving or heavy demolition work.

AIR QUALITY. During construction, fugitive dust generation and on-site emission from construction equipment 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 exterior improvements.

B. LONG TERM IMPACTS

TRAFFIC AND PARKING. The proposed project will result in a net gain of 2 spaces. Existing trailers and temporary shop area storage spaces will be relocated to create two new stalls. The proposed project does result in an increase in parking demand for the University in that 25 weather service personnel will be utilizing the new facility. A number of parking facilities, traffic improvements and transportation system management practices which are being implemented for the campus as a whole should help to mitigate the impacts associated with the proposed project.

NOISE. The installation of mechanical equipment for air conditioning and air condensing equipment will result in a minor increase in noise levels within and without the complex. Noise levels for air conditioning equipment will be within acceptable limits as outlined in OSHA standards. The noise from mechanical

equipment will be kept to a minimum by proper placement and housing construction. In addition, internal lined duct work will be used to reduce any noise which may be transmitted into the building.

There will be periodic impacts from the emergency generator when it is either in use (during times of an emergency) or being tested. Because these events are likely to be infrequent, no significant impact is anticipated. Testing of the generator will be timed and coordinated with the University so as to minimize impacts on other uses.

VISUAL RESOURCES. The placement of eleven antennas on the roof of the shop and lab wing will have a limited impact to ground level views in the vicinity of the building as the view angle from the ground level 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 as: (1) the visual quality of the existing environment is already impacted by existing structures; (2) the overall size of the antennas 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 installation of air conditioning equipment on the shop wing roof will not significantly impact ground level views. The air conditioning equipment may be visible from upper floors of adjacent buildings, but should not significantly impact the overall visual quality of views from these buildings. Special consideration will be made to get the equipment toward the center of the building to better conceal the mechanical equipment from ground level views.

SOCIO-ECONOMIC. The proposed project will have a positive impact by providing opportunities for collaboration between faculty, staff and students. Additional federal dollars will be brought into the local economy for construction activity. The long-term impact of the collaboration may also result in more research and educational dollars to the State.

1.5 SUMMARY OF ALTERNATIVES CONSIDERED

Five alternative actions were examined. The no-action alternative would not result in any change to the present condition of the project site, however, this alternative is not in line with the National Weather Service's goals for modernization. The remaining alternatives include: (1) renovating and expanding the existing facility, (2) relocating the facility to another building on campus, (3) renovating an existing facility off-campus, and, (4) constructing a new facility off campus. All of these alternatives would not provide as good an opportunity for collaboration between the University's Meteorology Department and the National Weather Service as the proposed alternative. In addition, implementation of these alternatives could result in higher Federal government expenditures, greater displacement of existing uses, insufficient space for the National Weather Service, and additional time delays.

1.6 DETERMINATION

Based upon the findings presented in this Environmental Assessment and supporting technical studies, the potential impacts of the construction and operation of the proposed Weather Forecast Office have been sufficiently examined and discussed. After reviewing the significance criteria outlined in Section 11-200-12, EIS Rules, Contents of Environmental Assessment, it has been determined that the action is not expected to result in significant adverse effects on the natural environment. Further consideration of the project's impacts through preparation of a Draft Environmental Impact Statement is not necessary.

2.0 PROJECT DESCRIPTION

2.1 PURPOSE AND NEED FOR THE PROJECT

The U.S. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS) is undergoing a nationwide upgrade and modernization of their weather forecasting facilities. As part of this upgrade, the National Weather Service is interested in relocating their existing facility, currently housed at the Honolulu International Airport, to the University of Hawaii, Manoa Campus. The leased facility will be located on the second floor of the shop wing and part of the adjacent laboratory wing of the Hawaii Institute of Geophysics (HIG) building on the Manoa Campus. The proposed facility will enhance collaborative research between the University and the National Weather Service. Additionally, college students will be able to get hands-on experience at the local NWS office.

2.2 LOCATION, OWNERSHIP AND SURROUNDING LAND USES

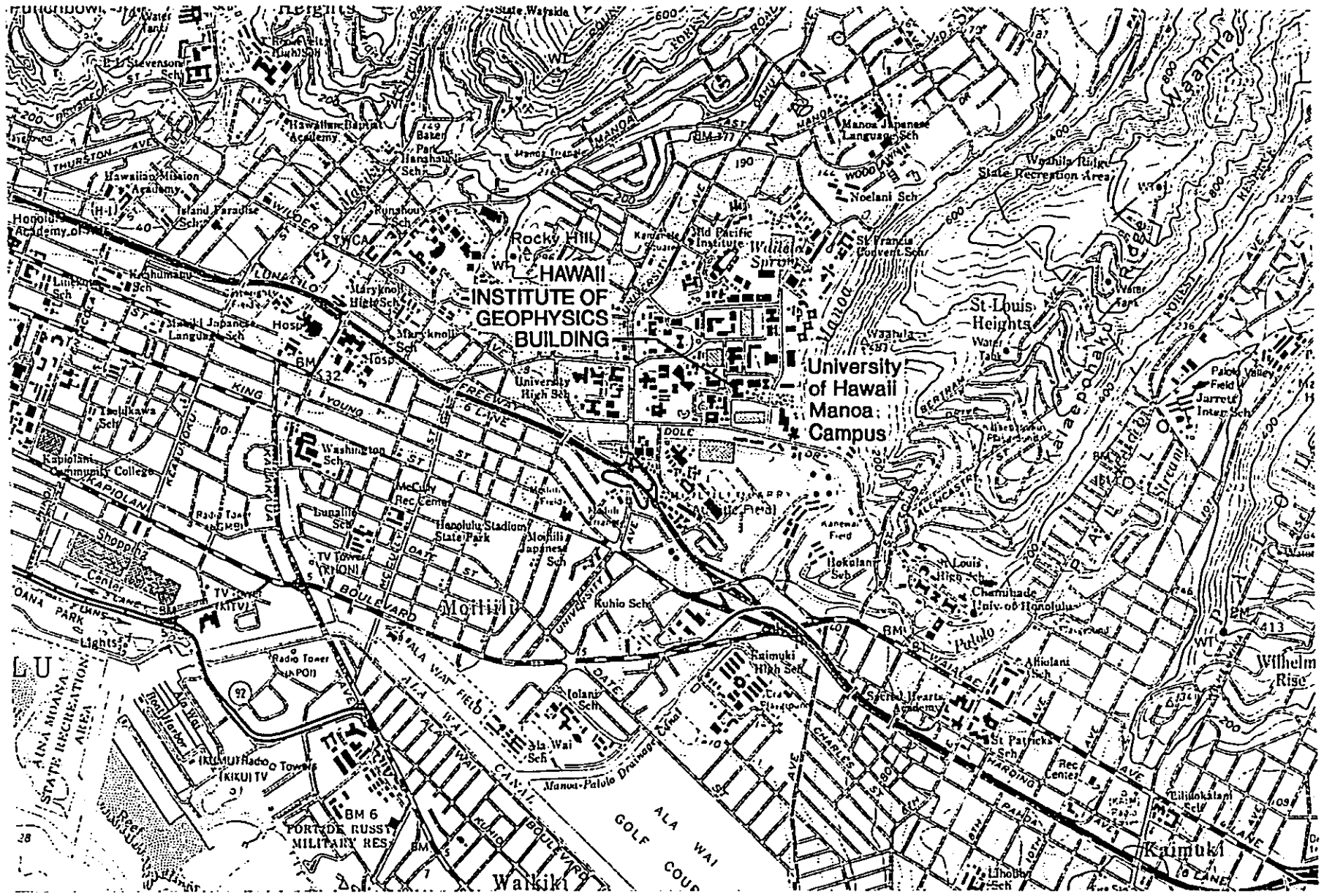
The site for the proposed Weather Forecast Office is located on the University of Hawaii, Manoa Campus in Honolulu on the island of Oahu. See Figure 1. The University of Hawaii is a multi-campus system of post-secondary educational institutions serving the State of Hawaii. The University of Hawaii at Manoa is the system's major comprehensive graduate and research campus with more than 19,000 students and is commonly referred to as the Manoa Campus.

The University of Hawaii Long Range Development Plan (UHLRDP) divides the Manoa Campus into four subareas: the Central Campus, the Upper/Central Campus, the Mauka Campus, and the Makai Campus. The HIG building is centrally located within the Central Campus on about an acre of land. The building occupies a portion of Tax Map Key: 2-8-23-3 which is owned by the University of Hawaii. See Figure 2.

The HIG building is bordered by Correa Road, Watanabe Hall, the Marine Sciences Building, Kuykendall Hall, and the Pacific Ocean Science and Technology (POST) building (which is currently under construction makai of the proposed project). The HIG building is strategically located in close proximity to a number of science and science related buildings which include: Watanabe Hall (Physics), Bilger Hall (Chemistry), Physical Science Building, Marine Science Building and Holmes Hall (Engineering). See Figure 3.

2.3 EXISTING FACILITY

The multi-story HIG building is comprised of three wings (the office wing, the laboratory wing and the shop wing). The three wings front a grassed courtyard on the eastern side of the building. Designed in 1961, this concrete building has a net floor area of approximately 83,800 square feet. The second floor is constructed with a concrete beam and girder system. The third and fourth floors are concrete double tees supported by girders. Structural modifications to the third floor to meet seismic requirements are scheduled to be completed by the University of Hawaii by June 1994 in accordance with a Memorandum of Understanding between NOAA and the University.



Source: USGS, 1983

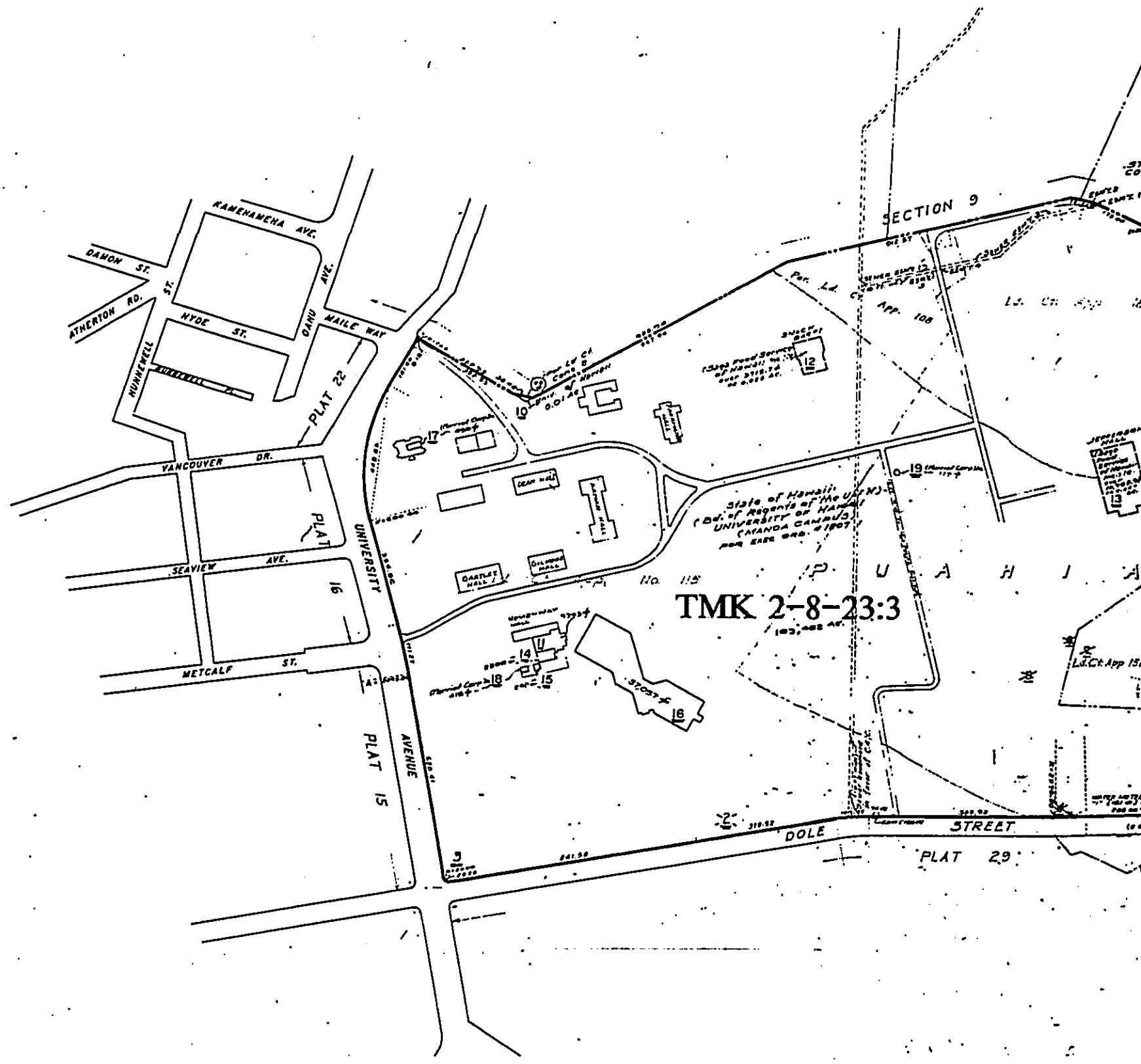
0' 1000' 2000' 4000' NORTH

LOCATION MAP

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA
ENVIRONMENTAL ASSESSMENT

FIGURE 1

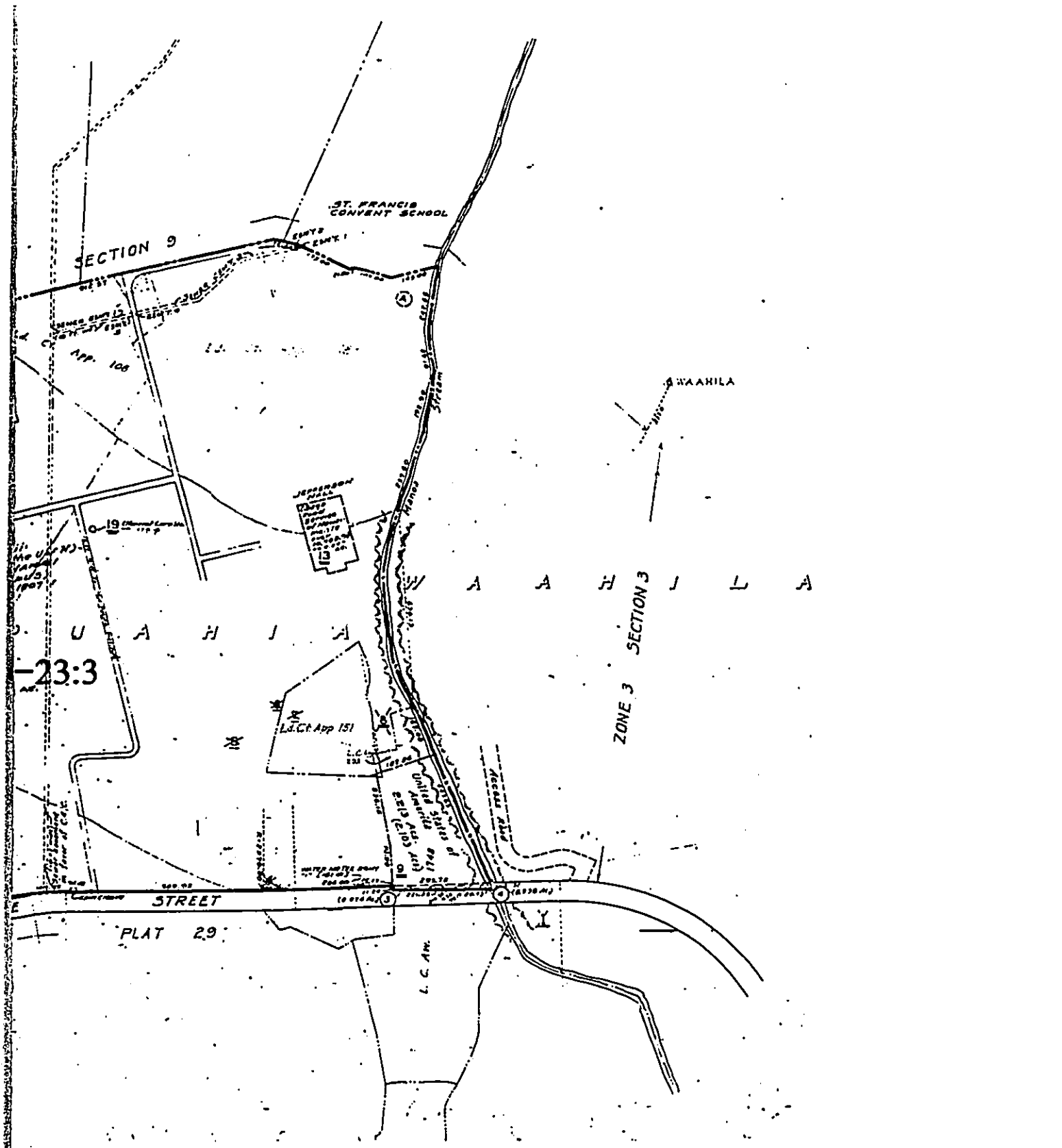
DOCUMENT CAPTURED AS RECEIVED



TAX MAP KEY

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA, ENVIRONMENTAL ASSESSMENT

DOCUMENT CAPTURED AS RECEIVED

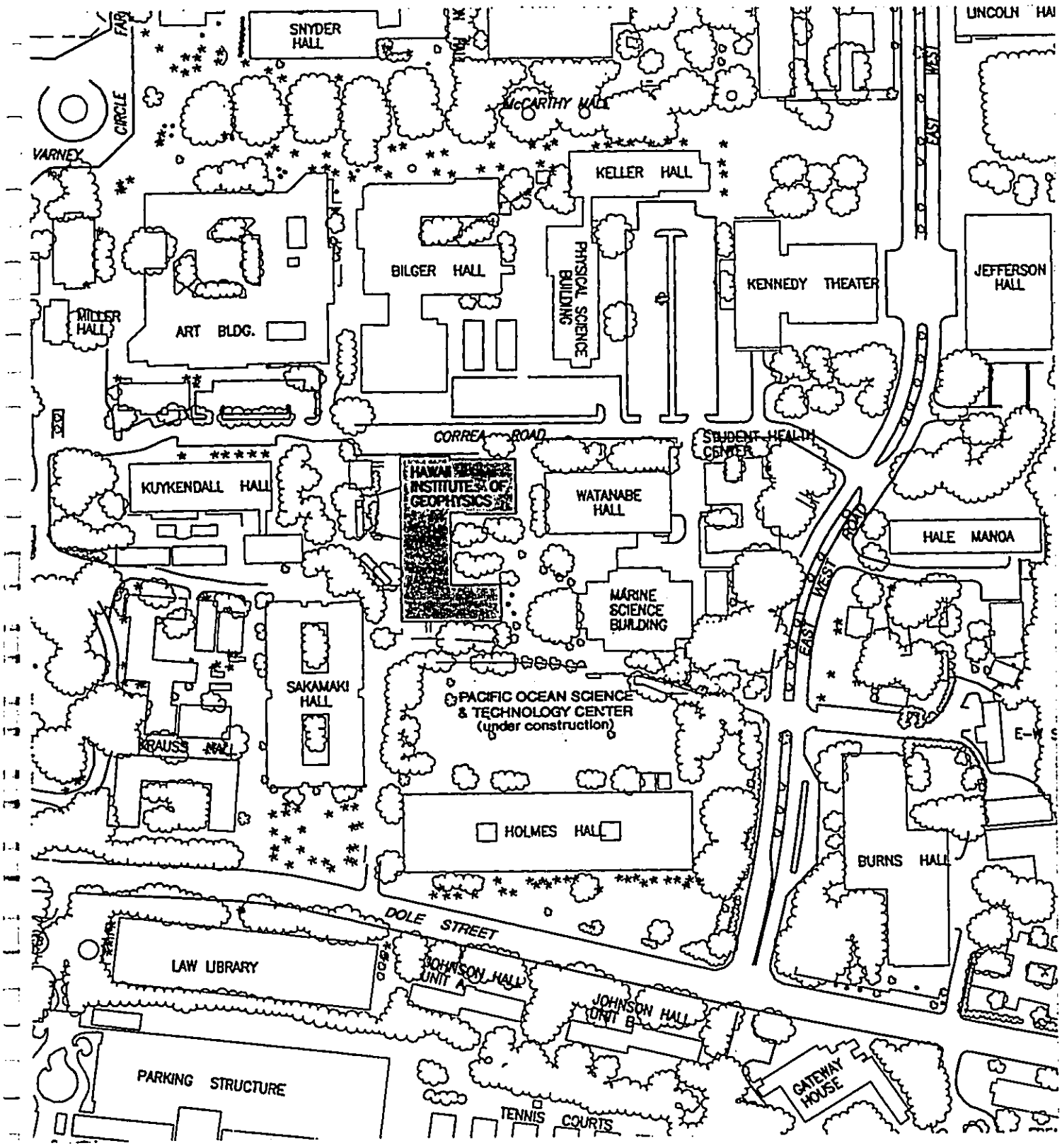


23:3

ASSESSMENT

FIGURE 2

DOCUMENT CAPTURED AS RECEIVED



Source: R. M.Towill

BUILDING LOCATION MAP

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA
ENVIRONMENTAL ASSESSMENT

FIGURE 3

There is some existing parking at the ground floor north of the shop and lab wings. A no parking zone, which is used for a trash dumpster and material/equipment delivery, is located directly north of the north/south corridor between the two wings. Three "maintenance-use" trailers are located north of the shop wing.

The building is currently occupied by the Meteorology Department, the Hawaii Institute of Geophysics, and the Geology and Geophysics Department. Aside from a few faculty offices and a Petrography laboratory, most of the area which will be occupied by the National Weather Service is currently vacant.

2.4 PROPOSED PROJECT

The National Weather Service is proposing to lease a portion of the HIG Building for their Weather Forecast Office. The Weather Forecast Office will occupy approximately 10,000 square feet of space on the second floor shop wing and part of the adjacent laboratory wing, on the mauka, diamond head side of the building. The proposed project includes renovations to the interior and a number of additions to the exterior of the HIG building. These are described below (Figure 4,5,6).

A. INTERIOR RENOVATIONS

Interior renovations to update the facility to FY 91 design standards for Weather Forecasting Office operations include the removal and replacement of existing doors, walls and flooring; and the installation of mechanical equipment for air conditioning in the equipment room. Renovations will limit second floor access to authorized personnel. Emergency exists for building occupants will be provided through stairwells locateed on the central and southern portions of the building.

B. EXTERIOR IMPROVEMENTS

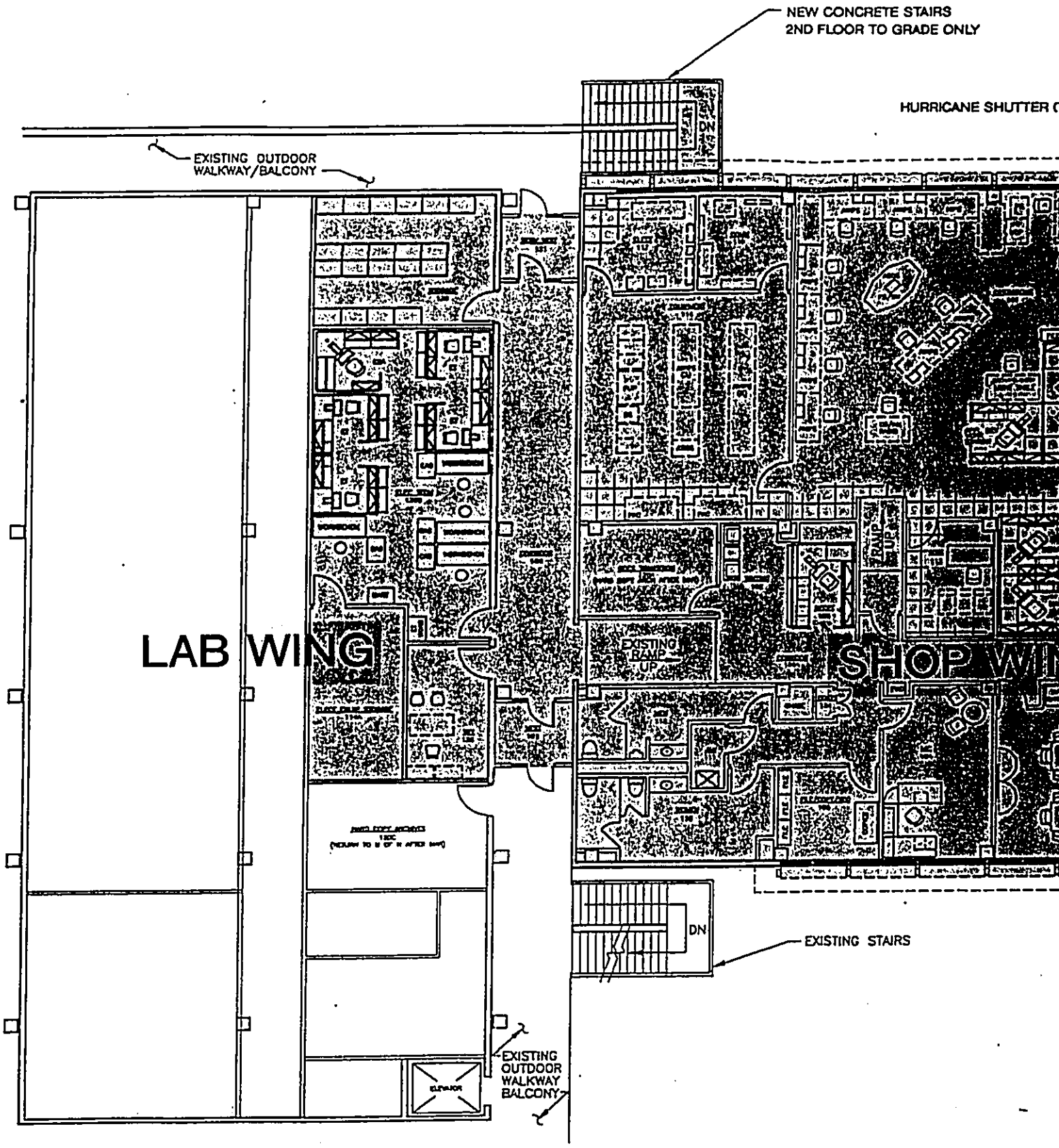
Exterior improvements will include:

1. The addition of hurricane shutters to the second and third floors of the building to prevent flooding during hurricanes.

2. A new stairway, will be added to the north side of the building providing direct access to the second floor from ground level.

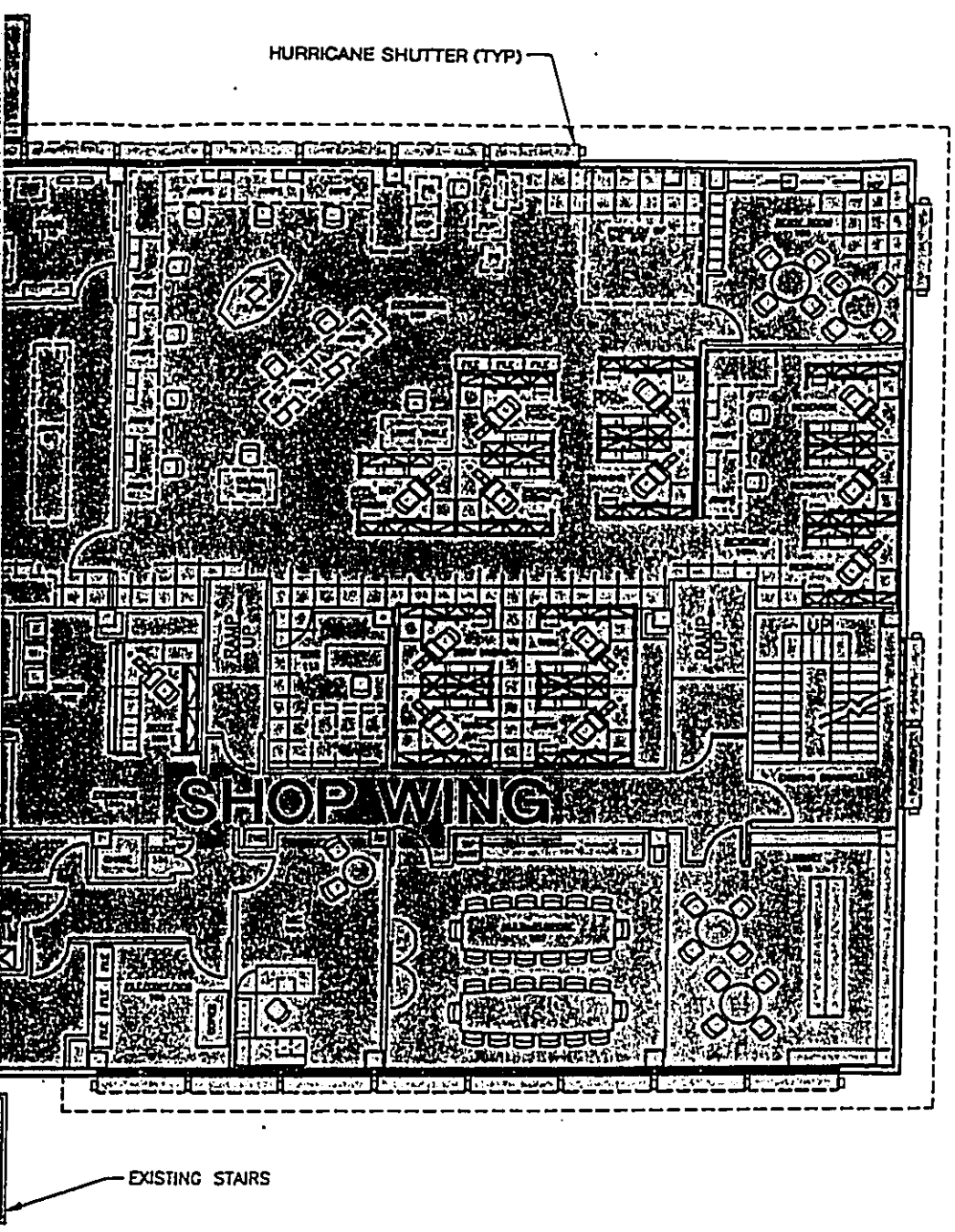
3. The addition of air handling units and condensers to the shop wing roof and the equipment room.

4. The placement of four antennas on the lab wing roof and seven antennas on the shop wing roof. The four antennas proposed for the lab wing include: a 4' loop antenna; a 8.2-foot (2.5 meter) dish antenna; a 6.6-foot (2 meter) dish antenna; and a 6.6-foot (2 m.) 5 element, Yagi antenna. Antennas proposed for the shop wing roof include: a 15.1-foot (4.6 m.) dish antenna; a 6.6-foot (2m.) dish antenna; a 9.8-foot (3 m.) dish antenna; a 4.6-foot (1.4 m.) dish antenna; a 6.6-foot (2 meter) 5 element, Yagi antenna; and radom wire. (See Figure 7).



PROPOSED INTERIOR SECOND FLOOR RENOVATIONS

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA, ENVIRONMENTAL ASSESSMENT

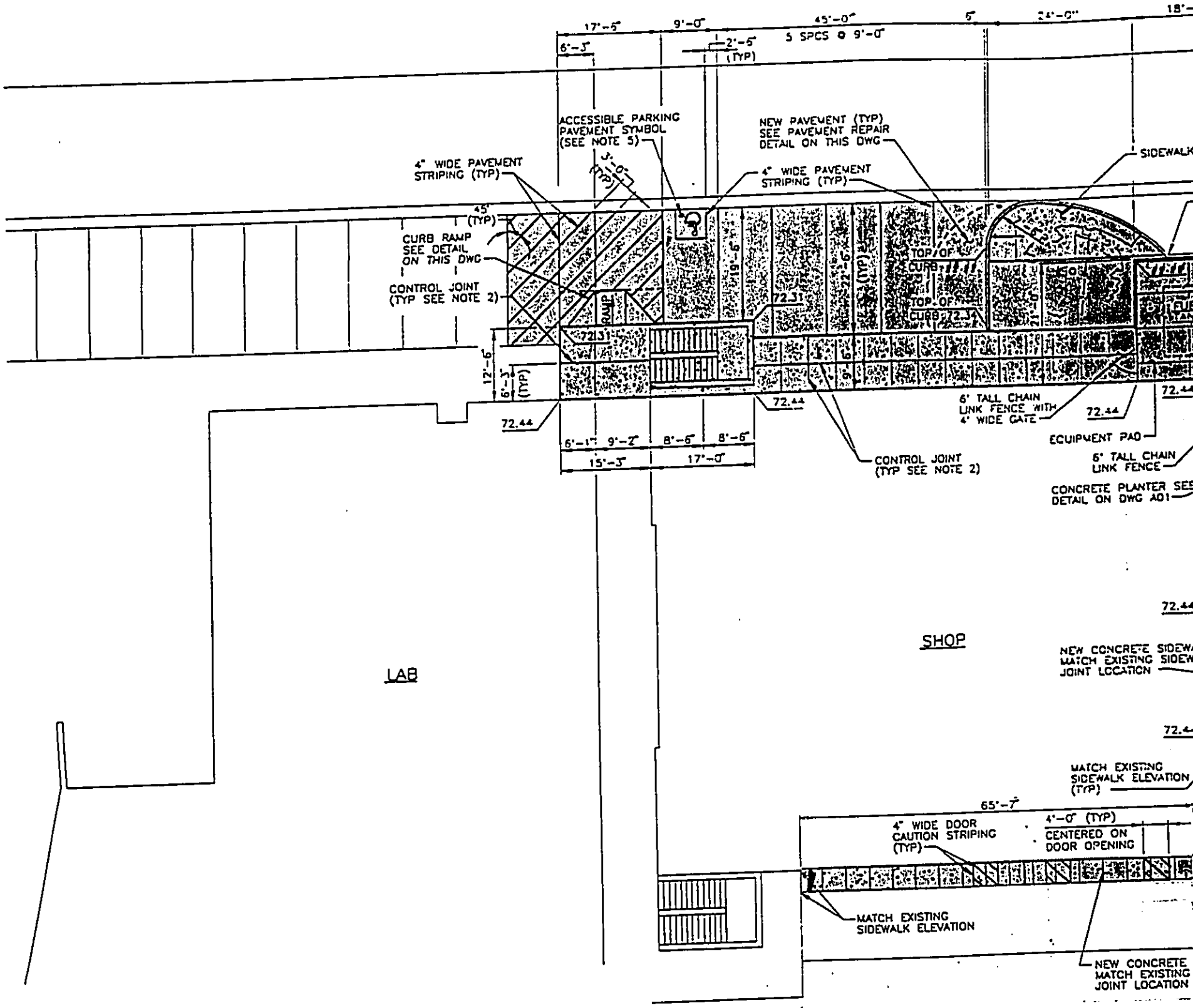


Source: U.S. Department of Commerce, National Weather Service

0' 8' 16' 32'

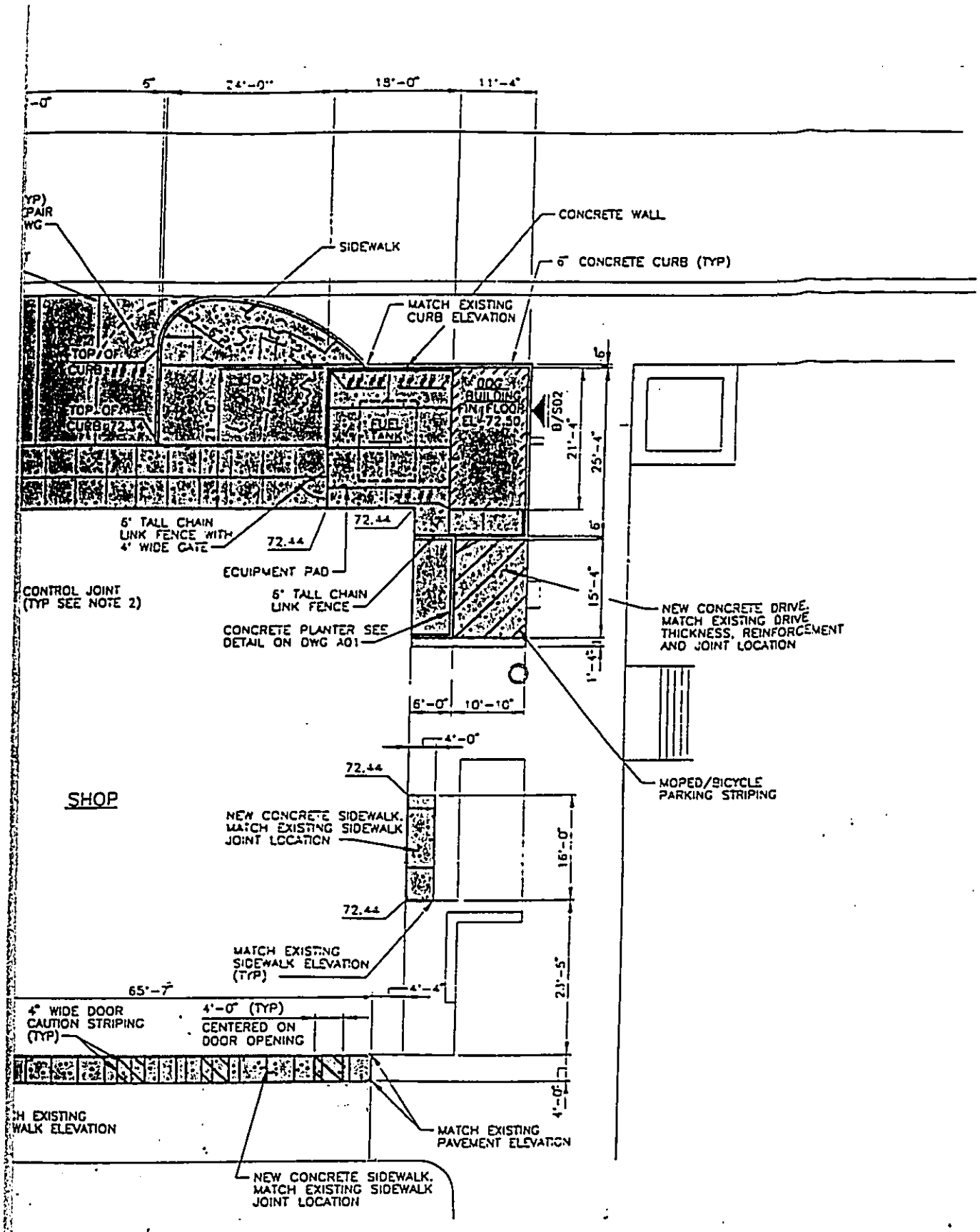
FIGURE 4

SSESSMENT



PROPOSED GROUND LEVEL IMPROVEMENTS

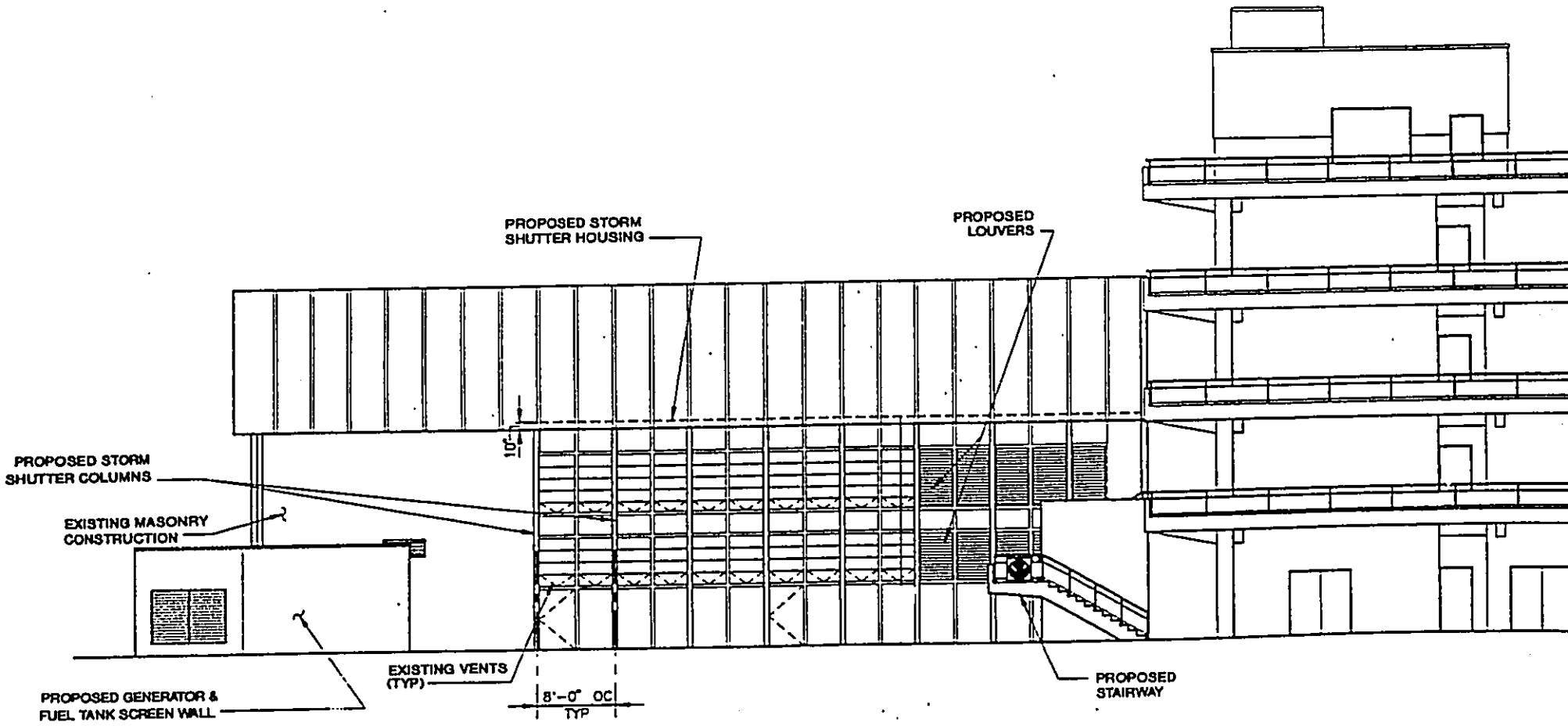
WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA, ENVIRONMENTAL ASSESSMENT



Source: Fluor Daniel & Gould Evans Architects

FIGURE 5

ASSESSMENT

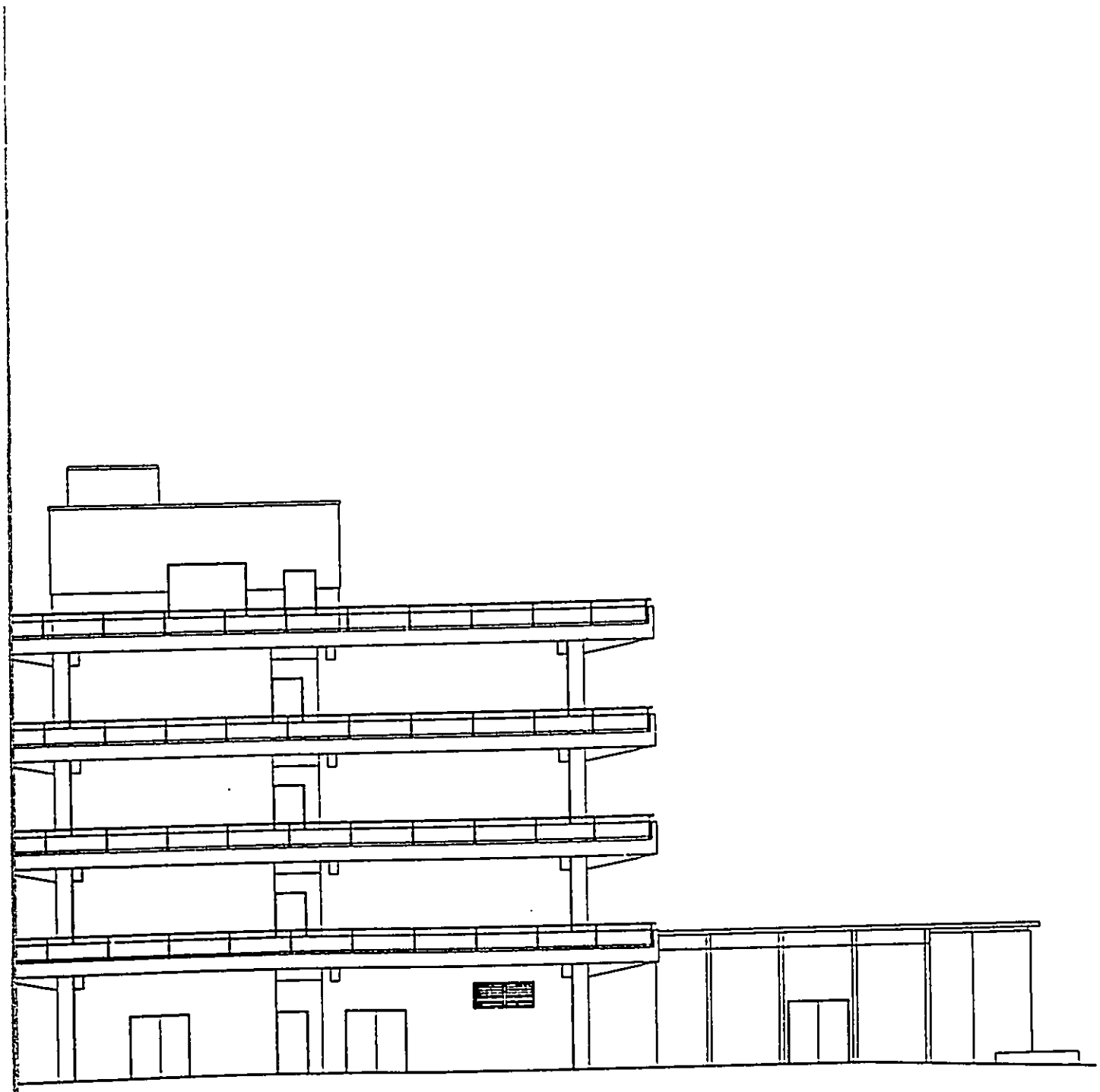


SHOP WING

LAB WIN

PROPOSED GROUND LEVEL IMPROVEMENTS - NORTH ELEVATION

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA, ENVIRONMENTAL ASSESSMENT

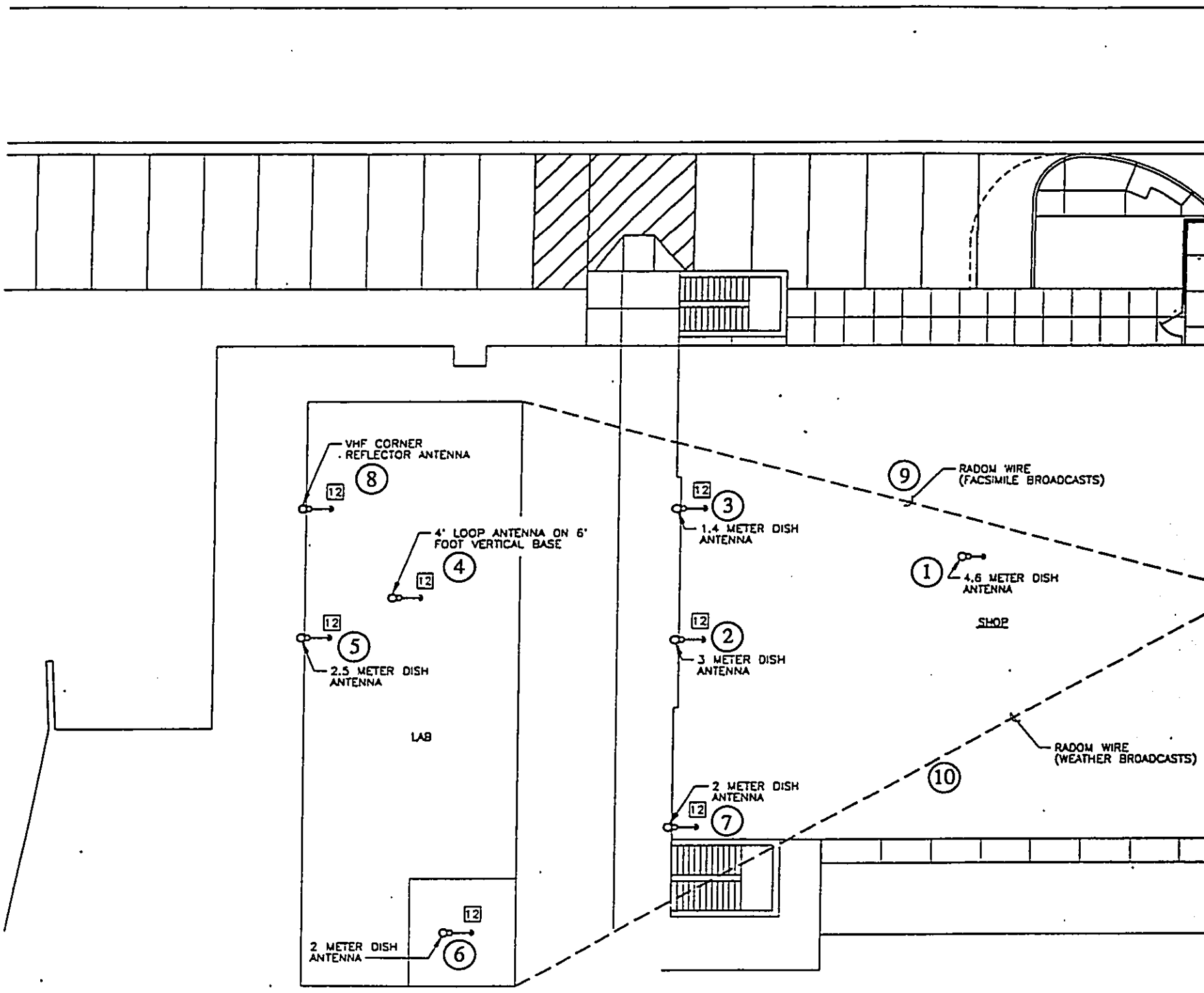


LAB WING

Source: Fluor Daniel & Gould Evans Architects

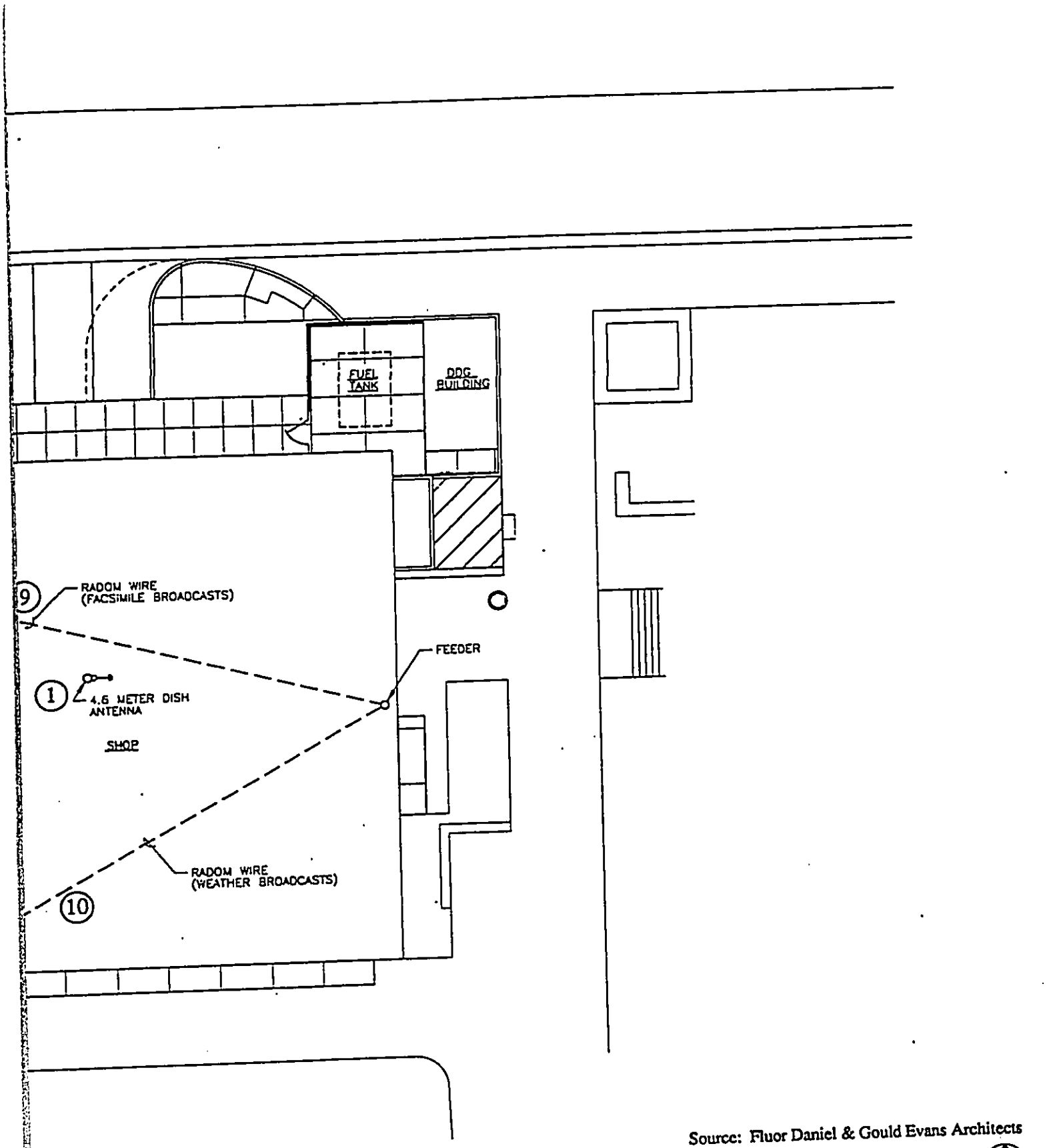
0' 10' 20' 40'

FIGURE 6



ROOF PLAN SHOWING ANTENNA LOCATIONS

WEATHER FORECAST OFFICE, UNIVERSITY OF HAWAII AT MANOA, ENVIRONMENTAL ASSESSMENT



Source: Fluor Daniel & Gould Evans Architects

FIGURE 7

SSESSMENT

5. A generator building and a diesel fuel tank will be located just outside the northeast corner of the shop wing. Three existing "maintenance-use" trailers and a storage bin will be relocated by the University of Hawaii to provide the space required for the generator equipment.

6. Six parking spaces (including one handicapped stall) will be reserved on the north side of the shop wing to allow for visitor and media parking. This will be especially important during severe storm situations. The proposed parking spaces are directly north of the shop areas just east of the no parking zone. (See Figure 5)

7. Additional concrete slab work will be required on the north side of the facility to accommodate the generator and fuel storage areas, stairwell, parking and handicapped ramps.

The Weather Forecast Office will employ approximately 50 employees. The operations will be utilized 24 hours a day, 365 days a year.

2.5 Project Schedule

The construction of the project will take approximately 8 months. It is scheduled to start in July 1994 and to be completed around March 1995.

2.6 Project Costs

The estimated construction cost of the renovation for the Weather Forecast Office facility is $1 million to $2 million.

3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING, ANTICIPATED IMPACTS, AND MITIGATIVE MEASURES

3.1 CLIMATE

A. EXISTING CONDITIONS

Average daily minimum and maximum temperatures range from the low 70's (degrees Fahrenheit) to the low 90's, 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 significant alterations to existing grades as the improvements are primarily renovations.

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 not significantly impact the existing soil character as the site is entirely urban in character and the proposed improvements (which are concentrated mainly on the second floor of the HIG building) will not involve large scale earthwork.

3.4 SURFACE WATER AND DRAINAGE

A. EXISTING CONDITIONS

The proposed project is designated as Zone X, "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 second floor of the existing building.

B. ANTICIPATED IMPACTS

The proposed project is not anticipated to have any significant impacts on existing drainage patterns or volumes because the site is already highly urban. Ground level activity covers 4,600 square feet and little impact is expected even during construction.

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 an existing gold tree (*Tabebuia donnell-smithii)* and coral tree (*Erythrina sp.*). The landscape strip has a ground cover of wedelia. Some bird species observed on 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

Construction activity will result in the disturbance and removal of existing vegetation in the vicinity of the ground floor improvements. To avoid disturbance to the existing gold tree, a temporary fence shall be placed around the tree to avoid disturbance to the root system during construction. Wildlife species currently utilizing the site will most likely be displaced into adjacent areas during construction.

3.6 ARCHAEOLOGICAL/HISTORICAL RESOURCES

A. EXISTING CONDITIONS

There are no known historic sites on the project site.

B. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

Because the proposed project does not require significant earthwork, no archaeological or historically significant resources are anticipated to be encountered during the construction period.

3.7 TRAFFIC AND PARKING

A detailed Traffic Impact Study was prepared for the 1987 LRDP update for the entire University of Hawaii/Manoa Campus by Austin, Tsutsumi & Associates, Inc. (October 1987). This report was later updated in June 1989.

A. EXISTING CONDITIONS

Regional access to the University of Hawaii Manoa Campus is provided by the Lunalilo (H-1) Freeway. The site is accessed through Correa Road via East West Road which connects to Dole Street. Correa Road is a two-laned, two-way road which provides internal access for pedestrians and vehicles to parking facilities and buildings within the Central Campus.

Parking on campus is part of an overall University parking system. Thus, parking for users of the HIG building may be located in various facilities and lots on campus. There is an existing parking area directly mauka of the HIG building. Parking facilities adjacent and in the vicinity of the proposed facility include Bilger Hall and the parking lot adjacent to the Physical Science Building. The Holmes Hall parking lot, which provided approximately 200 parking stalls, has been closed due to the construction of the POST building. A 62 car parking lot will be located adjacent to the new building to replace a portion of the stalls lost due to the construction of the POST building. Phase 2A of the Quarry parking structure is currently under construction. Upon completion this structure will provide 900 additional parking spaces for students, faculty and staff of the University of Hawaii.

B. ANTICIPATED IMPACTS

1. Short-term Impacts

Short-term traffic impacts will 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. Construction related traffic impacts are anticipated to be minimal as the project will provide approximately 20 construction related jobs during the peak period (about 1 to 2 months) and 10-11 jobs during the remainder of the construction period (6-7 months). In addition, operation of construction equipment and trucks may, on occasion, impede traffic in the area during construction.

During construction, the proposed project may inhibit the use of the four spaces and the adjacent loading area directly fronting the shop wing.

2. Long-term Impacts

Four parking stalls and a loading area are located mauka of the shop wing and are part of the parking area mauka of the HIG building. The proposed improvements will provide two additional parking spaces in this area. However, five of the six stalls will be used by

the National Weather Service for the media's vehicles during times of severe weather crisis. In total, the National Weather Services will require the use of 25 spaces including some in the Quarry parking structures to accommodate employee parking.

C. MITIGATIVE MEASURES

A number of mitigative measures will be generally employed to minimize the short-term and long-term impacts of the construction of University projects. While the Weather Forecast Office project will not add significantly to the current traffic and parking problems on the Manoa Campus, various improvements and programs are being implemented that will provide relief to the overall problem.

Some of these improvements and programs are as follows:

1. University Ave., Dole St. and Lower Campus Road have been widened to facilitate the flow of traffic into the Makai Campus (Quarry) during the morning peak hours and the evening sports events.

2. A second 1,800 car parking structure is being constructed in the Quarry in two increments -- each containing spaces for about 900 cars.

3. The State has recently installed a computerized traffic signal system along Dole St. and University Ave. to maximize traffic flow under existing traffic conditions.

4. The City bus service to the University is being upgraded as increased ridership warrants improvements to schedules. A City bus now comes into the Manoa Campus.

5. The Commuter Plan developed by the University in January 1991 calls for more car-pooling, the extensive use of public transportation, and the implementation of a campus shuttle service. The Plan is being implemented in stages.

6. On a long-term basis, more student and faculty housing facilities are being constructed on campus which would reduce the demand for more parking and traffic loads on existing street systems.

3.8 UTILITIES

A Utilities Master Plan for the University of Hawaii, Manoa Campus, was developed by Fukunaga & Associates, Inc. in March 1982 and updated in December 1990.

3.8.1. WATER SYSTEM

A. EXISTING CONDITIONS

The Board of Water Supply (BWS) owns and operates two separate water supply systems in the Manoa area. The BWS "high service" system, at an elevation of 405 feet above mean sea level, generally serves the central University of Hawaii Manoa Campus area. The "low service system," at an elevation of 180 feet, serves the COE Campus and the

Makai Campus of the University of Hawaii. Based upon the BWS policy of limiting service zones to 100 feet below the reservoir spillway, the dividing line between the two service zones lies along the 80-foot elevation, or slightly above Dole Street and Metcalf Street. The HIG building is supplied by the BWS "high service system." The renovation will be designed to meet Board of Water Supply Cross-connection control requirements.

B. ANTICIPATED IMPACTS

The BWS system is capable of providing ample amounts of water at adequate pressure to accommodate the University of Hawaii Manoa Campus. This availability will be confirmed at the building permit phase. The proposed Weather Forecast Office will not create a significant increase in the water demands of the HIG building.

3.8.2. WASTEWATER

A. EXISTING CONDITIONS

The HIG building is presently served by the City and County's 27-inch sewer line which empties into a 60-inch sewer tunnel running below Dole Street. The Central Campus area is served by existing sewerage.

B. ANTICIPATED IMPACTS

The existing wastewater system has adequate capacity to accommodate anticipated flows and no major changes to the present system are anticipated.

C. ELECTRICAL POWER SYSTEM

A. EXISTING CONDITIONS

The HIG building is currently served by a 12.4kV dual primary feed line. The primary switches and step-down transformers are all located in the first floor electrical room at the north end of the laboratory wing of the HIG building.

B. ANTICIPATED IMPACTS

According to past demand charts from the UH Facilities Electrical Planner, the capacity required for the WFO is available from the existing 208/120 volt transformers. In addition to upgrading and rewiring the existing electrical system, a new 175 kW government-furnished diesel driven generator will be installed in a hurricane-proof enclosure north of the HIG building at the east end. This generator will serve as a back-up energy source during power failure.

3.9 NOISE

A. EXISTING CONDITIONS

Noise levels in the vicinity of the project site are affected by student voices and vehicular noise. Traffic noise from Correa Road and Pope Road as well as Bilger and

Holmes Hall parking lots are generally not disruptive because vehicle speeds are low.

B. ANTICIPATED IMPACTS

1. Short-Term Impacts

The construction activities of the Weather Forecast Office will result in an increase in noise levels during the 8 month renovation and construction period. Construction related noise may affect faculty and staff offices (located directly above), and the shop (located directly below) the proposed facility. However, disruption to these activities is anticipated to be minor as the proposed project will not involve major earthmoving, piledriving or heavy demolition work. At most, disruption may be limited to about one to two months. Construction related noise should not seriously affect the teaching and learning processes in the neighboring, Bilger Hall, Kuykendall Hall, Sakamaki Hall, Marine Science Building and Watanabe Hall -- as these buildings are either substantially enclosed or air conditioned, or both.

2. Long -Term Impacts

No long-term noise impacts are anticipated by the operations of the Weather Forecast Office. After renovations are complete, noise generated from the second floor office may even be lower than the current situation due to the enclosure of the second floor. The installation of mechanical equipment required for air conditioning and air condensing equipment will result in a minor increase in noise levels. At a distance of 5 feet from the unit, the noise level ratings for the air conditioning equipment will be approximately 74 Db. This noise level will be drastically reduced as the distance from the unit increases and will be within acceptable limits as outlined in OSHA standards. There will be periodic impacts from the emergency generator when it is either in use or being tested. Field date for noise levels taken from another National Weather Service site for the same size and manufacture of generator had a decibal rating of 75 Db at a distance of 10 feet from the generator, 53 Db at a distance of 50 feet from the generator, and 53 Db at a distance of 100 feet from the generator. This particular site has the generator in a weather-proof metal enclosure which is noisier than can be expected at the project site, since a masonry building wall will be constructed around the generator. Because operation of the generator will be infrequent, impacts are not likely to be significant.

C MITIGATIVE MEASURES

The noise from mechanical equipment will be kept to a minimum by proper housing and placement. Internal lined duct work will be used to reduce any noise which may be transmitted into the building. Testing of the generator will be timed and coordinated with the University so as to minimize impacts on other uses.

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. No recent air pollutant monitoring data are available for the University area. A 1989 Air Quality Assessment by Barry D. Root and Barry D. Neal made reference to records of carbon monoxide concentrations at the DOH monitoring station in Waikiki, at Kalakaua Avenue, near the intersection with Saratoga Avenue. Their report stated that carbon monoxide concentrations recorded at the Waikiki station "are likely indicative of concentrations that occur at traffic congested locations in the project area due to the relatively short distance between the two locations and the similarity of dispersal conditions." No exceedances of the State 1-hour or 8-hour AAQS for carbon monoxide were recorded during 1986 and 1987. The project site is further from a major transportation corridor than the Waikiki station, and air pollution impacts are expected to be minimal.

B. ANTICIPATED IMPACTS

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 of the proposed project.

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 the capacity of the parking lot will remain unchanged. Increased vehicles from new employees will also impact air quality but this would be true regardless of the project as any alternative tenant would also influence air quality. Periodic venting by the emergency generator may be a occasional localized problem. The generator exhaust will be installed at an adequate distance from the building to dissipate fumes. The stack will extend approximately 2 to 3 feet above the generator building roof line. No debris will be emitted from the exhaust duct that will cause any property damage or health concerns. However, due to the infrequent nature of this occurrence it is not seen as a significant problem.

C. MITIGATIVE MEASURES

Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers will be alleviated by moving equipment and personnel to the site during off-peak traffic hours to the extent possible.

3.11 VISUAL RESOURCES

A. EXISTING CONDITIONS

The Koolau mountains, Waahila Ridge and Tantalus (Puu Ohia) serve as a backdrop for views in the vicinity of the HIG building. However, the opportunities for experiencing these views is limited due to a number of multi-story structures surrounding the HIG Building. There are some small antennae currently located on the roof of the building.

B. ANTICIPATED IMPACTS

The proposed project will not significantly alter the existing massing or overall appearance of the proposed structure. The proposed antennae and associated communications equipment will be located on the mauka sides of the shop and lab wing roof. Four antennae are proposed to be located on the lab wing roof. The remaining 7 antennas will be located on the shop wing roof. The largest antenna will be a 15-foot dish antenna, centrally located on the shop wing roof. With the exception of the radom wire, the remaining antennae proposed for the shop wing will be located on the western portion of the building, adjacent to the lab wing. The antennae located on the lab wing will be placed on the 5th floor and elevator shaft roof. The installation of the proposed antennae will have limited impacts on ground level views as the view angle from the ground level limits views to the outer portion of the roof. Visual impacts will mainly occur to views from the upper floors of adjacent building looking toward the HIG building. However, these impacts are anticipated to be minimal as: (1) the views are urban in character and are already impacted by the existing built environment; (2) the overall size of the antenna in comparison to the building itself will result in changes to a portion of the building roof, but will not result in a significant alteration to the overall form.

The installation of the new air conditioning equipment on the shop wing roof will not significantly impact ground level views. The air conditioning equipment may be visible from upper floors of adjacent buildings. As a mitigation measure, special considerations will be made to get the equipment toward the center of the building to avoid the possibility of seeing the equipment from the street.

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 which are designated as single-family residential. There is a height limit of 25 feet for R-5 districts, but this limit is

amended by the City Council-approved PRU/LRDP which sets different heights in different locations. Although no specific height is set for the HIG Building, 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 Manoa community surrounding the UH Manoa Campus is an older, stable neighborhood of mostly large single family residences. Most homes were built in the first quarter of this century, and are still maintained in good condition. The neighborhood gets its name from the valley formed by two mountain ridges of the Koolau mountain chain. Waahila Ridge borders the University on the east, and residential properties and private educational institutions border much of the rest of the perimeter. Manoa is generally regarded as a very desirable place to live, and hence, home values are extremely high. Many University students, faculty and staff live in the surrounding community.

The HIG building is currently occupied by the Meteorology Department, the Hawaii Institute of Geophysics, and the Geology and Geophysics Department. The area in which the proposed facility will be located was once used as offices for faculty, a library, and a publications office. These activities have recently been relocated to other areas in the HIG building and the Marine Science Building. Currently, all of the shop wing and a majority of the laboratory wing which will be occupied by the National Weather Service is presently vacant. Remaining activities in the laboratory wing include a few faculty offices and a Petrography Laboratory.

B. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

1. Short-Term Impacts

During peak periods, the proposed project will create employment opportunities for 20 construction related jobs. The normal work force employed for the construction of the project will be about 10-11 jobs.

Construction of the proposed project will not disturb any vibration sensitive equipment within the HIG Building.

2. Long-Term Impacts

No significant impacts are anticipated due to the loss of space on the second floor of the HIG building as most of the space is currently vacant and the relocation of remaining activities will be incorporated internally throughout the School of Ocean and Earth

Science and Technology (SOEST). The installation of the proposed generator building and fuel tank will result in the relocation of three "maintenance-use" trailers to another place adjacent to the HIG building.

The proposed project will provide a number of opportunities for collaboration between faculty, staff and students which include: (1) joint research opportunities between the staff of the National Weather Service and the Meteorology Department; (2) the National Weather Service staff will serve as part-time faculty on student committees; (3) students will be provided an opportunity for hands-on experience without having to leave campus; and (4) Weather Service staff who wish to pursue graduate research will have easier access to the University and its facilities. The long-term impact of the collaboration may also result in more research and educational dollars to the State.

3.14 PEDESTRIAN PATHWAYS

A. EXISTING CONDITIONS

The existing pedestrian pathway along the eastern side of the building has a width of about 24 feet. A portion of the pathway is often used as a service parking area for vehicles. This activity reduces the useable width of the pathway.

B. ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

Construction of the generator building will reduce the width of the pedestrian pathway to about 15 feet. Although this is a significant reduction in width, the pathway width complies with the Long Range Development Plan requirements for malls and pathways which specifies a width of 20 feet for malls and a range of widths from 6 to 12 feet for pathways. Because this pathway is not identified as a major mall, a width of 15 feet should be sufficient to accommodate pedestrian traffic along the pathway. In addition, removal of the existing trailers and service parking at the entry to the pedestrian pathway should help improve the overall character for pedestrians in the immediate vicinity of the pathway.

3.15 HAZARDOUS MATERIAL

Asbestos containing material used for piping insulation has been identified within the structure. This material will be removed prior to renovation and occupancy.

3.16 INTERFERENCE WITH COMMUNICATIONS SYSTEMS

The proposed antennas will both receive and transmit information. The National Weather Service will modify the antennas as necessary to eliminate any interference problems as they arise in the future.

3.17 POLICE AND FIRE

The relocation of the Forecast Station does not add significantly to increased demand for police and fire protection. The increase in service population is minimal. On-site fire protection requirements are being coordinated with the Honolulu Fire Department.

The Fire Chief has reviewed the plans and has no objections to the proposed plans.

3.18 EMF

A. Existing Conditions

Electromagnetic fields exist wherever electricity is used. The HIG building has existing equipment and antennae which produce various levels of EMF at the present time. The current literature on EMF is inconclusive and the debate on impacts continues. Rooftop antennae are currently located on both the shop and the lab wings.

B. Anticipated Impacts and Mitigative Measures

The proposed project will increase the number of antennae and equipment in use at the HIG building. Therefore, it is anticipated that there will be some increase in the frequency and intensity of EMF on the site. However, it is felt that no mitigative measures are necessary since the research results are inconclusive, and the types of antennae which will be used have been in use for many years and to date we are unaware of any report of hazardous impacts. A more detailed description of the antennae and their intensities and frequencies are found in the appendix to this EA. No mitigative measures are proposed.

4.0 UNAVOIDABLE ADVERSE IMPACTS

4.0 UNAVOIDABLE ADVERSE IMPACTS

The construction of the Weather Forecast Office 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. Temporary increases in soil erosion may result from construction operations, and minor amounts of debris may be carried off-site in surface runoff water.

2. Operation of construction equipment, trucks and worker vehicles may, on occasion, impede traffic in the area during the construction period.

3. 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 DOH regulations.

4. The visual character of the area will be affected by construction activities and by the presence and operation of construction equipment.

5. Increases in noise levels will result from construction activities. Noise and construction may cause minor disruption to activities on the floors directly above and below the proposed facility.

5.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction and maintenance of the Weather Forecasting Office will involve the irretrievable commitment of certain physical and fiscal resources. The major resource commitment will be the loss of academic spaces on the second floor of the HIG building for the development of the project. Financial resources, construction materials, manpower, and energy will all be expended to construct, renovate, and maintain these facilities.

The impact of utilizing these resources should, however, be weighed against the benefits of providing upgraded and improved weather forecasting facilities, increased research collaboration and increased educational opportunities for university faculty and students.

6.0 ALTERNATIVES

Five alternatives were examined for their feasibility as alternatives to the proposed action. The following alternatives were examined: (1) no-action, (2) renovating the existing Weather Forecast Office structure, (3) relocation to other campus buildings, (4) renovating an existing building off-campus, and (5) constructing a new facility off-campus.

6.1 NO-ACTION

The no-action alternative would result in the Weather Forecasting Office remaining at its current location. This alternative would result in no change to the present environmental characteristics of the project site; to employment, to government expenditures, to infrastructure services, to public services, and to traffic congestion. However, this alternative is not in line with federal policy to upgrade existing weather station facilities. The existing facility is aging and continued operations without improvements will make it difficult for the Weather Forecast Office to carry out its daily forecasting operations in an efficient modern manner. Opportunities for collaboration between the University and National Weather Service staff will remain limited.

6.2 RENOVATE AND EXPAND EXISTING FACILITIES

This alternative involves the renovation and expansion of the existing Weather Forecast facility which is located at the Honolulu International Airport. This alternative would not result in the displacement of existing University activities, however, it would not realize the benefit of collaboration between the National Weather Service and the University.

6.3 RELOCATE TO ANOTHER CAMPUS BUILDINGS

This alternative would involve locating the Weather Forecast Office to another building on or adjacent to the University of Hawaii campus. The federally owned National Marine Fisheries Service Building was examined as a potential site for the relocation of the Weather Forecast Office. Implementation of this alternative would result in approximately the same, generally negligible, environmental impacts to topography, soils, drainage, water quality, flora, fauna, noise, and air quality as the proposed action. The alternative would probably have similar impacts on employment and utilities as it would involve approximately the same floor area as the proposed project. One advantage of this alternative is that University facilities will remain available for University users. However, the NMFS building does not appear as feasible a site as the HIG building for the following reasons: (1) the existing space seems insufficient to accommodate the National Weather Service program requirements for a Weather Forecast Office; (2) it would be difficult to find space to relocate the activities displaced by the Weather Forecast Office; and (3) the proposed facility is not an optimal fit with existing uses and would not promote the type of synergistic relationship which would occur if the facility were located in the HIG building.

6.4 RENOVATE AN EXISTING FACILITY OFF-CAMPUS

This alternative would involve the renovation of an existing facility outside of the University of Hawaii campus. Depending on the facility selected, implementation of this alternative would result in approximately the same environmental impacts as the proposed project. The alternative would not result in any loss of existing office space or displacement of University users, however, it would not realize the benefit of collaboration between the National Weather Service and the University. There are no obvious sites which would provide an appropriate home for the proposed facilities and costs and time delays associated with the relocation also remain uncertain.

6.5 CONSTRUCT A NEW FACILITY OFF-CAMPUS

This alternative would involve the construction of a new facility outside of the University of Hawaii campus. Construction of a new facility would result in greater impacts to topography, soils, drainage and water quality, flora, fauna, noise and air quality, employment, federal expenditures, and utilities compared to the proposed project. The costs of acquiring a new property, time delay due to the construction of a new facility, and environmental impacts associated with the construction of a new facility make this alternative less desirable. Finally, implementation of this alternative will not promote collaboration between the University and the National Weather Service.

7.0 SUMMARY OF UNRESOLVED ISSUES

7.1 STRUCTURAL/FOUNDATION WORK

In accordance with a Memorandum of Understanding between the University of Hawaii and NOAA, structural modifications to the second and third floors to meet seismic requirements must be completed before the National Weather Service can commence work on the proposed project. This work is scheduled to be completed by June 1994. Any delay to the completion of the structural modifications could affect the overall schedule for the completion of the proposed renovations for the Weather Forecast Office.

7.2 INCREASED PARKING DEMAND

The 25 additional stalls requested by the National Weather Service will need to be accommodated. The location and number of these stalls is under negotiation.

8.0 RELATIONSHIP TO EXISTING POLICIES AND PLANS

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

8.1 THE HAWAII STATE PLAN

This section includes an assessment of the proposed Weather Forecast Office to the applicable goals, objectives, and policies of the Hawaii State Plan, Chapter 226 HRS.

8.1.1 OBJECTIVES AND POLICIES

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

"(11) Maintain acceptable working conditions and standards for Hawaii's workers."

Discussion: The proposed project is part of the National Weather Service's nationwide upgrade of weather facilities. Upgrading the existing facility will provide better working conditions for employees and upgrade the facility to the National Weather Service's new standards.

Section 9(a): Objectives and policies for the economy-federal expenditure:
Section 9(b): Applicable policies:

"(1) Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment."

"(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment."

"(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii."

Discussion: The proposed project will provide for the continued long-term employment of approximately 50 federal employees. As opposed to building a new structure to house the proposed facility, the Weather Forecast Office will be located on the second floor of an existing building on the University of Hawaii campus. Because the proposed use is consistent with existing uses within the building, this action serves

to minimize adverse impacts to existing communities and the environment. Coordination and communication between federal, state and county agencies will be maintained and enhanced through: (1) collaboration between National Weather Service employees and University faculty and staff, and (2) the location of the proposed facility in close proximity to county and state civil defense agencies.

Section 11(a): Objectives and policies for the physical environment-land based, shoreline, and marine resources.
Section 11(b): Applicable policies:

"(3) Take into account the physical attributes of areas when planning and designing activities and facilities."

"(8) Pursue compatible relationships among activities, facilities, and natural resources."

Discussion: The proposed project will be located in an urban setting and will be compatible with existing uses. The proposed facility will create an environment that encourages collaboration between employees of the National Weather Service and faculty and students of the University's Meteorology Department.

Section 21(a): Objectives and policies for socio-cultural advancement-education
Section 21(b): Applicable policies:

"(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence."

"(9) Support research programs and activities that enhance the education programs to the State."

Discussion: The project will promote collaboration between the University and National Weather Service personnel on both educational programs and research activities. The proposed project will improve the quality of the University's Meteorology program by providing hands-on training experience which will better prepare students for careers in Meteorology. In addition, there will be a wider range of faculty for students to work with as employees of the Weather Service will serve as part-time faculty in the Meteorology Department. Finally, the project encourages interaction between University of Hawaii faculty and students with the staff of the National Weather Service on joint research projects and programs.

Section 26(a): Objectives and policies for socio-cultural advancement -public safety:
Section 26(b): Applicable policies:

"(1) Assurance of public safety and adequate protection of life and property for all people."

"(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances."

Section 26 (d): Applicable policies.

"(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times."

"(2) Enhance the coordination between emergency management programs throughout the State."

Discussion: The facility will be located in a building that is structurally sound, and in close proximity to other emergency management programs. This will provide greater assurance that the facility will be operable and in closer contact with other emergency management programs in the event of any disaster or disturbance. In addition, the new facility will be able to provide improved services through the use of upgraded equipment and collaboration with the faculty and staff of the University's Meteorology Department.

8.1.2 PRIORITY GUIDELINES

The purpose of the State Plan priority guidelines is to address areas of statewide concern. The following discussion provides an assessment of how the proposed project conforms to the relevant priority guidelines.

Section 107:

"(6) Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific."

"(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education."

Discussion: The proposed project will provide a number of research and training opportunities for students and faculty of the Meteorology Department These opportunities will help to establish the University as a research and training center of the Pacific. In addition, the hands-on training experience and addition of National Weather Service employees as part-faculty serves to improve the overall quality of the educational services provided by the University.

8.2 STATE FUNCTIONAL PLANS

The State Functional Plans translate the broad goals and objectives of the Hawaii State Plan into detailed courses of action. The relationship of the proposed actions within the project to the relevant State Functional Plan objectives and implementing actions is described below:

8.2.1 STATE HIGHER EDUCATION FUNCTIONAL PLAN

There are three policy statements within the State Higher Education Functional Plan which are pertinent to the proposed project.

QUALITY
Section B(1) Applicable policies:

"Sustain the commitment to quality instruction and scholarship in the basic arts, letters, humanities, and social and natural sciences as a necessary prerequisite to overall institutional quality."

Section B(3) Applicable policy:

"Maintain and strengthen the position of the University of Hawaii at Manoa as a leading national and international research center."

COORDINATION
Section E(1) Applicable policy:

"Increase cooperation and consultation between the public and independent sectors in order to coordinate delivery of the most diverse range of educational opportunities within the total resources available."

Discussion: The hands-on experience provided to students, along with the addition of National Weather Service employees serving as part-time faculty, promotes interaction with a federal agency and strengthens the quality of education available to students. In addition, collaboration between the two agencies will create a synergy that could help strengthen the research arm of the University.

8.2.2 STATE ENERGY FUNCTIONAL PLAN

There is one policy statement in the State Energy Functional Plan which is pertinent to the proposed project.

Section A(1) Applicable policy:

"Moderate the growth in energy demand through conservation and energy efficiency."

Discussion: Locating the proposed facility in an existing building promotes energy efficiency as it reduces energy requirements that would be required for the construction

of a new facility. In addition, it reduces costs for the construction of additional utility systems (such as electricity, water, sewer) that would be incurred with the construction of a new facility.

The remaining functional plans regarding Transportation, Employment, Recreation, Water Resources Development, Conservation Land, Health, Housing, Tourism, Human Services, and Historic Preservation, are not directly relevant to the proposed project.

8.3 STATE LAND USE LAW

The proposed project is presently classified within the State Land Use Urban District. Public Facilities and research institutions are compatible in the Urban District. Thus, the project is consistent with the State Land Use District Classification.

8.4 THE UNIVERSITY OF HAWAII, MANOA CAMPUS LONG RANGE DEVELOPMENT PLAN (LRDP)

In 1987, the University of Hawaii Board of Regents adopted the LRDP for the University of Hawaii Manoa Campus, to guide campus development through the year 2010. For the Hawaii Institute of Geophysics Building, the LRDP proposes that in the future a higher density instruction and research building replace the HIG building. However, the University does not anticipate the replacement of the HIG building in the near future.

Although the proposed project displaces a portion of the existing activity on the second floor of the building and replaces them with non-University personnel, the proposed use is similar and compatible with current uses. NOAA and HIG staff engage in similar work and there is a strong likelihood of future collaboration in research and education by personnel from both agencies. Thus, the proposed project is consistent with the University of Hawaii, Manoa Campus LRDP.

8.5 CITY AND COUNTY OF HONOLULU GENERAL PLAN

The following discussion provides an assessment of how the proposed project conforms to and implements the updated 1988 General Plan adopted by the City and County of Honolulu.

ECONOMIC ACTIVITY

Objective A:

"To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living."

Policy 6: *"Encourage the continuation of a significant level of Federal employment on Oahu."*

Discussion: The proposed facility will provide for the continued long-term employment of about 50 federal employees.

Objective F:

"To increase the amount of Federal spending on Oahu."

Policy 1: *"Take full advantage of Federal programs and grants which will contribute to the economic and social well-being of Oahu's residents."*

Discussion: In addition to the long-term employment of federal employees, the proposed facility will create a number of construction related employment opportunities during the 8-month construction period. Aside from providing employment opportunities for Oahu's residents, the National Weather Service plays a vital role in providing weather forecast information which contributes to the safety and social well-being of all of the State's residents. The facility will be under lease from the State of Hawaii and will provide a source of long-term revenue to the State.

NATURAL ENVIRONMENT

Objective A

Policy 9: *"Protect mature trees on public and private lands and encourage their integration into new developments."*

Discussion: Mitigative measures will be provided to insure that the existing gold tree remains undisturbed during the construction of the generator building and installation of the diesel fuel tank.

PHYSICAL DEVELOPMENT AND URBAN DESIGN

Objective A

Policy 5: *"Provide for more compact development and intensive use of urban lands where compatible with the physical and social character of existing communities."*

Discussion: The proposed project is located within the Primary Urban Center, in close proximity to public safety agencies and facilities. Infrastructure at the University is adequate to support the proposed facility. The facility will be compatible with the physical and social character of the University and its surrounding environment.

PUBLIC SAFETY

Objective B:

"To protect the people of Oahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions."

Policy 4: *"Cooperate with State and Federal agencies to provide tsunami warning and protection for Oahu."*

Policy 8: *"Provide adequate search and rescue and disaster response services."*

Discussion: During times of natural disasters and emergencies, the Weather Forecast Office plays an integral role in providing information to State and County agencies and the public. The office provides information on weather which is used for tsunami warning and protection and search and rescue missions.

HEALTH AND EDUCATION

Objective C:

"To make Honolulu the center of higher education in the Pacific."

Policy 1: *"Encourage continuing improvement in the quality of higher education in Hawaii."*

Discussion: The hands-on experience provided to students along with the addition of National Weather Service employees serving as part-time faculty, will help to strengthen the quality of education available to students. In addition, the proposed project creates educational opportunities for employees of the Weather Service who are interested in pursuing graduate work at the University.

8.6 THE CITY AND COUNTY OF HONOLULU DEVELOPMENT PLANS

The City's Development Plan Land Use Map designates the site of the proposed Weather Forecast Office for Public Facility. The Weather Forecast Office is in compliance with the existing designation.

8.7 LAND USE ORDINANCE - ZONING

The existing zoning is R-5 University and Public Facility Uses are permitted. University uses are permitted under a Plan Review Use.

8.8 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 Hawaii, Manoa Campus. The PRU was amended in 1993 to redesignate the Physical Education Facility Phase II as the Special Events Arena and to increase its seating capacity. The proposed Weather Forecast Office is consistent with the uses approved in the PRU.

9.0 DETERMINATION, FINDINGS, AND REASONS SUPPORTING DETERMINATION

9.1 DETERMINATION

Based upon the findings presented in this Environmental Assessment and supporting technical studies, the potential impacts of the construction and operation of the proposed Weather Forecast Office have been sufficiently examined and discussed. After reviewing the significance criteria outlined in Section 11-200-12, EIS Rules, Contents of Environmental Assessment, it has been determined that the action is not expected to result in significant adverse effects on the natural environment. This determination was based on the assessment that the proposed action does not:

- Involve an irrevocable commitment to loss or destruction of any natural or cultural resource;
- Curtail the range of beneficial use of the environment;
- Conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS;
- Substantially or adversely affect the economic or social welfare of the community or State;
- Substantially or adversely affect public health;
- Involve substantial or adverse secondary impacts, such as population changes or effects on public facilities;
- Involve a substantial degradation of environmental quality;
- Cumulatively have a considerable effect upon the environment or involve a commitment for larger actions;
- Affect a rare, threatened or endangered species, or its habitat;
- Detrimentally affect air or water quality or ambient noise levels; or
- Affect an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

It is felt that further consideration of the project's impacts through the preparation of a Environmental Impact Statement is not necessary.

10.0 REFERENCES, CONSULTED PARTIES, AND LIST OF PREPARERS

10.1 REFERENCES

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U.S. Department of Agriculture. August 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai; State of Hawaii;* (Soil Conservation Service, in cooperation with the University of Hawaii Agricultural Experiment Station). Washington, D.C.

U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service. March 1993. *Programming Study Weather Forecast Office, Honolulu, Hawaii*.

U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service. 26 May 1993. *Response Letter to Mike Yoneda, University of Hawaii at Manoa, Facilities Planning and Management Office.*

10.2 CONSULTED PARTIES

Listed below are the agencies and organizations consulted in the preparation of the Environmental Assessment.

FEDERAL AGENCIES

United States Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service

STATE AGENCIES

Office of Environmental Quality Control
Department of Accounting and General Services
Department of Business, Economic Development and Tourism
Department of Business, Economic Development and Tourism, Land Use Commission
Department of Health
Department of Health, Environmental Management Division
Department of Transportation
Office of State Planning
Department of Land and Natural Resources
Department of Land and Natural Resources, State Historic Preservation Division
University of Hawaii at Manoa, Environmental Center
University of Hawaii at Manoa, Water Resources Research Center
University of Hawaii at Manoa, Facility Planning and Management Office
University of Hawaii at Manoa, School of Ocean and Earth Science and Technology

COUNTY AGENCIES

Board of Water Supply
Planning Department
Department of Land Utilization (DLU)
Department of Public Works
Department of Transportation Services
Fire Department

OTHER AGENCIES

American Lung Association
Hawaiian Electric Company

10.3 LIST OF PREPARERS

This Environmental Assessment has been prepared by the planners and environmental analysts at GROUP 70 International, Inc., 925 Bethel Street, Fifth Floor, Honolulu, Hawaii 96813, Telephone (808) 523-5866. The GROUP 70 staff involved in the preparation of this document included:

George Atta, AICP	Project Manager
Kathryn A. Tsukano	Graphics
Kathy Hida	Graphics

11.0 COMMENTS AND RESPONSES

11.1 COMMENTS RECEIVED DURING THE REVIEW PERIOD

Listed below are the agencies and organizations who responded during the various review and consultation periods. The table indicates with an "X" those who submitted written comments or letters stating they have no comments.

	Comments Received	
A. FEDERAL AGENCIES		
U.S. Department of Commerce, National Oceanic Atmospheric Administration, National Weather Service	X	11/26
B. STATE AGENCIES		
Office of Environmental Quality Control	X	
Department of Accounting and General Services	X	
Dept. of Business and Economic Development	X	
State Land Use Commission	X	
Department of Transportation	X	
Department of Health	-	
Department of Health, Environmental Management Division	-	
Office of State Planning	-	
Department of Land and Natural Resources	X	
DLNR/State Historic Preservation Division	-	
University of Hawaii, Environmental Center	X	EMF
University of Hawaii, Water Resources Center	-	
University of Hawaii, Facilities Planning and Management	X	
University of Hawaii, School of Ocean and Earth Science and Technology	-	

7/14/94 t.c. George Atta
- means no response

	Comments Received
C. CITY AND COUNTY AGENCIES	
✓Board of Water Supply	X
Planning Department	X
Department of Land Utilization	-
Department of Public Works	X
Department of Transportation Services	-
Fire Department	-
D. ORGANIZATIONS	
American Lung Association	-
Hawaiian Electric Company	-

APPENDIX

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE PACIFIC REGION
BOX 50027
HONOLULU, HAWAII 96850-4993

November 26, 1993

W/PR11x1:MHK
File: 1102-03

Mr. Ronald Lau
Facilities Planning & Management Office
University of Hawaii at Manoa
2002 East-West Road
Honolulu, Hawaii 96822

Dear Mr. Lau:

Enclosed is the information requested concerning our microwave transmit antenna requirements. Also, I'm including information for all of our antenna requirements:

Attachment I, dated August 25, 1993, along with its attachments covers all of the requirements for both the transmit and receive antennas for HF, VHF, as well as microwave.

Attachment II is a drawing of the proposed antenna sites on the HIG roof.

Attachment III is the specific information requested for the microwave transmit antennas. Because of our unfamiliarity with the term "power gain," we omitted that entry.

Please call me at 541-1659 (or FAX to 541-1678, to my attention) if any additional information is needed.

Sincerely,

Myron H. Kerner
Communications Manager

Attachments

cc:
W/PR11
W/PR13

ATTACHMENT 1

August 25, 1993 W/PR11x1:MHK
File: 1102-03

NWS Antenna Requirements - UH

1. 4.6 meter dish, receive only, approximate azimuth - 103° up angle - 22°, for AWIPS, (Figure 1 illustrates this type of antenna)

2. 3 meter dish, transmit only, azimuth 103°, NWWS uplink, approximately 6 GHz (See figure 2A)

3. 1.4 meter dish, receive only, azimuth 103° NWWS downlink, approximately 4 GHz (See figure 2C)

4. 4 foot loop antenna on 6 foot vertical base, transceive, for medium and high frequency radio communications, 2 to 30 MHz, 125 watts output to antenna. (See packet 1)

5. 2.5 meter dish, transceive, for link to Mauna Kapu for Hawaii Rainbow System access, 2.22 GHz (See figure 1)

6. 2 meter dish, azimuth - 260° vertical 15°, receive only, for signal from GMS, 1691.0 MHz (See figure 1)

7. 2 meter dish, azimuth - 138° vertical 58°, receive only, for signal from GOES, 1691.0 MHz (See figure 1)

8. VHF corner reflector antenna, vertically polarized, azimuth 303°, transmit only, for link to Mt. Kaala NWR transmitter, 173.025 MHz, 25 watts output delivered to the antenna (See figure 3)

9. Random wire, roughly 35 to 100 feet, receive only, any orientation, for monitoring radio facsimile broadcasts

10. Random wire, roughly 35 to 100 feet, receive only, any orientation, for monitoring various weather broadcasts

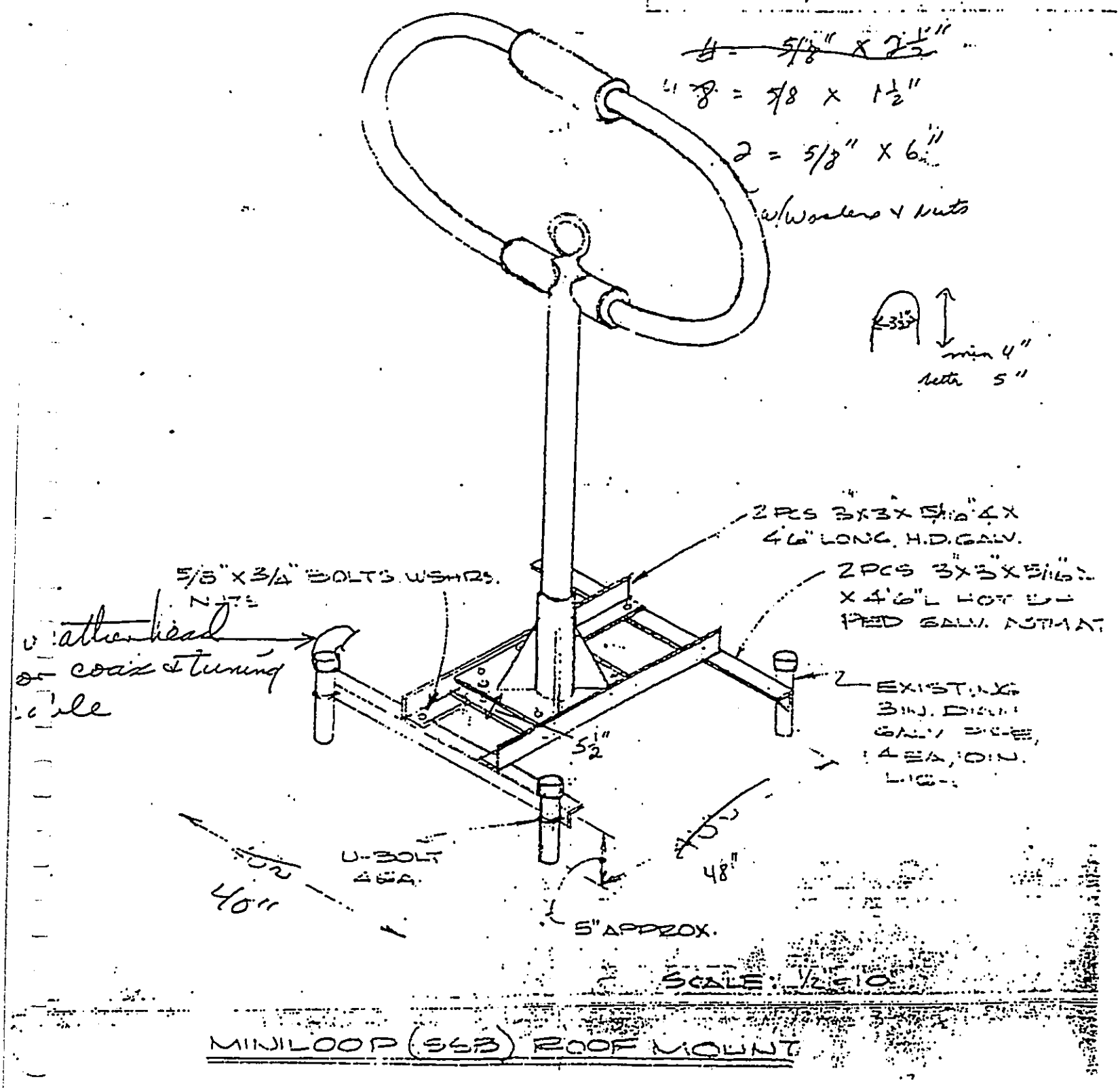
All antennas must be connected to a directly-to-ground system

Site geographical coordinates: 21°18'10"N 157°49'10"W

Attachments

PACKET 1

2	MATERIAL REQUIRED	
	4 EA - 5/8" X 1½"	
	2 EA - 5/8" X 6"	
	W/WASHERS & NUTS	



MINILOOP (SS3) ROOF MOUNT

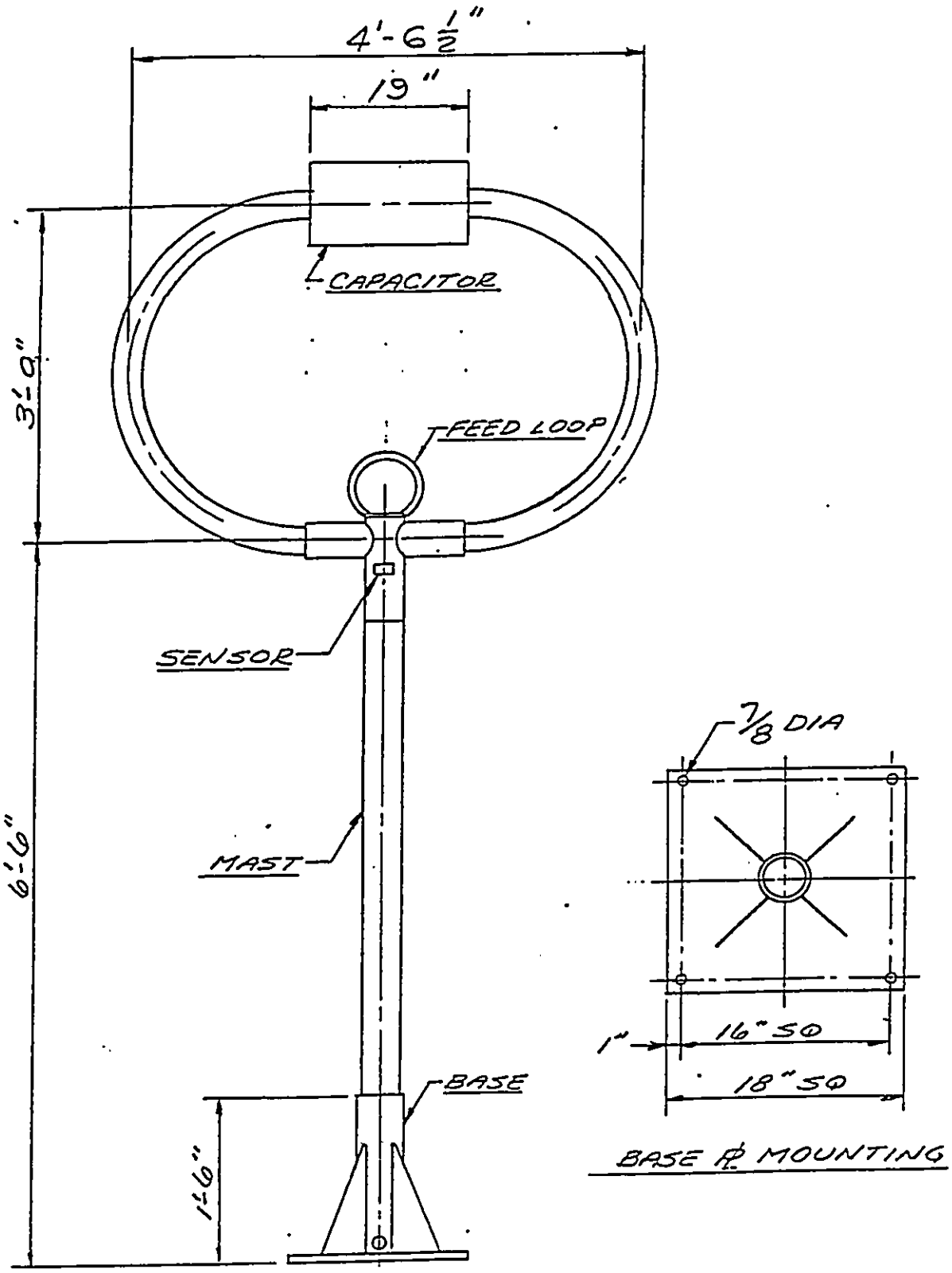


FIGURE 8. Outline Dimensions of MLA-2/D Miniloop Antenna and Base Mount

SECTION I

GENERAL DESCRIPTION

1.1 INTRODUCTION

The MLA-2/D is a vertical loop antenna system designed for transmitting and receiving applications in the frequency range of 3 - 24 MHz. The elliptical shape, which has an average radius of only 22 inches, represents a size reduction in the order of 50:1 compared to a half-wave dipole at 3 MHz. The antenna is suitable for either transportable or fixed-station use.

Since the Miniloop has an almost hemispherical overhead radiation pattern, it is applicable to all transmission distances. Its performance is especially outstanding at the short ranges up to about 300 miles where high-angle oblique-incidence propagation must be used, and for which there has been no satisfactory antenna until the advent of the Miniloop. Ordinarily a horizontal wire dipole or an inverted-V spaced electrically close to the ground is used, but both of these antennas are very inefficient for several reasons. The long, thin wire is lossy, the induction field includes a large volume of lossy ground, and high currents in the wires are necessary to compensate for the cancelling effect of the negative image in the ground. The loop has short, fat conductors, a very compact induction field that includes a minimum of ground within its volume, and a positive (aiding) ground image. The Miniloop is therefore highly efficient compared to the conventional antennas. A vertical whip is not used for short-range work because of its poor high-angle response.

The Miniloop is well qualified for highly transportable, tactical and mobile communications applications by virtue of its remarkably small size, extraordinary immunity to the geometry of its immediate environment, lack of need for a ground plane of any kind, quick and easy set-up, safety of a grounded or groundable structure, and full-range tunability by remote control. Electrical aspects such as the excellent balance with respect to ground, high Q, high efficiency, broad overhead pattern and relative insensitivity to the electric field component of close-by r.f. sources and scatterers combine to render the Miniloop a superb HF communications antenna. The interference rejection characteristics which result from the combination of these many factors are so favorable to reception that much lower power levels can be used at the transmitting end of a given link than is possible with other antennas, thus reducing the interference in co-located systems. This and other features are discussed in the sections which follow.

The basic antenna system consists of a loop, 6 ft. vertical mast, and a bolt-down flanged-base support. In this system, the loop is rotated and oriented in azimuth manually. A pin-look at the base holds loop in position and prevents rotation in high winds. An electrically operated azimuthal rotator, with a remote control/indicator unit, is available as an added accessory to the basic system.

	Input Connector:	Type N Female, unless otherwise specified.
	Output Connector:	Type TNC Female Phase Error Signal to Control Unit.
	Phase Error Cable:	RG-58
	Control Cable:	12-conductor, No. 16 AWG, stranded. Individual conductors are rubber insulated, and jacket is Neoprene. Outside diameter is 3/4" . A separate length of RG-58/U coaxial cable is used between the loop and control unit for the sensor signal channel.
	RF Cable:	Customer *provided RG-9B/U* recommended.
1.2.2	Mechanical	
	Wind:	150 mph (no ice) without damage or structural failure.
	Ice:	2 inches radial with a 50 mph wind without damage or structural failure.
	Size:	Loop proper is approximately 3 ft. high x 4 1/2 ft. wide on centerlines, with a conductor diameter of 3 1/2 inch.
	Height above ground:	Any height above a conducting plane in excess of 3 to 5 ft. is satisfactory. A mast is normally supplied with all models which puts the lowest part of the loop 6 1/2 feet above the base.
	Weight:	Overall weight with simple mast and base mount is about 150 lbs. Net weight of loop antenna is less than 100 lbs.
	Material:	Copper and Aluminum. (Heavy silver plate on main loop flanges and connection points.)
	Power: Tuning Unit:	90 to 130 volts A. C., 50 - 60 Hertz 2 amperes maximum.
	Rotator:	90 to 100 volts, A. C., 50 - 60 Hertz, 1 amp maximum starting and running current.
	Rotation Limits:	365° with electrical rotator and 360° with hand rotation which uses pin stops every 45°.
	Rotation Speed:	2 rpm with remote control rotator.

Finish: Aluminum - Clear Iridite and Epoxy Paint
Copper - Epoxy paint
Fiberglas - Lacquer
Color - White or Grey

Installation Time: Three men less than one hour assuming mounting pad is ready and antenna is unpacked.

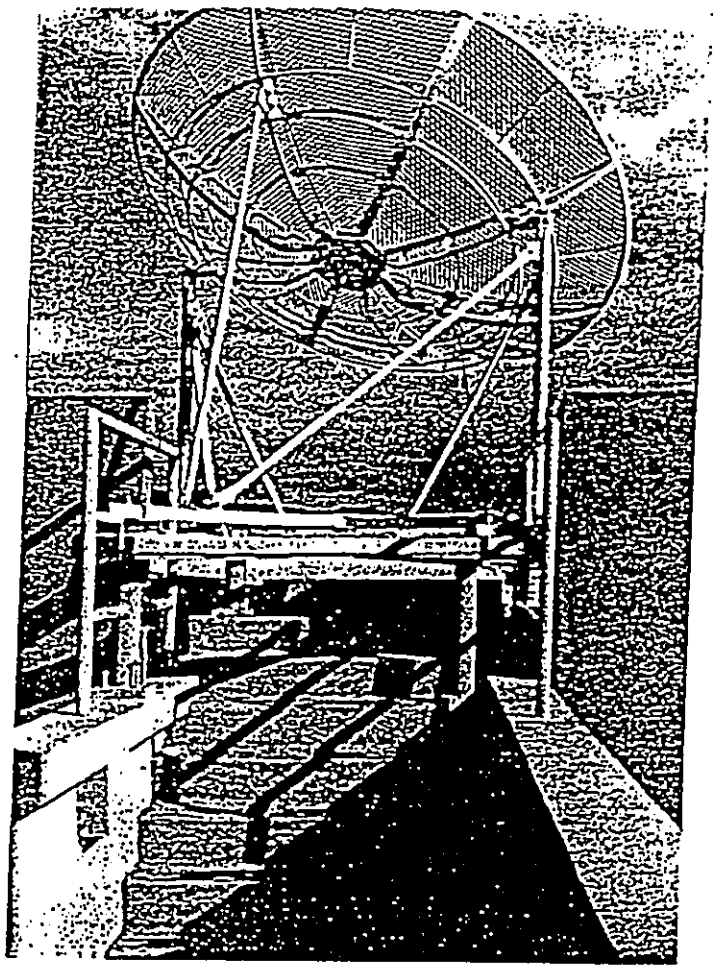


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FIGURE 7: EXISTING DISH ANTENNA TO BE RELOCATED

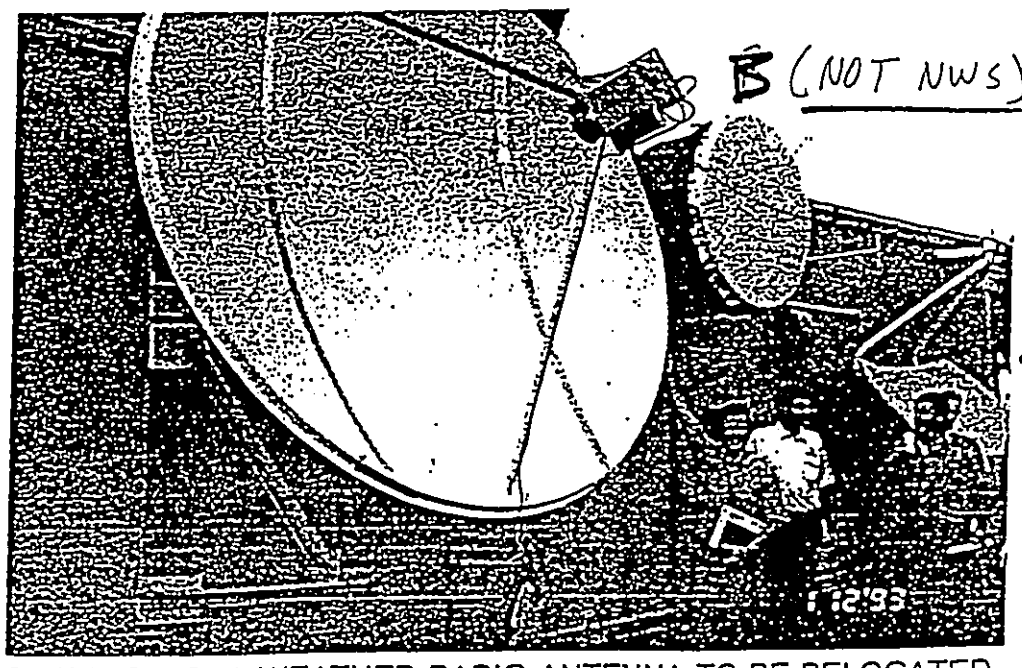

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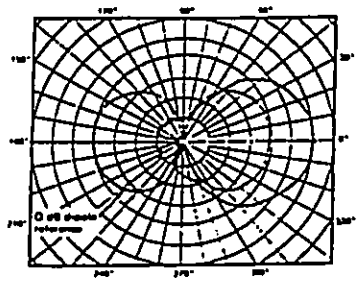
FIGURE 8: EXISTING NOAA WEATHER RADIO ANTENNA TO BE RELOCATED

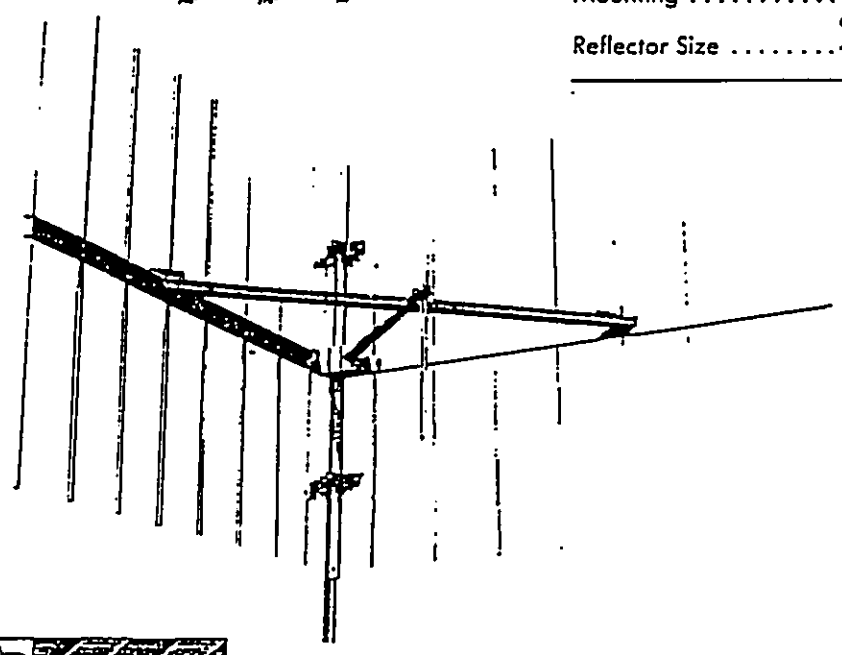
Rugged, High Performance 8 dB Gain, VHF Corner Reflector Fixed Station Antenna

Model
ASPR603

- **Point-to-Point** — high gain and highest front-to-back ratio for critical long path or low power applications
- **Rugged** — extensive welding of high strength corrosion-resistant aluminum promises years of trouble-free service
- **Broadband** — full 148 to 174 MHz coverage requires no tuning or electrical set-up in the field — may be stocked
- **Versatile** — may be stacked with more corner reflectors for additional gain or with omni antennas for keyhole patterns

Horizontal Field Pattern





SPECIFICATIONS

Electrical

Gain	8 dB
Power	500 watts maximum
Frequency Range	148-174 MHz
Front-to-Back Ratio	25 dB typical
Bandwidth	26 MHz
VSWR	1.5:1
Impedance	50 ohms
Vertical Beamwidth	62 degrees
Horizontal Beamwidth	67 degrees
Lightning Protection	Direct ground
Terminotion	3 ft RG-213 cable with male N connector
Feed	Folded dipole with ¼ wave matching section

Mechanical

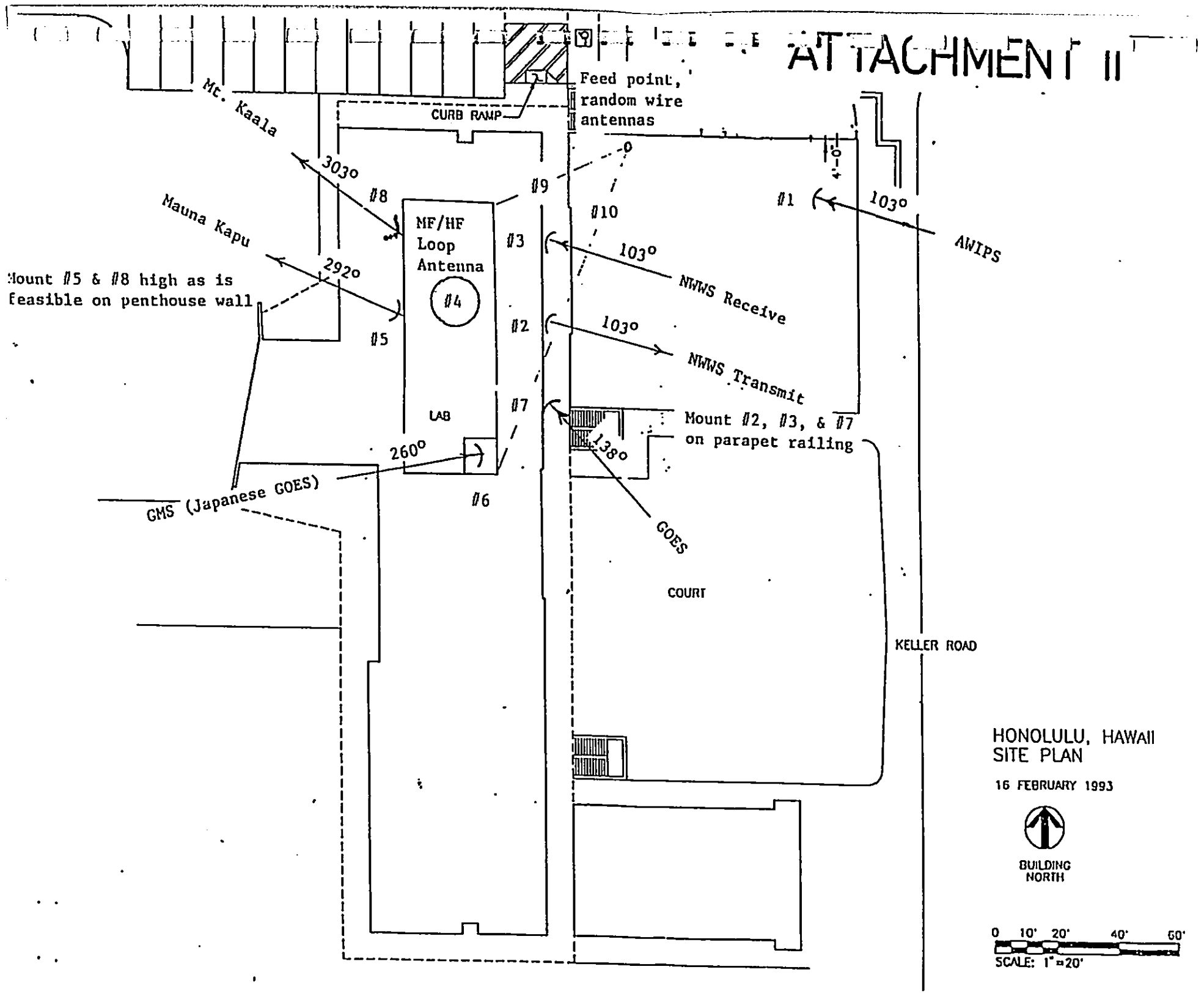
Rated Wind Velocity	105 mi/h
Lateral Thrust @ 100 mi/h: Equivalent Flat Plate Area	140 lb (63.5 kg) 3.2 ft² (0.30m²)
Weight	26 lb (11.8 kg)
Mounting	Two (2) ASP-616-type heavy duty mast clamps included*
Reflector Size	48 inches×54 inches (1.2×1.4 m)—(each side)

Shipping Information

Weight . . . . . 46 lb (20.8 kg)
58 x 52 x 6 inches
(148×132×15.2 cm)

*See Catalog for mounting brackets, coaxial cable, connectors and other materials required for complete installation.

ATTACHMENT II



HONOLULU, HAWAII
SITE PLAN

16 FEBRUARY 1993

BUILDING NORTH

0 10' 20' 40' 60'
SCALE: 1" = 20'

University of Hawaii
03/93

Environmental Health and Safety Office

ATTACHMENT III

MICROWAVE ANTENNA INFORMATION

Please answer the following information needed for calculating safe work distances:

BAND DESIGNATION = UHF

FREQUENCY = 2.2 GHz ~~MHz~~

WAVELENGTH= 14 cm

AVERAGE POWER = 2 Watts

ANTENNA GAIN = 29 dB

This is antenna #5 in Attachments I & II

POWER GAIN = _____

DIAMETER OF ANTENNA (for circular antennae)

= 1.1 in meters

The following information is needed for notification of maintenance personnel:

1. Location of the antenna: HIG Building, roof-top

2. Is there a set schedule of broadcasts? * yes _____ no.

   If yes, submit a schedule to the Work Coodination Center at the Facilities Planning and Management Office. If no, notify the Work Coordination Center at FPMO for each broadcast time and date as scheduling permits.

3. If broadcasting occurs after work hours and/or weekends, name contact person and phone number in case of emergencies.

   Contact person: Myron Kerner Phone no. 541-1659

Please return this form to: Radiation Safety Office, 2040 East-West Road, Honolulu, HI, 96822

*Broadcasts continuously

University of Hawaii
03/93

Environmental Health and Safety Office

MICROWAVE ANTENNA INFORMATION

(Transmit antenna for NOAA Weather Wire Service)

Please answer the following information needed for calculating safe work distances:

BAND DESIGNATION = SHF

FREQUENCY = 6 GHz ~~MHzx~~

This is antenna 1 in Attachment I and Attachment II

WAVELENGTH= 5 cm

AVERAGE POWER = 1 Watts

ANTENNA GAIN = 44 dB

POWER GAIN = _____

DIAMETER OF ANTENNA (for circular antennae)

= 3 in meters

The following information is needed for notification of maintenance personnel:

1. Location of the antenna: HIG Building, roof-top

2. Is there a set schedule of broadcasts? * yes _____ no.

   If yes, submit a schedule to the Work Coodination Center at the Facilities Planning and Management Office. If no, notify the Work Coordination Center at FPMO for each broadcast time and date as scheduling permits.

3. If broadcasting occurs after work hours and/or weekends, name contact person and phone number in case of emergencies.

   Contact person: Myron Kerner Phone no. 541-1659

Please return this form to: Radiation Safety Office, 2040 East-West Road, Honolulu, HI, 96822

*Broadcasts are at frequent, irregular intervals around the clock seven days a week

University of Hawaii
03/93

Environmental Health and Safety Office

MEDIUM & HIGH FREQUENCY
~~MICROWAVE~~ ANTENNA INFORMATION

Please answer the following information needed for calculating safe work distances:

BAND DESIGNATION = MF & HF

FREQUENCY = 2 to 24 MHz

WAVELENGTH= 12 to 150 meters ~~cm~~

AVERAGE POWER = 125 Watts

ANTENNA GAIN = 3 dB

POWER GAIN = _____

DIAMETER OF ANTENNA (for circular antennae)

= N/A in meters

The following information is needed for notification of maintenance personnel:

1. Location of the antenna: HIG Building, roof-top

2. Is there a set schedule of broadcasts? * yes _____ no.

   If yes, submit a schedule to the Work Coodination Center at the Facilities Planning and Management Office. If no, notify the Work Coordination Center at FPMO for each broadcast time and date as scheduling permits.

3. If broadcasting occurs after work hours and/or weekends, name contact person and phone number in case of emergencies.

   Contact person: Myron Kerner Phone no. 541-1659

Please return this form to: Radiation Safety Office, 2040 East-West Road, Honolulu, HI, 96822

*Broadcasts are at ~~f~~ irregular, irregular intervals around the clock seven days a week

University of Hawaii
03/93

Environmental Health and Safety Office

VHF ~~MICROWAVE~~ ANTENNA INFORMATION

Please answer the following information needed for calculating safe work distances:

BAND DESIGNATION = VHF

FREQUENCY = 173.025 MHz

WAVELENGTH= 173 cm

AVERAGE POWER = 25 Watts

ANTENNA GAIN = 9 dB

POWER GAIN = _____

DIAMETER OF ANTENNA (for circular antennae)

= _____ in meters

The following information is needed for notification of maintenance personnel:

1. Location of the antenna: . HIG Building, roof-top

2. Is there a set schedule of broadcasts? _____yes *____no.

   If yes, submit a schedule to the Work Coodination Center at the Facilities Planning and Management Office. If no, notify the Work Coordination Center at FPMO for each broadcast time and date as scheduling permits.

3. If broadcasting occurs after work hours and/or weekends, name contact person and phone number in case of emergencies.

   Contact person: Myron Kerner Phone no. 541-1659

Please return this form to: Radiation Safety Office, 2040 East-West Road, Honolulu, HI, 96822

*This is a back-up link to the NOAA weather Broadcast station on Mt. Kaala; used only very infrequently - aside from a monthly test

University of Hawai'i at Mānoa

Environmental Health and Safety Office
2040 East-West Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-8060 • Facsimile: (808) 956-3205

January 7, 1994

PAGES 1 DATE 1/7 FAX # 65385
TO Ron Lau
FROM Irene Sakimoto
CO. EHSO
PH # 956-8591 FAX # 956-3205

MEMORANDUM

TO: Mr. Ron Lau
FPMO

FROM: Irene Sakimoto Irene Sakimoto
Radiation Safety Officer

SUBJECT: NWS antennae at HIG

The safe distance of 10 mW/cm² from the antennae were calculated as follows.

Antenna #5: UHF - broadcast continually: Safe Distance = 1.23 yards

Antenna # 2 - SHF - broadcast frequent, irregular intervals every day.
Safe Distance = 4.9 yards

MF & HF antenna is not considered to be within microwave range.

Antenna with VHF - back-up link to NOAA broadcast station on Mt. Kaala.
Safe Distance = 0.4 yards.

If you have any questions, please call me at x68591.