STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
Honolulu, Hawaii

180-Day Exp. Date: December 6, 2010

November 22, 2010

Board of Land and
Natural Resources
State of Hawaii
Honolulu, Hawaii

REGARDING: **Conservation District Use Application MA-3542**
Advanced Technology Solar Telescope

APPLICANTS: University of Hawai`i, Institute for Astronomy; National Science Foundation

AGENT: Mike Maberry, Assistant Director, University of Hawai`i, 34 `Ōhi`a Kū, Room 216, Makawao, HI 96768

LANDOWNER: State of Hawai`i, set aside by Executive Order 1987 to the University of Hawai`i

LOCATION: Haleakalā High Altitude Observatories Site (HO) at Pu`u Kolekole, ahupua`a of Papa`anui, moku of Honua`ula, Makawao District, Maui

TMK: (2) 2-2-007:008; 007:007 (part; staging only)

ARE OF PARCEL: 18.166 acres (HO)

AREA OF USE: 0.86 acres

SUBZONE: General

DESCRIPTION OF AREA AND CURRENT USE

Haleakalā High Altitude Observatories Site (HO), popularly known as "Science City," lies in the Pu`u Kolekole volcanic cone near the summit of Haleakalā. The 18-acre parcel is wholly contained in Kolekole, and ranges in elevation from 9840 to 10,000 feet above mean sea level (AMSL). The project location is on the southern side of the parcel, at 9980 AMSL.

Approximately 40% of the parcel is developed with roads, buildings, parking areas, and walkways. The site has housed astronomical facilities since the early 1950s. Current observatories include the Mees Solar Observatory, the Zodiacal Observatory, Pan-STARRS, the Advanced Electro-Optical System, the Maui Space Surveillance Site, the Ground-based Electro-Optical Deep Space Surveillance (GEODSS), the Airglow Facility, the Neutron Monitor Station, and the Faulkes Telescope North. **Exhibit 1** shows HO and adjoining properties, and contains an aerial photograph of the existing facilities at HO.

Kolekole is one of three cones at the apex of the southwest rift zone on the Mākena-side of Haleakalā. Pu`u `Ula`ula, at 10,023 feet AMSL, is the tallest point on the mountain. A parking lot occupies the shallow caldera, and the short paved trail to the summit is one of the most popular in Haleakalā National Park. This summit in turn overlooks Pu`u Kolekole, 0.3 miles away. Continuing down the ridge, a third cinder cone houses county, state, and federal telecommunications facilities[1].

The next series of cinder cones, including the 8537 foot AMSL Pu`u Kalepeamoa, remain in their natural state. The lands on either side of the ridge are part of the Kula and Kahikinui Forest Reserves, and also remain pristine.

In the other direction, inside Haleakalā National Park and below the Park's Visitor Center, is Pa Ka`oao. This is the 9778 foot AMSL "White Hill" that is popular among visitors and residents for watching the sun rise over Haleakalā.

HO is in the *moku*[2] of Honua`ula, and *ahupua`a*[3] of Papa`anui.

Some sources indicate that Haleakalā's original name was either *`Alehe-lā* or *`Ahelekalā*, (*`aleha* = to snare, *lā* = the sun), derived from the stories of Maui snaring the rays of the sun here. *Haleakalā*, the 'House of the Sun," is the name of a sharp point along the crater rim outside Kaupō Gap which later came to signify the entire mountain.

As shown in **Exhibit 2**, All the moku in eastern Maui – Ko`olau, Hana, Kīpahulu, Kaupō, Kahikinui, Honua`ula, Kula, and Hamakualoa – radiate outwards from Pōhaku Pālaha on the northeast rim of Haleakalā's main crater. The moku of Honua`ula traverses a narrow band eastward from Pōhaku Pālaha across the center of the crater, then follows the southwest ridgeline to Pu`u Mākua. Here the moku widens to encompass the coastal communities from Wailea to Kanaio, as well as the nearby islands of Molokini and Kaho`olawe.

Papa`anui is a discontinuous ahupua`a within Honua`ula. A lower section runs from Mākena on the coast to Keonehulu at 4000 feet above mean sea level (AMSL). An upper section runs along the ridgeline and across the crater, from Pu`u Keōkea to the moku's origin at Pōhaku Pālaha.

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[1] OCCL suspects that this is the Pu`u Keokeo mentioned by Thomas Maunupau in "A Visit to Kaupo, Maui and Haleakala," *Ka Nupepa Kuokoa*, 1923; collected in Elspeth P. Sterling's *Sites of Maui* (Bishop Museum Press, Honolulu, 1998).

[2] Traditional land district

[3] Traditional land division within a moku.

Flora and Fauna

There is very little soil development at HO, and the surface area is composed of a mixture of pumice, cinders, and ash. Vegetative cover is correspondingly sparse at five to ten percent, which is typical of alpine dry shrubland ecosystems in Hawai`i. The few plants include two endemic daisies (*Dubautia menziesii* and *Tetramoloium numile)*, two endemic perennial grasses (hairgrass, *Deschampsia nubigena* and mountain pili, *Trisetum glomeratum),* hairy cat's ear *(Hypochoeris radicata),* and a single pūkiawe (*Styphelia tameiameiae).* No wild endangered silverswords (*Argyroxiphium sandwicense)* were found on the site, although there are some being cultivated near the AEOS parking lot.

Fauna are represented by birds, mammals, and arthropods.

85% of the known population of the federally-listed `ua`u (Hawaiian petrel, *Pterodroma sandwichensis)* nests near the Haleakalā summit. At HO there are thirty known burrows along the southeastern perimeter, as well as several burrows to the northwest. This is a typical size for `ua`u colonies in the region.

The birds nest from February to November, with the birds returning to the same nest year after year. `Ua`u leave their nests to feed on ocean fish just before sunrise, and return just before sunset. The petrels have limited vision yet fly at high speeds, which leads to an increased possibility of collision with stationary objects. Other causes of mortality include burrow collapse from wandering goats, predation by owls, and disturbances from road resurfacing activity.

Scientists have observed `ua`u building new burrows deep under the existing facilities. They theorize that the buildings' foundations might allow for more stable burrows as there would be limited risk of collapse from wandering goats.

Nēnē (Hawaiian goose, *Branta sandvicensis)* have been known to fly over HO, but the Kolekole summit area is outside the known feeding range of the geese.

There have been several sightings of `ope`ape`a (Hawaiian hoary bat, *Lasiurus cenerus semotus)* near the summit, but they are believed to reside primarily in the lowlands due to both the cold and the lack of insects for food at the summit.

Multiple surveys of arthropod fauna were conducted. Two surveys did not find any species of note, while a third survey located one carabid beetle (*Mecyclothorax*) and two species of long horn beetles (*Plagithmysus* spp.). Carabid beetles are at risk from alien predators, and their conservation is important.

No ant colonies were found at HO, although predatory ant species have been found in the neighboring Park. The invasive potential of these ants, particularly from the Argentine ant (*Linepithema humile*), calls for active control programs.

Yellow jackets (*Vespula pensylvanica*) were found at the project location. Yellow jackets are a known threat to diversity at Haleakalā, and active management is also required to control these predators.

Introduced fauna include the chukar (*Alectoris chukar),* feral goat (*Capra hircus)*, Polynesian rat (*Rattus exulans),* and roof rat (*Rattus rattus).* The goats and rats are a direct threat to the summit's endemic bird species.

Cultural Resources

While Haleakalā's alpine climate was too extreme for permanent habitation, the summit area is extraordinarily rich in historic and cultural sites. At the HO parcel a 2002 archaeological survey identified a trail remnant, wind shelters, petroglyphs, a possible burial feature, and the remnants from an earlier telescope built in 1952. The survey concluded that the general lack of material culture indicated that the area was used more for short-term shelter purposes than extended period of occupation. The survey recommended passive preservation for all sites, with the possible exception of the telescope remnant.

Historic cultural practices at Haleakalā included gathering of plants; hunting for `ua`u, nēnē, *Platochen pau* (extinct) and *Branta hylobadisies* (extinct); collecting basalt for tool-making; burial of the dead; burial of umbilical cords; the calling of the sun (*e ala e*); and training for astronomers and navigators. There were certainly other practices that were not widely known outside specific lineages, and there are chants that discuss initiations and rites of passage that occurred on the summit.

In the modern period the hunting of `ua`u and nēnē is no longer legal, and if burial ceremonies still occur they are kept secret. Other cultural practices continue today. Hula halau and lapa`au practitioners gather materials at Haleakalā, and the site is still used by both Native Hawaiian and various esoteric "New Age" groups for sunrise and sunset ceremonies.

The general public is not allowed to access HO, and recreational activities are prohibited. However, the site is not gated and the HO entrance sign welcomes *Na `ōiwi Hawai`i.* The welcome is not translated into English. The University of Hawai`i has funded the placement of two *ahu*, or stone altars, for religious and cultural use. In addition, the Programmatic Agreement for HO calls for the NSF and the University to provide a "place for shelter" for Native Hawaiian practitioners.

PROPOSED USE

The proposal would establish a Gregorian-style solar telescope at the 9980 foot AMSL elevation on a previously disturbed site on the southern perimeter of HO. The proposed Advanced Technology Solar Telescope (ATST) facilities would include:

- An observatory facility, including the telescope, pier, and rotating coudé instrument platform. The telescope's optic support structure, including mirrors,

would weigh 75 tons; the mount base 90 tons; and the coudé rotator 160 tons. The concrete pier would be 1700 cubic yards, plus foundations. The coudé rotator floor would be 9.6 meters above ground level, the altitude axis 28 meters, and the top of the assembly 36.7 meters.

- A telescope enclosure. The 5955.2 cubic meter enclosure would be a thermally controlled, highly ventilated, co-rotating hybrid with independent rotation when the telescope is positioned at zenith. The enclosure's diameter would be 25.65 meters, and the top of the entrance aperture tube at zenith would be 43.5 meters.
- A support and operations (S&O) building attached to the observatory. The 23.2 meter tall S&O building would contain a docking bay with a 20-ton crane, room for equipment storage, telescope maintenance facilities, offices, workrooms, and laboratories.
- A utility building attached to the S&O building by an underground utility chase. The steel-framed metal structure would measure 5.2 meters in height, 12.2 meters in width, and 19.5 meters in length. The building would house a 300 KVA generator, an 80-ton low-temperature chiller, a 10-ton heat pump condenser unit, 2 ventilation fans, a vacuum pump, and 3 uninterruptible power sources. Sound-abatement devices would be incorporated into the walls and roof. An electric transformer and 3 ice storage tanks would be located outside this building.
- An expanded parking area and service area, to be shared with the existing MEES Solar Observatory (MSO).
- Modifications to the interior of the existing MSO facility.
- A small wastewater treatment plant (less than 1000 gallons per day). The plant would utilize aeration and biologically accelerated treatment to achieve the required water quality standards.
- A grounding filed consisting of a series of shallow trenches around the facility and fanning out to the south of the S&O building. The trenches would be filled with conductive material, either concrete or coke breeze, to safely provide an electrical ground for the facility.
- A stormwater management system consisting of gutters, catchment drains, an underground tank, and pipes connecting this to the cistern at the MSO facility.
- A new electrical transformer next to the utility building, and a diesel generator for use in case of power outages.

The majority of the volcanic sand gravel that is excavated would be used as backfill around ATST structures. A maximum of 5400 cubic yards of soil would be spread to an average depth of 4 feet on the neighboring parcel TMK 2-2-007:007. The proposed Primary Staging Area for the construction phase is also on parcel 007:007. The Federal Aviation Administration is the owner of this parcel, and would need to approve the site for these uses. If they do not grant approval then another HO or off-site area would need to be found.

Attachment 1 contains 11"x17" selections from the schematic design sheets for the ATST. These have been included as a separate attachment for ease of referral while reading this report. The design sheets show a 3-D model of the ATST, a location map, the overall site plan, the location site plan and nearby `ua`u burrows, the grading and bmp

plans, the north elevation of the S&O and Utility Buildings, and an E-W section of the telescope, enclosure, and pier.

IMPACTS AND PROPOSED MITIGATION MEASURES

The application lists the following major or moderate adverse long-term impacts:

- The FAA Remote Communications Air/Ground facility would experience degradation of its communication signal.
- Haleakalā has been identified as a *Traditional Cultural Property* as defined by the National Historic Preservation Act. There would be impacts to cultural practices located within the ROI, and an impact to resources along the park road corridor.
- The project area contains or is near habitat for the endangered `ua`u, or Hawaiian dark-rumped petrel (*Pterodoma phaeopygia sandwichensis)* and nēnē (*Branta sandwicencis*). The area is also habitat for `ahinahina (*Geranium multiflorum*).
- The proposed facility would have an impact on Maui`s view plains.

The application lists 19 mitigative measures to address the project's impacts. The applicant has signed a Programmatic Agreement with the State Historic Preservation Division regarding mitigation measures. The measures dealing with cultural, historical, and archaeological resources include:

- Having construction crew members attend a "sense of place" training session;
- Hiring a cultural resource monitor, preferably a clergyman, to ensure protection of additional cultural resources during construction;
- Limiting noise levels at certain times of the day and certain times of year;
- Photographing and documenting all historic features and other areas susceptible to potential impact;
- Reserving up to 2% of the total ATST usage time for Native Hawaiian scientists, when there are Native Hawaiians among the pool of qualified scientists;
- Painting a mural on the lower portion of the ATST showing a "well thought out representation of traditional Hawaiian culture;"
- Providing $20 million over ten years to support an educational initiative addressing the intersection between Native Hawaiian culture and science; and
- Renaming the roads on the summit.

The applicant is also developing a Habitat Conservation Plan to address impacts on biological resources. Mitigative measures include:

- Funding a qualified person to conduct biological resource monitoring, with a specific focus on petrel and nēnē behavior and mortality. The monitor would "likely" work with the National Park Service and State Division of Forestry and Wildlife in their on-going management activities.
- Complying with the Endangered Species Act through the following avoidance and minimization measures developed during informal Section 7 consultations:

- To minimize the collision of petrels with equipment and buildings: Lower the construction crane at night and mark it with white polytape; paint outdoor structures white; forbid the use of outdoor lighting.
- To reduce the risk of burrow collapse during construction: Follow United States Fish and Wildlife Service (USFWS) ground vibration thresholds for burrow collapse; monitor vibrations to ensure that threshold is not surpassed.
- To limit predator population increase: Trash would be contained; Reduce rat population through vector control methods.
- To reduce the risk of transporting invasive species to the site: Inspect cargo thoroughly; Inspect all grounds within 100 feet of ATST on a semi-annual basis and remove any introduced floral species[4].

- Washing vehicles and equipment and implementing weeding to prevent the introduction of alien invasive species.
- Conducting road-widening work outside of the nēnē nesting season; engaging in nēnē avoidance measures such as installing temporary orange fencing around construction sites; and restoring sites with native vegetation.
- Following a programmatic monitoring plan for invertebrates, flora, and fauna.

The expected life span of the facility is 50 years, or just over two solar cycles, after which time NSF would decommission and deconstruct the project. Alternatively, it would divest itself of all responsibility for the project based upon consultation with the Native Hawaiian community.

Exhibit 3, Impact Summary Table, contains a list of the identified Resource Sections which will be impacted, and identifies the corresponding proposed mitigation measures. These will be discussed in greater depth in the Discussion section of this report.

SUMMARY OF COMMENTS

The application was referred to the following agencies for their review and comment:

Office of Hawaiian Affairs; Maui County – Planning Department; Maui County Conservation Alliance; DLNR – Land Division, Historic Preservation, DOFAW, Engineering; DBEDT – Energy, Resources, & Technology Division; Planning Office; State Department of Health; United States, Fish and Wildlife Service; FAA; University of Hawai`i, Institute for Astronomy, Hawaiian Studies, Environmental Center; Native Hawaiian Legal Corporation; Kilakila `O Haleakalā; Polynesian Voyaging Society; Maui Community College; Bishop Museum

[4] Additional limitations on construction were originally proposed during `ua`u incubation periods. However, during consultations for the Incidental Take Permit it was determined that the potential impacts on the `ua`u colony would be greater if construction lasted over a longer period than if it continued during the incubation period; these limitations were consequently withdrawn from the proposal.

In addition, the CDUA and supporting Environmental Documents were available for review at the Hawai`i State Library and the Wailuku and Kahului Public Libraries. The documents were also available online at OCCL's website.

Comments were received by the following and summarized by Staff as follows:

DLNR Land Division
No comments

DLNR Division of Forestry and Wildlife
The Division has concluded that the project will likely result in the take of `ua`u (Hawaiian petrel, *Pterodoma sandwichensis*), and notes that the applicant is seeking approval of a Habitat Conservation Plan and Incidental Take License.

Applicant's Response
The project will complete the process to approve the Habitat Conservation Plan and will obtain an Incidental Take License.

State Department of Health
The Department has no objections to the proposal as the treatment and disposal of domestic wastewater will be handled by an aerobic treatment unity. Plans for any wastewater system must conform to HAR §11-62, WASTEWATER SYSTEMS.

Applicant's Response
The proposed system is being designed to conform with HAR §11-62.

Native Hawaiian Legal Corporation
The Corporation notes that the applicant does not qualify for a CDUP as the construction and operation of ATST would result in major adverse long and short term impacts on traditional and cultural resources. The impacts will be caused by construction activities, the visual presence of the structure, the noise generated by the ATST and associated activities, and the operation of the facility itself. The proposed mitigation measures, such as holding a 'sense of place' training, "cannot mitigate the pain and loss suffered by Native Hawaiian traditional and customary practitioners." It is not right that the ATST will not compromise on size, color, or location of the structure, yet insist that Native Hawaiians must compromise their practices.

Applicant's Response

- *The cultural, historic, and archaeological sites are protected through the Management Plan accompanying the CDUA;*
- *The applicant respectfully disagrees that the ATST does not qualify for a CDUP;*
- *The potential impacts of ATST construction and maintenance have been discussed in the EIS;*
- *Mitigation of feelings is an elusive objective; the proposed measures were based upon consultation with cultural practitioners and others in the Native Hawaiian*

community and the applicant recognizes that they are not designed to mitigate feelings of pain or loss;

- *Efforts were made to minimize the footprint, height, and proximity to resources; however, certain elements such as color are intrinsic to the project's goals. The facility is designed with the minimum height and footprint possible. The chosen location is a compromise, as the "Reber Circle" site had better atmospheric "seeing" but would've had a greater visual and cultural impact. A taller and larger facility, with a height over 200 feet, could achieve the desired results more rapidly and with less instrumentation; the height was reduced as much as possible.*
- *189,000 cars, buses, and trucks enter Haleakalā National Park every year, and the ATST should be assessed in that context. Traffic will increase in a small increment. The significant construction noise impact will occur within a radius of 2500 feet of the project, or at the Pu`u `Ula`ula overlook. Noise mitigation strategies are discussed in the EIS, and there are additional noise limitations placed on equipment that might harm petrels.*
- *The visual impact was analyzed extensively in the EIS, with the conclusion that only moderate impacts would occur in the view plain.*
- *NSF will periodically reassess technological options for new types of coatings, more efficient cooling methods, or improved compensation for thermal turbulence, which may allow the buildings to be painted a different color.*

County of Maui Department of Planning

The Department recommends that the applicant consider choosing a different color than bright white for the ATST, choosing a different color for the associated structures, and using colors in the mural that would reduce the visual impact.

Applicant's Response

NSF will periodically reassess technological options for new types of coatings, more efficient cooling methods, or improved compensation for thermal turbulence, which may allow the buildings to be painted a different color.

Additional public testimony was received at and after the public hearing. OCCL will address the issues raised in the Discussion Section later in this report..

ANALYSIS

OCCL notified the applicant on June 16, 2010 that:

1. The project is an identified land use pursuant to HAR §13-5-22, Identified Land Uses in the Resource Subzone, R-3 ASTRONOMY FACILITIES, (D-1) *Astronomy facilities under an approved management plan.* This land use requires a permit from the Board of Land and Natural Resources. The Board has the final authority to grant, modify, or deny any permit application.

A Management Plan for the Haleakalā High Altitude Observatory Site is being processed concurrently.

2. The Chair of the Board of Land and Natural Resources authorized OCCL to conduct a Public Hearing pursuant to HAR §13-5-40 HEARINGS (a) *Public hearings shall be held* (4) *On all applications determined by the chairperson that the scope of proposed use, or the public interest requires a public hearing on the application.*

   The Public Hearing was held at Pukalani, Maui on August 26, 2010. The Hearing was noted in the paper of record. Approximately 150 members of the public attended, 35 persons provided oral testimony, and 15 persons submitted written testimony at the meeting or shortly thereafter.

3. Pursuant to HAR §13-5-31 (4) *Permit applications,* the permit required an environmental impact statement (EIS).

   The NSF published a federal and state Draft Environmental Impact Statement in September 2006 (DEIS), a federal and state Supplemental Draft Environmental Impact Statement (SDEIS) in May 2009, and a federal Final Environmental Impact Statement (FEIS) in July 2009. On August 8, 2009, the Office of Environmental Quality Control (OEQC) published notice of the state FEIS in the *Environmental Notice*. On December 3, 2009, a Record of Decision (ROD) was executed by the Director of NSF and published in the *Federal Register* to allow funding to be issued to construct the ATST.

Notice of CDUA MA-3542 was published in the June 23, 2010 issue of the *Environmental Notice.*

CONSERVATION CRITERIA

The following discussion evaluates the merits of the proposed land use by applying the criteria established in HAR §13-5-30.

1. *The proposed land use is consistent with the purpose of the Conservation District.*

   The objective of the Conservation District is to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.

   The parcel was conveyed to the University of Hawai`i by Executive Order 1987, which stated that land was to be used for "the Haleakalā High Altitude Observatory Site purposes only." OCCL notes that Hawai`i Administrative Rules require that astronomy facilities have an approved management plan. A

management plan for the ATST is being processed concurrently with this application.

2. *The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.*

The objective of the General subzone is to designate open space where specific conservation uses may not be defined, but where urban use would be premature.

The proposed use is an identified land use in the General subzone of the Conservation District, pursuant to HAR §13-5-24, R-3 ASTRONOMY FACILITIES, (D-1) *Astronomy facilities under an approved management plan..*

Approximately 40% of the 18 acre parcel is developed with roads, parking lots, and astronomy facilities. The proposed ATST will occupy one of the last two developable sites at HO, and thus should have a negligible effect on open space at Haleakalā.

3. *The proposed land use complies with provisions and guidelines contained in Chapter 205, HRS, entitled* Coastal Zone Management, *where applicable.*

The goals of the CZM program are to address issues from an integrated ecosystem perspective, and as no lands in Hawai`i are more than 30 miles from the shore the entire State is considered to be in the Coastal Zone.

Many of the objectives of the CZM program outlined in HRS 205A – protection of historic resources, scenic and open space resources, and recreational resources – parallel the objectives of the Conservation District.

There are additional 205 A objectives specific to coastal ecosystems, and the impact of upland areas on coastal ecosystems. These are *to promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.*

Best Management Practices have been incorporated into the plan that address these, with practices designed to minimize stormwater runoff, protect adjacent areas, and to ensure that there are no injurious effects on groundwater. These include using temporary diverters during construction to direct surface water flow into the drainage system, installing a system to capture rainwater, using portable toilets during construction, and using native soils to fill holes post-construction.

OCCL believes that the proposal is consistent with the guidelines and objectives contained in HRS 205A.

4. *The proposed land use will not cause substantial adverse impacts to existing natural resources within the surrounding area, community, or region.*

The Final Environmental Impact Statement (EIS) identified four potential areas of significant impact: 1) the degradation of the communication signal at the nearby FAA facility; 2) the impact on the cultural practices at and *mana* of the mountain; 3) the impact on habitat for `ua`u, nēnē, and `ahinahina; and 4) the impact on view plains.

The majority of community concerns revolved around the impact of the proposal on the spiritual qualities of Haleakalā, and on view plains.

Mitigation strategies will be discussed more thoroughly in the following section, but in summary:

- Federal agencies are working on methods to mitigate ATST's impact on the FAA's communication signal; the issue will need to be resolved prior to the ATST being built.

- The impact of the project on the spiritual qualities of Haleakalā is harder to quantify; if one accepts the premise that the mere *presence* of an astronomy facility is an affront then the impact becomes impossible to mitigate. A Programmatic Agreement has been signed with the State Historic Preservation Division that addresses some of the issues.

- As ATST will likely result in the take of `ua`u (Hawaiian petrel, *Pterodoma sandwichensis*), the applicant is seeking approval of a Habitat Conservation Plan and Incidental Take License. Take is not expected for other federally-listed species.

- The impact on the view plains from the populated areas of Maui will be minimal. The project will be most visible from the road leading to the National Park, and from the summit of Haleakalā at Pu`u `Ula`ula. A taller facility at the northern side of HO would have been more economical and efficient; the proposed location and dimensions were designed to minimize the impact as much as possible without compromising the purpose of the facility.

5. *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding area, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

The HO site has contained astronomy facilities since the 1950's. The proposed ATST will have a smaller footprint than the nearby military facilities, but will be the tallest structure on the mountain. The suitability of this, or any astronomy facility, on the summit of Haleakalā is a subject of passionate debate. OCCL will explore the issue in the Discussion section.

6. *The existing physical and environmental aspect of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, which ever is applicable.*

   The project will involve 5400 cubic yards of grading on an already disturbed area. There will be some impact on the visual perception of open space.

7. *Subdivision of the land will not be utilized to increase the intensity of land uses in the Conservation District.*

   There will be no subdivision of land for this proposed project.

8. *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

   Staff believes the proposed project has the potential to benefit the public health, safety, and welfare. There will be direct economic benefits through construction contracts, new jobs, and incoming research grants; educational benefits by keeping Hawaiian institutions at the forefront of astronomical research; and safety benefits via the increase in our understanding of how solar energy affects air travelers, earth's climate, air travelers, and satellite communication. There is also the less tangible benefit of increasing humanity's overall pool of knowledge.

DISCUSSION

The University of Hawai`i and the National Science Foundation (NSF) propose to construct the Advanced Technology Solar Telescope (ATST) at Haleakalā Observatories (HO). If approved the facility would be the first ground-based solar telescope built in the US in 40 years. The NSF predicts that the facility will be the world's flagship facility for the study of magnetic phenomena in the solar atmosphere. There is no similar facility, worldwide or space-based, in existence, nor is one currently being planned.

The proposed facility includes the telescope and enclosure, a Support and Operations Building, a Utility Building, a parking area, and modifications to the existing MEES Observatory. The entire project would include 43,980 square feet of new building space, occupying a footprint of 0.74 acres.

If approved, the applicant proposes the following construction schedule:

Year 1: Excavation and construction of the foundations and pier
Years 2-4: Erection of the enclosure and building structures.
Years 4-7: Mounting of the telescope mount; installation of optics, control systems, and instrumentation; integration, testing and commissioning of the various systems and instruments.
Years 7-8: Verification of the science and transition into an operational system.

The EIS predicted that the site would be fully operational during 2017, but this was based upon a start date during Federal fiscal year 2010.

The base of the project would be at 9980 feet AMSL, with support caissons extending approximately twenty feet below the surface. The rotational center of the telescope will be 92 feet above base level. This is the minimum height for which the scientific goals of the project could be achieved. The enclosure would then be 142.7 feet tall and 84 feet in diameter.

The highest point on Maui is the 10,023 foot AMSL Pu`u `Ula`ula, 0.3 miles upslope from the site. The top height of a finished ATST would be 11,022 feet AMSL, making it the highest point on the island by 100 feet, and the third highest point in the State.

HO is located entirely within Pu`u Kolekole, one of three cinder cones at the apex of Haleakalā's southwest rift zone. The earliest astronomy facilities here date from the mid 1950's. The 18-acre parcel was conveyed to the University of Hawai`i by Executive Order 1987, which stated that land was to be used for "the Haleakalā High Altitude Observatory Site purposes only."

Pu`u Kolekole was selected from an original list of 72 candidates for the ATST. It was finally chosen for having the "cleanest" light – meaning that there were less particulates in the daytime air which could diffract the sunlight. Of the other top candidates, pollen at Big Bear and dust from Saharan sandstorms at the Canary Islands both diminished the quality of light in those places. Mauna Kea has a layer of remnant dust caused by glacial scouring of the lava; this dust rises with ground moisture in the heat of the day, and subsides at night. Astronomers consider Mauna Kea one of the world's top sites for nighttime astronomy, but Haleakalā the top site for daytime astronomy.

The facility, like most modern astronomy facilities, will be run robotically. Staff at the completed site will be limited to technicians, engineers, and maintenance people. Scientists will run the telescope and collect the incoming data remotely.

The Final EIS was published in OEQC's *Environmental Notice* on August 8, 2009, and the National Science Foundation published a Record of Decision in the Federal Register on December 3, 2009. The EIS examined three alternatives – the preferred Mees site, the alternative Reber Circle Site, and the no-action alternative. The Reber Circle alternative had better atmospheric "seeing" but would've had a greater visual and cultural impact. The chosen Mees site will still result in several major, adverse impacts to natural and cultural resources, as not all the impacts could be reduced to lower intensity levels.

The major and moderate long-term impacts identified in the EIS are discussed below. In addition, there was significant concern expressed at the public hearing regarding the impact of ATST on the *mana*, or spiritual nature, of Haleakalā. Although difficult to quantify, OCCL feels that these concerns must also be addressed.

Land Use and Existing Activities (Section 4.1)

The EIS identifies a *"Major, Adverse, Long-term* impact on the Federal Aviation Administration (FAA) Remote Communications Air/Ground (RCAG) facility by degradation of the communication signal.[5]"

The NSF, University, and FAA are working together to design replacements and modifications to the existing antenna and platforms to address this. The EIS concludes that the final impact will be reduced to *Minor* after mitigation. OCCL concurs with this conclusion.

Cultural, Historic, and Archeological Resources (Section 4.2)

The EIS identifies a *"Major, Adverse, Long-term* impact resulting from construction and day-to-day use of the proposed ATST project on the summit area of Haleakalā. The proposed ATST Project would be seen as culturally insensitive and disturb traditional cultural practices conducted within the Region of Influence (ROI). Further, noise and construction-related disturbances would have a major adverse impact on traditional cultural practices within the ROI. No mitigation would eliminate these impacts." The EIS calls for 12 mitigation strategies, but concludes that the final impact will remain *Major, Adverse,* and *Long-term.*

Haleakalā has been identified as a *Traditional Cultural Place* that satisfies the criteria to be eligible for listing on the National Register of Historic Places. This is based on the mountain's association with indigenous cultural practices and its importance, as testified by the Office of Hawaiian Affairs, in *maintaining the continued cultural identity of the community.*

Many community members also provided testimony that the summit of Haleakalā is considered a *wahi pana*, or a celebrated and sacred place, in the Native Hawaiian community. It is the realm of the *akua*, the gods and spirits that are still revered here.

Neither the application itself nor the numerous comments OCCL received draws a clear distinction between the impacts to actual cultural practices and deeper, spiritual impacts to the mountain's mana. OCCL believes that this is an important distinction. Impacts to cultural practice can be assessed, and mitigation measures can be designed to address them. Impacts to spirituality, and to the experience of a place, can in turn affect cultural practice. Spirituality itself, however, is difficult to assess and potentially impossible to mitigate for.

As discussed earlier, the main known cultural practices occurring at HO and in the Realm of Impact are gathering by hula halau, lapa`au practitioners, and others; and various sunset and sunrise ceremonies performed along the east and west perimeters of Pu`u Kolekole.

[5] The quoted items heading each section are taken from the applicant's submittal.

A sign at the entry states that unauthorized access is forbidden. However, it is followed by an un-translated statement in Hawaiian welcoming Native Hawaiian practitioners – in effect, authorizing them to enter the site.

The University has set aside 24,000 square feet of land on the western side of HO in perpetuity for the use of Native Hawaiians for religious and cultural purposes. In addition, they have funded two ahu, or stone altars, for ceremonial use. The west-facing ahu, Hinala`anui, is within the set-aside area. It is down-slope of the developed area, and the astronomy facilities are not visible from it. A second, east-facing ahu, Pā`ele Kū Ai I Ka Moku, was built with material from the proposed ATST site, and is outside the set-aside area. The ahu are shown in **Exhibit 4**. In addition, the Programmatic Agreement signed by the National Science Foundation, the National Park Service, the University of Hawaii, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation calls for a "place for shelter" at HO for cultural and religious practitioners.

Certainly the main grounds of HO are not hospitable to cultural practices. However, OCCL feels there is a strong argument to be made that - in providing roads and shelter – HO does not impede cultural practice, and further improves access to the *wahi pana* for cultural practitioners, and in particular the frail and/or elderly.

This, of course, is balanced by the potential impact of ATST on the spiritual nature of the summit. This impact is challenging to assess due to a number of issues: the difficulty people had in conveying spiritual beliefs in a public forum, the elusive nature of spirituality, and the private nature of many Native Hawaiian cultural practices.

These challenges were compounded by the dissemination of misinformation regarding the proposal[6]. OCCL notes that many who spoke in opposition to the proposal at the Public Hearing quoted the misinformation provided by these organizations.

Many who spoke and wrote in opposition to ATST drew a distinct line between 'indigenous spirituality' and 'Western science.' While the speakers represented a wide range of syncretic belief systems, all professed to represent a form of Native Hawaiian spiritual practice, and all were very clear that, for them, the mere presence of the telescope near the summit was sacrilege. The Maui Group Sierra Club quoted Charles Maxwell's report on cultural resources that concluded that "any building or structure built on this site is an intrusion on the sacredness and spirituality of this mountain."

OCCL believes that dialogue is hindered by the supposition that there is a difference in the quest for meaning and knowledge between 'indigenous' and 'Western' people, or that certain positions are "Hawaiian" and other positions "non Hawaiian." We note that

[6] Kahea (**Exhibit 5**) advertised that the telescope would occupy 100 acres of land (the application states 0.74 acres), while Kilakila O Haleakalā (**Exhibit 6**) advertised that the facility would extend five stories underground (the application states twenty feet), be located 200 feet from the National Park's Visitor Center (the site is over 1500 feet from Pu`u `Ula`ula, and 3600 feet – 0.65 miles - from the Haleakalā Visitor Center) and be 100% visible from both the Visitor Center and South Maui (not according to any models OCCL has seen).

astronomy was a specialized and valuable discipline in pre-Contact Hawai`i, and that the Kingdom of Hawai`i was an early adopter of many of the technological innovations of the 19th Century. The navigator and the scientist exist on the same continuum, and we should be careful in drawing a line that says "this is traditional" (and therefore good) and "this is modern" (and therefore bad).

Despite our reservations, we still acknowledge that the proposed structure will have a potentially significant impact on the spiritual experience of the mountain for a diverse group of people.

Testimony provided by the Native Hawaiian Legal Corporation provides one possible avenue for assessing spiritual impacts to cultural practices. According to their submittal, the impacts would be caused by four main factors: construction activities, the visual presence of the structure, the noise generated by the ATST and associated activities, and the operation of the facility itself.

The construction of the facility will certainly be a major operation, and will result in significant visual and aural impacts. The construction crane when in operation will extend 240 feet skyward, and will be much more visible and than the facility itself when completed. Construction noise is predicted to be a more significant issue. **Exhibit 7** shows the noise contours for the major impulse and non-impulse noises. Impulse noises from an ongoing source such as a bulldozer (96 dBA) will be reduced to 55 dBA just before the Pu`u `Ula`ula overlook. This is at maximum levels established for Class A zoning in Hawai`i, and would be as loud as a normal conversation at 1 meter. The non-impulse noise of a rock hammer or drill (113 dBA) will travel farther, and State standards for impulse noise would be exceeded at the overlook but not at the Visitor's Center. OCCL concurs that construction will have a major and adverse impact on cultural practices at HO, and that the significant impacts will extend as far as Pu`u `Ula`ula.

There are no aural impacts associated outside of the immediate area associated with the day to day operation of the facility. OCCL notes that our site visit to HO occurred on a calm day, and yet the loudest noise at the site was still the wind. Noise levels in the crater from the operations of existing facilities have been measured at 10 dBA, which is approximately the same noise level as leaves rustling. OCCL does not concur that noise will have a long-term adverse impact.

Visual impacts will be long term. Models show that ATST will dominate the view from the Pu`u `Ula`ula overlook; will be prominently visible from the areas of the National Park adjacent to HO; a small portion of the views from the Upper Park Road and Visitor's Center; and not visible from inside Haleakalā crater or the lower Park Road corridor. In the populated areas of Maui ATST would be visible in some distant ridgeline views, but obscured by terrain in others. **Exhibit 8** contains models of ATST's visual impact from six locations.

None of the view plains that were modeled in the EIS show the ATST blocking the site line of any significant topographical feature. While much of the criticism of ATST's visual impact surrounded the height of the structure, the models show that the more

significant impact will be that ATST will expand the *horizontal* visual footprint of the facilities at HO.

This expansion is tempered by the fact that HO is a finite space, and development of astronomical facilities at Haleakalā cannot expand indefinitely. There is no more space for any additional structures as large as ATST, and only one possible site for a moderately sized facility. The horizontal expansion of HO will reach it's maximum if ATST is approved. OCCL does note, though, that we do not know the limits of any potential vertical expansion of HO.

OCCL notes that the applicant states that they have modified the physical infrastructure to a point where further modifications would impact the functioning of the telescope itself. Even the color itself, a bright white which many commented on, is necessary to reduce thermal turbulence. Given today's technology, the visual impacts cannot be further mitigated without compromising the integrity of the proposal. The applicant has agreed to consider other paints or surface coatings if the technology becomes available.

There is a final element to consider that lies outside of any direct visual impact. The final structure will rise 100 feet over the tallest point on Maui, and will become the third highest point in the State. There are no potential sites at lower elevations; HO is limited in size and there are no alternate candidate parcels being considered for development of astronomical facilities.

The mitigation strategies designed to address the potential cultural, historical, and spiritual impacts were included a Programmatic Agreement signed on September of 2009 between NSF and participating signatory agencies and individuals representing Native Hawaiian organizations. The strategies include the establishment of a Native Hawaiian Working Group, the retention of a Cultural Specialist, "preferably a clergyman[7]," for construction monitoring and naming roads at HO; reserving up to 2% of the total ATST usage time for Native Hawaiian scientists, when there are Native Hawaiians among the pool of qualified scientists; painting a mural on the lower portion of the ATST showing a "well thought out representation of traditional Hawaiian culture;" and providing $20 million over ten years to support an educational initiative addressing the intersection between Native Hawaiian culture and science[8].

These measures represent a significant investment on the part of ATST. However, OCCL shares many of the concerns raised in the public meeting that the proposed mitigation measures do not seem to directly address spiritual impacts, and we concur with testimony that pointed out that providing sense of place training, painting murals, employing a cultural specialist or offering science scholarships is not actual mitigation of spiritual impacts.

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[7] OCCL questions why a clergyman would be preferable to a member of any other religion.

[8] The agreement also discusses the placement of a "star compass" at the summit to assist in the studying of traditional astronomy and navigation. This has been criticized as "Polynesian but not Hawaiian," and the proposal has been withdrawn from the plan.

As stated before, one cannot mitigate spirituality. Rather, these measures represent an attempt at providing offset solutions to related issues, thereby approaching a type of indirect mitigation.

The EIS concludes that the final impact on cultural resources will be *Major, Adverse,* and *Long-term*, and that the mitigation strategies proposed will not significantly reduce the impact. OCCL does not fully concur. We agree that the impact to cultural practice will be *Major* and *Adverse* during the first three to four years of construction. However, we believe that the nature of long term impact on cultural practices will be *Mixed*, as it is dependent upon the philosophy and beliefs of the viewer. Development at the site will limit some forms of practice, but will in turn make access to a harsh environment significantly easier for the less physically-fit.

In terms of the spiritual impact of the proposal: those who view science and spirituality as related paths on humanity's quest for knowledge will consider the impacts to be neutral to beneficial, while those who view the summit as an untouchable *wahi pana* will consider the proposal one of a long series of major, adverse impacts.

Biological Resources (Section 4.3)

The EIS identifies a *"Major, Adverse, Short-term* impact on the Hawaiian Petrel during the egg incubation period due to noise and vibration generated by construction activities. Potential major, adverse effects from construction could include the disturbance of the `ua`u habitat at HO, where birds would not be willing to remain in their burrows during the nesting season. Unrestrained construction noise, vibration, or human proximity could affect the nesting habits of the `ua`u to the extent that they may not return to, remain in, or otherwise utilize the burrows that are inhabited each year." The EIS predicts that proper mitigation can reduce this to a *Negligible* impact.

At HO there are thirty known burrows along the southeastern perimeter, as well as several burrows to the northwest. This is a typical size for `ua`u colonies in the region, and the colony appears to be healthy and stable. Major threats include predation by rats, and burrow collapse caused by wandering goats. The burrows can extend twenty feet underground, and birds return to the same burrow year after year. The loss of a burrow threatens the life of both the chicks and the adults.

HO staff have observed that `ua`u are creating new burrows under existing facilities. They theorize that this makes them less vulnerable to collapse, as the foundation of the buildings provide a goat-proof roof.

The Division has concluded that the project will likely result in the take of `ua`u (Hawaiian petrel, *Pterodoma sandwichensis*) from construction activities, and notes that the applicant is seeking approval of a Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP).

OCCL received public testimony that `ua`u are considered to be *amakua*, or manifestations of one's ancestors, by some Native Hawaiian lineages. Any take,

therefore, would be unacceptable. OCCL would point out that Native Hawaiians once hunted `ua`u, and that 'take' was therefore culturally acceptable in the historic period. The discussion as to whether any take at all is unacceptable in the modern period should occur as part of the development of the HCP and ITP.

The mitigation strategies for the impacts on `ua`u were developed in coordination with USFWS. They include: funding an agreed upon person to conduct biological monitoring, routinely surveying the existing colony for new burrows and initiating additional Section 7 consultations with USFWS if active burrows are found closer to ATST, monitoring the cumulative noise and vibration levels during construction to insure that they are not exceeded, lowering the construction crane at night and marking it with white polytape for visibility, setting ground vibration thresholds for burrow collapse, and initiating vector control measures to control fro rat predation.

OCCL concurs with the applicant that the post-mitigation impact on the `ua`u colony will be *Negligible, Adverse*, and *Short Term.*

The EIS identifies a *"Major, Adverse, Short- and Long-term* impact on botanical resources resulting from earth movement during construction and Alien Invasive Species introduction. Potential effects on `ahinahina (*Geranium multiflorum*) critical habitat, and `ua`u burrows were found to be negligible." The EIS predicts that proper mitigation can reduce this to a *Negligible* impact.

OCCL notes that botanical surveys did not reveal the presence of wild `ahinahina, and that there are no burrows at the construction site itself. OCCL concurs that the potential impacts on these resources is thus negligible.

The main known invasive species threats to ecosystem at HO are Argentine ants, yellow jackets, and rats. Mitigation measures involve containing trash to control predator populations, vector control measures for rats, inspecting cargo for introduced species, inspecting ATST within 100 feet of all buildings on a semi-annual basis and removing any introduced floral species, following vehicle washing and inspection protocols, and implementing a programmatic monitoring plan for invertebrates, flora, and fauna.

Alien species control is a challenge across the State. OCCL believes that the greatest risk of introducing new species to the summit will occur during construction, and emphasizes that the above protocols will need to be rigorously enforced. If this is done properly, OCCL concurs that the final risk will be reduced to *Negligible.*

Visual Resources and View Planes (Section 4.5)

The EIS identifies a *"Moderate, Adverse, Short-term* impact during the construction period when equipment, specifically cranes, will be visible from the Pu`u `Ula`ula Overlook, the western edge of the Haleakalā Visitor's Center, the summits of White Hill (Pa Ka`oao) and Magnetic Peak, and along the Park road corridor near Kalahaku Overlook." The EIS also identifies a *"Moderate, Adverse, Long-term* impact after the ATST facility is erected and is visible from Pu'u `Ula`ula Overlook, the western edge of

the Haleakalā Visitor's Center, the summits of Pa Ka`oao and Magnetic Peak, and along the Park road corridor nearing HO." The EIS concludes that no mitigation would adequately reduce these impacts.

OCCL notes that other a larger facility would have been more economical and efficient, and that placing the facility at the Reber Circle site would have allowed greater "seeing." Both of these options, however, would have created a greater visual impact. OCCL accepts the applicant's argument that further reductions in height would compromise the scientific objectives of the telescope, as it needs to escape thermal turbulence at ground level in order to function.

The actual impacts of ATST on view plains were discussed earlier,

Visitor Use and Experience (Section 4.6) and **Public Services and Facilities** (Section 4.13)

The EIS identifies a *"Major, Adverse, Long-term* impact resulting from visual effects on visitor expectations for summit area natural vistas." The EIS also identifies a *"Moderate, Adverse, Long-term* impact on recreational facilities as a result of the change in the viewshed." The applicant does not offer any mitigation measures.

OCCL questions the conclusion that the visual impact on Park Users will be Major and Adverse. The ATST will be a significant and visible addition to view plains in a concentrated area that *already include astronomical facilities*. ATST will expand the horizontal footprint of HO, but will not obstruct the view of any topographical feature for Park users, nor will it interfere with the viewing of the sunrise or sunset from the Park. ATST will not be visible from anywhere in the Crater.

HO itself, along with the Haleakalā Visitor Center, the summit roads and parking lots, and neighboring communication facilities, have certainly already had a major and adverse impact on summit area natural vistas. The addition of ATST should be taken in this context; its addition to the built environment at the Haleakalā summit rather than an addition in a pristine and untouched area; as such it should not have a major, adverse impact on visitor expectations.

The EIS also identifies a *"Major, Adverse, Short-term* impact resulting from construction related noise." To mitigate this, the applicant proposes to limit ATST-related construction activities from 30 minutes after sunrise and 30 minutes prior to sunset, to limit the hours for wide load vehicles to traverse the Park road to 8 pm to 4 am, and to limit vehicles that are Class 5 or larger from traveling through the Park during the peak visiting hours between 11 am and 2 pm. OCCL concurs with the applicant that these measures will reduce the impact to *Moderate*.

Infrastructure and Utilities (Section 4.9)

The EIS identifies a" *Major, Adverse, Long-term* impact on the FAA RCAG facility by degradation of the communication signal." To mitigate this the FAA will erect high-gain antennas and modify or replace the existing platforms on which the antennas are mounted. This will reduce the impact to *Negligible.*

The EIS identifies a *"Moderate, Adverse, Short-term* impact during the construction period to the roadways within HO." To mitigate this, the contractors will be required to take measures to minimize road damage, and any damage resulting from ATST construction will be repaired so as to return the roadway to its prior condition. In addition, construction related traffic will be coordinated with the National Park Service to avoid or minimize damage to the road pavement, potential damage to historic structures along the road, and traffic congestion. OCCL concurs with the EIS that these measures will reduce the impact to *Minor.*

In addition, providing access at the Park entrance station to wide-load trucks will require special mitigation measures. These will occur off-site and in areas under the jurisdiction of the National Park Service.

Noise (Section 4.10)

The EIS identifies a *"Major, Adverse, Short-term* impact resulting from construction-related noise both within and outside of the project area and along the Park road corridor." In addition to the mitigation measures discussed above, the contractors will be required to maintain all powered equipment in good operating condition and with proper intake and exhaust mufflers, to turn off machinery between active operations, and to shield noises whenever possible. Contractors will also be required to comply with applicable State noise regulations under Hawai`i Administrative Rules (HAR) §11-46.

Noise levels are low in the crater and at the Park, as discussed earlier. Consequently, any increase in noise levels should be considered to be significant. Despite the mitigation levels proposed above, OCCL concurs that the impact will remain *Major* and *Adverse,* and will continue to be for the first three to four years of construction. After this the majority of construction will occur inside, and we can expect noise levels to drop accordingly. No significant noise impacts are expected from the actual operation of the facility once construction is completed.

Compliance with the Haleakalā Observatories Management Plan

The Haleakalā Observatories Management Plan contains over fifty conditions regarding Monitoring Strategies, Cultural and Historic Preservation Management, Environmental Protection of Site Resources, Construction Practices, and Facility Design Criteria. The sections dealing with resource management parallel those actions recommended in the EIS for ATST. Any actions in the Management Plan not covered specifically in the EIS should be assumed to be a condition of a CDUP for ATST, should the Board issue it.

The Management Plan contains specific requirements for the design of new facilities. These are:

- New facilities will not be permitted to obscure the observation function of existing facilities
- New facilities will not be permitted to impact `ua`u habitat. They will not be fenced, and will not have unshielded lights or other attractants.
- New facilities will not impact known archaeological resources, and no construction will be permitted within fifty feet of any site or feature.
- New facilities will be painted to match the color of the cinder and lava when possible, with the understanding that daytime observatories can be painted white in order to keep the inside temperatures cool.
- Construction design will consider sight plains to population centers in Maui.
- When possible natural materials will be used for façades, walls, walkways, entryways, etc.
- IfA will seek broad public comment on any new construction activities.
- New facilities will be designed to minimize potential adverse impacts from natural and anthropogenic hazards.

OCCL notes that the design of the proposed ATST is consistent with these guidelines.

Conclusion

OCCL believes that the applicant has done a fair job in identifying the major and moderate impacts of the project, and in developing mitigation measures that will bring most but not all of the long-term impacts down to either minor or negligible levels.

The remaining impacts identified by OCCL as Major or Moderate after mitigation are: the long term impact to cultural resources to those who view ATST's presence as an affront to Haleakalā's *mana*, and the short term impact to both Park users and cultural practitioners from construction activities. OCCL feels that the impact of ATST on Haleakalā's and Maui's view plains is open to interpretation, and we are not convinced that it will be a major adverse impact on Park user's experience.

There have not been any valid proposals that could mitigate the visual or noise impacts further without compromising the purpose of the telescope itself, although the applicant has promised to consider alternate paints or covering material in the future should new technologies make them available.

The mitigation measure designed to address the cultural impacts, and indirectly the spiritual impact, were agreed upon in a prior Programmatic Agreement, and are not up for Board review at this meeting.

The interpretation of the spiritual impact is based upon individual perception. Some will view the telescope as another step forward in mankind's historic quest for knowledge,

and consistent with the trajectory of Hawaiian culture, while others will view it as the further desecration of one set of beliefs in favor of another.

The Board faces the difficult task of deciding whether the project may proceed. The research conducted at ATST will substantially add to our understanding of solar phenomenon, and have clear benefits for the public health, safety, and welfare. The project will also trigger adverse environmental and cultural impacts. As noted in this report, the applicant has done a reasonable job in identifying those impacts and developing mitigation measures to reduce those impacts. Despite this, some impacts remain difficult or impossible to mitigate. The public benefits of the proposed project should be weighed against the environmental and cultural impacts to the site and area.

Staff would recommend that a condition of the permit be that the applicant follow all mitigation strategies outlined in the application and EIS, with the exception of the two that were modified or withdrawn during the review process (concerning the star compass, and construction activities during `ua`u incubation periods).

Staff would also recommend that the Board draw particular attention to certain mitigation strategies by making them specific conditions of the permit; these are included under OCCL's proposed Conditions 7 through 10..

Staff would also like to incorporate reporting requirements into the permit conditions, so that OCCL and DLNR are kept informed of the construction progress, the Habitat Conservation Plan, the Programmatic Monitoring Plan for Invertebrates, Flora, and Fauna, and the Programmatic Agreement on Cultural Resources.

After careful review of the application and associated environmental documents, and balancing the potential benefits against the potential impacts of the project, OCCL will recommend that the Board approve this proposal.

As such, staff recommends as follows,

RECOMMENDATION:

Based on the preceding analysis, Staff recommends that the Board of Land and Natural Resources approve this Conservation District Use Application (CDUA) MA-3542 for the Advanced Technology Solar Telescope at the Haleakalā High Altitude Observatory Site, Pu`u Kolekole, ahupua`a of Papa`anui, moku of Honua`ula, Makawao District, Maui, TMK: (2) 2-2-007:008 , subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules, regulations, and conditions of the Federal, State, and County governments, and applicable parts of the Hawaii Administrative Rules, Chapter 13-5;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawai`i harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;

3. The applicant shall obtain appropriate authorization from the department for the occupancy of state lands, if applicable;

4. The applicant shall comply with all applicable Department of Health administrative rules;

5. Any work done or construction to be done on the land shall be initiated within one year of the approval of such use, in accordance with construction plans that have been signed by the Chairperson, and, unless otherwise authorized, shall be completed within seven (7) years of the approval. The applicant shall notify the Department in writing when construction activity is initiated and when it is completed;

6. Before proceeding with any work authorized by the Board, the applicant shall submit four copies of the construction and grading plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three of the copies will be returned to the applicant. Plan approval by the Chairperson does not constitute approval required from other agencies;

7. All representations relative to mitigation set forth in the Environmental Impact Statement and Conservation District Use Application are incorporated as conditions of the permit, with the exception of the two strategies that were withdrawn during the review process concerning a star compass and construction during `ua`u incubation periods;

8. The applicant will follow the stipulations agreed upon in the Programmatic Agreement signed between the National Science Foundation, the National Park Service, the University of Hawaii, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation. These include but are not limited to the establishment of a Native Hawaiian Working Group, the retention of a Cultural Specialist; reserving up to 2% of the total ATST usage time for Native Hawaiian scientists, when there are Native Hawaiians among the pool of qualified scientists; and providing support to an educational initiative addressing the intersection between Native Hawaiian culture and science. The applicant will notify OCCL in writing of any changes to the stipulations;

9. The applicant will not initiate construction activities until it has obtained both a Federal Incidental Take Permit and State Incidental Take License. All mitigation measures that are agreed upon as part of the Take Licenses and

associated Habitat Conservation Plan are assumed to be conditions of this permit, including but not limited to forbidding outdoor lighting at night, not exceeding ground vibration levels for burrow collapse, containing trash to control for rat predation, thoroughly inspecting cargo for alien invasive species, and educating drivers on the risk to avifauna;

10. The Programmatic Monitoring Activities discussed in the EIS are incorporated as conditions of this permit, including but not limited to botanical reconnaissance, invertebrate collections, field faunal surveys, video avian monitoring, and faunal radar surveys;

11. The Requirements set out in the Haleakalā Observatories Management Plan for Monitoring Strategies, Cultural and Historic Preservation Management, Environmental Protection of Site Resources, Construction Practices, and Facility Design Criteria are incorporated as conditions of this permit;

12. The applicant will incorporate into the annual HO management report progress updates on construction, the Habitat Conservation Plan, the Programmatic Monitoring Plan for invertebrates, flora, and fauna, and the Programmatic Agreement on Cultural Resources;

13. When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the board of water supply;

14. The applicant understands and agrees that this permit does not convey any vested rights or exclusive privilege;

15. In issuing this permit, the Department and Board have relied on the information and data that the applicant has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;

16. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take the measures to minimize or eliminate the interference, nuisance, harm, or hazard;

17. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact HPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary; the applicant will also notify OHA at the same time;

18. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities

19. Other terms and conditions as may be prescribed by the Chairperson; and

20. Failure to comply with any of these conditions shall render this Conservation District Use Permit null and void.

Respectfully submitted,

Michael Cain, Staff Planner
Office of Conservation and Coastal Lands

Approved for submittal:

Laura H. Thielen, Chairperson
Board of Land and Natural Resources

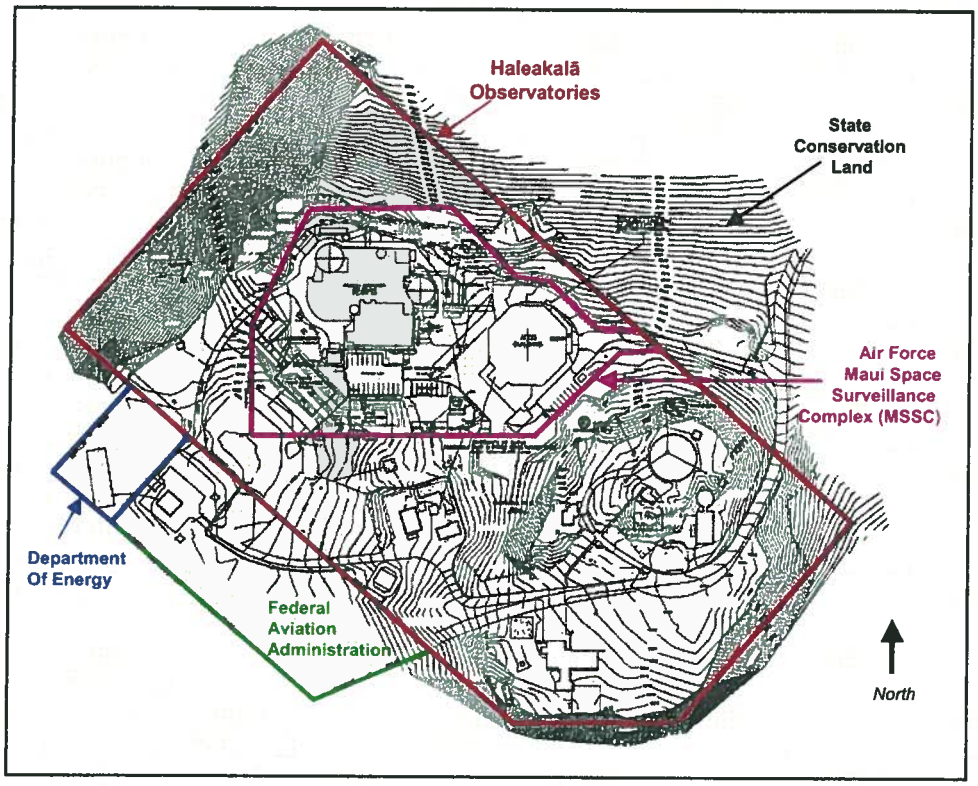


Figure 2. HO, Department of Energy, and Federal Aviation Administration Properties.

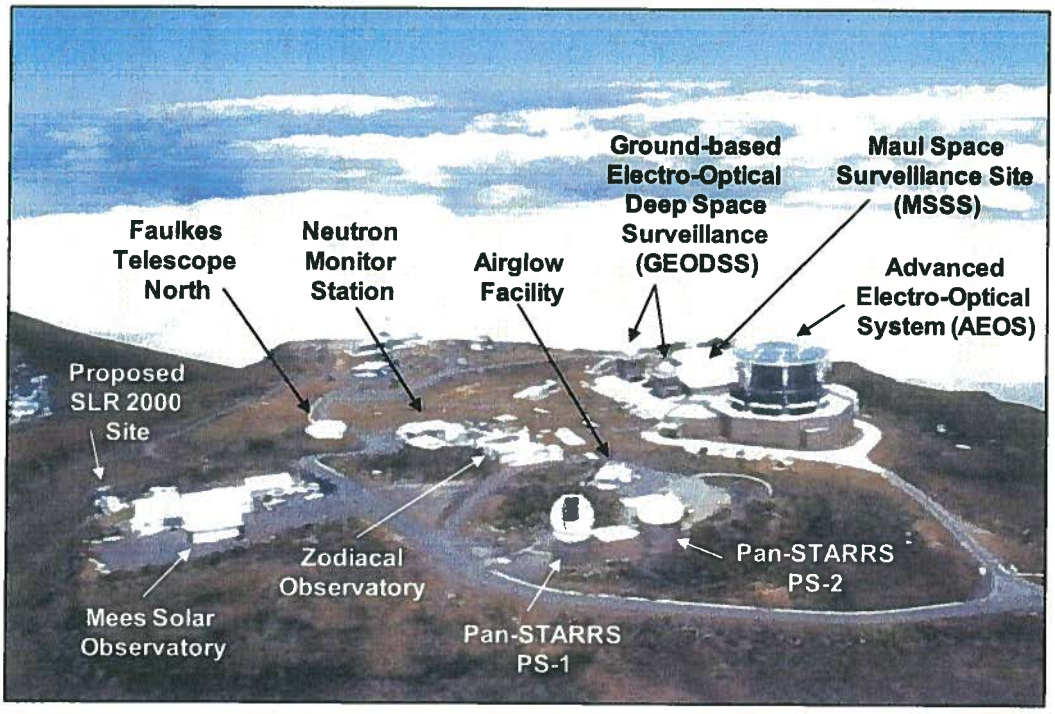
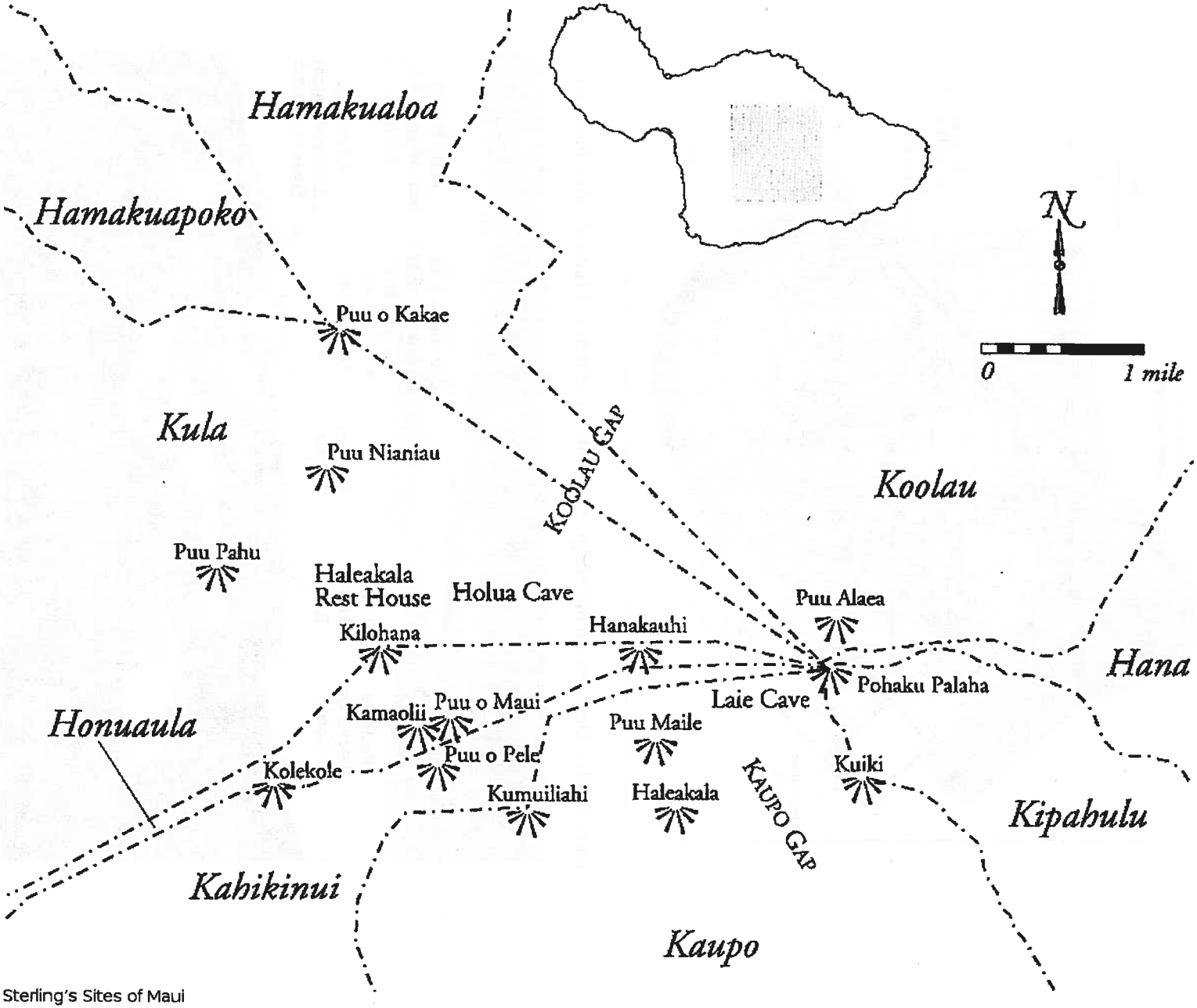


Figure 3. Aerial Haleakalā High Altitude Observatories Showing Existing Facilities.

EXHIBIT 1



From
Elspeth P. Sterling's Sites of Maui
(Bishop Museum Press, Honolulu, 1998)

EXHIBIT 2

Table 1. Impact Summary Table for Mees Site.

FEIS Resource Section	Impact	Mitigation	Final Impact
	Impacts of the Mees Site		
4.1-Land Use and Existing Activities	*Minor, Adverse, Long-term* impact on level of use of the land and current land use designation (Conservation District, General Subzone).	MIT-1	Minor, Adverse, Long-term
	Major, Adverse, Long-term impact on the Federal Aviation Administration (FAA) Remote Communications Air/Ground (RCAG) facility by degradation of the communication signal.	MIT-2	Negligible, Adverse, Long-term
4.2 -Cultural, Historic, and Archeological Resources	*Major, adverse, long-term* impact resulting from construction and day-to-day use of the proposed ATST project on the summit area of Haleakalā. The proposed ATST Project would be seen as culturally insensitive and disturb traditional cultural practices conducted within the ROI. Further, noise and construction-related disturbances would have a major adverse impact on traditional cultural practices within the ROI. No mitigation would eliminate these impacts.	MIT-1 MIT-3 MIT-4 MIT-5 MIT-6 MIT-13 MIT-14 MIT-16 MIT-18	Major, Adverse, Long-Term
	Moderate, Adverse, Long-term impact resulting from the potential disturbance to historic resources along the Park road corridor.	MIT-6 MIT-7 MIT-12	Minor, Adverse, Long-term
	Negligible, Adverse, Long-term impact on archeological resources during construction and operation.	MIT-5 MIT-7	Negligible, Adverse, Long-term
4.3-Biological Resources	*Major, Adverse, Short-term* impact on the Hawaiian Petrel during the egg incubation period due to noise and vibration generated by construction activities. Potential major, adverse effects from construction could include the disturbance of the 'ua'u habitat at HO, where birds would not be willing to remain in their burrows during the nesting season. Unrestrained construction noise, vibration, or human proximity could affect the nesting habits of the 'ua'u to the extent that they may not return to, remain in, or otherwise utilize the burrows that are inhabited each year.	MIT-6	Negligible, Adverse, Short-term
	Major, Adverse, Short- and Long-term impact on botanical resources resulting from earth movement during construction and AIS introduction. Potential effects on 'ahinahina plants, Geranium multiflorum critical habitat, and 'ua'u burrows were found to be negligible.	MIT-9	Negligible, Adverse, Short- and Long-term
4.4-Topography, Geology, and Soils	*Minor, Adverse, Short-term* impact resulting from land clearing, demolition, grading/leveling, excavation, and other construction-related earthmoving activities.	N/M	

EXHIBIT 3

Table 1. Impact Summary Table for Mees Site. (cont.)

FEIS Resource Section	Impact	Mitigation	Final Impact
	Impacts of the Mees Site		
4.5-Visual Resources and View Planes	*Moderate, Adverse, Short-term* impact during the construction period when equipment, specifically cranes, will be visible from the Pu'u Ula'ula Overlook, the western edge of the Haleakalā Visitor's Center, the summits of White Hill (Pa Ka'oao) and Magnetic Peak, and along the Park road corridor near Kalahaku Overlook. No mitigation would adequately reduce this impact.	N/M	
	Moderate, Adverse, Long-term impact after the ATST facility is erected and is visible from Pu'u Ula'ula Overlook, the western edge of the Haleakalā Visitor's Center, the summits of Pa Ka'oao and Magnetic Peak, and along the Park road corridor nearing HO. No mitigation would adequately reduce this impact.	N/M	
4.6-Visitor Use and Experience	*Major, Adverse, Long-term* impact resulting from visual effects on visitor expectations for summit area natural vistas	N/M	
	Major, Adverse, Short-term impact resulting from construction-related noise.	MIT-6	Moderate, Adverse, Short-term
	Negligible, Adverse, Long-term impact resulting from construction-related traffic traversing the Park road corridor.	MIT-10	Negligible, Adverse, Long-term
4.7-Water Resources	*Minor, Adverse, Short- and Long-term* impact on surface water and drainage at HO.	N/M	
	Minor, Beneficial, Long-term impact on groundwater sources and supplies because the existing cesspool would be replaced by an individual wastewater system to treat sanitary waste. The potential for release or failure during installation creates a negligible, adverse, short-term impact.	N/M	
4.8-Hazardous Materials and Solid Waste	*Negligible, Adverse, Long-term* impact resulting from construction debris and hazardous materials used in building construction and operation. Adherence to the LRDP would restrict hazardous material use and guide management practices. There would be no substantive change in solid waste generation or disposal practices.	N/M	
4.9 - Infrastructure and Utilities	*Major, Adverse, Long-term* impact on the FAA RCAG facility by degradation of the communication signal.	MIT-2	Negligible, Adverse, Long-term
	Moderate, Adverse, Short-term impact during the construction period to the roadways within HO.	MIT-11	Minor, Adverse, short-term
	Minor, Adverse, Short- and Long-term impact during the construction period on State and Park roadways. This impact would continue at a lower level during operations.	MIT-12	Minor, Adverse, Short- and Long-term
	Moderate, Beneficial, Long-term impact on electrical systems at HO due to the proposed MECO upgrade.	N/M	
	Negligible, Adverse, Long-term impact on stormwater and communication systems.	N/M	

Table 2. Mitigation Summary.

Mitigation No.	Mitigation Description	Affected Resources (FEIS Section)
MIT-1	NSF would decommission and deconstruct the proposed ATST Project at the end of its productive lifetime (approximately 50 years from the date operations commence), unless decided otherwise in consultation with the Native Hawaiian community. In that case, NSF would take steps to divest itself of all responsibility of the proposed ATST Project.	4.1-Land Use and Existing Activities* 4.2-Cultural, Historic, and Archeological Resources *mitigation not required, but applied to reduce long- term impacts
MIT-2	FAA will erect high-gain antennas in the same location as the current RCAG antennas and modifying/replacing the existing platforms on which the antennas are mounted, to accommodate wind loading and configuration of the new antennas. The FAA has stated that further modification of the site and relocations of the antennas may be needed, but environmental impacts from such a potential modification and relocation would not rise to a level of significance.	4.1-Land Use and Existing Activities 4.9-Infrastructure and Utilities
MIT-3	NSF, the Association of Universities for Research in Astronomy (AURA)/NSO, and UH IfA, in consultation with the Native Hawaiian community, will use best efforts to locate an area for a Hawai'i star compass at the summit.	4.2-Cultural, Historic, and Archeological Resources
MIT-4	In accordance with IfA's Long Range Development Plan, all construction crewmembers would attend UH-approved "Sense of Place" training prior to working on the proposed ATST Project.	4.2-Cultural, Historic, and Archeological Resources
MIT-5	AURA/NSO would hire a cultural resource monitor to ensure protection of existing traditional cultural resources during construction. The cultural resource monitor will be a Kanaka Maoli, preferably a kupuna (elder) and if possible a kahu (clergyman) as well, and one who has knowledge of the spiritual and cultural significance and protocol of Haleakalā. The cultural resource monitor's knowledge should be concentrated in traditional and cultural practices and protocols. The cultural resources monitor would be chosen in consultation with appropriate organizations and individuals with knowledge of such traditions and protocols.	4.2-Cultural, Historic, and Archeological Resources
MIT-6	HALE would restrict noise levels during certain hours of the day and during certain months of the year, limit on-site ATST-related construction activities during the time-frame from 30 minutes after sunrise to 30 minutes prior to sunset, limit the hours for wide load vehicles to traverse the Park road (such vehicles need to come through the Park during the night between approximately 8:00 p.m. and 4:00 a.m., and prohibit wide or heavy loads from coming through the Park at night between April 20th and July 15th). The seasonal restriction on wide load traffic is also imposed by USFWS.	4.2-Cultural, Historic, and Archeological Resources; 4.3-Biological Resources; 4.6-Visitor Use and Experience; 4.10-Noise
MIT-7	Special Use Permit (SUP) Pre- and Post-Project Documentation: Prior to and after the proposed ATST Project, all historic features and other areas susceptible to potential impact along the Park road shall be photographed and documented (see Federal Highway Administration (FHWA) report – "Haleakala Highway, Haleakala National Park, Pavement Drainage Condition Investigation, Distress Identification and Recommendations Report # HALA 3-2-2009, March 2, 2009 (revised April 2009)", found in FEIS, Vol. II-Appendix P). This will be completed by a qualified person funded by the proposed ATST Project.	4.2-Cultural, Historic, and Archeological Resources
MIT-8	Remove site Archeological Site 50-50-11-5443, concrete ring, which is a remnant of a 1952 radio telescope experiment, in accordance with the Archaeological Data Recovery Plan.	4.2-Cultural, Historic, and Archeological Resources

Table 2. Mitigation Summary (cont.).

Mitigation No.	Mitigation Description		Affected Resources (FEIS Section)
MIT-9 (cont.)	**Possible Impact**	**Avoidance and Minimization Measure Adopted**	
	Collision of petrels with equipment and buildings	Construction crane will be lowered at night and marked with white polytape for visibility. All structures will be painted white. No outdoor lighting will be associated with the project.	
	Burrow collapse from construction vibration	USFWS set ground vibration thresholds for burrow collapse. Vibration will be monitored to ensure that the burrow collapse threshold is not exceeded.	
	Noise concerns and incubating Hawaiian petrels	Construction noise at burrows within 80 meters will be no louder than 83 dBA measured at 5-feet from the source during incubation periods (April 20th through July 15th). Only two truck round-trips per day will be driven to the construction site during the incubation period.	
	Predator population increase	Trash will be contained. Rat predation at the Haleakalā Observatories will be minimized by vector control methods to protect the Hawaiian petrel.	
	Transport of invasive species to Haleakala	Cargo will be thoroughly inspected for introduced non-native species. All ATST facilities and grounds with 100 feet of the buildings will be thoroughly inspected for introduced species on a semi-annual basis and any introduced floral species found will be removed.	
	Driver education	All drivers will receive a briefing and a breeding season refresher to further reduce the chance that a vehicle associated with the project would cause injury or mortality to nēnē.	
	5. Alien Invasive Species Prevention - NPS vehicle, equipment, and materials washing and inspection protocol will be followed by the proposed ATST Project. Further, to augment prevention, the IfA has implemented weeding throughout HO. This would reduce or eliminate AIS introduction if prevention is not successful. 6. Impact Prevention To Nēnē At Entrance Station - To enable wide loads to clear the Park entrance station, an area 12-feet wide, currently occupied by a septic tank, underground utilities, and native vegetation, would be temporarily developed into a drivable surface. To mitigate the potential impact on nēnē that frequent the area, widening of the shoulder would be completed outside the nēnē nesting season. Park staff would work with the proposed ATST project team to implement nēnē avoidance methods for this road-widening work. Avoidance measures would include survey of the site for nēnē prior to construction and installation of temporary "orange fencing" around the outer perimeter of the construction area to prevent nēnē from walking into the site during construction. The site will be restored with native vegetation after use to further reduce impacts on nēnē. 7. Programmatic Monitoring - A programmatic monitoring plan for invertebrates, flora and fauna during the project has been prepared for the project, as described in the FEIS Vol. I, Table 4-1.		

Table 2. Mitigation Summary (cont.).

Mitigation No.	Mitigation Description	Affected Resources (FEIS Section)
MIT-10	Slow moving vehicles and/or vehicles that are class 5 or larger should not travel through the Park between approximately 11:00 a.m. and 2:00 p.m. These are peak visitation hours. The proposed ATST Project shall provide regular updates to appropriate NPS staff during the project so NPS staff can provide information to Park visitors.	4.6-Visitor Use and Experience; 4.10-Noise
MIT-11	Contractors would be made aware of the potential for road damage and would be required to take measures to minimize the damage. Any damage to HO roadways that does result from ATST construction traffic would be repaired so as to, at a minimum, restore those roadways back its condition before construction of the proposed ATST Project. These mitigation measures, to be negotiated between the affected parties, would reduce the overall impact on HO roadways and traffic down to minor, adverse, and short-term impacts.	4.9-Infrastructure and Utilities
MIT-12	All construction-related traffic within the Park road corridor would be coordinated with HALE and conducted in compliance with an SUP issued by HALE, so as to avoid or minimize: damage to the road pavement, potential damage to historic structures along the park road corridor, traffic congestion, and other potential adverse impacts on Park resources and the visitor use and experience. SUP provisions issued by HALE would include mitigation measures to address traffic issues, potentially including those recommended in the FHWA HALE Road Report. The provision of wide-load truck access at the HALE entrance station would require special mitigations related to that project, as described in Section 2.4.3-Construction Activities, Construction Traffic. This would include: 1. Assurance by the proposed ATST Project that the septic system is adequately protected. Mitigation may include placement of metal plate covers, grade beams, other protective structures, or relocation of utilities as a last resort. 2. Protection of existing utility man-hole covers. Specifically, the Project would: a. avoid direct axle loading on the covers, b. replace the existing covers with heavier gage steel; or, c. reinforce the existing covers with additional steel bracing. 3. Provision of a barricade system, such as a gate, removable bollards or similar devices on the widened shoulder to deter Park visitors and staff from driving on it. 4. To minimize the potential impact to the nēnē habitat in this area, the access widening project would be completed outside the nēnē nesting season, which is November through March. 5. Native plants in the area of the access widening project would be protected when possible and HALE staff would work with the Project on this mitigation. 6. When the widened access is no longer needed for the proposed ATST Project, the area would be fully restored and rehabilitated to its pre-existing condition.	4.9-Infrastructure and Utilities

Table 2. Mitigation Summary (cont.).

Mitigation No.	Mitigation Description	Affected Resources (FEIS Section)
MIT-13	To mitigate construction noise, contractors would implement reasonable noise-reduction practices and abatement procedures. These would include the following source control mitigation measures, all regarded as somewhat standard in the industry. These mitigation measures to minimize expected noise impacts during construction at HO would be as follows: 1. Conduct all noise-emitting activities within strict day and time constraints, with work prohibited during sensitive nighttime periods. 2. Reduce or substitute power operations/processes through use of proportionally sized and powered equipment necessary only for tasks at hand. 3. Maintain all powered mechanical equipment and machinery in good operating condition with proper intake and exhaust mufflers, 4. Turn off or shut down equipment and machinery between active operations; and, 5. Shield noise sources where possible. Contractors would be required to comply with applicable State noise regulations, under HAR 11-46.	4.10-Noise
MIT-14	During the 50-year lifetime of ATST, the Project will periodically reassess technological options for new types of coatings, more efficient cooling methods, or improved compensation for thermal turbulence which may allow the ATST enclosure and buildings to be painted a color other than white. If such future technology is determined to be an effective, reliable and affordable solution that meets the scientific requirements of the proposed ATST Project, NSF will consider repainting the exterior structures of the ATST with a more neutral color.	4.2-Cultural, Historic, and Archeological Resources
MIT-15	If there are Native Hawaiian scientists among the pool of scientists qualified to conduct research at the proposed ATST Project, NSO will reserve up to 2% of total ATST usage time for these Native Hawaiian scientists. Usage time will be provided through the Telescope Allocation Committee process similar to other scientists' requests based on technical feasibility and scientific merit. Unused time will not be carried forward to the next allocation period. Qualifications for usage will be based on established NSO guidelines.	4.2-Cultural, Historic, and Archeological Resources
MIT-16	The exterior design for the lower portion of the ATST building will include a well thought-out representation of traditional Hawaiian culture suitable to the Haleakalā setting, such as artwork depicting Maui and the Sun or other appropriate motifs. These depictions will be developed in consultation with Native Hawaiian artists.	4.2-Cultural, Historic, and Archeological Resources
MIT-17	NSF will support Maui Community College (MCC) in developing an educational initiative (Akeakamai I Ka La Hiki Ola, or Scientific Exploration Beneath the Life-Bringing Sun) on Maui to address the intersection between traditional Native Hawaiian culture and science. To support this educational initiative at MCC, NSF will, if the proposed ATST Project is approved, make available $20 million ($2 million per fiscal year, commencing in FY 2011), subject to applicable Federal law.	4.2-Cultural, Historic, and Archeological Resources
MIT-18	UH IfA will work with appropriate authorities to consider renaming the roads on the summit.	4.2-Cultural, Historic, and Archeological Resources

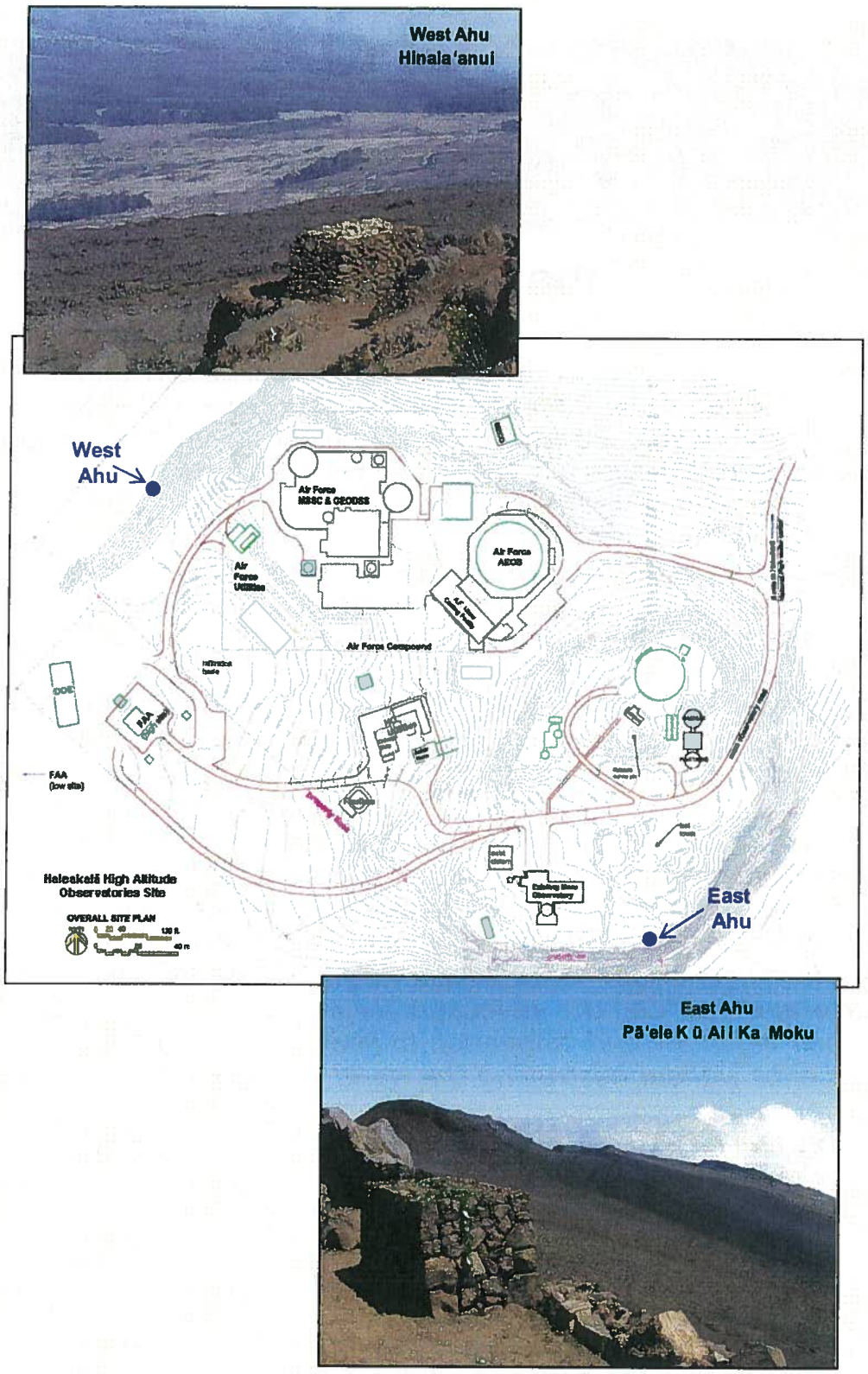


Figure 8. East- and West-facing Ahu Locations at HO.

EXHIBIT 4

KAHEA

The Hawaiian-Environmental Alliance

HO'OKAHI NO KA 'AINA A ME NA KANAKA

THE LAND AND THE PEOPLE ARE ONE

The House of the Sun Needs Your Help![1]

Haleakala -- The House of the Sun -- is the ecologically unique and culturally sacred summit on the island of Maui, where the demigod Maui snared the sun and where the last major colony of endangered Hawaiian petrels thrives. It is also the preferred site for the construction of another giant telescope.

Another giant telescope proposed on sacred land.
The University of Hawaii, together with the National Science Foundation, is pushing to construct a 14-story, 100-acre solar telescope, called the Advanced Technology Solar Telescope (ATST), on the summit of Haleakala. The ATST proposes to study solar magnetic activity (basically how the sun affects things in space), an area so well studied that scientists have yet to review the data they have already collected.

> *"I challenge the assumption that all science is progress. Is it progress to destroy the environment, to kill endangered life? Is it progress to desecrate the culture of another, to perpetuate cultural genocide?"* ***said Kiope Raymond of Kilakila O Haleakala****. "Can the advocates for modern astronomy not use their ingenuity and innovation to find a way to conduct their science without destroying the world we live in?"*

Building the ATST on Haleakala will have serious cultural and environmental impacts.
The official cultural impact assessment for the telescope found that "the overwhelming evidence, from a cultural and traditional standpoint, points towards significant adverse impact on Native Hawaiian traditional cultural practices and beliefs." The assessment concluded that "the proposed undertaking is unmitigable," and recommended that "no action" be taken. Proceeding with the ATST means undermining the constitutionally protected cultural practices on

[1] http://salsa.democracyinaction.org/o/2699/p/dia/action/public/?action_KEY=1037; accessed September 8, 2010

EXHIBIT 5

the sacred temple-summit of Haleakala.

Construction of this giant telescope will also likely disturb one of the last major nesting colonies of the Hawaiian petrel. This ground-nesting seabird was once common throughout the Hawaiian Islands, but habitat loss has pushed it to the brink of extinction. The only major nesting colony of Hawaiian petrels left on earth consists of less than 1,000 birds on the summit of Haleakala. Vibrations from the construction of the ATST could cause nesting burrows to collapse. More than 450 cement trucks are expected to traverse the historic Haleakala National Park Highway just during the most intense phase of construction.

This means the ATST will destroy ancient cultural traditions and unique habitats, in order to conduct duplicative research on weather in space. That is why we join **the community's demand that the University of Hawaii and the National Science Foundation halt the proposal to build the ATST on Haleakala** until three things are done:

1. an independent, community-based plan for the management of the conservation district that protects the entire summit of Haleakala is completed and fully adopted by the State.

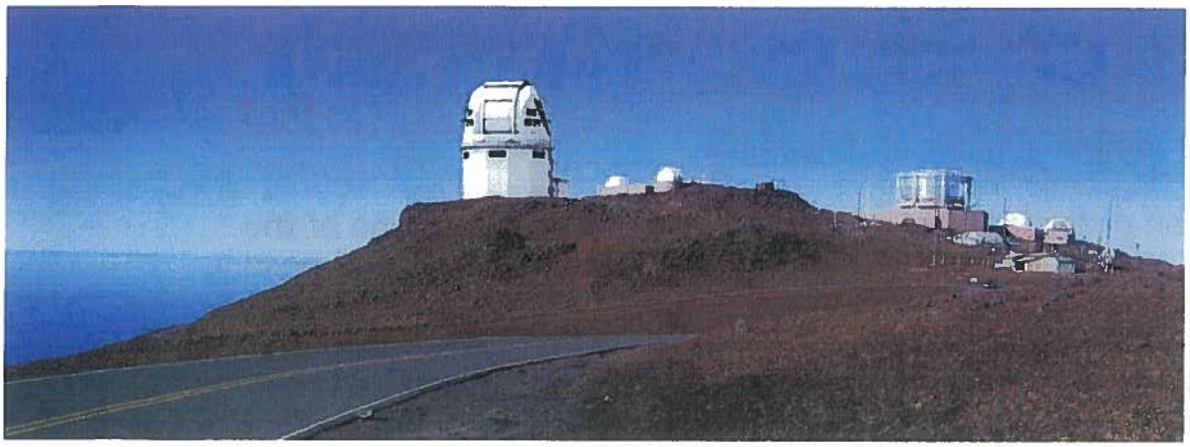
2. an environmental impact statement for the other two possible locations for the solar telescope (La Palma in the Canary Islands and Big Bear Lake in California) is completed.

3. all of the data already collected on solar magnetic activity is cataloged, studied, and assessed to determine whether the ATST is even necessary.

In order to address your message to the appropriate recipient, we need to identify where you are.

Please enter your zip/postal code:

You can also visit Kilakila O Haleakala on the web to learn more about this important issue and sign their petition in opposition to the Advanced Technology Solar Telescope, just click here to go to www.kilakilahaleakala.org.



Record your support of

NO MITIGATION / NO ATST TELESCOPE

Sign petition at Kilakila Haleakala.org

On Haleakala????

Revere Haleakala

ATST telescope-

Best built somewhere else

Approx 143feet = Approx 50 ft higher than the County Building

5 stories underground

9 stories above ground

100% Visible from visitor center 200 ft away

100% Visible from South Maui

Visible from Central Maui

EXHIBIT 6

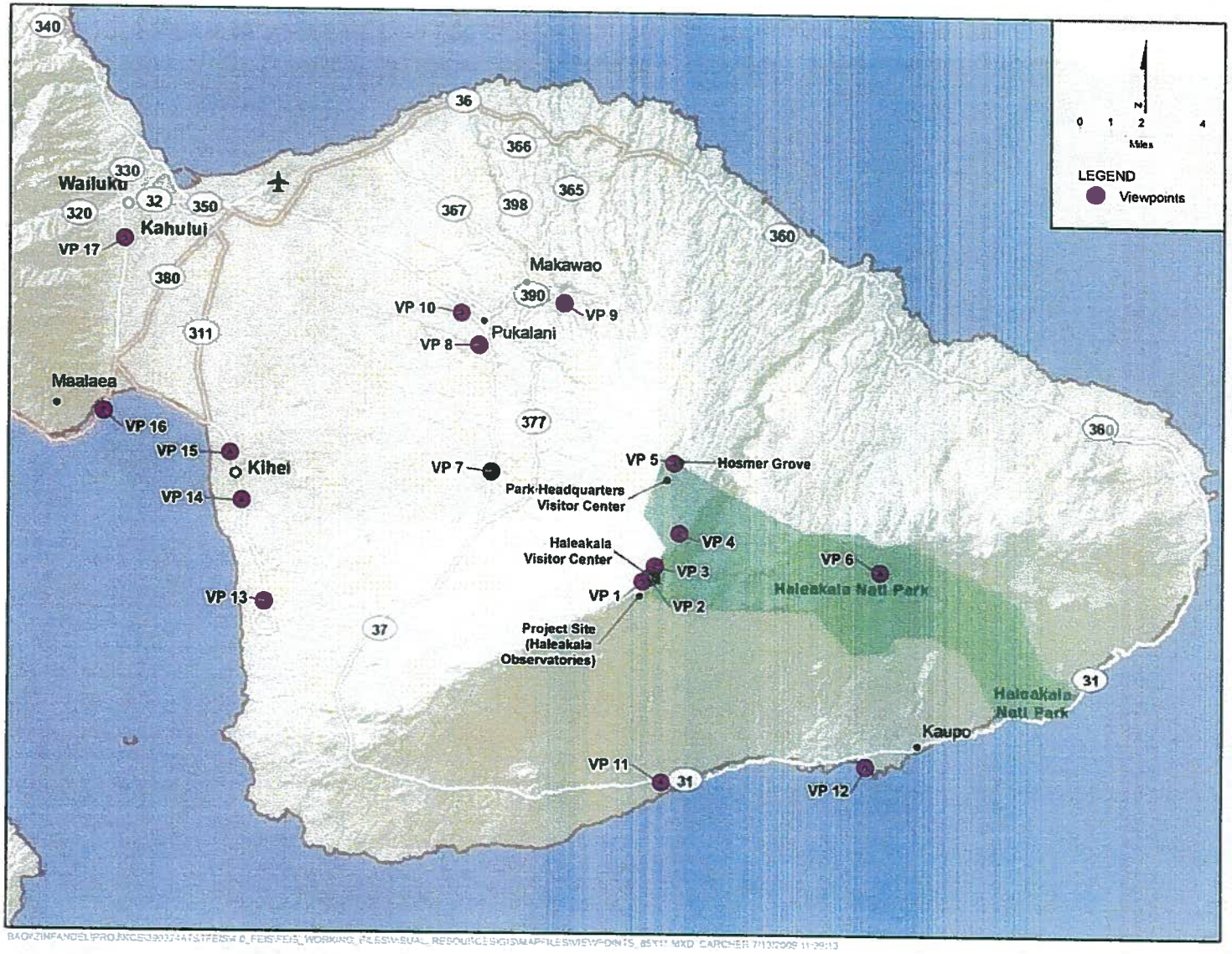


Figure 4-3. Viewpoint Locations.

EXHIBIT 7

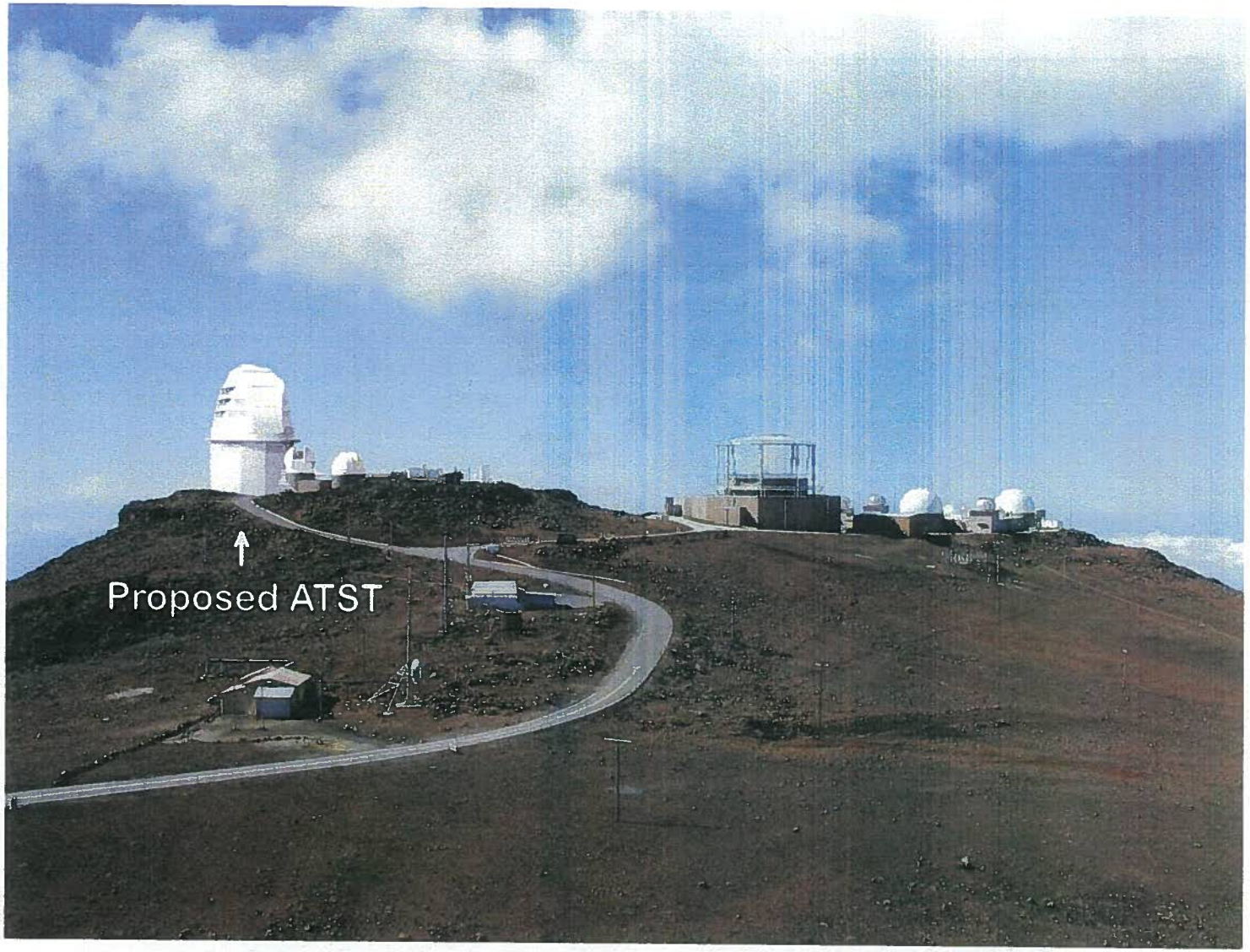


Figure 4-4b. View from Pu'u Ula'ula (Red Hill) Overlook (Viewpoint 1) and Mees Site Rendering.

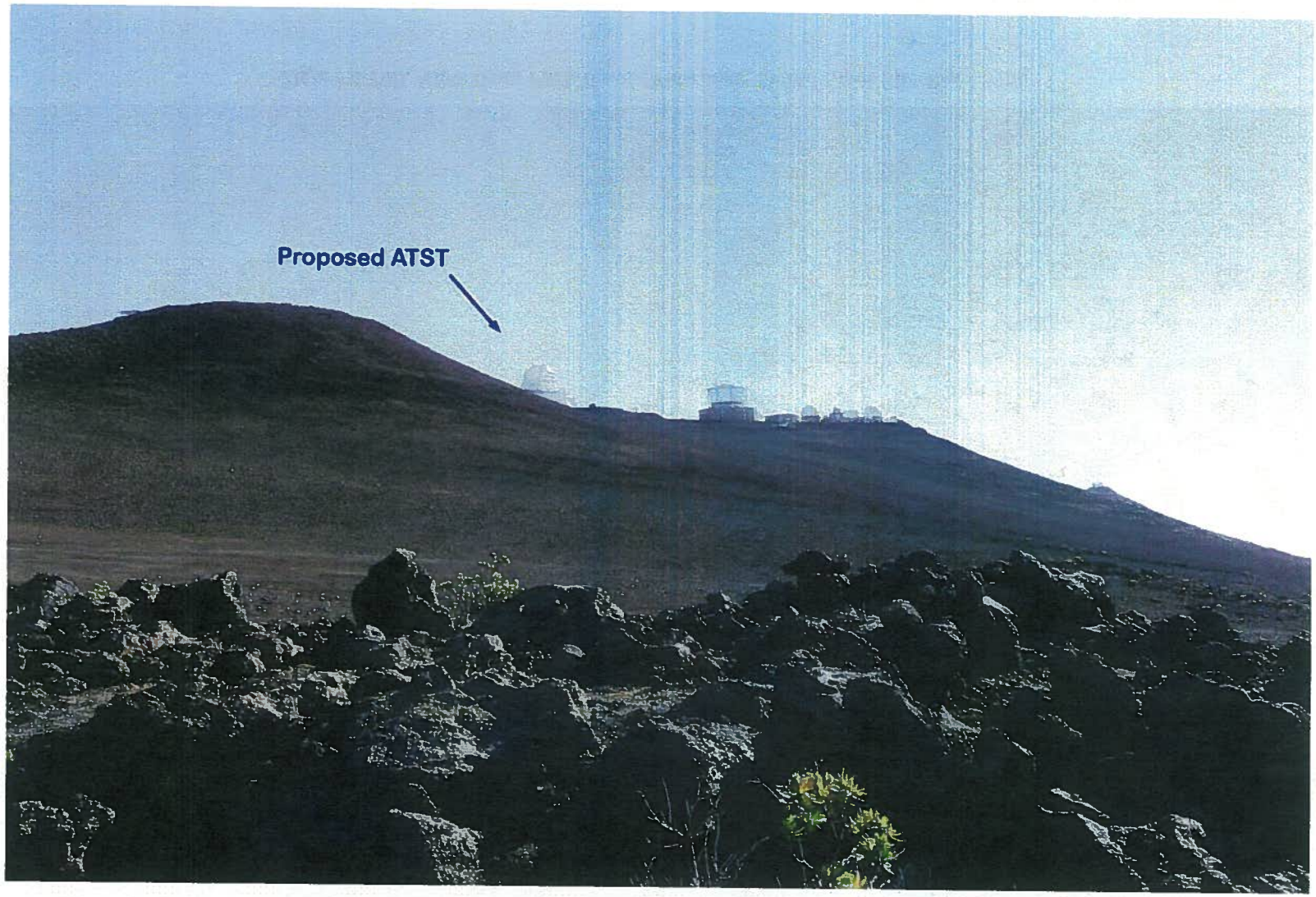


Figure 4-8b. View from Park Road (Viewpoint 2) and Mees Site Rendering

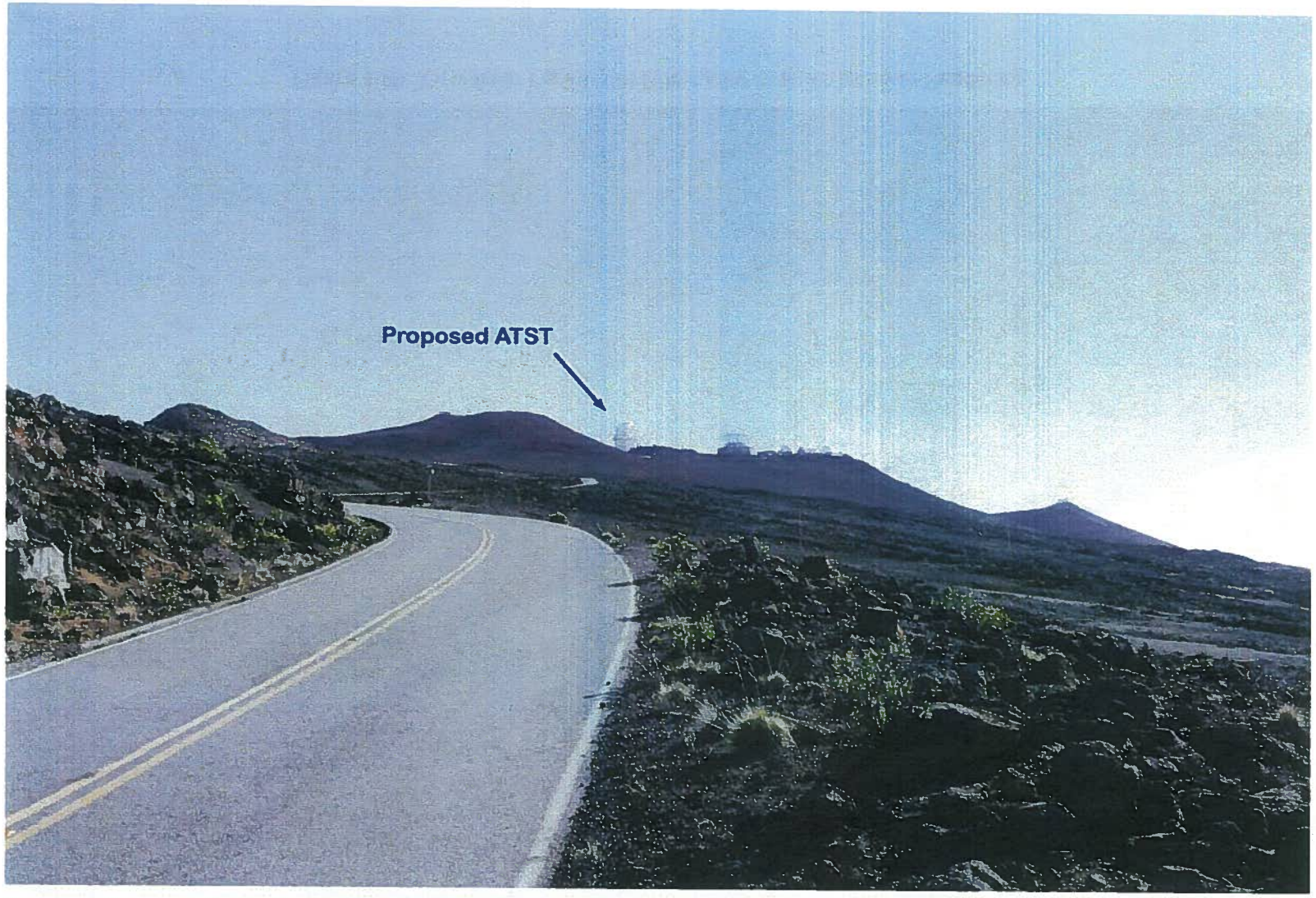


Figure 4-10b. View from Park Road (Viewpoint 3) and Mees Site Rendering.

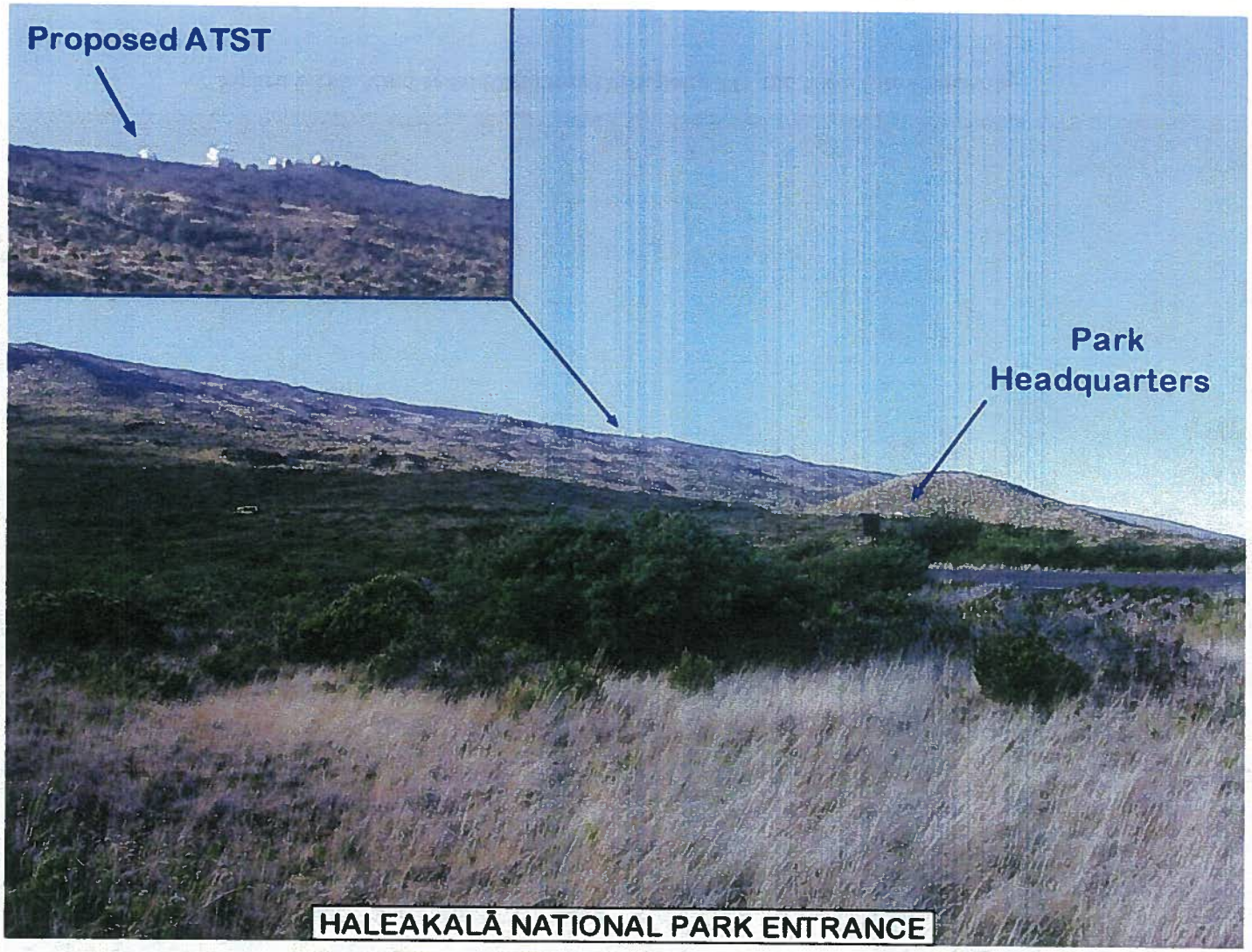


Figure 4-12b. View from Park Road at Entrance to Hosmer Grove (Viewpoint 5) and Mees Site Rendering.

Figure 4-19b. View from Kahikinui (Viewpoint 11) and Mees Site Rendering.

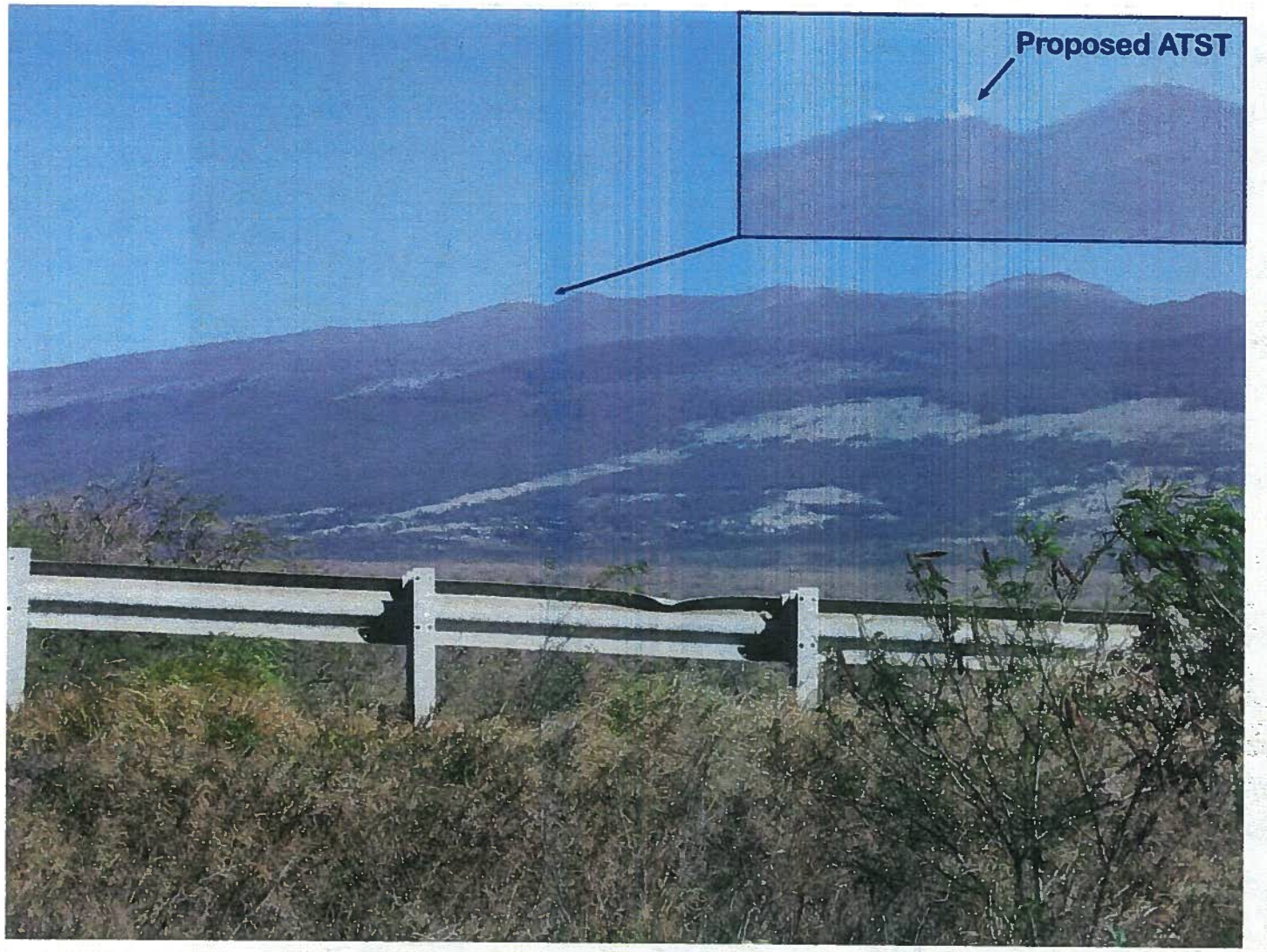


Figure 4-21b. View from Keonekai, Kihei (Viewpoint 13), and Mees Site Rendering.

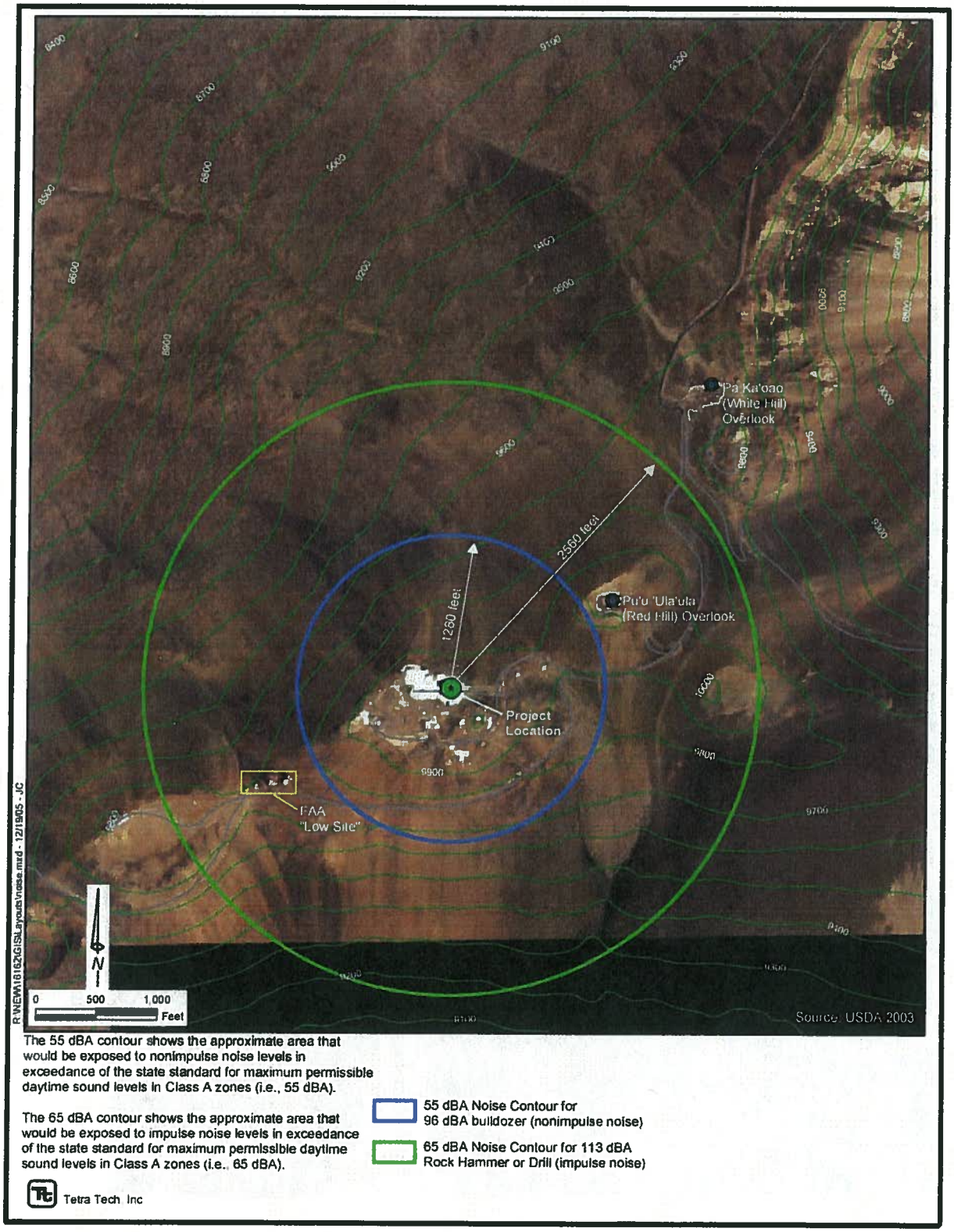


Figure 4-28. Impulse and Non-impulse Construction Noise Contours.