



***FINAL ENVIRONMENTAL IMPACT STATEMENT FOR
THE OUTRIGGER TELESCOPES PROJECT***

VOLUME I

Mauna Kea Science Reserve, Island of Hawai'i

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Universe Division
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EXHIBIT A-70

4.2.13.3 *Impacts of Reasonably Foreseeable Future Activities of Noise*

Impacts from the reasonably foreseeable future activities are anticipated to generate noise at levels comparable to those of past and present activities. Construction and installation activities would lead to larger increases in noise levels within the ROI for shorter periods of time. It is anticipated that noise levels would remain compatible with existing activities within the ROI, constituting a small impact. Furthermore, it is anticipated that future construction and installation activities would be consistent with the State of Hawai'i community noise standards (Hawai'i Administrative Rules, Title 11, Chapter 46).

4.2.13.4 *Cumulative Impact Summary*

The impact of noise from past, present, and reasonably foreseeable future activities is generally small. The Outrigger Telescopes Project would have no incremental impact. Although individual construction events would continue to produce occasional increased noise levels, overall noise conditions in the ROI would remain low.

4.2.14 *Visual/Aesthetics*

4.2.14.1 *ROI for Visual/Aesthetics*

The ROI for assessing cumulative visual impacts is the MKSR and any off-mountain areas from which the Mauna Kea observatories would be visible—such as Hilo, Waimea, and Honoka'a.

4.2.14.2 *Impacts of Past and Present Activities on Visual/Aesthetics*

The astronomy facilities at the summit of Mauna Kea have become a prominent, and to many Native Hawaiians notorious, feature. At least some of the observatories are visible from most locations within the MKSR and from many off-mountain

locations including Hilo, Waimea, and Honoka'a. In particular, the summit ridge observatories (UKIRT, UH 2.2-m, Gemini North, and CFHT) are visible from Hilo; IRTF, the W.M. Keck Observatory, and Subaru are visible from Waimea and Honoka'a. The observatory structures are white or silver to minimize internal temperature variations which can affect seeing quality. Whereas most of the observatory structures are curved domes, Subaru has an unusual paneled structure that renders it less visible much of the day. However, Subaru appears extremely bright at sunset from off-mountain locations where it is visible owing to specular reflections of sunlight from its flat surfaces.

Although not within the specific ROI for visual impacts, the Hale Pōhaku Mid-Elevation Support Facilities were constructed with design restrictions. These structures were sited and constructed to follow mountain contours and colored to blend with the surrounding natural features and terrain.

4.2.14.3 *Impacts of Reasonably Foreseeable Future Activities on Visual/Aesthetics*

In general, reasonably foreseeable future activities with the greatest potential for visual impact would be those that involve development of a previously undeveloped site. The principal such project is the TMT, which is being considered for a site on the northwest plateau. This location would take advantage of a northerly extension of the summit ridge to entirely block views on the new facility from Hilo and partially block views from Honoka'a (Master Plan 2000). Redevelopment of an existing facility would have a small to minimal visual impact as long as the basic frame of the structure remained unaltered. Any modifications would follow design guidelines specified in the 2000 Master Plan limiting size, color,

and surface materials so as to minimize the observatory's visual impact. All future projects will be reviewed by the Design Review Committee for adherence to these guidelines prior to approval (UH 1999).

Construction activities on the mountain can create a local visual impact from dust, trash, and equipment. It is expected that dust and trash will be minimized throughout construction phases on all future projects on Mauna Kea through appropriate management plans which include dust and trash controls. All construction equipment would be removed from the site and the mountain after construction is completed.

4.2.14.4 Cumulative Impact Summary

The visual impacts of past and present astronomy-related activities in the MKSR have been substantial. Future visual impacts may be minimized by new design guidelines and careful site selection of new development projects. Mitigating dust generation, enforcing strict trash control, and minimizing on-site staging areas would reduce local short-term visual impacts. The Outrigger Telescopes Project would add a small incremental visual impact. Overall, the cumulative visual impact from past, present, and reasonably foreseeable future activities is substantial.

4.2.15 Cumulative Impacts of End of Lease

As a reasonably foreseeable future astronomy project, End of Lease in 2033 could result in a variety of outcomes and, thus, its precise nature is unclear at this time. Two bounding scenarios will be addressed for the purposes of this cumulative impact analysis:

- (1) All observatories (*i.e.*, those currently existing and the reasonably foreseeable future projects) would continue operation beyond 2033; and

- (2) All observatories operating on Mauna Kea as of 2033 would be decommissioned and completely removed from the mountain.

4.2.15.1 Continued Operation of All Observatories Beyond 2033

This scenario assumes that all environmental protection and mitigation measures required for operation of the Mauna Kea observatories including the reasonably foreseeable future astronomy projects undertaken prior to 2033 would continue beyond that time. The impacts of continued operation of all observatories on Mauna Kea beyond 2033 would be similar to the cumulative impacts that have been addressed throughout Section 4.2. Continued operation of the observatories would have little to no adverse incremental impacts on solid wastes and hazardous waste management; geology, soils and slope stability; land use and existing uses; transportation; utilities and services; air quality; flora and fauna; the Wēkiu bug and its habitat; hydrology and water quality; and noise through the indefinite future beyond 2033. The incremental impacts of the Outrigger Telescopes Project would remain a minor contributor.

The principal cumulative environmental impacts resulting from continued operation of the observatories beyond 2033 would largely be on cultural resources and visual/aesthetics. The cumulative impact on cultural resources was addressed in Section 4.2.3 where it was noted that the impact of past and present astronomy and related projects has been adverse substantial, and the cumulative impact associated with operation of the existing observatories and reasonably foreseeable future astronomy projects is anticipated to be adverse and substantial. Thus, continued operation of the astronomy facilities beyond 2033 would, in turn, continue to be substantial and