



MEMORANDUM

February 13, 2025

TO: Mauna Kea Stewardship and Oversight Authority

FROM: Greg Chun, Executive Director, CMS

SUBJECT: Review of Keck Temporary Outdoor Storage Project Site Plan Application

- Date proposal rec'd: 1/7/2025
- Type **A** B / C
- CMS MIP #352
- ED review: 1/8/2025
- EC review: 1/9/2025
- KKM review: 1/9/2025
- MKMB review: 2/4/2025
- MKSOA review: 2/13/2025

I. Project Description, Anticipated Impact and Suggested Mitigation

The W. M. Keck Observatory (“WMKO”) requests to store items outside its summit facility for up to two, eight-week periods during March-April 2025 and August-October 2025 while it completes interior repairs to the grouting of the Keck I telescope pier. Keck I was originally approved under CDUP HA-1646 (1984). The project items include, but may not be limited to, a dumpster, air compressor, two-20 foot long shipping containers, and portable toilets to be placed near their front entrance; additional similar items may be required as the project proceeds. The outdoor placement of items meets the definition of “land use” as stated in the Conservation District Rules and requires Site Plan Approval. All project activity will otherwise be entirely indoors and the requested outdoor equipment will be used for normal intended purposes:

- Air compressor will run pneumatic hand-tools to remove the old grouting of the KI pier. Tools are only used indoors. Dust will be contained with no fugitive dust escaping outside.
- Dumpster will hold project waste. Waste will be secured and properly disposed offsite. No hazardous materials are involved.
- Shipping containers will store tools and supplies.
- Portable toilets to supplement existing indoor lavatories for the estimated 32 contractor personnel.

The installation work will be completed by in-house staff and contractors. The action is expected to have temporary and either minimal or no significant effects. The project will have a temporary effect on recreational resources as it requires closure of the WMKO telescope-viewing gallery and restrooms to maintain a controlled environment for storage, handling, and curing of the new epoxy grouting. These areas, which may experience dust, will also be closed to maintain public health and safety and workers handling the material will use respirators. During the project period, WMKO will also restrict onsite parking to staff and contractors, and parking will not be available to the general public. No impacts are anticipated to any identified historic properties or cultural resources, nor to any natural (geological and hydrological), or biological resources. The work will not extend or enlarge WMKO’s footprint and does not change the permitted use of the facility.



II. Department of Land and Natural Resources Rules

The project is a like-to-like replacement of grouting on the telescope pier and presumes the following land use under HAR §13-5-22, P-8, Structures and Land Uses, Existing, (A-1) *Minor repair, maintenance, and operation to an existing structure, facility, use, land, and equipment, whether it is nonconforming or permitted, that involves mostly cosmetic work or like-to-like replacement of component parts, and that results in negligible change to or impact to land, or a natural and cultural resource...*

The project involves no heavy machinery and the action is considered exempt under HAR §11-200.1-15 (c)(1) *Operations, repairs, or maintenance of existing structures, facilities, equipment, or topographical features, involving minor expansion or minor change of use beyond that previously existing*; and HAR §11-200-8(a), Exemption Class #7: Interior alterations involving such things as partitions, plumbing, and electrical conveyances. (6) Masonry and concrete work.

III. Comprehensive Management Plan Compliance

The request is consistent with the Comprehensive Management Plan (CMP) 2022 Supplement, the 2022 Master Plan for the University of Hawai'i Maunakea Lands, the University's lease for the Science Reserve, and the Hawai'i Administrative Rules §20-26, "Public and Commercial Activities on Mauna Kea Lands." In accordance with the Master Plan project review process, the project has undergone consultation with community advisory boards:

- Environment Committee meeting January 9, 2025; no concerns or objections.
- Kahu Kū Mauna (KKM) meeting January 9, 2025. KKM members expressed the following concerns, with no overall objections:
 - Concern about public access in the storage area. KKM members suggested the area be temporarily blocked off to the public during project activity and signage posted about the restricted access. WMKO has agreed to this. WMKO also noted that its telescope viewing gallery and restrooms will be closed to the public.
 - Concern whether the dumpster would be secure against wind. WMKO confirmed it will rent a lidded dumpster.
 - Concern for impact to cultural practitioners' viewplanes. KKM described various viewplanes including star-lines and ocean-lines and requested CMS consider these in future project review.
- Maunakea Management Board (MKMB) meeting February 4, 2025; no concerns or objections.

CMS' review of project requests like this complies with the following CMP Actions:

- NR-1: Limit threats to natural resources through management of permitted activities and uses. Habitat alteration and disturbance will be minimized via implementation of Construction Guidelines detailed in the CMP's six Permitting and Enforcement Actions, including:
 - P-1: Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH management Areas.



- P-2: Strengthen CMP implementation by recommending that compliance with the CMP be a condition of permits and agreements.
- P-4: Educate management staff and users of the mountain about all applicable rules and permit requirements

- IM-5: Develop and implement a Debris Removal, Monitoring and Prevention Plan, particularly that “All incidental rubbish and debris shall be secured in a windproof rubbish bin or kept indoors.”

- C-9: Inspection of construction materials. Shipping containers and crates will be inspected by a DLNR-approved biologist or by Department of Agriculture personnel prior to arriving at Maunakea. Identified mitigation measures will be complied with.

- EO-2: Require orientation of users. All project workers will be required to successfully complete the Maunakea Resource Orientation prior to working onsite.

- AR-2: Prevent light pollution, radio frequency interference (RF) and dust. Contractors and staff will minimize dust.

VI. Center for Maunakea Stewardship Recommendation

CMS recommends MKSOA approve this request to proceed as a Site Plan application to the Office of Coastal and Conservation Lands (OCCL) with project conditions listed in Proposal Attachment 1. The application for Site Plan Approval will be submitted pending review by the Mauna Kea Stewardship and Oversight Authority at its February 13, 2025 meeting. The project will not proceed unless all applicable reviews are completed and approvals obtained. Standard Best Management Conditions, applicable CMS project conditions, and OCCL approval conditions will be complied with.



SITE PLAN APPROVAL APPLICATION (SPA)

File No:

Acceptance Date:

30-Day Expiration Date:

Assigned Planner:

for DLNR Use

Pursuant to Hawai'i Administrative Rules (HAR) §§13-5-22 through 24, identified land uses beginning with letter (B) require a site plan approval by the department.

PROJECT NAME: Click or tap here to enter text.

Conservation District Subzone: Resource

Identified Land Use: HAR § 13-5-22, Protective subzone, P-8, Structures and Land Uses, Existing, (A-1)

Minor repair, maintenance, and operation to an existing structure, facility, use, land, and equipment, whether it is nonconforming or permitted, that involves mostly cosmetic work or like-to-like replacement of component parts, and that results in negligible change to or impact to land...

(See Hawai'i Administrative Rules (HAR) §13-5-22 through §13-5-25)

Project Address: W. M. Keck Observatory, Maunakea summit area

Ahupua'a, District, Island: Ka'ohe mauka, Hamakua, Hawaii Island

Tax Map Key(s): 3-4-4-015:009, Mauna Kea Science Reserve (por.)

Proposed Commencement Date: March 15, 2025

Proposed Completion Date: October 24, 2025

Estimated Project Cost: \$4.14 million

Total area of proposed use: Approximately up to 450 square feet for outdoor storage

ATTACHMENTS

- \$50 application fee (*ref §13-5-32 through 34*)
- Location map
- Site plan
- Construction, grading, site restoration, landscaping, or fire buffer plans, as applicable

Note: The application fee for State projects is waived pursuant to HAR §13-5-32.

REQUIRED SIGNATURES

Applicant

Name: W. M. Keck Observatory

Title; Agency: Click or tap here to enter text.

Mailing Address: 65-1120 Mamalahoa Hwy, Kamuela, HI 96743

Contact Person & Title: Andrew Odell, Chief Administrative and Legal Affairs Officer

Phone: 808-881-3629

Email: aodell@keck.hawaii.edu

Interest in Property: Sub-Lessee

Signature: _____ Date: _____

Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization

Landowner (if different than the applicant)

Name: State of Hawai'i (managed by University of Hawai'i)

Title; Agency: Greg Chun, Executive Director, Center for Maunakea Stewardship

Mailing Address: 640 N. A'ohoku Place, Hilo, HI 96720

Phone: 808-933-0743

Email: cmshilo@hawaii.edu

Signature: _____ Date: _____

For public lands, the government entity with management control shall sign as landowner.

Agent or Consultant

Agency: N/A

Contact Person & Title: Click or tap here to enter text.

Mailing Address: Click or tap here to enter text.

Phone: Click or tap here to enter text.

Email: Click or tap here to enter text.

Signature: _____ Date: _____

For DLNR Managed Lands

Chairperson, Board of Land and Natural Resources

P.O. Box 621

Honolulu, Hawai'i 96809-0621

Signature: _____ Date: _____

PROPOSED USE

Total size/area of proposed use (indicate in acres or sq. ft.): 450 sq ft

Please provide a detailed description of the proposed land use(s) in its entirety. Information should describe what the proposed use is; the need and purpose for the proposed use; the size of the proposed use (provide dimensions and quantities of materials); and how the work for the proposed use will be done (methodology). If there are multiple components to a project, please answer the above for each component. Also include information regarding secondary improvements including, but not limited to, grading and grubbing, placement of accessory equipment, installation of utilities, roads, driveways, fences, landscaping, etc.

The actual project, to regROUT the Keck-I telescope pier, occurs wholly within the Keck facility but requires the outdoor placement of items supporting the project, potentially for up to seven continuous months. Equipment to be stored outdoors, requiring approximately 450 sq ft of storage area:

-(320 sq ft) Two, 20' X 8' storage containers to house tools and materials outside at the dome entrance.

-(96 sq ft) One, 10-15 yard roll off dumpster (footprint ~12' X 8') situated near the storage containers, will securely store project debris.

(4 sq ft) One small, towable, wheeled diesel air compressor, also set near the dome entrance, to drive pneumatic hand tools. The hand tools will be used indoor-only.

(30 sq ft) Portable toilets, exact count (estimated 2-4) and placement to be determined.

PROPOSED EXEMPTION

An exemption from needing an environmental assessment (EA) refers to specific situations or projects that are not required to undergo the standard EA process due to their minimal potential impact on the environment.

Government agencies should use the appropriate exemption list as concurred by the Environmental Advisory Council as found at planning.hawaii.gov/erp/agency-exemption-list

Private parties should use DLNR's Exemption List as concurred by the Environmental Council on November 10, 2020 as found at files.hawaii.gov/dbedt/erp/Agency_Exemption_Lists/State-Department-of-Land-and-Natural-Resources-Exemption-List-2020-11-10.pdf

The project involves no heavy machinery and the action is considered exempt under HAR §11-200.1-15 (c)(1) Operations, repairs, or maintenance of existing structures, facilities, equipment, or topographical features, involving minor expansion or minor change of use beyond that previously existing; and HAR §11-200-8(a), Exemption Class #7: Interior alterations involving such things as partitions, plumbing, and electrical conveyances. (6) Masonry and concrete work.

EXISTING CONDITIONS

Please describe existing conditions on the parcel (geology, ecology, cultural and recreational resources, historic resources, structures, landscaping, etc). Provide information regarding existing buildings and structures as well as infrastructure and utilities as applicable.

The project site is the W.M. Keck Observatory, where the soil is previously excavated backfill. Climate is considered subalpine desert. Hazards may include weather-related hazards such as freezing temperature, black ice, falling icicles, and fog-diminishing visibility, and high-altitude related conditions and illness.

No Flora, Fauna, Ecology, or Water resources will be altered or disturbed. All work is inside except for the articles placed outside on previously disturbed soil.

The WMKO is located within two historic districts identified on the State Inventory of Historic Places, the Mauna Kea Summit Region Historic District, SIHP #50-10-23-26869, and Mauna A Wakea Traditional Cultural Property and District, SIHP #50-10-23031382. There are no identified historic properties within one thousand feet of the project area. The project will not disturb or impact any cultural or historic resources. Project activity will be focused within the WMKO facility and the items placed outside will be on previously disturbed soil that is regularly used for parking and delivery.

EVALUATION CRITERIA

The Department or Board will evaluate the merits of a proposed land use based upon the following eight criteria (*ref §13-5-30(c)*)

1. **The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. How is the proposed land use consistent with the purpose of the conservation district?** (*ref §13-5-1*)

The proposed project does not negatively impact the level of conservation, protection or preservation of the natural and cultural resources of the site.

2. **How is the proposed use consistent with the objectives of the subzone of the land on which the land use will occur?** (*ref §13-5-11 through §13-5-15*)

The objective of the Resource subzone, where the WMKO is located, is "...to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." This proposed land use (placement of solid material for more than thirty days) is an allowable use within the Conservation District Resource subzone, pursuant to HAR 13-5-24, R-3, Astronomy Facilities, (D-1), under an approved management plan. The approved management plan is the 2022 Maunakea Comprehensive Management Plan Supplement. In addition to the proposed project being an identified use, both the UH and WMKO are committed to managing the natural and cultural resources of the UH Management Areas in a way that fulfills the objective of the Resource subzone of the Conservation District. The project will facilitate sustained use of the site for existing, approved uses. No change in footprint or type, extent, or intensity of use will occur as a result of this project. Natural and cultural resources will not be negatively impacted.

3. **Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management" (see 205A objectives on p. 7).**

The site of the proposed use is over 20 miles from the coast and is not connected to shoreline resources. The project will have no effect on any of the coastal resources identified in 205A, including, but not limited to, recreational opportunities, historic resources, scenic and open space, ecosystems, economic uses, beach and coastal dune protection, and/or marine and coastal resources. The project is also not a coastal development. Consequently, the project complies with the objectives of HRS 205A.

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

The project is within the WMKO parcel, an area disturbed when WMKO was originally constructed. The area is currently used for regular operations including vehicle movement, vehicle parking, and routine maintenance. Current project work will be limited to inside the building. None of the waste generated is considered hazardous and all waste will be removed from the summit. CMS will ensure the project complies with the 2022 CMP Supplement; all applicable Standard Operating Procedures of the Maunakea Invasive Species Management Plan to ensure that natural resources are not harmed and no invasive species are introduced; conditions recommended by the Environment Committee, Kahu Ku Mauna Council, Maunakea Management Board, the Mauna Kea Stewardship and Oversight Authority; and approval conditions provided by OCCL.

5. **Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.**

The project seeks to repair a component within the existing facility. This is compatible with the locality and surrounding area as the parcel has already been developed with infrastructure and the project will maintain the capabilities of the parcel. The project will maintain the technical ability of the WMKO and will not affect any natural, cultural, or historic resources.

6. **Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.**

No changes will occur to the existing physical and environmental aspects of the land.

7. **If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.**

No new subdivision of land will occur.

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

The project bears no negative impact to the public health, safety and welfare and will take measures to maintain public safety.

CULTURAL IMPACTS

Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiian and other ethnic groups.

Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.

The WMKO is located within two historic districts identified on the State Inventory of Historic Places, the Mauna Kea Summit Region Historic District, SIHP #50-10-23-26869, and Mauna A Wakea Traditional Cultural Property and District, SIHP #50-10-23031382. There are no identified cultural resources and no historic properties within one thousand feet of the project area. The project site is within the alpine stone desert ecosystem, which significantly limits the abundance and diversity of plant and animal species that can survive here. CMS' invasive species and arthropod monitoring programs provides the most comprehensive reference for species discovered at the project site. Geologically, the project site is composed of local backfilled cinder and rocks. There are no hydrological resources on the site. Additional details provided in the previous "Existing Conditions" section of this application.

Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.

Project activity including the outdoor storage of some bulky equipment and supplies will be limited to within the WMKO facility and sublease area. This area is of previously disturbed soil/cinder that is regularly used for parking, deliveries, and daily maintenance and operations. The cultural advisory council, Kahu Ku Mauna, has consulted on the proposed land use and not identified any traditional and customary Native Hawaiian rights that may be affected by the project, and the applicant does not anticipate any degree of disturbance or impacts to any cultural, historical, and natural resources, including traditional and customary Native Hawaiian rights.

What feasible action, if any, could be taken by the Board of Land and Natural Resources regarding your application to reasonably protect Native Hawai'i rights?

The applicant defers to the BLNR on feasible actions to reasonably protect Native Hawai'i rights.

CHAPTER 205A – COASTAL ZONE MANAGEMENT

Land uses are required to comply with the provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled "Coastal Zone Management," as described below:

- **Recreational resources:** Provide coastal recreational opportunities accessible to the public.
- **Historic resources:** Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- **Scenic and open space resources:** Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- **Coastal ecosystems:** Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
- **Economic uses:** Provide public or private facilities and improvements important to the State's economy in suitable locations.
- **Coastal hazards:** Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- **Managing development:** Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- **Public participation:** Stimulate public awareness, education, and participation in coastal management.
- **Beach protection:** Protect beaches for public use and recreation.
- **Marine resources:** Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

CERTIFICATION

I hereby certify that I have read this completed application and that, to the best of my knowledge, the information in this application and all attachments and exhibits is complete and correct. I understand that the failure to provide any requested information or misstatements submitted in support of the application shall be grounds for either refusing to accept this application, for denying the permit, or for suspending or revoking a permit issued on the basis of such misrepresentations, or for seeking of such further relief as may seem proper to the Land Board.

I hereby authorize representatives of the Department of Land and Natural Resources to conduct site inspections on my property. Unless arranged otherwise, these site inspections shall take place between the hours of 8:00 a.m. and 4:30 p.m.

Signature of authorized agent(s) or if no agent, signature of applicant

AUTHORIZATION OF AGENT

I hereby authorize *Click or tap here to enter text.* to act as my representative and to bind me in all matters concerning this application.

Signature of applicant(s)

Facility Project Proposal for the UH-Managed Lands

For projects anticipated to be classified as having “Minimal Impact”

Proposals due by the 15th monthly

Please mark all that apply to your project

Project was reviewed in a 5- or 3-Year Plan

Project is a CMP, lease, or sublease compliance measure (e.g., keeps the site in safe working order)

Project involves heavy machinery

Project requires ground disturbance such as digging or trenching

Project will result in a change to the facility footprint or use

Facility Name

W.M. Keck Observatory (WMKO).

Brief Descriptive Title of Project

Keck Temporary Outdoor Storage.

Project Description

Keck seeks Site Plan Approval for outdoor storage of materials for longer than 30 days to support the regrouting of its Keck I (“KI”) telescope pier, which occurs wholly within the Keck facility. The outdoor storage of some or all the items is anticipated for potentially up to seven continuous months. The items, listed below, will require approximately 450 sq ft:

- (320 sq ft) Two, 20’X 8’ storage containers to house tools and materials outside at the dome entrance.
- (96 sq ft) One, 10-15 yard roll off dumpster (footprint ~12’ X 8’) situated within the adjacent carport to securely store debris.
- (4 sq ft) One small, towable, wheeled diesel air compressor, set near the entrance, to operate pneumatic hand tools. The hand tools will be used indoor-only.
- (30 sq ft) Portable toilets, exact count to be determined (estimated 2-4)

Identified Land Use (see HAR § 13-5-22 through 13-5-25)

Hawaii Administrative Rules 13-5, Conservation District, defines “land use” as the placement or erection of any solid material on land if that material remains on the land more than thirty days, or which causes a permanent change in the land area on which it occurs. This project involves the placement of a dumpster, air compressor, shipping containers, and portable toilets, outside of the WMKO summit facilities and within its sublease, for the project duration 6-7 months). Site Plan Approval is sought based on the duration of placement, expected to be more than thirty days, and is not expected to cause a permanent change to the land.

The specific land use under HAR § 13-5-22, is considered to be P-8, Structures and Land Uses, Existing, (A-1) *Minor repair, maintenance, and operation to an existing structure, facility, use,*

land, and equipment, whether it is nonconforming or permitted, that involves mostly cosmetic work or like-to-like replacement of component parts, and that results in negligible change to or impact to land...

Identify the existing CDUP this proposal alters or affects, if any
Keck I HA-1646 (1984)

Identify [University of Hawai'i exemption](#) per HAR § 11-200-8(a), if any

The project involves no heavy machinery and the action is considered exempt under HAR §11-200.1-15 (c)(1) *Operations, repairs, or maintenance of existing structures, facilities, equipment, or topographical features, involving minor expansion or minor change of use beyond that previously existing*; and HAR §11-200-8(a), Exemption Class #7: Interior alterations involving such things as partitions, plumbing, and electrical conveyances. (6) Masonry and concrete work.

Tax Map Key(s)

4-4-015:009 – Mauna Kea Science Reserve (por.)

Proposed Commencement Date

Phase I: 3 March 2025 through 30 April 2025

Phase II: 25 August 2025 through 24 October 2025

Proposed Completion Date

24 October 2025

Estimated Project Cost

\$4,140,000

Total size / area of proposed use

Project activity will mostly occur within the Keck I dome. This work requires the outdoor placement of the following, to require approximately 450 sq ft:

- (320 sq ft) Two, 20'X 8' storage containers to house tools and materials outside at the dome entrance.
- (96 sq ft) One roll off dumpster (footprint ~12' X 8') situated within the Keck carport to securely store debris.
- (4 sq ft) One small, towable, wheeled diesel air compressor to be set near the storage containers and used to drive pneumatic hand tools. The hand tools will be used indoor-only.
- (30 sq ft) Portable toilets, exact count to be determined (estimated 2-4)

Project Purpose and Need

The W. M. Keck Observatory (“WMKO”) requests to store items outside its facility for up to two, eight-week periods during March-April 2025 and August-October 2025 while it completes interior repairs to the grouting of the Keck I (“KI”) telescope pier, originally approved under CDUP HA-1646 (1984). The outdoor project items will be used for normal intended purposes. These items include, but may not be limited to:

- An air compressor, to run pneumatic hand-tools to remove the old grouting of the KI pier. Tools are only used indoors. Dust will be contained indoors with no fugitive dust escaping outside.
- A lidded dumpster for project waste. Waste will be secured and properly disposed offsite. No hazardous materials are involved.
- Two, 20’ long by 8’ wide shipping containers, for tools and supplies storage.
- Portable toilets, to supplement existing indoor lavatories for the estimated 32 contract workers; toilet count currently estimated at 2-4.

The outdoor placement of items meets the definition of “land use” as stated in the Conservation District rules HAR 13-5 and requires Site Plan Approval. All project activity will otherwise be entirely indoors. The interior work is not subject to agency review or permitting: KI moves in azimuth on a circular track atop a concrete pier with cementitious grout in between. The grout has degraded since the original construction and the track is becoming increasingly non-flat. Repairs are necessary to maintain telescope productivity and performance. The cementitious grout will be removed in two phases and replaced with an epoxy-based grout.

Has professional peer-review occurred

Yes, personnel with the National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL) personnel advised and participated in the planning for this project. A test section was repaired this way in November 2023 and is performing well. The test activity occurred entirely indoors and had no outside impacts.

Are there any related ongoing, pending, or planned projects associated with this submission?

As noted above, there was a test repair in November 2023. The current project is envisioned to occur in two phases.

Existing Conditions at Project Site(s)

Geology, Climate, & Hazards

Soil at the project site is previously excavated backfill. Climate is considered subalpine desert. Hazards may include weather-related hazards such as freezing temperature, black ice, falling icicles, and fog-diminishing visibility, and high-altitude related conditions and illness.

Flora, Fauna, Ecology, Water Resources

No Flora, Fauna, Ecology, or Water resources will be altered or disturbed. All work is inside except for the articles placed outside on previously disturbed soil.

Cultural Resources

The WMKO is within two historic districts identified on the State Inventory of Historic Places,
a. Mauna Kea Summit Region Historic District, SIHP #50-10-23-26869 and

- b. Mauna A Wākea Traditional Cultural Property and District, SIHP #50-10-23-31382 (designated 2023);

however, there are no identified historic properties within one thousand feet of the project area and the project will not disturb or impact any cultural or historic resources. Project activity will be focused within the WMKO facility and the items placed outside will be on previously disturbed soil that is used for regular operations including parking and delivery.

Recreation

There are no recreational activities within the project area other than occasional sightseeing visitors. Keck will setup temporary barricades such as safety delineators to protect public safety to keep the public away from the outdoor storage areas. Keck will also require closure of the public viewing gallery and restrooms for project storage needs such as to maintain a controlled environment for the replacement grout.

Built Infrastructure

Existing structures at the WMKO site include the telescope building, electrical and telecommunication lines, vehicle accessways, parking, retaining walls, and underground water and septic tanks. The proposed project is to repair/replace part of the Keck I telescope and will not contribute any additional permanent infrastructure to the existing infrastructure.

Landscaping & Visual Conditions

The landscape around WMKO is unvegetated, compacted volcanic cinder and rocks. Once the project is finished and the outdoor equipment removed, there will be no landscaping or visual changes to the observatory appearance.

Description of the Project

Location

W. M. Keck Observatory summit facility.

Description of the process of completing the project

Project work is focused within the dome. Personnel will regularly access and properly maintain and secure the air compressor, dumpster, and storage containers. Portable toilets, location TBD, will be regularly serviced by the rental company. The air compressor and storage containers will be placed on exterior of the facility's south-east side, near the parking area where the soil is previously excavated backfill. The roll-off dumpster will be placed in the nearby carport.

Who will do the work?

A combination of in-house staff and contracted workers will do the work.

Equipment & Transportation

One, or more, large trucks will deliver the two containers, the dumpster and the air compressor. No other heavy equipment or machinery is involved in this project. The grout removal and replacement are done with powered and pneumatic hand tools. The air compressor is needed for those tools that are pneumatic.

Measures to protect the environment and/or mitigate impacts

Impacts

No impacts to the environment are anticipated.

Protective Measures

WMKO will comply with CMS project conditions, attached as "Protective Measures."

Compliance with Lease, Sublease, or Comprehensive Management Plan (CMP)

The proposed use supports University of Hawaii General Lease S-4191, section 2, Maintenance of the Premises. *The Lessee shall keep the demised premises and improvements in a clean, sanitary, and orderly condition.* The project will maintain an "orderly condition" through replacement of the degrading pier grout, which is creating an uneven surface for telescope movement.

The proposed use is also consistent with UH-WMKO sublease,

Section III. SUBLESSEE HEREBY COVENANTS WITH SUBLESSOR AS FOLLOWS:

C. Repairs and Maintenance. At all times during the term of this SUBLEASE, SUBLESSEE shall, at SUBLESSEE's own cost and expense, keep and maintain the demised premises and the Facilities in good order and repair and in a clean condition. This obligation shall include, but not be limited to, the obligation to paint the Facilities as appropriate and to make any modification or alteration thereof when necessary.

Further, CMS' review of this proposal addresses numerous CMP Actions, including, but not limited to, the following:

- NR-1: Limit threats to natural resources through management of permitted activities and uses. Habitat alteration and disturbance will be minimized via implementation of Construction Guidelines detailed in the CMP’s six Permitting and Enforcement Actions, including:
 - P-1: Comply with all applicable federal, state, and local laws, regulations, and permit conditions related to activities in the UH Management Areas.
 - P-2: Strengthen CMP implementation by recommending that compliance with the CMP be a condition of permits and agreements.
 - P-4: Educate management staff and users of the mountain about applicable rules, CMP management actions, and permit requirements.

- IM-5: Develop and implement a Debris Removal, Monitoring and Prevention Plan, particularly that “All incidental rubbish and debris shall be secured in a windproof rubbish bin or kept indoors.”
- C-9: Inspection of construction materials. Shipping containers and crates will be inspected by a DLNR-approved biologist or by Department of Agriculture personnel prior to arriving at Maunakea. Identified mitigation measures will be complied with.
- EO-2: Require orientation of users. All project workers will be required to successfully complete the Maunakea Resource Orientation prior to working onsite.
- AR-2: Prevent light pollution, radio frequency interference (RF) and dust. Contractors and staff will be informed to keep within posted speed limits to minimize dust.

Identify other required or associated permits

N/A.

Five Year Outlook

This project was not identified in a Five Year (more recently Three Year) Outlook. The project is a repair to part of the Keck I telescope (i.e. inside the building) and the desire to locate some articles outside has only recently been identified.

Community Benefits

Benefits to other Maunakea entities and/or global astronomy community

Primarily those that accrue from the continued good performance of the Keck I telescope (world leading astronomy research).

Benefits to the Hawaii Island community

Primarily those that accrue from the continued good performance of the Keck I telescope (safe and continued operations of a significant Island employer, and source of pride and inspiration).

Will data, publications, or other products be free and available to the public?

Yes, where applicable.

DLNR Evaluation Criteria

After approval by the Maunakea Management Board, the Department of Land & Natural Resources or Board of Land & Natural Resources will evaluate the merits and approve the project based on the following eight criteria (§13-5-30). See <http://dlnr.hawaii.gov/occl/files/2013/08/13-5-2013.pdf>

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. (ref §13-5-1)
How is the proposed land use consistent with the purpose of the conservation district?

The proposed pier repair does not negatively impact the level of conservation, protection or preservation of the natural and cultural resources of the site.

2. How is the proposed use consistent with the objectives of the Resource subzone of the land on which the land use will occur?

The objective of the Resource subzone, where the WMKO is located, is "...to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." This proposed land use (placement of solid material for more than thirty days) is an allowable use within the Conservation District Resource subzone, pursuant to HAR §13-5-24, R-3, Astronomy Facilities, (D-1), under an approved management plan. The approved management plan is the 2022 Maunakea Comprehensive Management Plan. In addition to being an identified use, both UH and WMKO are committed to managing the natural and cultural resources through the UH Management Areas in a way that fulfills the objective of the Resource subzone of the Conservation District. The project will facilitate sustained use of the site for existing, approved uses. No change in footprint or type, extent, or intensity of use will occur as a result of this project. Natural and cultural resources will not be negatively impacted.

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management".

The site of the proposed use is over 20 miles from the coast and is not connected to shoreline resources. The project will have no effect on any of the coastal resources identified in 205A, including, but not limited to, recreational opportunities, historic resources, scenic and open space, ecosystems, economic uses, beach and coastal dune protection, and/or marine and coastal resources. The project is also not a coastal development. Consequently, the project complies with the objectives of HRS 205A.

4. Describe how the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

The project area is within the WMKO parcel, an area disturbed when WMKO was originally constructed. The area is currently used for vehicle movement, vehicle parking, and routine maintenance. Current project work will be limited to inside the building. None of the waste generated is considered hazardous and all waste will be removed from the summit. CMS will ensure the project complies with the 2022 CMP Supplement; all applicable Standard Operating

Procedures of the Maunakea Invasive Species Management Plan to ensure that natural resources are not harmed and no invasive species are introduced; conditions recommended by the Environment Committee, Kahu Kū Mauna Council, Maunakea Management Board, the Mauna Kea Stewardship and Oversight Authority; and approval conditions provided by OCCL.

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

The project seeks to repair a component within the existing facility. This is compatible with the locality and surrounding area as the parcel has already been developed with infrastructure, and the project will maintain the technical capabilities of the parcel. The project will not affect any natural, cultural, or historic resources.

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

No changes will occur to the existing physical and environmental aspects of the land.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

No new subdivision of land will occur.

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

The project bears no negative impact to the public health, safety and welfare and will take measures to maintain public safety.

Proposal Attachment 1, Protective Measures

Notifications

- Applicant may request to arrange a pre-construction meeting with CMS before work commences. These meetings review orientation content, implications of project non-compliance, project-specific concerns regarding resource protection, health and safety, visitor and/or traffic impacts, etc. Meetings may be held in person or via phone, webinar, or other means.
- Notify CMS in writing via email to cmshilo@hawaii.edu at least five (5) days prior to beginning field work on UH-managed lands (Halepōhaku, Road Corridor, Maunakea Science Reserve, or Astronomy Precinct) with the following:
 - Identify the date that onsite work will commence.
 - Identify by name-of-entity all observatories, contractors, vendors, suppliers, etc. anticipated to be associated with and substantively present on UH-managed lands for the project.
 - Identify the individual(s) who will be coordinating all invasive species inspections.
 - Attest that the observatory or relevant entity will ensure compliance with all permit conditions and communicate with CMS if there is any uncertainty.
 - Notify CMS in writing of any other entities responsible for elements of compliance.
 - Attest that all individuals anticipated to be associated with the project have completed the Maunakea User Orientation.
 - CMS is not liable or responsible for delays due to inadequate or late submissions or submissions requiring verification.

Onsite Activity

General

- Use of lighting from sunset to sunrise is prohibited unless described in the project proposal and approved.
- Use of cell-phones, other than in airplane mode, is prohibited except in case of emergency.
- Allow CMS Rangers to visit and monitor activities.

Transportation and Motorized Equipment

- No use of mechanized equipment is allowed unless authorized by this permit.
- 4-wheel-drive required for travel above Halepōhaku.
- Large, heavy, non-4-wheel-drive or oversized loads must submit notification to the Maunakea Road Conditions listserv, MK-ROAD-CONDITIONS@lists.hawaii.edu, at least one day prior to transit. Loads requiring an escort on public roadways must have this escort accompany them to the final destination. Projects failing to submit notification or arrange for escort to the summit may be denied entry to Halepōhaku or above.
- During public closures of the Summit Access Road, vehicle access above Halepōhaku is limited to explicitly-marked observatory, CMS, federal, or state of Hawaii vehicles. Vehicles must be operated by approved employees or representatives on official business and possessing requisite orientation, training, safety, and rescue supplies.

- Motorized equipment, when stationary, must have a drain-pan in place suitable for catching fuel or fluid leaks.

Debris Prevention and Severe Weather Concerns

- Ensure that any debris, tools and equipment are secured to avoid becoming windblown and are properly stored at the end of each day.
- Projects occurring in the summit region must verify that temporary and permanent infrastructure and improvements can sustain 120 MPH winds and severe weather.

Environmental Concerns

- Remove and properly dispose of all waste material.
- Nēnē (*Branta sandvicensis*) may be present. If a nēnē appears within 100 feet (30.5 meters) of ongoing work, all activity shall be temporarily suspended until the animal leaves the area of its own accord. Federal law prohibits feeding or any “taking” (e.g., harassing, harming, killing) of nēnē.
- Best Management Practices for seabirds, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*)
 - Use red light bulbs outside to the maximum practicable extent.
 - Fully shield outdoor bulbs so the light is only visible from below.
 - Install motion sensors or turn off lights when human activity is not occurring in the area.
 - September-December: Avoid nighttime construction.
- Best Management Practices for the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)
 - No barbed-wire fencing allowed.
 - June-November: Do not trim, remove, or disturb trees over 15 feet tall.

Invasive Species Prevention

- Employ invasive species prevention best practices, including inspections of materials by a DLNR-approved biologist, as identified in the Maunakea Invasive Species Management Plan prior to entering UH-managed lands.
 - Inspections can only occur at locations where landowners have given permission (i.e. facilities, baseyards, and vendor locations).
 - Inspections shall not occur on UH-managed lands on Maunakea, at State or County parks, along public roadsides, or on Department of Hawaiian Homelands lands.

Upon Project Completion

- The project must be completed within the time frame specified in the proposal and, when applicable, as specified by DLNR. Projects that cannot be completed within this timeframe are not allowed to continue (or commence) without explicit prior written approval from CMS.
- Notify CMS in writing when field activity associated with the project is completed.







MEMORANDUM

February 13, 2025

TO: Mauna Kea Stewardship and Oversight Authority

FROM: Greg Chun, Executive Director, CMS

SUBJECT: Informational: Concurrence request, Installation of Sulfur Dioxide and Dust Sensors at Subaru Telescope

- Date proposal rec'd: 1/1/2025
- Type **A** B / C
- CMS MIP #351
- ED review: 1/31/2025
- EC FYI: 2/13/2025
- KKM FYI: N/A
- MKMB FYI: 2/4/2025
- MKSOA FYI: 2/13/2025

I. Project Description

The Subaru Observatory requests to install monitoring instruments on the outer walls of their summit facility. Subaru was originally approved under Conservation District Use Permit 4/18/91-2462. The purposes are to monitor the amounts of sulfur dioxide (SO₂) and dust around/above the mirror to avoid degrading the mirror and losing observing quality and for worker safety. The proposed installation will occur entirely within Subaru's sublease. Using hand-tools, staff will install the following:

- One high-accuracy SO₂ monitor with air inlet hose, installed on the Control Building
- One Rasp-PI SO₂ monitor and a dust sensor, installed together within a roughly 1 cubic foot electronics box on the wall of the elevator tower.

The project presumes the following land use under HAR §13-5-22, P-1, Data Collection, (A-1) *Basic data collection, research, education and resource evaluation that is temporary (less than thirty days) and results in negligible ground disturbance (small gages [sic] or monitoring devices) and does not involve a land use...* CMS finds the request will result in no ground disturbance and is a negligible cosmetic addition to an existing, permitted facility (Subaru). There is no impact to the surrounding landscape or any resources. The proposal is being presented as informational-only to the Maunakea committees including the Environment Committee, Maunakea Management Board (MKMB) and the Mauna Kea Stewardship and Oversight Authority (MKSOA) prior to submittal of a concurrence request to the Office of Conservation and Coastal Lands (OCCL).

The project involves no heavy machinery and the action is considered exempt under HAR §11-200.1-15 (c)(5) *Basic data collection, research, experimental management, and*



resource and infrastructure testing and evaluation activities that do not result in a serious or major disturbance to an environmental resource; and HAR §11-200-8(a), Exemption Class #5: Basic data collection, research, experimental management, and resources evaluation activities which do not result in a serious or major disturbance to an environmental resource. (1) Gathering of soil, air, water, plant, animal, fish, mineral and other specimens for research, experimental, or instructional purposes...

II. Cultural Resources Identified

Subaru is within the Traditional Cultural Properties of Mauna a Wākea and Kūkahāūula. The facility is over 1,000 feet from the nearest identified historic properties, including those on Pūu Poliahu and sites 50-10-23-21209 and 50-10-23-26224 on Pūuwēkiu.

III. Impacts Identified

The proposed land use is not anticipated to have any effect on cultural resources or any historic properties. Similarly, as the instruments will be installed on the walls of the telescope facility, neither the installation nor long-term use of these instruments is anticipated to have any effect on viewplanes. CMS has also determined the project will not change, extend, or enlarge either the Subaru footprint or its permitted use. No impacts are anticipated to any natural (biological, hydrological, geological) or recreational resources and will help to maintain the Subaru Telescope, a scientific resource.

IV. Recommended Mitigation

CMS recommends Best Management Practices and other project conditions be adhered to in carrying out this work. The project will not proceed unless and until OCCL issues a determination of concurrence. The applicant will comply with any and all concurrence guidelines issued by OCCL.

V. Center for Maunakea Stewardship (CMS) Recommendation

CMS recommends MKSOA approve this request to proceed as a request for concurrence to the Office of Coastal and Conservation Lands (OCCL) with project conditions listed below. The request for concurrence will be submitted pending review by the Mauna Kea Stewardship and Oversight Authority at its February 13, 2025 meeting. The project will not proceed unless all applicable reviews are completed and approvals obtained. Standard



Best Management Conditions, CMS project conditions as listed below, and OCCL approval conditions will be complied with:

- The work area will be clearly delineated to warn the public of any hazards during project activity.
- All project participants must attend a Maunakea Orientation prior to work.
- Allow Maunakea Rangers to visit and monitor activities.
- Ensure that loose tools or equipment are not left unattended and are properly stored at the end of each day.
- In preparation for high summit winds, protocols must include measures to ensure debris and equipment are not blown from the job site.
- All improvements shall be designed and installed to withstand the severe weather conditions on the summit.
- Removal and proper disposal of all waste material. All perishable items including food, food wrappers and containers, etc. shall be removed from the site at the end of each day and properly disposed.
- Use of lighting from sunset to sunrise is prohibited unless otherwise stated in the project proposal and approved.
- Employ invasive species prevention best practices, including inspections of materials by a DLNR-approved biologist, as identified in the *Maunakea Invasive Species Management Plan* prior to entering UH managed lands. Inspections shall **not** occur on UH managed lands on Maunakea, at State or County parks, along public roadsides, or on Department of Hawaiian Home Lands.
- Nēnē (*Branta sandvicensis*) may be present. If a nēnē appears within 100 feet (30.5 meters) of ongoing work, all activity shall be temporarily suspended until the animal leaves the area of its own accord. Federal law prohibits feeding or any “taking” (e.g., harassing, harming, killing) of nēnē.
- The project approval/permit may not be transferred or assigned without prior approval.
- No use of mechanized equipment except as provided for in DLNR concurrence or approval.
- Identify and comply with other permit requirements, such as County of Hawaii building permits or Department of Land & Natural Resources (see both any applicable DLNR permit and HAR §13-5-42 Standard Conditions).
- The project must be completed within the time frame specified in the proposal and (when applicable) as provided for in DLNR concurrence or approval.

Facility Project Proposal for the UH-Managed Lands

for projects anticipated to be classified as having “Minimal Impact”

Proposals due by the 15th monthly

Please mark all that apply to your project

- Project was reviewed in a 3-Year Plan
- Project is a CMP, lease, or sublease compliance measure (e.g., keeps the site in safe working order)
- Project involves heavy machinery
- Project requires ground disturbance such as digging or trenching
- Project will result in a change to the facility footprint

Facility Name

Subaru Telescope

Brief Descriptive Title of Project

Subaru Telescope Air Quality Monitors

Project Description

Subaru will install two sulfur dioxide (SO₂) sensors and one particulate/dust sensor to its outer wall. The sensors will be in protective housing with associated wiring. The dust sensor will also have a small, air intake hose.

Proposed Commencement Date

As soon as approved

Proposed Completion Date

Within one month from commencing installation

Estimated Project Cost

\$1,000

Total size / area of proposed use

Less than 1 m²

Project Purpose and Need

Volcanoes are constantly active in Hawai'i. The sulfur dioxide (SO₂) in volcanic gases is chemically active and can pose a health hazard to those who inhale it. In addition, fine dust particles in the atmosphere can act as catalysts for chemical reactions between volcanic gases and the high-precision mirror coating when they accrete on the surface of the mirror, resulting in degradation of mirror reflectance. Therefore, the objective of this project is to monitor the concentration of SO₂ in the atmosphere and the amount of dust around the mirror to ensure that the scientific value of the telescope is not compromised and that no health hazard occurs to the people working at the summit facility day or night.

Has professional peer-review occurred

No.

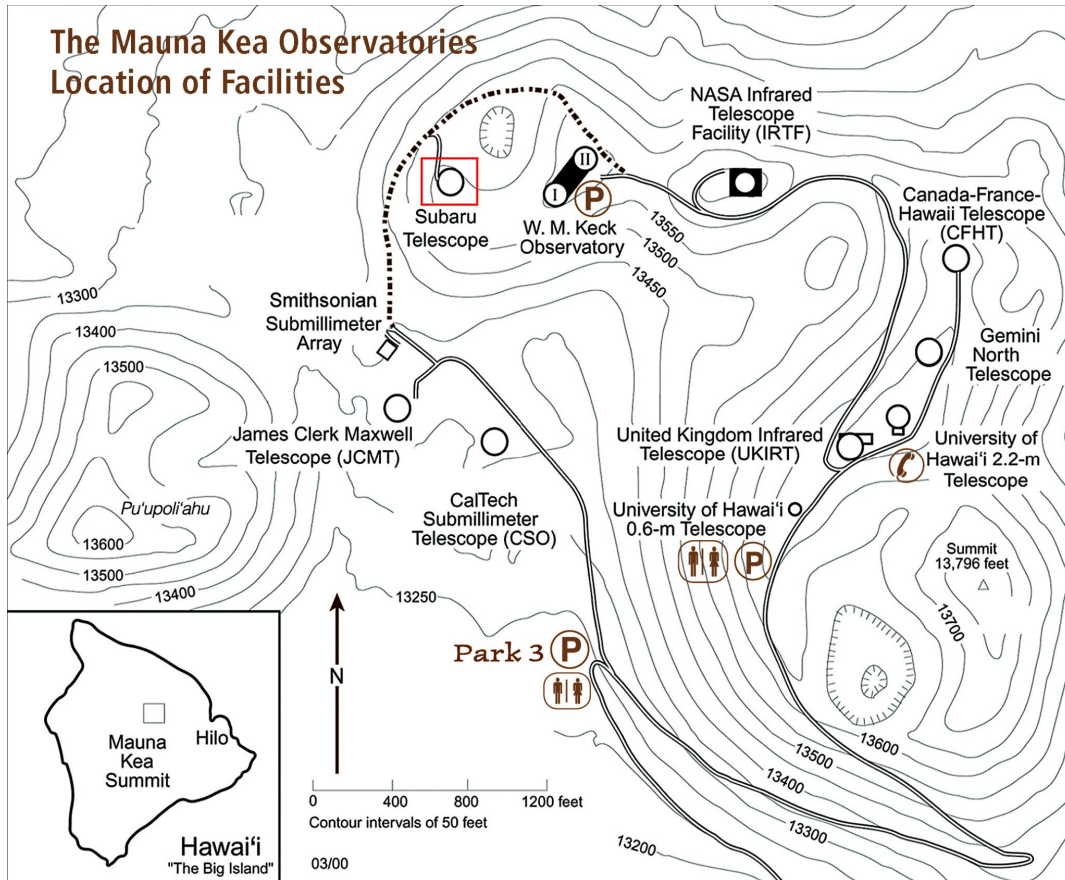
Are there any related ongoing, pending, or planned projects associated with this submission?

No.

Description of the Project

Location

The sensors will be installed on the exterior of the Subaru control building and the exterior of the elevator tower at the Subaru Telescope Summit Facility. The location of the Subaru Telescope Summit Facility is denoted on the following image by a red box.



A single enclosure containing a Rasp-PI sulfur dioxide (SO₂) sensor, a particulate matter sensor, and the necessary supporting electronics will be installed on the exterior of the elevator tower at the Subaru Telescope Summit Facility. The placement of this device on the elevator tower is noted on the following image (A). In addition, we install an extremely high accuracy SO₂ meter (“NOAA SO₂ Meter”) to the control building. We send the outside air to the instrument by a ¼” Teflon hose with a heater line. These lines are covered by 1.5inch heat protection form tube. The proposed path is shown in the same image (B).



Description of the process of completing the project

[A] The elevator tower sulfur dioxide (SO₂) and particulate matter sensor, along with supporting electronics, are installed within a weatherproof enclosure box with dimensions of 213 mm W x 293 mm H x 130 mm D. The enclosure has a mass of approximately 2kg and is a discrete, beige color. The network cable enters the bottom of the enclosure via a cable gland and will be directed to the existing hole in the elevator tower (see photo in previous response). After physical installation is complete, the network cable simply needs to be plugged into the nearest network switch and we will automatically start collecting data from the attached sensors.

[B] A professional grade SO₂ meter (“NOAA SO₂ Meter”) is provided by the Air Resources Laboratory (ARL), Oceanic and Atmospheric Research (OAR) Division, the National Oceanic and Atmospheric Administration (NOAA). It is already installed inside the control building. We send the outside air to the instrument by a ¼” Teflon hose with a heater line. These lines are covered by 1.5 inch heat protection form tube, and then it is sent through the ceiling of the building.

Who will do the work?

Several in-house employees will complete the installation.

Equipment & Transportation

No heavy equipment nor oversized vehicles will be required for this project.

Measures to protect the environment and/or mitigate impacts

Impacts

No impact to environment.

Compliance with Lease, Sublease, or Comprehensive Management Plan (CMP)

Yes, to maintain safe operations.

Identify other required or associated permits

N/A

Community Benefits

Benefits to other Maunakea entities and/or global astronomy community

We will make the measurement data available to public, including all the MKO facilities. As the sensors are utilized to help protect workers' health and sensitive optics, all observatories may benefit from having this information.

Benefits to the Hawaii Island community

As a home of two active volcanoes (Kilauea and Mauna Loa) which emit toxic SO₂ gas, this knowledge of atmospheric composition is a high interest of our local community. Increasing the accuracy of the SO₂ gas forecast is crucial for keeping the community healthy. Pairing the measurements of SO₂ at Maunakea with the estimated emissions of SO₂ from the Kilauea and Mauna Loa volcanoes will allow for the evaluation of Hybrid Single-Particle Lagrangian Trajectory (HYSPLIT) transport and dispersion model, providing a direct benefit to the Hawai'i community.

Will data, publications, or other products be free and available to the public?

Yes, via the Association of Research Libraries (ARL) web portal, Subaru telemetry portal, and the Maunakea Weather Center website.

For internal use only by CMS

Review checklist

Staff review and report

Outside agency review or approval required

Environment committee, if environmental impacts are anticipated

Kahu Ku Mauna, if cultural impacts are anticipated and KKM requested consultation, or the project was not included in a 5YP or 3YP

Maunakea Management Board