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BOARD OF LAND AND NATURAL RESOURCES  
STATE OF HAWAII

A Contested Case Hearing Re:  
Conservation District Use Application  
HA-3568 for the Thirty Meter Telescope  
on the Northern Plateau in the  
Mauna Kea Conservation District, Ka'ohe,  
Hamakua District, Island of Hawai'i  
TMK (3) 4-4-015:009

DLNR File No. HA-CC 16-002  
(CDUA HA-3568)

CLARENCE KUKAUAKAHI  
CHING'S PROPOSED FINDINGS  
OF FACT, CONCLUSIONS OF LAW,  
AND DECISION AND ORDER, COS

**CLARENCE KUKAUAKAHI CHING'S PROPOSED FINDINGS  
OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER**

This Contested Case Hearing is based on Conservation District Use Application HA-3568 ("CDUA") filed on September 2, 2009, for the Thirty Meter Telescope Project "TMT") to be located on Area E, the northern plateau, the Mauna Kea Science Reserve, on Mauna Kea, Ka'ohe mauka [sic], Hamakua, Hawai'i, TMK (3) 4-4-015:00, by the University of Hawaii at Hilo, an entity of University of Hawaii (hereinafter referred to as "The University" or "Applicant"), pursuant to chapter 183C of the Hawaii Revised Statutes (hereinafter "HRS") and chapter 13-5 of the Hawaii Administrative Rules (hereinafter "HAR"). The total area of the parcel is 11,288 acres and the area of the proposed use is 8.7 acres.

The State of Hawaii Board of Land and Natural Resources (hereinafter referred to as "BLNR"), having heard and examined the testimony, evidence, and arguments of all parties, hereby makes the following Findings of Fact, Conclusions of Law, and Decision and Order denying CDUA HA-3568 for the Thirty Meter Telescope (TMT).

Received  
Office of Conservation and Coastal Lands  
Department of Land and Natural Resources  
State of Hawaii  
2017 May 30 3:06 pm

In the opening lines of his book *Inconvenient Indian: A Curious Account of Native People in North America*, Thomas King, in speaking about the Indians of North America, as it parallels Hawaiians of Hawai'i Island of the Hawaiian Kingdom, declares the following:

“Land. If you understand nothing else about the history of Indians in North America, you need to understand that the question that really matters is the question of land.

Land has always been a defining element of Aboriginal culture. Land contains the languages, the stories, and the histories of a people. It provides water, air, shelter, and food. Land participates in the ceremonies and the songs. And land is home. Not in an abstract way. The Blackfoot in Alberta live in the shadow of Ninastiko or Chief Mountain. The mountain is a special place for the Blackfoot, and friends on the reserve at Standoff have told me more than once that, as long as they can see the mountain, know they are home.

For non-Natives, land is primarily a commodity, something that has value for what you can take from it or what you can get for it.”

So, yes, when one can see the Mountain, or be up there experiencing its lofty ridges and distant slopes, Mauna Kea is our Mountain, the Mountain that is DNA—and blood-related to us according to principles of Hawaiian cosmology—our elder, mountain brother. Its status to us is as elevated as that of our other elder brother—the kalo.

The Mountain is also the place where the bones of many of our ancient ancestors have deteriorated to become, with the rocks, stones, and gravels, the actual substance of what is the Mountain.

Like its brother mountains scattered over the Earth that are respected and acknowledged, and possibly worshiped, Mauna Kea's status is indeed as important to many Hawaiians.

According to Catie Leary, who writes about science, travel, animals and the arts, mountains are indeed sacred. She writes:

“Religions around the world have long attributed divine qualities to the mountains that tower over their civilizations, and it makes a lot of sense. After all, these looming peaks are often the objects that are most closely positioned next to the heavens, the celestial bodies and the unknown.

However, that's not the only reason why mountains are often imbued with religious significance.

Many of Earth's peaks are considered sacred because of their connections to famous events—when Noah's ark came to rest upon Mount Ararat—or because the mountain demonstrates a god-like strength for destruction—consider Mount Shasta or Mauna Kea.

Regardless of whether you believe the legends that surround them, it's hard to deny the sublime power that mountains represent.”

These are some of the reasons why I place so much significance on the sacredness of Mauna Kea. The tsunami of persons—Hawaiian and non-Hawaiian—who feel similarly, make Mauna Kea the globally-regarded sacred Mountain that it is, just as Kailash, Fuji, Shasta, Kilimanjaro, Aconcagua, or Denali are.

As of this date, May 30, 2017, the Record as defined in HAR 13-1-38(a) of this Contested Case Hearing is not complete and therefore I join with the Temple of Lono's Supplemental FOF, COL etc dated May 29, 2017, pointing out that the record, as late as Friday, May, 26, 2017, is still changing and is not complete.

Because my and others' FOF/COL etc are incomplete, I hereby incorporate the Findings of Fact and Conclusions of Law etc of the following Petitioners:  
Debbie J.Ward, Clarence “Ku” Ching, Temple of Lono, Mehana Kihoi, J.Leina'ala Slightholm, Cindy and William Freitas and Hank Fergerstrom, Flores-Case Ohana and KAHEA: the Environmental Alliance to our Findings of Facts, Conclusions of Law by reference.

Because there remains outstanding issues regarding the record, such as having outstanding Motions and potential Motions for Reconsideration pending, I reserve the right to amend/complete my FOF/COL and D and O when the record is complete.

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## I. INTRODUCTION

Pursuant to the opinion of the Supreme Court filed on December 2, 2015 in *Mauna Kea Anaina Hou et al vs. Board of Land and Natural Resources et al* 136 Hawaii 376 (2015) and the Judgment on Appeal filed by the Supreme Court on December 29, 2015 and Order of Remand filed by the Third Circuit Court on February 22, 2016, the Hearings Officer has heard and considered the evidence presented, and being fully apprised of the premises, makes the following Findings of Fact and Conclusions of Law.

These Findings of Fact and Conclusions of Law shall be construed as follows:

- (1) If it is later determined that a Finding of Fact should be properly deemed to be a Conclusion of Law, the Hearings Officer so concludes on those legal issues.
- (2) If it is later determined that a Conclusion of Law should properly be deemed to be a Finding of Fact, the Hearings Officer so finds on those factual issues.
- (3) To the extent that any of the following Findings of Fact and Conclusions of Law include a mix of finding of fact and conclusion of law, each shall be given full effect.

## II. FINDINGS OF FACT

### A. First Proceeding (2011)—Procedural Matters

#### Public Hearings

1. Public hearings on CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka'ohē Mauka, Hamakua, Hawai'i, **TMK (3) 4-4-015:009** were held:
2. On December 2, 2010 at the Hawaii County Council Room, 25 Aupuni Street in Hilo, on December 3, 2010, at the Natural Energy Laboratory in Kona. **Ex. A059**
3. On February 25, 2011, the Board of Land and Natural Resources (BLNR) held a public hearing in Honolulu and voted to approved the CDUA HA-3568 for the Thirty-Meter Telescope in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka'ohē Mauka, Hāmakua, Hawai'i. **Ex. A059**
4. On February 25, 2011 and March 7, 2011, the Office of Conservation and Coastal Lands (OCCL) received seven requests for a contested case hearing on CDUA-HA-3568, in compliance with HAR 13-1-28, from Mo'oinanea (represented by E. Kalani Flores), the Flores-Case 'Ohana, Deborah J. Ward, Paul K. Neves (as an individual and as representative of the Royal Order of Kamehameha I (ROOK)), Clarence Kūkauakahi Ching, KAHEA: The Hawaiian-Environmental Alliance (represented by Marti Townsend), and Mauna Kea Anaina Hou (represented by Kealoha Pisciotta). **Ex. A059**
5. On February 25, 2011, the board granted the permit with conditions, one of which was that a contested case be conducted, thus “putting the cart before the horse,” as later described by the Hawaii State Supreme Court. **Ex. A059**

## **Hearing Officer for First Contested Case**

6. On April 15, 2011, the BLNR Chairperson appointed Mr. Paul Aoki as the presiding officer over the contested case hearing (hereinafter Mr. Aoki is referred to as “Hearing Officer” or “HO”). **Min. Ord. 1, April 15, 2011**

## **Pre-Hearing Matters**

7. On May 13, 2011, a pre-hearing conference was held on CDUA HA-3568 in Hilo. **Min. Ord. 1, April 15, 2011; Aoki, Tr. May 13, 2011, 4:1**

8. At the pre-hearing conference, the issue of the Petitioners’ standing was discussed. Applicant did not object to the standing of petitioners Mauna Kea Anaina Hou, Paul K. Neves, Deborah J. Ward, Clarence Kukauakahi Ching, or KAHEA: The Hawaiian-Environmental Alliance.

**Aoki, Tr. May 13, 2011, 6:17-20; Pisciotta, Tr. May 13, 2011, 43:24-46:25**

## **Parties**

- a. Applicant University of Hawai‘i at Hilo
- b. Petitioner Mauna Kea Anaina Hou
- c. Petitioner Kumu Hula Paul K. Neves
- d. Petitioner Deborah J. Ward
- e. Petitioner Clarence Kukauakahi Ching
- f. Petitioner Flores-Case ‘Ohana
- g. Petitioner KAHEA: The Hawaiian-Environmental Alliance

## **Evidence and Experts**

9. On August 25, 2011, Petitioners Neves, Ching, Pisciotta, and Flores were recognized as Native Hawaiian cultural practitioners and experts in the traditional and customary practices of Native Hawaiians. **Lui Kwan, Tr. August 25, 2011, 28:4-30:6**

10. On September 26, 2011, Flores was also recognized as expert in Native Hawaiian traditions and culture. **Flores, Tr. September 26, 2011, 4:25-6:25**

11. The first contested case was conducted in 2011, and after seven days of testimony, the hearing closed, and the Applicant and Petitioners (combined) filed findings of fact, conclusions of law and decision and order. Each party provided the Hearing Officer with responses to the other’s document, and a year later the Hearing Officer issued a decision. BLNR held a public hearing regarding the Hearing Officer’s recommendation, but made the decision to (again) grant the permit outside of public scrutiny.

12. The BLNR approval of the permit was vacated in 2015 by the Hawai‘i Supreme Court, which remanded the case back to the BLNR for further proceedings. **Mauna Kea Anaina Hou v. Bd. of Land & Nat. Res., 136 Hawai‘i 376, 363 p.3d 224 (2015)**



## **B. Second Proceeding (2016)—Procedural Findings of Fact**

### **Second Contested Case Hearing in 2016-2017**

13. BLNR failed to hold a new public hearing to revisit the application filed six years earlier and the Final Environmental Impact Statement accepted seven years earlier, nor was anyone in the public invited to comment, call for participation in a contested case hearing, or given the opportunity to establish standing in accordance with the Hawaii Administrative Rules. Instead the BLNR issued an RFP for applications for the position of Hearing Officer for a second contested case hearing process.

### **Hearing Officer Appointment**

14. Hearing Officer Riki May Amano was appointed, and in spite of opposition from both the Applicant and the original petitioners, (Doc) the Board elected not to recuse Hearing Officer Riki May Amano.

15. The Hearing Officer called for a prehearing conference on O‘ahu, with less than the required notice, and six petitioners, not notified in a timely manner, were unable to attend. Attorney Richard Naiwiehu Wurdeman represented petitioners at the pre-hearing conference.

### **Pre-Hearing Conferences**

16. DOC 016/MO 5 dated May 9, 2016 set May 16, 2016, for the 1st pre-hearing conference to be held in Honolulu at the DLNR office in the Kalanimoku Board Room located on the first floor, Makai side, of the Kalanimoku Building at 1151 Punchbowl Street, Honolulu, Hawai‘i. The conference was held to establish Record for contested case hearing; set schedule regarding applications, motions, requests to intervene as a party; set hearing on interventions and the 2nd pre-hearing conference for June 17, 2016 (Minute Order Nos. 7 and 8). **TR V. i Titled “Prehearing Conference”**

17. The 15-day notice requirement for the 1st pre-hearing conference was violated by giving only 7 days notice. According to Minute Order 5, dated May 9, 2016, a pre-hearing conference was set for Monday, May 16, 2016. Notice requirements in Ch 91-9.5 (a) states: Unless otherwise provided by law, all parties shall be given written notice of hearing by registered or certified mail with return receipt requested at least 15 days before the hearing.

18. DOC 49/MO 08 Dated May 27, 2016 set a 2nd Pre-Hearing Conference to be held on June 17, 2016 at the Hilo State Office Rooms A, B, and C, 75 Aupuni Street, Hilo, Hawai‘i. Minute order titled “Minute Order 8: Order setting hearings on motions to intervene and 2nd pre-hearing conference; COS (3).” **Tr. Vol II**

19. Also, on June 17, 2016, as part of the 2nd pre-hearing conference, there was a scheduling discussion on how many witnesses the parties would be calling, establishing a date for site inspection, deadlines for pre-hearing motions, deadlines for subpoenas.

## **TR VOL II, “Request for Admission and Motions”**

20. The new parties were expected to discuss or state their case on how many witnesses they would be calling for example, when they had no access to any motions filed and were not informed that they needed to come prepared with that information because they were not a party up until that point. All new parties except TIO and P.U.E.O. were pro se.

21. Hearing Officer stated she will be filing a minute order describing the filing procedures.  
**Tr. Vol III, “Request for Admission and Motions,” p.7: 4-6**

22. On August 5, 2016, a 3rd pre-hearing conference was held at the YMCA building to hear motions. 300 West Lanikaula Street, Hilo, Hawai‘i.  
**Tr. Vol IV, “Motions Hearing”**

23. August 12, 2016, the 4th pre-hearing conference was held at Hawaii Community College Cafeteria, 1175 Manono St, Hilo, Hawai‘i to argue motions.  
**Tr. Vol V, “Motions Hearing”**

24. August 29, 2016, the 5th pre-hearing conference was held at Hawaii Community College Cafeteria, 1175 Manono, Hilo, Hawai‘i. Further Motions were heard.  
**Tr. Vol VI, “Motions Hearings”**

25. October 3, 2016 the 6th pre-hearing conference was held at the Grand Naniloa Hotel, Crown Room, 93 Banyan Drive, Hilo, Hawai‘i.  
**Tr. Vol VII, “Motions Hearing”**

26. October 17, 2016, the 7th pre-hearing conference was held at the Grand Naniloa Hotel, Crown Room, 93 Banyan Drive, Hilo, Hawai‘i.  
**Tr. Vol VIII, “Prehearing”**

## **Parties/Interveners**

27. The Applicant and six petitioners were the original parties in the first contested case.
- a. Applicant University of Hawai‘i at Hilo
  - b. Petitioner Mauna Kea Anaina Hou and Kealoha Pisciotta
  - c. Petitioner Kumu Hula Paul K. Neves
  - d. Petitioner Deborah J. Ward
  - e. Petitioner Clarence Kukauakahi Ching
  - f. Petitioner Flores-Case ‘Ohana
  - g. Petitioner KAHEA: The Hawaiian-Environmental Alliance
  - h. Intervenor Thirty Meter Telescope International Observatory LLC
  - i. Intervenor Harry Fergerstrom
  - j. Intervenor Mehana Kihoi
  - k. Intervenor C. M. Kaho‘okahi Kanuha
  - l. Intervenor Joseph Kualī‘i Lindsey Camara

- m. Intervenor J. Leina'ala Sleightholm
- n. Intervenor Maelani Lee
- o. Intervenor The Temple of Lono
- p. Intervenor Kalikolehua Kanaele
- q. Intervenor Perpetuating Unique Educational Opportunities, Inc.
- r. Intervenor Stephanie Malia Tabbada
- s. Intervenor Tiffnie Kakalia
- t. Intervenor Glen Kila
- u. Intervenor Dwight J. Vicente
- v. Intervenor Brannon Kamahana Kealoha
- w. Intervenor Cindy Freitas
- x. Intervenor William Freitas
- y. Intervenor Perpetuating Unique Educational Opportunity (P.U.E.O.)

**Hearing Officer Witnesses**

- z. Wilma Holi

Several others, who had intended to be parties, agreed to be witnesses for the Hearing Officer as well.

**Party: Applicant University of Hawai'i at Hilo**

28. The Applicant, University of Hawai'i at Hilo (UH-Hilo), is seeking a Conservation District Use Permit (CDUP) relative to CDUA HA-3568 on behalf of TMT Observatory Corporation ("TMT"). **Ex. A001, K-1 (CDUA), p.13**

29. The Agent (signatory) for the Applicant UH-Hilo on CDUA HA-3568 is Dr. Donald Straney, Chancellor. Dr. Donald Straney is the Chancellor of UH-Hilo. UH-Hilo is a subdivision of the University of Hawaii System. **Ex. A001, Item K-1 p.1; Ex. A009, p3-9**

30. The University of Hawaii System was established as an institution of higher education. Its purpose is: "To give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires." **HRS §304A-102**

31. Conservation land management is not listed as a purpose of the University system. **HRS §304A-102**

## **Petitioner Clarence Kauakahi Ching**

32. I am an individual Hawaiian cultural and religious practitioner on Mauna Kea. Being a descendent of ‘Umi A Liloa, one of the paramount chiefs on Hawai‘i island in the 1500s. Therefore, I have family and genealogical ties to Mauna Kea. I am also a graduate of Kamehameha Schools (Class of 1954), and was a Trustee at the Office of Hawaiian Affairs from 1986 to 1990—a time when voters and trustees were “certified” to be Hawaiian by blood.

33. I am a Hawaiian subject—and I participate in this administrative hearing under duress. I have been involved in traditional cultural, religious, and spiritual practice on Mauna Kea since the mid-1980s. I have traversed the trails and roads leading to, over, and around Mauna Kea.

34. I am a member of the kalai wa‘a (canoe building) community (having been a member of the crew that built the voyaging canoe, Hawai‘i Loa from 1990 to 1993, with special ties to Keanakako‘i (the adze quarry) situated not far from the summit of Mauna Kea. I work with, and gather, traditional wood, fiber, and stone materials, as related to canoe building and other cultural works. I also collect sacred waters from various locations on Mauna Kea, including Lake Waiau and the springs at Houpo O Kane for spiritual and medicinal purposes. I have spent years in the protection and propagation of endemic and other plant species.

35. Like Queen Emma who visited Mauna Kea in the 1880s, who traversed the trails on the Mountain, and visited Lake Waiau and other places on the Mountain; as the leader of Huaka‘i i na ‘Aina Mauka—a cultural and religious hiking group that “walks in the footsteps of our ancestors”—I too have visited different parts of the Mountain, and have partaken of the tranquil silence and serenity of rituals and ceremonies on Mauna Kea.

## **Pre-Hearing Matters, Motions, and Minute Orders**

### **Representation**

36. Petitioners Mauna Kea Anaina Hou and Kealoha Pisciotto, Clarence Kauakahi Ching, Paul Neves, Deborah J Ward, and Flores-Case ‘Ohana, and KAHEA: The Environmental Alliance (hereinafter “Mauna Kea Hui Petitioners”) were represented by attorney Richard Naiwieha Wurdeman from May to October 10, 2016.

37. Thereafter, Mauna Kea Anaina Hou and Kealoha Pisciotto, Clarence Kauakahi Ching, Paul Neves, Deborah J Ward, and Flores-Case ‘Ohana represented themselves pro se, and KAHEA: The Environmental Alliance was represented by attorneys Yuklin Aluli and Dexter Kaiama.

## **Evidentiary Hearing Motions**

### **Motions filed by Mauna Kea Hui Petitioners**

38. By motion dated April 15, 2016, Mauna Kea Hui Petitioners filed [Doc. 6] Petitioners' objections to selection process and to appointment of Hearing Officer made pursuant to Minute Order No. 1, dated March 31, 2016.

39. By motion dated May 6, 2016, Mauna Kea Hui Petitioners filed [Doc. 15] Petitioners' objections regarding procurement committee and process and committee member / BLNR Board member.

40. By motion dated May 13, 2016, Mauna Kea Hui Petitioners filed [Doc. 17] Petitioners' motion for reconsideration of Minute Order No. 4, filed on May 6, 2016 and/or motion to strike selection process and to disqualify various members and hearing officer.

41. By motion dated May 31, 2016, Mauna Kea Hui Petitioners filed [Doc. 52] Petitioners' submissions and positions on record; Exhibit "A."

42. By motion dated June 16, 2016, Mauna Kea Hui Petitioners filed [Doc. 69] Petitioners' memorandum in opposition to Perpetuating Unique Educational Opportunities, Inc.'s motion to intervene, dated May 16 2016.

43. By motion dated June 13, 2016, Mauna Kea Hui Petitioners filed [Doc. 70] Petitioners' memorandum in opposition to TMT's motion to have TMT International Observatory, LLC admitted as a party in the contested case hearing.

44. By motion dated July 11, 2016, Mauna Kea Hui Petitioners filed [Doc. 81] Petitioners Mauna Kea Anaina Hou et al.'s request for continuance on submissions and next hearing date.

45. By motion dated July 12, 2016, Mauna Kea Hui Petitioners filed [Doc. 83] Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions and next hearing date.

46. By motion dated July 14, 2016, Mauna Kea Hui Petitioners filed [Doc. 87] Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions and next hearing date.

47. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 94] Petitioners Mauna Kea Anaina Hou et al.'s motion to strike Conservation District Use Application, HA-3568, dated September 2, 2010, and/or motion for summary judgement.

48. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 95] Petitioners Mauna Kea Anaina Hou et al.'s motion to disqualify BLNR's and Hearing Officer's counsel.

49. By motion dated July 18, 2016 Mauna Kea Hui Petitioners filed [Doc.103] Petitioners Mauna Kea Anaina Hou et al.'s witness list.
50. By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 104] Petitioners Mauna Kea Anaina Hou et al.'s supplemental witness list.
51. By motion dated July 26, 2016, Mauna Kea Hui Petitioners filed [Doc. 130] Petitioners Mauna Kea Anaina Hou et al.'s: (1) Renewal of objections to hearing officer selection process and hearing officer appointment, and (2) supplemental arguments on motion to disqualify BLNR's and Hearing Officer's counsel, filed on July 18, 2016.
52. By motion dated August 1, 2016, Mauna Kea Hui Petitioners filed [Doc. 163] Mauna Kea Anaina Hou, et. al. Petitioners' initial objections to witnesses designated by other parties.
53. By motion dated August 1, 2016, Mauna Kea Hui Petitioners filed [Doc. 165] (email) Note for the record.
54. By motion dated August 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 188] Wurdeman correspondence addressed to Hearing Officer Judge (Ret.) Riki May Amano and BLNR Chair Suzanne Case re: Hearing on Petitioners' motion to disqualify BLNR's and Hearing Officer's counsel, filed on July 18, 2016, filed on August 10, 2016.
55. By motion dated August 17, 2016, Mauna Kea Hui Petitioners filed [Doc. 218] Petitioners Mauna Kea Anaina Hou, et al.'s site visit recommendations.
56. By motion dated August 22, 2016, Mauna Kea Hui Petitioners filed [Doc. 233] Petitioners Mauna Kea Anaina Hou, et al.'s memorandum in opposition to motion for protective order for the Honorable David Y. Ige, Suzanne Case and Stanley Reohrig, filed on August 8, 2016.
57. By motion dated September 8, 2016, Mauna Kea Hui Petitioners filed [Doc. 254] Petitioners Mauna Kea Anaina Hou, et al.'s request for further status conference and/or consideration of proposed scheduling.
58. By motion dated September 19, 2016, Mauna Kea Hui Petitioners filed [Doc. 270] Mauna Kea Anaina Hou, et al. Petitioners' response to P.U.E.O., Inc.'s proposed minute order granting P.U.E.O., Inc.'s motion to set issues.
59. By motion dated September 23, 2016, Mauna Kea Hui Petitioners filed [Doc. 282] Correspondence regarding notice of contested case hearing.
60. By motion dated September 26, 2016, Mauna Kea Hui Petitioners filed [Doc. 288] Petitioner Mauna Kea Anaina Hou, et al.'s objections to site visit and Minute Order No. 18.

61. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 340] Petitioners Mauna Kea Anaina Hou, et al.'s renewed motion to disqualify hearing officer.

62. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 341] Notice of withdrawal of counsel.

63. By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 342] Petitioners Mauna Kea Anaina Hou and Kealoha Pisciotta, Clarence Kukauakahi Ching; Flores-Case 'Ohana, Deborah J. Ward, Paul K. Neves, and Kahea: The Environmental Alliance list of e-mail addresses for service of process.

64. By motion dated October 17, 2016, Mauna Kea Hui Petitioners filed [Doc. 383] Petitioners' Statement of Position in Response to the University's Statement Re Petitioners Renewed Motion to Disqualify Hearing Officer Document 369.

### **Conduct of Contested Case Hearing**

#### **Exhibit Admittance and Numbering: Due Process Violation**

65. The Hearing Officer ordered Applicant and Petitioners to submit Witness Written Direct Testimony and Exhibits simultaneously on or by October 11, 2016.

66. Later, the petitioners were made aware that a documents library had been set up online, where Shared Exhibits Numbers R-8 were added to the Mauna Kea Documents Library Evidentiary Hearing Submittals. At the beginning of the evidentiary hearings, there were several duplications of exhibits from the various parties.

88. During the hearings references were made to the duplicated documents by number, as reflected in the transcripts. No attempt was made at any time to resolve the duplication, nor was there an opportunity to compare documents or rectify discrepancies between documents and the various versions. The parties did not have the opportunity to compare the documents and collectively agree on the documents to be used.

67. The Officer also received in to evidence the Applicant's document(s) over the Shared documents uploaded by BLNR's librarian. Consequently, at the close of the hearing, the Hearing Officer verbally expressed her intent to accept all exhibits to be judged by her on weight. Following the close of the evidentiary hearing, petitioners relied upon her assertions, made few objections, assuming that statements regarding weight would be issued in the findings of fact.

68. However, the Applicant(s) UH/TIO offered a barrage of objections to the exhibits petitioners had relied on throughout the evidentiary hearing process. Petitioners were not extended the opportunity to respond to objections to defend our own exhibits, and Hearing Officer made her decisions on admissibility based in part, if not primarily, on the the Applicants' arguments.

69. On Mar 2, 2017 the Hearing Officer stated on March 23, “I will by Minute Order identify all exhibits that I will be receiving onto evidence.” **Tr. Mar 2, 2017, Vol 44:288:1-22** After accepting objections on March 16, it wasn’t until April 20, 2017, Minute order 44 was issued.

70. Based on the HO representation, **Tr. 3.2.17**, petitioners expected that there would be a full list of accepted exhibits with which to establish Findings of Fact. Instead petitioners received multiple uncollated lists, **MO 44/Doc 553**, which included responses to Applicants’ objections. On the last working day, May 26, 2017, prior to the filing deadline for Findings, the Hearing Officer issued a revised set of admitted exhibits. **MO 59/Doc 647, MO Amended 44/Doc 649**

71. The Hearing Officer had countervailing positions regarding what docs should be admitted or not. For example, in some instances she required that laws that were relied on in witness testimony to entered as an exhibit, while later she denied that document’s receipt into evidence.

72. More importantly, Minute Order 44 (Doc 553) issued 4/20/2017 regarding documentary evidence, clearly demonstrates the problem. The Order is contradictory, in that on one page several exhibits are received, while on another page the same exhibits are denied. For example, in Minute Order 44 see pages 28 and 33 to compare the decisions on exactly the same documents; on one page they are received, and and on the other, they are denied.

73. Therefore, petitioner asserts the due process injuries are as follows: As of this date (last working day before for submission of these findings of fact), the record is incomplete because there are outstanding dispositive motions, and motions for reconsideration regarding exhibits.

74. The references from the transcript do not match the exhibits admitted by the Hearing Officer.

75. Some exhibits offered by witnesses who had already testified were later not received into evidence by the hearing officer.

76. Citations to exhibits may be inconsistent throughout the record and the Findings of Fact will reflect the confusion.

### **Issues to be Decided**

77. During the August 29, 2016 hearing, the petitioners articulated on the record a number of issues to be addressed in the contested case hearing. While some of these issues were addressed in P.U.E.O.’s proposed order, the proposed order failed to include a number of issues important in this case.



78. As outlined in the conservation district rules, the applicant for a CDUP must demonstrate compliance with all eight permit criteria. **HAR §13-5-30(c)**. There is no dispute that the University of Hawaii at Hilo (UHH) must meet all eight criteria and that as applicant has the burden proof to demonstrate that all eight have been met. The UHH has failed to demonstrate how the TMT would even satisfy one criterion, much less all eight.

### **Issue 1—TMT is not Consistent with the Purpose of the Conservation District**

79. Conservation districts were formed “for the purpose of conserving, protecting and preserving the important natural resources of the State through appropriate management to promote their long-term sustainability and the public health, safety, and welfare.” HAR §13-5-1, see also, HRS §205-2(e). UHH proposes that an 18-story, five-acre industrial structure in a predominantly undisturbed natural area is not consistent with this purpose. This is an overbroad interpretation of HAR §13-5-30(c)(1) that, if accepted, would ultimately undermine conservation district protections. When interpreting a statute, the “whole act” rule demands that “the court will not look merely at a particular clause in which general words may be used, but will take in connection with it the whole statute . . . and the objects and policy of the law, as indicated by its various provisions, and give to it such a construction as will carry into execution the will of the Legislature.”

80. *Azarte v. Ashcroft*, 394 F.3d 1287-88 (9th Cir. 2005) quoting *Kokoszka v. Belford*, 417 U.S. 642, 650 (1974). Against this rule of statutory interpretation, UHH focuses solely on the latter half of the regulation to focus on “appropriate management,” ignoring the context of this general term and therefore the stated purpose of the conservation district. Because the TMT cannot meet this first criterion, this CDUA cannot be approved without abusing BLNR’s discretion.

81. “Within the historic district, the effect of a project on the historic district as a whole needs to be assessed as well as the project’s effect on individual historic properties located within or immediately adjacent to the project area. The effect of a project on the historic district must be addressed even if no individual historic properties are found within or immediately adjacent to the project area.”

82. “Effects on a district should consider the visual impact of a facility on the surrounding landscape (i.e., the various land forms creating the setting and context of the multiple historic properties encompassed by the district) and on those individual historic properties which contribute to the significance of the district.”

**Ex. FEIS Vol 1 R-3 Sec 3.3, p.3-49 3rd and 4th par.**

83. “...Integrity plays a very big role in historic preservation law, and you see it as being integral to what constitutes the significant site, that the site have integrity, and by placing something so - - I think, the scale of the project and it’s relative huge footprint within the landscape of the region, the integrity of the sites within the area would be compromised.”  
**Tr. May 11, 2016, Vol 27, p.32 22-25, p.33 1-4**

84. The lives of cultural practitioners who wake up in their own homes every day and see the TMT on Mauna Kea, and who do not want that telescope in their environment, would be profoundly affected, in a very recognizable way, and in a way that is adverse.

**Tr. Jan 25, 2017, Vol. 30, p.35:25-20**

85. “Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group’s sense of identity and self respect.”

86. Roughly 6.2 acres of previously undisturbed land will be disturbed by the TMT Observatory and Access Way. **Ex. R-3/B.32 FEIS Section 3.2, p.3-26**

87. “Thus, while the TMT project carries many benefits both scientifically, economically, and in the form of higher education for the Big Island and the State as a whole, there will be environmental and cultural impacts of a significant and adverse nature on the summit of Mauna Kea.” **Ex. R-4 FEIS V2, p.17 of 531 pdf 3rd par**

88. The TMT’s footprint will be a minimum of 8.5 acres on a pristine plateau.  
**Ex. Feb 25, 2011, B.70 CDUA Staff Report, p.K-1**

89. The total dome height will be 184 feet above finished grade, with an exterior radius of 108 feet. **Ex. Feb 25, 2011, B.70 CDUA Staff Report, p.15**

## **Issue 2—TMT is not Consistent with the Purpose of Subzone**

90. So heavy is UHH’s reliance on “astronomy facility” as an identified use in the Resource subzone that it crushes the foundational purpose of conservation districts—“conserving, protecting, and preserving the important natural resources of the State.”  
**HAR §13- 5-30(c)(1)**

91. Subzones are subset of a conservation district—not an exception to it. Any activity proposed for a subzone must comply with all of the requirements of the conservation district itself. **HAR §13-5-30(c)(2)**

92. Identified uses in a resource subzone are hierarchically classified according to their consistency with the mission and purpose of the conservation district. See, Department of Land and Natural Resources, State of Hawaii. “Conservation District Review Project: The Discussion Draft.” November 1993. Prepared by Gail W. Atwater.  
**Ex. B.03t, p.16, Atwater Report (1993)**

93. While astronomy is an identified use in the conservation district subzone, such use is permitted if and only if it will not entail substantial adverse impacts on the conservation district. According to **HAR §13-5-13(a)**, “[T]he objective of this [Resource] subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.” **Ex. B.03t, p.16, Atwater Report (1993)**

94. Ensuring sustained use of Mauna Kea's natural resources necessarily means ensuring that these resources are actually conserved, not degraded. Mauna Kea's central location in mauka viewsheds, views from the summit itself, unique rare and species habitat, and its cultural significance are resources would be degraded by the proposed TMT, as UHH readily admits. **Ex. A003/R-3 FEIS Vol. 1, p. S-12 through S-19**

95. Thus, the TMT project cannot comply with criterion 2 and the CDUA should be denied.

### **Issue 3—TMT is not Consistent with the Coastal Zone Management Act**

96. Most of the Coastal Zone Management (CZM) policies align with those of the Conservation District. These policies, along with other CZM objectives and guidelines, are binding on agency actions within the coastal zone management area, which includes Mauna Kea. **HRS § 205A-4(b)**

97. The TMT project fails to demonstrate compliance with CZM policies for many of the same reasons that it would entail adverse, significant and substantial impacts on the natural and cultural resources of the Mauna Kea conservation district. UHH has failed to show that the TMT can comply with CZM policies for protecting watersheds and aquifers. **HRS Chapter 205A(c)(4)(E)**

98. The Mauna Kea Science Reserve is located above five State of Hawai'i delineated aquifers. See the Mauna Kea Comprehensive Management Plan for UH Management Areas, Jan. 2009. **Ex. A009 CMP, p.5-32**

99. Ground water and aquifer contamination is a "potential side effect of a variety of human activities on the mountain," and groundwater rates and flows at the summit are "unknown." **Ex. A009 CMP, p.6-14**

100. Moreover, as observatory operators have demonstrated, spills and run-off from telescopes, the Access Way, and a potential Mid-Level Facility have been allowed to "percolate into the ground[.]" **Ex, A003 FEIS Vol.1, p.3-120**

101. In March 2008, as much as 1,000 gallons of sewage overflowed onto the ground and was "quickly absorbed" into highly porous ground, beneath which are flows to aquifers. **Ex. A009 CMP, p. 6-10**

102. The TMT's three underground storage tanks (USTs), one of which will store hazardous wastes, raise additional concerns. Neither the CDUA nor the FEIS state whether they meet the EPA's standards for maintaining USTs. UHH does not consider how this percolation impacts aquifers. UHH has not conducted any hydrologic studies to understand how surface and ground water flows and the other water sources such as the lake, snow, ice and the melt waters follow.

103. In addition, as explained in more detailed below, the proposed TMT would directly interfere with scenic views to and from Mauna Kea's summit region in violation of CZM policies. **HRS §205A-2(c)(3)(E)**

104. If built, the TMT would be an unavoidable blight on the remaining natural viewplanes in the line of sight between Mauna Kea and Haleakala on Maui. Native traditions, oral histories, and historical accounts of Mauna Kea contain many references to the north-facing viewshed from Mauna Kea. **Ex. Maly 2005, p.169, 209, 218, 231.1**

#### **Issue 4—TMT Would Cause Substantial Adverse Impacts on Mauna Kea Resources**

105. **HAR §13-5-30(c)(4)** requires that “[T]he proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.” **Ex. Maly 2005, p.169, 209, 218, 231.1**

106. Compliance with the fourth permit criteria is essential to ensure that the natural and cultural resources of the conservation district are not sacrificed in pursuit of unrelated goals.

#### **UHH admits the TMT would have substantial adverse impacts**

107. “Cumulative” is defined as “made up of accumulated parts; increasing by successive additions.” **Webster’s Dictionary, 2011** This definition is consistent with **HAR §11-200-2**, which defines “cumulative impact” as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.”

108. UHH’s attempts to limit review of the project solely to the TMT’s discrete contribution to cumulative impacts. **HAR §13-5-30(c)(4)** is concerned with the effects of proposed actions on natural resources and not with tracking individual contributions from different impact sources. UHH’s attempt to justify additional incremental impacts to a district already overburdened defies logic, for cumulative impacts necessarily results from incremental impacts.

109. UHH’s conclusion that the impact of the proposed TMT would only be “incremental” is based on sophistries that unnecessarily complicate findings in the FEIS and by the DLNR itself. The record is undeniable: the TMT will have a substantial, significant, adverse impact.

110. What UHH admits, we need not prove. The TMT FEIS states: “From a cumulative perspective, the impact of past and present actions on cultural, archaeological, and historic resources is substantial, significant, and adverse: these impacts would continue to be substantial, significant, and adverse with the consideration of the [TMT] Project and other reasonably foreseeable future actions.” **Ex. A003/R-3 TMT FEIS, S-8**

111. In comments to the TMT-DEIS, the DLNR Chairperson states: “[I]t is our view that the effect of astronomy development on cultural resources and on the landscape of Mauna Kea has been significant and adverse. While a project such as TMT can bring new resources into play that may mitigate certain cultural impacts and even benefit native Hawaiians, we believe that the project will increase the level of impact on cultural resources, which remains to be significant and adverse.” **Ex. A004.R-4, FEIS Vol.2, p.17**

112. The record demonstrates that, if built, the TMT would contribute significant harm to conservation resources on Mauna Kea. The TMT would introduce an 18-story industrial structure to a pristine plateau, increase astronomy-related personnel at the summit by fifty percent, and destroy over 12 acres total. DLNR Comment on the Draft EIS, **Ex. A004 FEIS Vol.2, p.21**

113. In light of these substantial, adverse impacts on natural resources, UHH’s argument that the project will only have an “incremental impact” is disingenuous. The DLNR staff’s elaboration of “incremental” unhelpfully stretches credulity to arrive at a finding of no-significance in regard to **HAR §13-5-30(c)(4)**.

114. In response to the FEIS finding that “impacts that are significant will remain significant with or without the TMT,” DLNR staff conclude, “the proposal is not significant in of itself, but will add incremental impacts to an area that has already undergone significant effects.” **Ex. A007, B.03aa/R-7 Staff Recommendations, p.59**

115. For a resource that is already sustaining more adversity than is permitted in the conservation district, any “increment” additional harm is unacceptable. Thus, not only is the proposed TMT improper, but existing development must also be mitigated to bring Mauna Kea conservation district management into compliance with the law.

#### **b. Substantial, adverse impacts on biological resources**

116. Among the reasons that UHH had to press beyond an EA to an EIS in the environmental review process were that the project possibly 1) “[I]nvolves an irrevocable commitment or loss or destruction of any natural or cultural resource” and 2) “[S]ubstantially affects a rare, threatened or endangered species, or its habitat.” **UH Environmental Impact Statement Preparation Notice, September 23, 2008, p.iii, quoting HAR § 11-200-12**

117. The FEIS addresses adverse impacts on Wēkiu bugs in a combined six acres area of the Northern Plateau and the TMT Access Way. **Ex. A003/R-3 FEIS Vol. 1, p.3-71**

118. Of particular concern is the substantial adverse impact of the TMT access road, which passes between two areas of Wēkiu bug habitat, Pu’u Hau’oki and Pu’u Poli’ahu. Considering the restricted range of Wēkiu bug habitat, much of which has already been destroyed by BLNR’s mismanagement, the loss of any additional habitat area would be significant.

119. **HAR 13-5-30(c)(4)** considers substantial adverse impacts on the area, community, or region—not just the immediate area of the Project. The TMT project would increase land use in surrounding summit areas that are home to a species that have, or are, candidates for Federal protection under the Endangered Species Act and several species of concern (including snails, bees, moths, and true bugs) in areas that would be more heavily utilized as a consequence of the TMT: the Hale Pohaku area, roads, the utilities maintenance corridor, and in the Batch Plant staging area. Increased usage of facilities will threaten biological resources in these areas as well, such as māmane subalpine woodland (palila habitat), endemic arthropods and snails, na‘ena‘e, silverswords, Hawaiian catchfly and their pollinators, ‘io, and other species. **Ex. A003/R-1 FEIS Vol.1, p.3-66**

120. Mamane subalpine forest habitat are also anticipated to be disturbed by activities at the Hale Pohaku and a potential TMT Mid-Level facility.  
**Ex. A003/R-1 FEIS Vol.1, p.3-73**

### **c. Significant interference with important viewplanes**

121. The proposed TMT’s failures to comply with CZM policies on scenic open space resources are also evidence of its substantial adverse impacts on viewplanes in the Mauna Kea conservation district, including those use by Native Hawaiian Practitioners. This project will mar the impressive natural viewscape of the summit with even more industrial structures and the negatively impact the mauka to makai, makai mauna view planes, the views from Mauna Kea to other other sacred site down the island chain, the views from Mama Kea to other Heiau and those use between pu‘u on the mauna and to important view planes use to track the 26,000 year cycle of the precession of the equinoxes (The Polohiwa) conducted on Mauna Kea. Certain ceremonies will not be able to be done and the practice will be lost. For all who visit the summit to watch sunset, the TMT would be an unavoidable intrusion into the view from Mauna Kea to Haleakala.

122. The context for the TMT’s proposal to intrude onto these last few intact viewplanes is the existing interference with natural views of Mauna Kea caused by prior telescope development. “[A]t least one observatory is visible from roughly 43 percent of the island’s area.” **Ex. A009 CDUA, p.7-2**

123. In this context, the TMT’s added percentage of visibility is a substantial adverse impact on viewshed resources. This is particularly true for views from the summit.

### **d. Water resources, wastewater, solid waste, and hazardous waste**

124. Adding to the concerns for water resources raised by the UHH’s failure to satisfy criterion 3 is the fact that the project would introduce other undesirable substances into the Mauna Kea conservation district. The TMT project would require the use, handling and storage of hazardous materials at Mauna Kea including: propylene glycol, acetone, methyl ethyl ketone, at least 2,000 gallons of diesel fuel, ethylene glycol, hydraulic fluid, liquid adhesives, coating metals, acids, paints, solvents, and other cleaning chemicals.  
**Ex. A003/R-3 FEIS Vol. 1, p.3-129**

125. TMT project managers anticipate the generation of approximately 120 cubic feet of trash per week. Ex. A003/R-3 FEIS Vol.1, p.3-129

126. UHH's promises to comply with regulations for leaks or spills further begs the question of whether these substances should be permitted in a conservation district in the first place. Ex. A003/R-3 FEIS Vol.1, p.3-125

**e. TMT mitigation inadequate, indirect, and inappropriate**

127. UHH admits, even with the proposed mitigation measures, the cumulative impacts on Mauna Kea's conservation district are and will continue to be substantial and adverse. The TMT FEIS states that: "[T]he cumulative impact of all actions at and near the summit of Maunakea, including the future TMT Observatory [and its proposed mitigation], on cultural resources will continue to be substantial, significant, and adverse[.]"

Ex. FEIS Vol.1 p.3-34

128. This findings is true in relation to cultural, archaeological, and historic resources (p.3-214), ecosystems (p.3-217), visual and aesthetic resources (p.3-101), and geological qualities (p.3-219). Ex. FEIS Vol.1

129. This means that none of the mitigation measures proposed for the TMT project would be enough to reduce the cumulative impact of telescope activity on Mauna Kea to a less than substantial level. At minimum, the EPA requires that mitigation measures address project-specific impacts, but finds appropriate mitigation efforts that "address cumulative impacts that are caused by activities other than the proposed project." U.S. Environmental Protection Agency, Office of Federal Activities (2252A).

**EPA 315-R-99-002, Consideration of Cumulative Impacts in EPA Review of NEPA Documents (May 1999)**

130. The mitigation measures proposed by UHH are too indirect and insufficient to meet the Supreme Court standard established in *Morimoto*. In **Morimoto v. Bd. of Land & Natural Res.**, 107 Haw. 296 (2005), the Court found that mitigation measures imposed through HAR § 13-5-42(a)(9) gives the BLNR authority to consider mitigation in assessing a CDUA under HAR § 13-5-30(c)(4).

131. While *Morimoto* does not explicitly develop standards for mitigation, the mitigation actions considered in that case overcame the HAR 15-3-30(c)(4) requirement because they directly ameliorated harmful impacts of road construction on endangered palila habitat and those actions were specifically implemented by the appropriate agency. In that case, the U.S. Fish and Wildlife Services had issued a Biological Opinion (BO) in which the agency agreed that redesigning the highway project to provide for more habitat and reintroduction of endangered species would mitigate project-related disturbances to palila and *Silene hawaiiensis*.

132. By contrast, the TMT project has not designed mitigation actions in accord with guiding documents. For example, the Cultural Impact Assessment (CIA) specifically, “recommended that the TMT Observatory project be built on a recycled site of an outdated telescope on the summit instead of Area E” and to “develop a paradigmatic shift in how they [“Project proponents”] engage with the community in a way that truly recognizes cumulative impacts[.]” Ex. A005/R-5 FEIS Appendix D-CIA for the TMT Observatory and TMT Mid-Level Facility Project, p.204-5

133. The range of mitigation measures offered by UHH—furnishing items with a sense of place, ride-sharing, repaving roads, funding education programs, monitoring Wēkiu bugs, painting facilities, complying with laws, etc.—do not directly address the harm caused by the proposed TMT or telescope activities in general, nor those impacts to Native Hawaiian Practitioners and their use and access.

134. The “primary mitigation” for TMT impacts on visual and scenic resources offered by UHH is their decision to locate the project outside of the summit ridge.  
Ex. A001/R-1 CDUA, p.4-30

135. UHH says they now finally recognize that Kukahau‘ula is an important traditional cultural property. Ex A001/R-1 CDUA, p.A-8

136. They claim it is because Kukahau‘ula is so important that they chose to locate the TMT on the plateau. We are not convinced. UHH has not shown that locating the TMT on the ridge would have been desirable or even possible. It is unlikely that the five-acre TMT could have been located on the summit ridge, so the fact that it is not proposed to be located there cannot be claimed as a mitigation measure for its unsightliness. The decision to locate the TMT on the northern plateau more reasonably proceeds from UH’s finding that locating the TMT in the summit region is not deemed good sites for the TMT project all were within “Area E” on the northern plateau. Ex. TMT FEIS, p.4-5

137. The few mitigation measures proposed for the TMT project do not directly address the anticipated harms caused by the proposal.

#### **Issue 5—TMT is not Compatible with Surrounding Areas of the Conservation District**

138. The proposed TMT would not be compatible with the wide open and natural space that is the northern plateau of Mauna Kea. It is important to remember that it is the conservation district that is the locality to be considered, not the existing telescopes (many of which were retroactively permitted after construction). UHH contends that the TMT project—comprised of more than 12.5 acres (4.9 acres for the observatory, 3.6 acres for the access way, 4 acres for the batch plant staging area, and a utilities corridor (that intrudes into the Natural Area Reserve)—and 400 foot corridor along Mauna Kea access road) must be assessed in the context of existing buildings (i.e. other observatories), otherwise the HAR §13-5-30(c)(5) criterion would be senseless because nothing could ever be built in a Conservation District. Ex. A001/R-1 CDUA, p.18



139. UHH's interpretation ignores HAR §13-5-30(b), which establishes at the outset that generally, "[L]and uses shall not be undertaken in the conservation district" and further, if they are to occur, land uses must be evaluated to ensure that no adverse and significant impacts occur. Ex. A001/R-1 CDUA, p.18

140. Problematically, the UHH limits its consideration of the TMT's potential impacts to the Mauna Kea summit region only. This is a very limited area and does not allow for consideration of run-off down into other areas or possible pollution seepage into the land below the summit. Nor is the compatibility of the TMT Utilities Corridor with the existing, adjacent Natural Area Reserve adequately assessed.

141. The proposed HELCO substation requires an easement corridor across NARS lands in order to service the TMT. In their comment on the TMT-CDUA, DOFAW drew attention to the disturbances of the NARS that will result from maintenance of utility conduits. DOFAW noted that after twenty years of neglect, "erosion and settling" have occurred in utilities corridor and that "[A]ccess to the pill (sic) boxes will require improvements that might not fall within the 20- foot access corridor, and movement of heavy equipment over unstable terrain." DOFAW comment letter in Staff Recommendations. Ex. A007/R-7, p.23

142. UHH's assurances that TMT-related disturbances of NARS lands that abut the construction corridor do not withstand the fact that a CDUP cannot authorize UHH activity in the NAR. The NAR is not leased to the University, nor does the CMP address disturbance mitigation in the NAR. To assume that disturbance outside the easement can be mitigated to the extent possible is an inappropriate and illegal encroachment on lands outside the boundaries of the lease to UH and the anticipated sublease to TMT. The TMT's incompatibility with the existing uses of the conservation district makes approval of the CDUA improper.

### **Issue 6—TMT Would Destroy Natural Beauty and Open Space**

143. The TMT is a man-made structure and while it maybe beautiful to some in a human engineering way, it neither preserves nor improves upon Mauna Kea's natural beauty, which is what the law requires.

144. UHH has not and cannot meet the requirement under the sixth criterion. First, because the TMT is a very large (18 stories) building that is proposed to be sited on the North Plateau, which, significantly, is one of the last un-hindered open space areas with views down to the sea, along the coasts, and across the island chain. The TMT would intrude upon the currently unobstructed view of Haleakala Mountain as well as the primary view of the setting sun from the mountain. It will also obstruct viewplanes used for traditional and cultural spiritual and religious Native Hawaiian practice.

145. When we look out on the plateau where the TMT is proposing to site their project—it is not just that it will now be blocking our eyes (depending on where we are looking from) but it will be the most dominant feature in our eyes and therefore the most dominant feature in our customary and traditional view plane. It is this view plane that we use to look and to honor the high maunas down the island chain.

**Written testimony of Paul Neves, Ex. F-1**

146. It is our position that any appropriate development in the conservation district must preserve or improve upon the natural characteristics of the district—that is the only way this criterion “makes sense.” **UHH Brief, p.18**

147. The TMT proposal far exceeds the scope and degree of what could reasonably be deemed appropriate development on the pristine northern plateau of Mauna Kea.

148. The proposed TMT would adversely impact viewplanes towards and away from the summit, increase noise levels and material pollutant levels, and permanently disrupt critical habitat for species that are Federally listed pursuant to the Endangered Species Act.

**Ex. A003/R-3 FEIS Vol. 1, p.S-12 through S-19**

149. The DLNR staff’s evaluation of the project under **HAR §13-5-30(c)(6)** criterion thus erroneously, “concluded that the TMT will not have a significant impact on the environmental or cultural characteristics of the land.”

**Ex. A007/R-7 Staff Recommendations, p.59**

150. Erroneously, DLNR staff recommends supporting the TMT as a “a series of trade-offs” in which development in new areas would be accompanied by the migration of observatories away from the Kukahau’ula summit. Id. Staff Recommendations, p. 59. The physical and environmental aspects of the land are neither preserved nor improved upon by the proposed new development and therefore the Agency’s “support[t] for the concept of moving observatories” is irrelevant to whether or not the proposed TMT meets this sixth criterion. The DLNR staff further erred by considering a pay-to-degrade rationale.

**Ex. A007/R-7 Staff Recommendations, p.59**

151. Staff Recommendations, p.59 (“It should be noted that TMT is committed to paying a ‘substantial’ amount of sublease rent in exchange for the site”). BLNR cannot accept a payment of cash in exchange for permission to destroy the very resources it is mandated to protect. If applicants were allowed to meet the conservation district permit criteria through payment, then these criteria would be meaningless in evaluating any project that promised to generate capital. No matter how much TMT promises to pay, it cannot satisfy criterion and the UHH CDUA should be denied.

#### **Issue 7—TMT Would Intensify Land Use by Subdividing Conservation Lands**

152. The TMT CDUA erroneously concluded that the “proposed TMT project does not involve the subdivision of land.” **Ex. CDUA, p.2-28**

153. Subdivision disposes of control over a land parcel so that more and different entities can make separate uses of the land and thus creates a greater capacity for land use that specifically cuts against conservation purposes. The Mauna Kea conservation district has been repeatedly subdivided through subleases between BLNR, UH, and telescope operators in order to facilitate increased telescope activity there. The TMT sublease would further parcel the original lot leased to UH in 1968 (Lease No. S-4191).

154. Agreements like this dispose of the original parcel in ways that intensify land use in violation of **HAR §13-5-30(c)(7)** (“subdivision of land will not be utilized to increase the intensity of land uses in the conservation district”). Because the proposed TMT CDUA is premised on a subdivision of land that will intensify land use, the BLNR cannot approve it without abusing its discretion.

155. Further UH has drawn arbitrary maps to describe claims to lands leased from the BLNR. **Ex. CDUA p.75-79 ref. MK MP2000**

156. Areas such as the “Astronomy Precinct” and the “UH Management Area” are within the Mauna Kea Conservation District. Per **HRS §205-2**, also the Land Use Commission (LUC) is the state agency tasked with not only establishing conservation districts but that holds the sole power to determine the boundaries of said districts. The Mauna Kea Conservation District was adopted in 1961, but the LUC never created either an “Astronomy Precinct” or a “UH Management Area.”

**a. UH subleases fit the definition of subdivision**

157. A “subdivision” is an enumerated form of land use in the conservation district rules, along with permanently placing materials, grading, and erecting or demolishing structures, all of which have been consequences of development on Mauna Kea. **HAR §13-5-2(1994)**

158. A “subdivision” is the division of a parcel of land into more than one parcel. **HAR §15-3-2**

159. Under “Uniform Land Sales Practices” **HRS §484-1 (2011)**, “subdivision” of lands are those enacted for the purpose of disposition (“includ[ing] sale, lease, assignment, award by lottery, or any other transaction concerning a subdivision, if undertaken for gain or profit) into two or more lots, parcels, units, or interests[.]” Id. UH has undertaken sublease agreements to gain telescope resources, viewing time, and other benefits and thus disposed of Mauna Kea conservation district land parcels to other telescope vendors.

160. HAR §13-5-30(c)(7) specifically guards against the intensification of land use that is usually, but not exclusively, associated with the subdivision of land. UH subleases intensified land use by increasing the burden of vehicles, visitors, and long-term personnel that will use access roads, sewage, electricity, utilities, and base-level and mid-level facilities. Land use in the Mauna Kea Science Reserve has the hallmarks of a subdivision: facilities and improvements cost sharing, planned development, and defined, independent property interests. These facilitate coordinated, simultaneous activities on different regions of land in ways that intensify land use.

161. In the applicants FEIS V.1, section 1, Figure 2-3, p.1-4 is a diagram of the subdivisions on the summit and on the Northern Plateau. “Areas a, b c, d, e, and f” are demarcated in the figure.

### **Issue 8—The TMT would be Materially Detrimental to Public Health, Safety, and Welfare**

#### **a. Watershed, view planes, and hazardous waste exposure**

162. The TMT proposal would increase the storage of hazardous wastes in the conservation district and poses unknown threats to aquifers; it therefore threatens public health and safety. The TMT will also increase the visibility of observatory construction on and from the mountain, which is already substantially adverse. Despite these examples of material detriment, UHH asserts “the Project will be an enormous benefit to the public welfare” because it will entail employment opportunities and generally “bring significant funds to Hawai‘i.” UHH Brief, p.11

163. Although “public welfare” is one purpose of maintaining the conservation district, UHH erroneously interprets this term to mean financial benefit, in order to fit their proposal.

164. “Public welfare” does not mean job-creation or money generation. “The concept of welfare was added [to the conservation district mission] to include the notion of aesthetics—preserving Hawaii’s unique natural beauty.” Ex. B03t Department of Land and Natural Resources, State of Hawaii. “Conservation District Review Project: The Discussion Draft,” November 1993, prepared by Gail W. Atwater, consultant, p.16

165. Thus, the Rule intends that the public welfare will be served by conserving natural beauty in the conservation district, as opposed to using conservation lands for economic development.

#### **b. Material detriment to the health of Native Hawaiians**

166. HAR §15-3-30(c)(8) is concerned with public health, which includes that of Native Hawaiians. “Native Hawaiians are members of the general public and in addition have traditional and customary rights that are legally protected.”

167. Telescope construction on Mauna Kea's upper regions is materially detrimental to the health of the Hawaiian people. "Native Hawaiians have watched the University repeatedly erect telescopes on Mauna Kea over and against their protests and patient explanations of this site's sacred importance. This ongoing violation of Hawaiians' religious and cultural attachments to Mauna Kea is linked to a colonial, systemic deprivation of self-determination that is materially detrimental to Native Hawaiian health[.]"

**Statement of Dr. Liu, Exhibit F-3**

168. The federal government recognizes, "The health and well-being of the Native Hawaiian people is intrinsically tied to their deep feelings and attachment to the land[.]"  
**"Apology Bill", Pub. L. 203-150 (1993)**

169. This attachment is not merely sentimental or romantic; and it links Mauna Kea and the physical, mental, and collective health of Native Hawaiians, individually and as a people.

**c. Material detriment to the health and safety of the general public of Hawai'i**

170. Observatory development on Mauna Kea's upper regions is materially detrimental to the health, safety, and welfare of the general public of Hawai'i. In the Native Hawaiian worldview, people are to live in harmony with the natural and sacred environment. When that harmony is tipped out of balance, nature strives to restore it.

171. The mountain of Wakea is one of those sacred natural environments that commands great respect. As UHH has admitted, the construction of telescopes on this mountain is undermining the balance between humanity and nature. Construction of the TMT would further this state of disharmony.

172. Ethnocentric methods for assessing materially detrimental impacts on sites of historic significance are inappropriate.

173. UHH purports to have evaluated TCP's against adverse impacts, but has failed to apply the correct standard of evaluation. Instead the UHH's inability to allow for Native Hawaiian views of the sacred significance of Mauna Kea cause them to apply ethnocentric approaches to evaluations of the TMT's impacts on Native Hawaiians.

174. "Ethnocentrism means viewing the world and the people in it only from the point of view of one's own culture and being unable to sympathize with the feelings, attitudes, and beliefs of someone who is a member of a different culture. It is particularly important to understand, and seek to avoid, ethnocentrism in the evaluation of traditional cultural properties." **Patricia Parker and Thomas King, "Guidelines for Evaluating and Documenting Traditional Cultural Properties, U.S. Department of the Interior National Park Service, National Register Bulletin 38, 10 (Revised 1998), B.01p Bulletin 38, p.4**

175. Native Hawaiian assertions that the telescopes desecrate a sacred cultural resource are not, as UHH insists, matters of “opinion” that are counterbalanced by other Native Hawaiians who view the TMT project as a much needed economic development project or otherwise benign. **Ex. A001/R-1, CDUA, p.3-13**

176. The Desecration Statute under HRS Chapter 711-1107, also defines what constitutes desecration and detraction of the sacred lands scape fits the criteria. UHH flouts guidelines for approaching conflicting claims over sites of cultural significance for Native groups. “Where one individual or group asserts that a property has traditional cultural significance, and another asserts that it does not or where there is disagreement about the nature or extent of a property’s significance, the mocontives and values of the parties, and the cultural straints operating on each, must be carefully analyzed.”

177. In the instant case, the motives and values of TMT supporters are explicitly linked to a need to increase employment opportunities and funding for research and education as seen in the PUEO group.

178. The motives and values of Native Hawaiian cultural practitioners who testify in opposition to Mauna Kea are equally plain: they are motivated to preserve Mauna Kea’s natural resources and cultural significance. For the purposes of evaluating a proposed conservation district land use, testimony motivated by conservation agendas should given more weight than those explicitly motivated by economic concerns.

### **Proposed TMT Site Sits Within a Historic District**

179. “Area E” is in an undeveloped area within a Mauna Kea Historic District. **Ex. R-3 FEIS Vol 1, p.2-3, Figure 2-4 under Project Description**

180. In 1999, during the preparation of the 2000 Master Plan, SHPD proposed that the cultural landscape on the top of Maunakea be recognized as the Mauna Kea Summit Region Historic District. The district is listed as SIHP # 50-10-23-26869. Nearly the entire MKSR is within the roughly 17,820-acre Mauna Kea Summit Region Historic District.

181. The TMT Observatory Project 13N site, the Access Way, and the Batch Plant Staging Area are all within the Mauna Kea Summit Region Historic District. The boundaries of the district generally coincide with the extent of the glacial moraines and crest of the relatively pronounced change in slope that creates the impression of a summit plateau surrounding the cinder cones at or near the summit (Figure 3-1). The district encompasses a concentration of historic properties, including most of the 263 summarized in Table 3-3, that are historically, culturally, and visually linked within the context of their setting and environment. The spiritual and sacred quality of Maunakea is related to this context and the link between the Historic Properties and their setting and environment. **Ex. R-3 FEIS Vol. 1, p.3-42**

182. Although the Mauna Kea Summit Historic District is only officially designated as a Historic District at the State level, it has been stated by SHPD that it is eligible for inclusion in the National Register of Historic Places (NRHP) as a district; however, no official application for such inclusion has been submitted. All of the Historic Properties discussed in this section are within the Historic District and are considered contributing properties. Based on recent archaeological field work, it has been proposed that the Historic District be expanded to include the entire MKSR (PSCI, 2010a). **Ex. R-3 FEIS Vol. 1, p.3-42**

183. The proposed TMT site is located within and is an integral part of a Historic District: Pursuant to HRS Chapter 6E-2, “Historic Property” means any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old. **Ex. R-3 FEIS Vol. 1, p.3-4**

184. “Historic Districts” are geographically definable areas possessing a significant concentration, linkage, or continuity of contributing properties—sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. Contributing properties add to the historic architectural qualities, historic associations, or archaeological values for which a district is significant because it was present during the period of significance, and possesses historic integrity reflecting its character at that time or is capable of yielding important information about the period.” **Ex. R-3 FEIS Vol. 1, p.3-4**

185. “Within the historic district, the effect of a project on the historic district as a whole needs to be assessed as well as the project’s effect on individual historic properties located within or immediately adjacent to the project area. The effect of a project on the historic district must be addressed even if no individual historic properties are found within or immediately adjacent to the project area.” (emphasis added) “Effects on a district would consider the visual impact of a facility on the surrounding landscape (i.e., the various land forms creating the setting and context of the multiple historic properties encompassed by the district) and on those individual historic properties which contribute to the significance of the district.....” **Ex. R-3 FEIS Vol. 1, p.3-49 3rd and 4th par**

186. There was no regional archaeological analysis done for the Proposed TMT project. **Tr. Vol. 27, May 11, 2016, p.31 7-15**

187. There were no analysis on how building the Thirty Meter Telescope in “Area E” which sits in the context of the ring of shrines would impact the sacred area. **Tr. Vol. 27, May 11, 2016, p.32 7-11**

188. Within the MKSR there are 263 historic properties, most of them shrines, but also burials. The majority of the Mauna Kea Science Reserve and these historic properties are located within the summit region Historic District. **Ex. R-3 FEIS Vol. 1, p.2-3**

189. Building the TMT within the ring of shrines that is in the Historic District would absolutely impact cultural practitioners. **Tr. Vol. 27, May 11, 2016, p.32 17-22**

190. “...Integrity plays a very big role in historic preservation law, and you see it as being integral to what constitutes the significant site, that the site have integrity, and by placing something so - - I think, the scale of the project and it’s relative huge footprint within the landscape of the region, the integrity of the sites within the area would be compromised.” **Tr. Vol. 27, May 11, 2016, p.32 22-25, p.33 1-4**

191. NASA’s FEIS analysis of the Outrigger Telescope Project stated that there would be adverse impact when looking at the cumulative picture or within a larger picture, it would create a significantly adverse impact. **Tr. Vol. 27, May 11, 2016, p.33 15-23**

### **Petitioner KAHEA Witnesses**

#### **Dr. Kehaunani Abad**

192. On January 19, 2017, KAHEA called its expert witness Dr. Kehaunani Abad. **Tr. 01/19/2017, Vol. 27, p.21**

193. Dr. Abad is a trained anthropologist, ethnohistorian, and archaeologist specializing in Hawaiian culture and history. **Ex. Doc. B.08a (Abad WDT), p.1**

194. Dr. Abad also learned firsthand about different wahi kupuna while growing up in Wai’anae and under her father, Fred Cachola’s tutelage. **Tr. 01/19/2017, Vol. 27, p.50-51**

195. Amongst her other qualifications, Dr. Abad was qualified as an expert witness in archaeology and Hawaiian cultural burial practices by the Third Circuit of the Circuit Courts of Hawai’i during the trial of Kelly v. 1250 Oceanside Partners (2001), concerning burial protections at issue in the Hōkūli’ā development in South Kona. **Ex. Doc. B.08a, p.3**

196. In preparing her oral and written testimony, Dr. Abad reviewed the CDUA, the FEIS, and the incorporated CIA and AIS, for the TMT project. **Ex. Doc. B.08a, p.1**

197. Dr. Abad opined that these documents lacked the appropriate unit of analysis—a wide lens regional perspective—and were also flawed in regard to the process of who was involved at what point to inform the reports and determinations. **Tr. 01/19/2017, Vol. 27, p.56: 7-14**

198. Consequently, the resulting analysis of the TMT project documents had myriad deficiencies that have great impacts on conclusions about the TMT. **Tr. 01/19/2017, Vol. 27, p.56: 7-14**

199. These deficiencies impact ka po’e Hawai’i, the Hawaiian people, as a people, as a lāhui. **Tr. 01/19/2017, Vol. 27, p.57: 19-21**

200. Mauna Kea has the highest significance of a wahi kupuna and “[t]he same degree that these wahi kupuna hold, that degree of impact will . . . reverberate throughout our lahui if anything were to destroy its integrity.” **Tr. 01/19/2017, Vol. 27, p.57: 1-5**



## **TMT CDUA Failed to Conduct a Regional Analysis**

201. Dr. Abad noted that the TMT CDUA acknowledged that the TMT Observatory site, the Access Way, and the Batch Plant Staging Area are all within the Mauna Kea Summit Region Historic District[,]” and “the District includes a concentration of significant historic properties that are linked through their setting, historic use, traditional associations, and ongoing cultural practices [and that] [t]he properties include shrines, adze quarry complexes and workshops, burials, stone markers/ memorials, temporary shelters, historic campsites, traditional cultural properties (TCPs), a historic trail, and sites of unknown function[.]”  
**Ex. Doc. B.08a, p.6 quoting TMT CDUA, p.2-2**

202. Despite these acknowledgments, “The TMT CDUA fails to address the full range of sites that should be considered in [the] regional analysis,” required pursuant to HAR §13-5-30(c)(4). **Ex. Doc. B.08a, p.5**

203. HAR §13-5-30(c)(4) requires BLNR, prior to granting a CDUP, to determine that a “proposed land use will not cause substantial adverse impact to existing natural resource within the surrounding area, community, or region[.]”  
**Ex. Doc. B.08a, p.5; Tr. 01/19/2017, Vol. 27, p.22: 17-25**

## **Regional v. Site-Specific Analyses**

204. Archaeologists following best practices will look at regional perspectives.  
**Tr. 01/19/2017, Vol. 27, p.25: 3-6**

205. “A regional perspective and unit of analysis is also strongly advised from an academic, archaeological perspective concerned with the scientific significance of sites.”  
**Ex. Doc. B.08a, p. 6**

206. This is because “studies using a smaller sized site as a unit of analysis lack rigor and fail to glean the full explanatory potential from the archaeological record, especially as it relates to surface artifacts.” **Ex. Doc. B.08a, p.6**

207. “If we don’t look at what’s happening at a regional level, we miss the importance of how these sites might be interacting with one another.”  
**Tr. 01/19/2017, Vol. 27, p.24: 10-14**

208. Where one site has very high significance, its importance emanates out to other areas, and may be given a buffer of respect. **Tr. 01/19/2017, Vol. 27, p.25: 17-21**

209. As a best practice, this regional view responds to a need to look at archaeological remains as a continuum of high and low densities and that there’s explanatory potential in that distribution. **Tr. 01/19/2017, Vol. 27, p.24: 1-10**

210. A site-specific focus on high density areas of artifacts may exclude low density areas and result in a detrimental, biased view of the past of unrelated, uneven spots of high cultural activity. **Tr. 01/19/2017, Vol. 27, p.24: 1-10**
211. These concerns are applicable to finds at Mauna Kea, where a historical district would be an appropriate scale of study as opposed to a scale focused on each of 263 separate sites within that district. **Ex. Doc. B.08a, p.6-7**
212. At Mauna Kea, there is a huge district at a regional level that includes hundreds of some of the most important, significant cultural and archaeological sites. “[F]rom every view, they’re astounding and they’re extraordinary on so many levels.”  
**Tr. 01/19/2017, Vol. 27, p.29: 15-19**
213. The scale and relatively huge footprint of the TMT project within the regional landscape would compromise the integrity of historic sites in that area.  
**Tr. 01/19/2017, Vol. 27, p.33: 1-4**
214. Any activities proposed within the Mauna Kea regional district should have triggered high levels of cultural conversations, consultation, engagement, decision making, but this did not occur. **Tr. 01/19/2017, Vol. 27, p.55-56**
215. The TMT CDUA (**Ex. R-1**) contained inaccurate and misleading statements that cultural activities have not been associated with a specific historic property in or near the Project Area. **Tr. 01/19/2017, Vol. 27, p.60: 6-20**
216. By contrast with the TMT Project AIS, Pat McCoy’s 2010 AIS prepared for the Mauna Kea Access Road, employed a regional perspective and thereby demonstrated that shrines were not randomly located, but rather followed a pathway of access to or exit from the quarry area, forming a pattern. **Tr. 01/19/2017, Vol. 27, p.34: 6-15; Ex. B.03c**
217. In McCoy’s opinion, the significance of this pattern is that it indicated a special type of cultural practitioner with kako’o or kuleana who were going into a kapu space. Shrines located along the way “played a role in transitioning into that kapu space both in and back out from noa to kapu and from kapu to noa.” **Tr. 01/19/2017, Vol. 27, p.34: 17-23**
218. McCoy’s analysis connected cultural practices, archaeological sites, and physical remains, and this bridging was made possible by using a regional perspective and knowledge of fundamental characteristics of Hawaiian culture. **Tr. 01/19/2017, Vol. 27, p.35: 3-8**
219. The TMT Project CDUA lacked this kind of analysis.  
**Tr. 01/19/2017, Vol. 27, p.35: 8-9**
220. Another example of a lack of comprehensive assessment concerns the significance of hundreds of shrines on Mauna Kea, which has been referred to as a ring of shrines.  
**Tr. 01/19/2017, Vol. 27, p.134-35**

221. There has not been adequate study to address the relationship of all of these shrines and relative to the undertaking. **Tr. 01/19/2017, Vol. 27, p.135: 11-14**

### **Inadequate Assessment of Mauna Kea Historic and Cultural Properties**

222. The TMT Project CDUA failed to properly assess upright sites or ahu of various shapes and sizes on Mauna Kea, which do not exist in isolation, but are rather alignments that connect to other ahu or ridge peaks, for example. **Tr. 01/19/2017, Vol. 27, p.35: 15-25**

223. The viewplane marked by these alignments are tremendously important and it is very likely that the TMT will block important viewplanes. **Tr. 01/19/2017, Vol. 27, p.36: 1-5**

224. Dr. Abad opined that a burial treatment plan “[a]bsolutely” should be prepared in connection with the TMT Project. **Tr. 01/19/2017, Vol. 27, p.38: 6**

225. The TMT CDUA did not include assessment of the visual impacts on the Mauna Kea regional historic district. **Tr. 01/19/2017, Vol. 27, p.63:10-15**

226. The TMT Project CDUA further failed to consider intangible resources, including the feeling and integrity of a site, which are considered under significance criteria described in **HAR §13-284-6**.

227. To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one of the historic property criteria. **Tr. 01/19/2017, Vol. 27, p.36-37**

228. Bulletin 38 offered similar guidance at the federal level.  
**Tr. 01/19/2017, Vol. 27, p.36: 20-25**

229. Bulletin 38 guidance states how sites should be evaluated and how to identify them in tandem with cultural consultations, particularly for archaeologists that lack cultural knowledge. **Tr. 01/19/2017, Vol. 27, p.38: 10-12 citing Ex. B.08j**

230. Such archaeologists cannot make determinations of cultural importance or impacts, rather that call must come from within the culture. **Tr. 01/19/2017, Vol. 27, p.41:10-12**

231. Bulletin 38 counseled that some informants may have inappropriate motivations and, in such cases, to also look at historical evidence such as ethnohistoric written records and to question the integrity of informants and whether the informant is judged to be credible by the pertinent cultural group. **Tr. 01/19/2017, Vol. 27, p.89-90**

### **Cultural Perspectives are Necessary at All Levels of Analysis**

232. “[T]he role of a cultural perspective is absolutely necessary in all levels of analysis, and this is what anthropologists and archeologists [sic] would refer to as emic perspectives.”  
**Tr. 01/19/2017, Vol. 27, p.26: 7-11**

233. An emic perspective is necessary to applying historic preservation legal criteria A, B, C, D, E. **Tr. 01/19/2017, Vol. 27, p.27: 8-11**
234. Criterion E, under **HAR §13-284-6**, concerns properties that have an important value to the Native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts, these associations being important to the group's history and cultural identity. **Tr. 01/19/2017, Vol. 27, p.27: 14-21**
235. This requires archaeologists to ask someone from within the applicable culture about the property's importance. **Tr. 01/19/2017, Vol. 27, p.28:7-9**
236. One of the largest flaws in archaeological and cultural impact documents prepared for the TMT project is that the two functions of consulting with knowledgeable Native Hawaiians and looking at sites has been bifurcated. **Tr. 01/19/2017, Vol. 27, p.28: 10-14**
237. [T]he way the research was conducted is that people were asked, tell us about why Mauna Kea is important, and they were never asked, here, this is what we found when we looked at the archaeology. Here's a picture. Here's—here's the report. Come. Let's go look. Let's go look in person. What do you folks think? That important step to bridge the two never occurred. And so, you had archeologists saying, oh, I don't think that's going to be a significant impact, this—planned project. No significant impact.  
**Tr. 01/19/2017, Vol. 27, p.28-29**
238. In reference to the preparers of TMT Project documents, Dr. Abad stated, "What they've done is just said this is all we're going to look at, and we're not even going to ask people about the interaction between their beliefs and this—these set[s] of findings."  
**Tr. 01/19/2017, Vol. 27, p.29: 20-25**
239. Dr. Abad opined that these documents did not fulfill standards of the discipline of archaeology, in contrast to, for example, the NASA Report.  
**Tr. 01/19/2017, Vol. 27, p.33: 10-20; Ex. B.03ap**
240. It was not only the quantitative lack of consultation with Native Hawaiian cultural practitioners, but also the types of questions that were asked and the kinds of information that were provided in the asking of the questions. **Tr. 01/19/2017, Vol. 27, p.84:19-25**
241. TMT CDUA arbitrarily and inappropriately limited review to within 200-feet of the Project site and 500-feet of the Batch Plant. The TMT CDUA isolated the project area from the contiguous historic district, as evident in its Figure 2-1.  
**Doc. B.08a p.7 citing TMT CDUA, p.2-4**

242. Figure 2-1 identified only 17 of 263 regional sites and inappropriately included a finding that “[t]here are no historic properties located within 200 feet of the limits of grading at the proposed TMT Observatory 13N site” because it failed to explain the reason sites in the required wide regional perspective were excluded from the map and analysis, and further, the rationale supporting an arbitrary 200 foot limit. **Ex. Doc. B.08a, p.7**

243. “There’s no explanation as to where the 200-feet came from. Why 200? Why not 2,000? Why not the whole historic district?” **Tr. 01/19/2017, Vol. 27, p.70: 9-13**

244. Similarly, there is no explanation as to why 500-feet was used as the limit for assessing individual historic properties located near the Batch Plant.

**Tr. 01/19/2017, Vol. 27, p.70: 13-21**

245. There is no explanation regarding why sites in the required wider regional perspective were excluded from the map and analysis and how the seemingly arbitrary 500-foot limit was determined. In fact, upon closer examination, the statement itself is false, since one of the 17 sites depicted, the Kūkahau‘ūla traditional cultural property (TCP), “is located approximately 50 feet to the east of the Batch Plant area” (TMT CDUA, p.2-4).

**Ex. Doc. B.08a, p.7-8**

246. The TMT CDUA apparently excluded Kūkahau‘ūla as a site for inclusion in their analysis under the belief that the portion of Kūkahau‘ūla located within the arbitrary 500-foot radius of the Batch Plant does not include “individual historic properties” is a site complex or district comprised of multiple sites, which constitutes a distinct historic property bearing its own site number (SIHP No. 50-10-23-21438). Its greater significance, scale, and complexity than other sites identified in the area. **Ex. Doc. B.08a, p.7-8**

247. **HAR §13-276-2** defines “historic property” as “any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old.”

**Ex. Doc. B.08a, p.7-8**

248. “The Kūkahau‘ūla TCP is a historic property (SIHP No. 50-10-23- 21438) occupying an area of approximately 463 acres” (TMT CDUA, p.2-2). It “consists of a group of pu‘u commonly known as Pu‘u Hau‘oki, Pu‘u Wēkiu, and Pu‘u Kea” and “has been determined to be a historic [district] by SHPD owing its association with legendary figures and ongoing Native Hawaiian cultural practices” (Ibid.). **Ex. Doc. B.08a, p.7-8**

249. “Approximately 1,100 feet of the 3,400-foot long Access Way serving the TMT Observatory would cross Kūkahau‘ūla.” This statement offered in the TMT CDUA is not accompanied by an analysis demonstrating how the TMT project will not create substantive adverse impacts to Kūkahau‘ūla. **Ex. Doc. B.08a, p.7-8 ¶8**

### **Irreparable Harms of the TMT Project**

250. Mauna Kea is a wahi kupuna of the highest sort. **Tr. 01/19/2017, Vol. 27, p.52:21-23**

251. The mana and sacredness on Mauna Kea is “to the extreme, extreme degree. It’s so kapuful that there are many dimensions of—of it. It’s not just the huge number of—of ahu and sacred pu’u. It’s their concentration within a—in a relatively small space. It’s the akua that are—that are associated with these places. It’s the known practice that’s happened there over—over the centuries and continues to reverberate in—in people today. There are many levels [of kapu present there].” **Tr. 01/19/2017, Vol. 27, p.46: 12-24, 47**

252. The mo’olelo and mo’oku’auhau of Mauna Kea also make it an extraordinarily sacred place. **Tr. 01/19/2017, Vol. 27, p.78-79**

253. Irreparable harm caused by the TMT Project will include physical harm to sites in the immediate area; relationships of sites to one another, intangibles such as the feeling associated with sites and the cultural practices associated, the akua.  
**Tr. 01/19/2017, Vol. 27, p.72: 1-16**

254. Psychological harms caused by desecration of a site considered sacred cannot be mitigated. **Tr. 01/19/2017, Vol. 27, p.81: 15-17**

255. Amongst the questions that should have been asked by archaeologists in determining whether the TMT Project AIS would have impacts was posed during oral arguments in the 2011 TMT CDUA hearings by BLNR Chair William Ailā to cultural practitioner and petitioner Pua Case. **Tr. 01/19/2017, Vol. 27, p.42:12-20**

256. Chair Ailā asked, “How would you be impacted? Would you still go up there?”  
**Tr. 01/19/2017, Vol. 27, p.42:12-20**

257. Petitioner Case responded that she would continue to go up the Mauna, but it would be with a different purpose because everything will have changed. She would not be there to enjoy and honor and celebrate this beautiful place and her connection to it. She would have to go there to apologize and to try to heal from and mihi for what she could not stop.  
**Tr. 01/19/2017, Vol. 27, p.42-43**

258. When a people have to change from honoring a place to asking forgiveness of a place, the kaumaha, the heaviness, the sadness, the weight, of what has happened weighs very heavily on the shoulders, the na’au, the very core of people’s being, and it creates a consistent sadness and eha, hurt, in the character of—of this being—this person.  
**Tr. 01/19/2017, Vol. 27, p.66:3-12**

259. Archaeologists for the TMT mischaracterize the importance of view planes that connect Mauna Kea to Haleakala. **Tr. Vol. 27, May 11, 2016, p.35 11-14**

260. Cultural impact assessments of the TMT Project have focused on physical effects on historic properties, and not adequately considered indirect effects on cultural practitioners and traditional and customary practices. **Tr. Jan 25, 2017, Vol. 30, p.14: 10-20**

261. “The potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.”  
**Ex. B.12a at 2 citing B.12c (OEQC Guidelines at 13)**
262. Other sites throughout Hawai‘i ahu, shrines, etc, don’t exist in isolation, they are alignments or are connected to other ahi or shrines to establish a siting point or a straight line etc. **Tr. Vol. 27, May 11, 2016, p.35 15-21**
263. OEQC guidelines are particularly relevant because the TMT would be visible to cultural practitioners over much of the island, thus introducing an expansive APE that would include large portions of Hilo, Kohala, and Kona. **Ex. B.12a at 2**
264. The expectation is that assessment of the project’s effects are to be broadly scoped to try to consider the impacts of these undertakings on cultural practitioners.  
**Tr. Jan 25, 2017, Vol. 30, p.15: 1-5**
265. The lives of cultural practitioners who wake up in their own homes every day and see the TMT on Mauna Kea, and who do not want that telescope in their environment, would be profoundly affected, in a very recognizable way, and in a way that is adverse.  
**Tr. Jan 25, 2017, Vol. 30, p.35:25-20**
266. When evaluating sites in and around the proposed TMT area, UH archaeologists did not look at it within a larger purview of everything that the site could be. The cultural context or cultural interpretation could not be known without cultural consultations which were not done. **Tr. May 11, 2017, Vol. 27, p.40 11-25**
267. UH archaeologists used an “etic” perspective (non-cultural or outside the culture) as opposed to “emic (from within the culture) as required by law.  
**Tr. May 11, 2017, Vol. 27, p.41 1-18**
268. The TMT CIA is inadequate. Together, the AIS and CIA were required to consult with cultural practitioners to understand how they perceive a place, and what the spiritual qualities of that place may be and to frame proposed TMT project plans in a way which recognizes what those values are. **Tr. May 11, 2017, Vol. 27, p.102:1-18**
269. The CDUA relied on those two documents and did not cover the Cultural Impact Assessment sides adequately. **Tr. May 11, 2017, Vol. 27**
270. A major reason for the CIA’s inadequacy was the limited area of potential effect it considered. **Tr. May 11, 2017, Vol. 27, p.102:1-18**

**Dr. Peter Mills Summary**  
**Ex. Vol.30, B.12a; B.12.b**

271. On January 25, 2017, Professor Peter Mills, who has been teaching at the University of Hawai'i at Hilo (UHH) for nineteen years, was called as a witness by Mauna Kea Anaina Hou. **Tr. 01/25/2017, Vol.30, p.11**

272. Professor Mills is a qualified archaeologist who meets the standards of the Secretary of the Interior (36 CFR Part 61), and Hawai'i's rules covering professional qualifications for principal investigators on archaeological projects in Hawai'i (**HAR §13-281-8**).  
**Ex. B.12a, p.1**

273. He has served as the President of the Society of Hawaiian Archaeology and specifically conducted geological and archaeological research on the Mauna Kea Adze quarry.  
**Ex. B.12a, p.1**

274. Professor Mills has a considerable amount of experience reviewing environmental impact statements under federal processes and Massachusetts state processes, through his work at the Massachusetts Historical Commission. **Tr. 01/25/2017, Vol.30, p.12: 10-17**

275. At UHH, Professor Mills developed a Heritage Management graduate program that deals with issues such as the ones raised by the TMT CDUA.  
**Tr. 01/25/2017, Vol.30, p. 12:20-25**

**Significance of Mauna Kea as a Historic District**

276. The Mauna Kea Summit Region Historic District (State Inventory of Historic Places # 50-10-23-2689) has been determined to be eligible for the State and National Registers of Historic Places, and receives the same protections under state and federal law as properties that are actually listed. **Ex. B.12a, p.1**

277. State criteria for eligibility include five categories (A through E), and the federal criteria include four (A through D), and in both cases, the Mauna Kea Summit Region Historic District is eligible under all criteria. **Ex. B.12a, p.1**

278. The eligibility of the Mauna Kea Region Historic District is particularly relevant when determining the "Area of Potential Effect" (APE) of any proposed project, including the TMT. **Ex. B.12a, p.1**

279. Portions of Mauna Kea have been assigned as traditional cultural properties (TCPs) and eligibility determinations have been made under the National and State Historic Registers. **Tr. 01/25/2017, Vol.30, p.84: 22-25**



280. Federal regulations define “APE” as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist[.]” 36 C.F.R. §800.16[b]. APE is also referenced under HRS Chapter 343 and associated guidelines for cultural impact assessments: “In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment.”

**Ex. B.12a, p.2 citing Guidelines for Assessing Cultural Impacts, Office of Environmental Quality Control (OEQC), State of Hawai‘i, Nov. 19, 1997, p.11 (Ex. B.12c)**

281. The OEQC Guidelines assist in clarifying what should be considered in assessing an APE for the TMT. **Tr. 01/25/2017, Vol.30, p.89: 11-14**

### **The TMT CIA was Inadequate**

282. Together, the AIS and CIA were required to consult with cultural practitioners to understand how they perceive a place, and what the spiritual qualities of that place may be and to frame proposed TMT project plans in a way which recognizes what those values are. **Tr. 01/25/2017, Vol.30, p.102:1-18**

283. The CDUA relied on those two document and did not cover the Cultural Impact Assessment side adequately. **Tr. 01/25/2017, Vol.30, p.102:1-18**

284. A major reason for the CIA’s inadequacy was the limited area of potential effect it considered. **Tr. 01/25/2017, Vol.30, p.102:1-18**

285. Cultural impact assessments of the TMT Project have focused on physical effects on historic properties, and not adequately considered indirect effects on cultural practitioners and traditional and customary practices. **Tr. 01/25/2017, Vol.30, p.14: 10-20**

286. “The potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.”

**Ex. B.12a, p.2 citing B.12c (OEQC Guidelines, p.13)**

287. OEQC guidelines are particularly relevant because the TMT would be visible to cultural practitioners over much of the island, thus introducing an expansive APE that would include large portions of Hilo, Kohala, and Kona. **Ex. B.12a, p.2**

288. The expectation is that assessment of the project’s effects are to be broadly scoped to try to consider the impacts of these undertakings on cultural practitioners.

**Tr. 01/25/2017, Vol.30, p.15: 1-5**

289. A cultural practitioner in Waimea who wakes up in the morning and sees a Thirty Meter Telescope on Mauna Kea from their home should be considered within the scope of adverse effects on cultural practitioners, even if they aren't on the mountain or within the Mauna Kea Historic District. **Tr. 01/25/2017, Vol.30, p.15: 8-15**
290. That assessment is not in the CDUA. **Tr. 01/25/2017, Vol.30, p.15:16**
291. The lives of cultural practitioners who wake up in their own homes every day and see the TMT on Mauna Kea, and who do not want that telescope in their environment, would be profoundly affected, in a very recognizable way, and in a way that is adverse. **Tr. 01/25/2017, Vol.30, p.35:25-20**
292. The review process is supposed to help identify these kinds of impacts so that decisions can be made to lessen this kind of encumbrance. **Tr. 01/25/2017, Vol.30, p.110:15-18**
293. Documents prepared in support of the TMT CDUA should have had a better analysis of where Native Hawaiian cultural practitioners were living and conducting cultural practices, and where viewplanes of the proposed TMT would intersect with those people and places. **Tr. 01/25/2017, Vol.30, p.111-12**
294. The CDUA underestimated the visual impact of the project (and former telescopes) on cultural practitioners, particularly in part stating, "there is no evidence suggesting that the presence of the existing observatories has prevented or impacted those [observances and rituals/traditional customary] practices" (CDUA page 4-7). **Ex. B.12a, p.2**
295. Subsequent sections of the CDUA (4.2.2 through 4.2.6) emphasize physical impacts to tangible resources but failed to adequately recognize adverse effects caused by the altered setting referred to in the accepted OEQC Guidelines for Assessing Cultural Impacts. **Ex. B.12a , p.2 citing B.12c**
296. Professor Mills noted that the map included with the CDUA application was cropped from the version prepared by Pacific Consulting Services, Inc. (PCSI) to limit presentation to an even smaller implied "Area of Potential Effect." **Ex. B.12a, p.2**
297. For a project of this magnitude and visibility around the island, Professor Mills found this limited presentation and discussion of cultural impacts inadequate. **Ex. B.12a, p.2**
298. Even in view of mitigation measures taken in the TMT project design and studies of visual impacts in the environmental review process, Professor Mills opined that the CDUA inadequately acknowledges the broad range of adverse effects to traditional and customary practices that will be caused by this significant construction project in the summit region. **Ex. B.12a, p.2**
299. In regard to mitigation consisting in locating the TMT on the northern plateau, Professor Mills stated, "The viewplane issue changes when you consider [that] large communities every day will see it." **Tr. 01/25/2017, Vol.30, p.39: 7-9**

300. Those standing at the base of Pu'u Lilinoe may receive a benefit to the TMT northern plateau site, but that site may affect a much larger number of people in a particular community. Tr. 01/25/2017, Vol.30, p.39:9-16

301. This was not evaluated as part of the cultural impact assessment process and there are things in the decision making process concerning the TMT location that were overlooked. Tr. 01/25/2017, Vol.30, p.39: 15-18

### **Intangibles have Archaeological and Anthropological Significance**

303. Intangibles should be an essential part of an archaeological or anthropological survey, but they have been given short shrift in the TMT site surveys. Tr. 01/25/2017, Vol.30, p.43:16-25

304. Intangibles may mean there is a natural thing that you can touch with no evidence of human modification, but it still carries great significance within cultural practice and in the minds of the cultural practitioner. Tr. 01/25/2017, Vol.30, p.97: 16-23

305. The non-culturally informed archaeologist may not be able to perceive the value of the natural object. Tr. 01/25/2017, Vol.30, p.97: 16-23.

306. Intangibles fit within the definition of traditional cultural properties (TCPs) offered in the National Park Service Bulletin 38, which established that boundaries of TCPs should not be circumscribed as a matter of convenience to limited areas, but should include everything that might relate to cultural practices of that area. Tr. 01/25/2017, Vol.30, p.83-84

307. SHPD Criterion "E" implies the same evaluation of cultural landscapes as that of Bulletin 38 should apply and therefore, a focus on physical cultural items, whether they are find spots or markers or shrines, is not the appropriate focus for evaluating impacts on TCPs. Tr. 01/25/2017, Vol.30, p.84: 6-12

308. A cultural impact assessment must evaluate the significance of the region, whether natural or build features, within the mind set of the cultural practitioners. ITr. 01/25/2017, Vol.30, p.84:13-18

309. The CDUA did not adequately address intangibles. Tr. 01/25/2017, Vol.30, p.97-98

### **Final Archaeological Inventory Survey (AIS) was Inadequate**

310. The TMT CDUA is incomplete in regard to its archaeological assessments. Tr. 01/25/2017, Vol.30, p.85: 5-9

311. The TMT AIS was based on a mere one day surface survey carried out by four people. Tr. 01/25/2017, Vol.30, p.21:21-25

312. The TMT AIS did not mention the genealogical chants for the birth of Kamehameha III, which describes the birth of Mauna Kea and ties it to Wakea, Papa, Walinu‘u, and to other highly significant people. **Tr. 01/25/2017, Vol.30, p.22:14-20**

313. This significant event should be in the AIS and it is readily available, as it was in the Maly and Maly report on Mauna Kea. **Tr. 01/25/2017, Vol.30, p.23: 4-12.**

314. Professor Mills found it important that the Kamehameha III genealogical chants are not listed in the CDUA and that this suggested that the CDUA was framed to ignore things that are important to some people, stating, “And I think that’s the reason we’re sitting in this room and why some of you have been here for a very long time.”

**Tr. 01/25/2017, Vol.30, p.23: 12:16**

315. The TMT AIS did not review pertinent literature, although there have been “decades and decades of archaeological research” on the area. **Tr. 01/25/2017, Vol.30, p.21-22**

316. Scott Williams’ Master’s thesis concerning Mauna Kea, published in 1989, is well known in the archaeological community and was not listed as having been reviewed in preparing the TMT AIS. **Tr. 01/25/2017, Vol.30, p.21, 93**

317. Nor was Professor Mills’ 2006 report concerning the archaeological evaluation of the Mauna Kea Adze Quarry referenced by the TMT AIS. **Tr. 01/25/2017, Vol.30, p.21:5-20**

318. An AIS should perform a complete literature review of archaeological and cultural research that has been conducted at a subject area. Because it omitted these reports, the TMT AIS was inadequate. **Tr. 01/25/2017, Vol.30, p.92: 1-10**

319. Many problems arise from this inadequacy, including that the TMT AIS will be viewed as an up-to-date and complete resource for this area, when it is not.

**Tr. 01/25/2017, Vol.30, p.92: 13-15**

320. Further, previously identified issues in those surveys were not included in the TMT AIS, which furthers the incompleteness of the AIS. **Tr. 01/25/2017, Vol.30, p.92: 16-23**

### **Find Spots**

321. “[E]very time information is omitted, we have less context for what we’re trying to interpret.” **Tr. 01/25/2017, Vol.30, p.24: 4:6**

322 The TMT CDUA omitted a number of “find spots” and even sites (SIHP -1619 and -21447) that are identified within the UH managed areas of the Mauna Kea summit.

**Ex. B.12a, p.2**

323. In 1997, SHPD instituted a process of recording locations termed “find spots,” which are cultural resources that are either obviously modern features or features that cannot be classified with any level of confidence as historic sites because of their uncertain age and function. **Tr. 01/25/2017, Vol.30, p.67-68**

324. “Find spots” nominate sites that are potentially culturally important and may include sites that are less than fifty years old. **Tr. 01/25/2017, Vol.30, p.25, 26: 4-6**

325. Just because modern material are found in an area does not immediately remove the site from the realm of ritual practice. **Tr. 01/25/2017, Vol.30, p. 68:18-20**

326. Modern ritual practices on Mauna Kea need to be considered within the scope of a cultural impact assessment. **Tr. 01/25/2017, Vol.30, p.26: 22-25**

327. However, how the process of evaluation for cultural appropriate behavior gets established is incredibly difficult in a colonized world where one of the major ways where the process gets set up is through something like the Office of Mauna Kea Management and Kahu Ku Mauna. **Tr. 01/25/2017, Vol.30, p.30:17-25**

328. Figure 5.1 in the Pacific Consulting Services Inc. (PCSI) AIS (Ex. B.02m) includes sites that were not noted in Figure 4.1 of the CDUA. **Tr. 01/25/2017, Vol.30, p. 77-80**

329. Rather than simply reproducing the map from the PCSI report, a decision was made to remove the find spots and zoom into the specific footprint of the TMT, and consequently many fewer sites are represented in the CDUA map, despite the fact that PCSI is cited as the source of the map. **Tr. 01/25/2017, Vol.30, p.96: 10-20**

330. In order to assess TMT impacts on viewplanes and shrines, the CDUA could not approach this as a mathematical problem of size or height.  
**Tr. 01/25/2017, Vol.30, p.82: 2:11**

331. A full understanding of why the shrines were built and where you would be standing when you were observing them was needed to answer questions of potential effect.  
**Tr. 01/25/2017, Vol.30, p. 82: 15-22**

332. Further, for the CDUA to determine that there would be no effect on archeoastronomy, it would need to have a full understanding of the cultural values of those shrines through extensive discussion with cultural practitioners who may have cultural knowledge of how those shrines should be used. **Tr. 01/25/2017, Vol.30, p.83: 1-11**

### **Mauna Kea Burials and Stone Objects**

333. Evidence of Native Hawaiian pre-western contact activity on Mauna Kea includes the lack of unused good quality stone. **Tr. 01/25/2017, Vol.30, p.104-105**

334. When Native Hawaiians were exploring the wao akua, they recognized a very valuable source of stone on Mauna Kea. Instead of taking the stone, they built a structured environment of small scale shrines that did not detract from the summit region's appearance or shape and to make their activity appropriate for the wao akua.

**Tr. 01/25/2017, Vol.30, p.105:7-17**

335. In regard to other archaeologists' observations that burials are in Mauna Kea cinder cones, Professor Mills noted that previous studies have largely utilized pedestrian surveys and "given the active nature of alluvial actions or the movement of sediment downslope, it would be very easy for burials which were exposed in 1892 to no longer be visible on the surface." **Tr. 01/25/2017, Vol.30, p.20: 5-8**

336. Not all burials on the summit are cinder-cone related.

**Tr. 01/25/2017, Vol.30, p.20: 9-14**

337. Practically the entire summit of the mountain, especially the northeast and northern sides, show abundant and unmistakable evidence of erosion by extensive glaciers.

**Tr. 01/25/2017, Vol.30, p.123: 10-16.1**

#### **Dr. Candace Fujikane**

338. On January 9, 2017, KAHEA called its expert witness Dr. Candace Fujikane.

**Tr. 01/09/2017, Vol. 23, p.205**

339. Dr. Fujikane is an English professor specializing in Hawai'i literary and cultural studies. **Ex. B.13a (Fujikane WDT), p.1**

340. Dr. Fujikane is the Cultural Studies in Asia / Pacific Concentration Advisor in the University of Hawai'i English Graduate Program. She has published work on the mo'olelo (stories/histories) of Māui in Wai'anae. **Ex. B.13a, p.1**

341. Dr. Fujikane also learned firsthand about the mo'olelo (stories/histories) while walking on the ancient trails and uplands of Mauna Kea, including the proposed site of the TMT, with Clarence Kūkauakahi Ching and other members of Huaka'i i Nā 'Āina Mauna, a cultural practice group that engages in the traditional Hawaiian cultural practice of ka'apuni māka'ika'i, traveling on spiritual huaka'i or journeys to remember the mo'olelo of the wahi pana or celebrated places. **Tr. 01/9/2017, Vol. 23, p.206**

342. This cultural practice of ka'apuni māka'ika'i is also critical to the stewardship and monitoring of sacred sites.

343. Dr. Fujikane's testimony was made in two parts: the first part focused on the rhetorical problems, the faulty and self-contradictory logic in the TMT's Conservation District Use Application (CDUA) that attempt to make substantial, adverse, and significant impacts "disappear." The second part focused on the cultural value of the integrity of land embodied in mo'ōāina land divisions, where relationships between land forms are unseverable.

344. Dr. Fujikane stated that the TMT CDUA cannot fulfill the 8 Conservation District Use Criteria because cumulatively, the TMT project would add to the impacts of existing observatories that are "substantial, adverse, and significant."  
**Tr. 01/9/2017, Vol. 23, p. 209-210**

345. NASA's 2005 Final Environmental Impact Statement for the Outrigger Telescopes project on Mauna Kea concluded that the impact of existing astronomical activities on Mauna Kea has been substantial, adverse, and significant: "From a cumulative perspective, the impact of the past, present, and reasonably foreseeable future activities on cultural and biological resources is substantial, adverse, and significant."  
**Ex. B13d, p.4-124**

346. The TMT's FEIS Vol. 1 also acknowledges that cumulatively, the TMT can only add to the substantial, significant and adverse impact on Mauna Kea: "From a cumulative perspective, the impact of past and present actions on cultural, archaeological, and historic resources is substantial, significant, and adverse; these impacts would continue to be substantial, significant, and adverse with the consideration of the Project and other reasonably foreseeable future actions."  
**Ex. B32, p.S-8; Tr. 01/9/2017, Vol. 23, p.210**

347. Dr. Fujikane states that as NASA's FEIS indicates, Mauna Kea is already overbuilt. The EIS claims that the TMT Project will add a "limited increment" to the level of cumulative impact, but that claim is irrelevant because what must be considered is not the individual impact of the TMT Project, but the cumulative impact of the TMT Project and the existing observatories. **Tr. 01/9/2017, Vol. 23, p.211**

348. HAR §11-200-12 "Significance criteria" provides the state's definition of "significance." The 8th criterion states: "In most instances, an action shall be determined to have a significant effect on the environment if it "Is individually limited, but cumulatively, has considerable effect upon the environment or involves a commitment for larger actions" **Ex. B.13e, p.1**

349. Dr. Fujikane stated that "The TMT CDUA uses a tactic that we see over and over again. Developers break up culturally significant places into smaller and smaller fragments of land in order to argue that each piece of land is no longer culturally significant because it is removed from each other." **Tr. 01/9/2017, Vol. 23, p.211**

350. The TMT's CDUA uses the logic of subdivision to describe the location of the TMT site as a "five-acre site" called "Site 13-North (13N)" in "Area E" in the "Astronomy Precinct" in the "Mauna Kea Science Reserve (MKS)." Ex. A001, p.1-6

351. The TMT's CDUA contradicts itself by stating that the siting of the TMT Project in Area E will have a less than significant adverse effect on the cultural practices because it is "removed" from the places of highest cultural concern but is still "compatible" with "the many existing astronomical observatories" in the surrounding area. The problem is precisely that the observatories have a cumulative substantial, adverse, and significant impact on cultural and natural resources.  
Tr. 01/9/2017, Vol. 23, p.212

352. The TMT's CDUA claims, "As detailed in this CDUA, locating the TMT project in Area E will result in less than significant impact on historic properties, cultural practices, and Native Hawaiian rights, as well as viewplanes, species habitat, and existing facilities." Ex. A002, p2-27, cited in Ex. B.13a, p.3

353. The CDUA contradicts this claim by also pointing out that, "As the Astronomy Precinct is the site of many existing astronomical observatories, the TMT project will be compatible with existing land uses" Ex. A002, p.2-27

354. Instead, however, the proposed TMT site is located in a pristine area that falls in the Mauna Kea Summit Region Historic District and the TMT site is an integral part of the cultural and natural resources of Mauna Kea.  
Ex. A002, p.2-6; Ex. B.13c, p.2-31, cited in Ex. B.13a, p.3

355. Dr. Fujikane states that the TMT FEIS acknowledges that the entire mountain, from the Saddle area up the summit is a sacred landscape. The FEIS concludes, "Due to the spiritual and sacred attributes of Maunakea in Native Hawaiian traditions, traditional and customary cultural practices are . . . associated with the belief in that the upper mountain region of Mauna Kea, from the Saddle area up to the summit is a sacred landscape, personifying the spiritual and physical connection between one's ancestors, history, and the heavens.  
Ex. B32, p.S-4, cited in Tr. 01/9/2017, Vol. 23, p.213-214

356. Dr. Fujikane cites Maly and Maly who explain that all of the mountain lands of Mauna Kea, including the northern plateau itself, is sacred. Ex. B.13a, p.7

357. Maly and Maly state, "In the Hawaiian mind, all aspects of natural and cultural resources are interrelated. All are culturally significant. Thus, when speaking of Mauna Kea—the firstborn child of Hawai'i, abode of the gods—its integrity and sense of place depends on the well-being of the whole entity, not only a part of it." Ex. B.13i, p.10



358. Hawaiian cultural value of the integrity of land embodied in the mo'ōāina  
Dr. Fujikane has conducted research on the Hawaiians culturally valued the integrity  
of land, and that cultural value is encoded in a land division known as “mo'ōāina.”  
**Tr. 01/9/2017, Vol. 23, p.214-215**

359. “Mo'ōāina” is defined by Mary Kawena Pukui and Samuel H. Elbert as a “narrow  
strip of land, smaller than an ‘ili.” **Ex. B.13j, p.253-254**

360. Mo'ōāina as a series of smaller land divisions that is part of a larger land base.  
Mo'ōāina foreground the relationality between land formations. Mo'ōāina are defined  
by what lies on their borders, by their relationality to other mo'ōāina.  
**Ex. B.13c is LCA Award 3131 illustrating a mo'ōāina land division**

361. Key here is that mo'ōāina are not defined by abstract cardinal directions north,  
south, east or west but in their relation to other land formations.

362. Dr. Fujikane states that this Hawaiian cultural value of the integrity of land can be  
seen in the mo'olelo (story/history) of the migration of mo'ō reptilian deities to Hawai'i  
and the procession of reptilian deities stretching out across O'ahu from Waialua to  
Kapūkakī, known as Red Hill. **Ex. B.13l, cited in Tr. 01/9/2017, Vol. 23, p216-217**

363. In this illustration, we see the mo'ōāina embodied as reptilian deities who are  
connected through the mo'okū'auhau, the genealogical line of Mo'oinanea; as the great  
mo'ō family marches across O'ahu two by two, the mo'ō represent the mo'ōāina, the  
smaller land divisions that are lined up, 'ohana to each other.

364. The term “mo'ōāina,” then, indicates that Mo'oinanea's presence on Mauna Kea  
is also about the integrity of land there, and that the undivided ahupua'a of Ka'ōhe  
represents an even higher expression of this integrity of land.  
**Ex. B.13.m, p.2-5, cited in Ex B.13a, p.10**

365. As surveyor Curtis J. Lyons explained in 1875, “The whole main body of Mauna  
Kea belongs to one land from Hamakua, viz., Ka'ōhe.”  
**Ex. B.13o, p.14, cited in Ex. B.13a, p.10**

366. Siting the TMT on the northern plateau would violate this integrity of the land.

367. Dr. Fujikane stated that TMT FEIS identifies over 263 historic properties,  
including 141 ancient shrines in the Mauna Kea Science Reserve. **Ex. A32, p.P-3**

368. Yet, the TMT's CDUA ignores 260 historic properties and recognizes only three  
TCPs as culturally significant sites. **Ex. B.13a, p.6 and 11**

369. The TMT FEIS states, “The TMT Observatory will be placed at the 13N site  
where it will not be visible from culturally sensitive locations, such as the summit of  
Kūkahau'ula, Lake Waiau, and Pu'u Lilinoe.” **Ex. B32, p.S-12, cited in Ex. B.13a, p.6**

370. Hawaiian stories and histories, however, explain that Poli‘ahu, her sisters and Kūkahau‘ula, like the cultural practitioners who honor them, were not limited in their traversal of the mountains to the three TCPs of Pu‘u Kūkahau‘ula, Pu‘u Lilinoe, and Waiau or to their viewplanes. **Ex. B.13a, p.11**

371. The integrity of the uplands, the lands at the summit and the northern plateau, is evident in Emma Ahuena Davison Taylor’s (1866-1937) account of Kūkahau‘ula, Poli‘ahu and Mo‘oinanea published in July 1931 in *Paradise of the Pacific*. **Ex. B.13a, p.10**

372. In this mo‘olelo, Ahuena describes the domain of Poli‘ahu as stretching from the summit to the fern belt: “[Kūkahau‘ula] watched her every day as she played with the kini-akuas (fairies) amidst the silversword (hina-hina) near the pool, and, sometimes further down near the fern belt.” **Ex. B.13p: Ahuena, “The Betrothal”**

373. Later, Kūkahau‘ula is watching: “Poli‘ahu was coming slowly down the mountainside almost to where plant life grew.” In Mo‘oinanea’s final chant, Poli‘ahu and Kūkahau‘ula are “the residents of the uplands.” **Ex. B.13p, cited in Ex. B.13a, p.10**

#### **TMT Would Violate State Desecration Law**

374. Dr. Fujikane stated that the CDUA failed to address the State Desecration Law. **Ex. B.13h, cited in Tr. 01/9/2017, Vol. 23, p.214-215**

375. Fujikane states, “If all of Mauna a Wakea is considered sacred from Saddle Road up to the summit, and the NASA Environmental Impact Statement for the Outrigger project deemed that there is already adverse, substantial—that there is cumulative, adverse, substantial and significant impact—the building of the TMT would be desecrating a place that is held sacred by Hawaiians and by many who are not Hawaiian. And in that sense, I think that the CDUA doesn’t address the Desecration Law at all, and I’m not sure why there’s that huge omission, because one of the questions has to do with the protection of Native Hawaiian rights and cultural practices.” **Tr. 01/9/2017, Vol. 23, p.222-223**

376. Dr. Fujikane also recalled the charges of desecration proposed by the Office of Hawaiian Affairs in a letter to Stephanie Nagata, Director of the Office of Mauna Kea Management (OMKM) calling for the investigation of an OMKM staff member who bulldozed an ahu (altar) erected at the TMT site. **Tr. 01/9/2017, Vol. 25, p.68-69**

#### **CDUA Fails to Recognize Mauna Kea as a Cultural Resource**

377. Fujikane stated that the CDUA fails to address Mauna Kea itself as a cultural resource. **Tr. 01/9/2017, Vol. 23, p.249-250**

378. This is a result of a discrepancy between the TMT's CDUA quoting the State Land Use Law (Chapter 183C, Hawai'i Revised Statutes) instead of Hawai'i Administrative Rule §13-5-1 as it is cited in the first application question.

**Ex. B.13f: HAR §13-5-1; Ex. B.13a, p.3-4**

379. These two texts differ, and the result is that the TMT's CDUA omits the protection of "cultural resources" as stated on the actual application. The TMT's CDUA states the purpose of the Conservation thus: "The purpose of the Conservation District to conserve, protect, and preserve the natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare." **Ex. A002, p.2-1**

380. The application itself actually states that it is the "natural and cultural resources" that is to be conserved, protected, and preserved. The application states, "The purpose of the Conservation District to conserve, protect, and preserve the 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."

381. The TMT project cannot "conserve, protect, and preserve" the natural or cultural resources of the northern plateau, the sacred ground that will be desecrated by the construction of the TMT.

382. Dr. Fujikane states, "What the CDUA is trying to say is that cultural practices will not be infringed upon, but it says nothing about the cultural resources, and the land is a cultural resource because it reminds us of the mo'olelo. Some people will try to argue that you can still remember the mo'olelo if you build the TMT, but it will not be the same. So the land itself is a map that reminds us of the mo'olelo, and certain features of the land will trigger connections that we can make to other mo'olelo. But if it's built upon we will lose that capacity to connect mo'olelo through, you know, being in those places." **Tr. 01/9/2017, Vol. 23, p.225**

### **Viewplanes as a Cultural Resource**

383. Dr. Fujikane stated that viewplanes are an important cultural resource on Mauna Kea, and that city and county ordinances in Honolulu recognize that viewplanes are an important aspect of preserving natural beauty. **Tr. 01/9/2017, Vol. 23, p.90**

384. She states, "So viewplanes are recognized in the CDUA application itself when it asks whether a development project will preserve open space and natural beauty. That to me is a recognition of the importance of viewplanes, and it's also again reinforcing other kinds of city ordinances, where you need height variance applications when you build a building beyond a certain height." **Tr. 01/9/2017, Vol. 23, p. 90**

385. Dr. Fujikane specifies the viewplanes of Mauna Kea: “So the viewplanes in the mo’olelo are very important because there are recognized viewplanes from Mauna a Wākea all the way to Kaua’i where there is an ahu, the Ahu o Poli’ahu on Kaua’i. And I have heard on a clear day—and this is in the Cultural Impact Assessment of the TMT--you can see Kaua’i from—I think you can see Kaua’i from Mauna a Wākea, but why do you have an ahu on Kaua’i, Ahu o Poliahu, unless there is a viewplane and a connection between these sacred points?” **Tr. 01/9/2017, Vol. 23, p.90-91**

386. The 7th Conservation District Use criterion clearly states that conservation lands are not to be subdivided, but Dr. Fujikane states that the TMT CDUA is subdividing the Mauna Kea Summit Region Historic District. **Ex. Doc. B.13a, p.6-7**

387. First, the application states, “If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.” Subdivision is defined in HAR 13-5-5 as “the division of land into more than one parcel.” **Tr. 01/9/2017, Vol. 23, p.229**

388. In actuality, it is precisely the subdivision of land that we see in the CDUA that describes the location of the TMT site as a “five-acre site” called “Site 13-North (13N)” in “Area E” in the “Astronomy Precinct” in the “Mauna Kea Science Reserve (MKSR).” **Ex. A002, p.1-6**

389. Moreover, the CDUA attempts to justify how the project is consistent with existing observatories: “As the Astronomy Precinct is the site of many existing astronomical observatories, the TMT project will be compatible with existing land uses.” **Ex. A002, p.2-27**

390. Dr. Fujikane states that by claiming that the TMT project is consistent with these “many astronomical observatories” to prove consistency with existing uses, the CDUA describes the intensification of land use for astronomical observatories in a subdivision that is a part of the Mauna Kea Summit Region Historic District. **Ex. B.13a, p-4**

### **Brian Cruz**

391. On February 28, 2017, KAHEA called witness Brian Cruz. **Tr. 02/28/2017, Vol. 42, p.100**

392. Cruz had been working in the field of cultural impact assessments for six years and has working on approximately 40-50 CIAs. **Tr. 02/28/2017, Vol. 42, p.104: 14-16**

393. He worked for Cultural Surveys Hawaii (CSH) from approximately 2007 to 2012 and had previously worked for Maria Orr by interviewing kupuna in connection with the Honolulu Area Rail project for approximately 16 months. **Tr. 02/28/2017, Vol. 42, p.129, 131:2-18, 169:19**

394. In late 2008, early 2009, Cruz began working on the TMT Cultural Impact Assessment (CIA). **Tr. 02/28/2017, Vol. 42, p.102:12-13**
395. He spent six months researching and interviewing community consultants, including cultural practitioners from Hawai'i Island. **Tr. 02/28/2017, Vol. 42, p.102:15-16**
396. This research led to the conclusion that there should be “no further action’ on the summit of Mauna Kea because of the sacredness of the site.”  
**Tr. 02/28/2017, Vol. 42, p.102: 17-20**
397. Criteria used to select interviewees were: knowledge of Mauna Kea, history with Mauna Kea, does cultural practice on Mauna Kea, and not whether they supported the TMT project or not. **Tr. 02/28/2017, Vol. 42, p.115: 6-14**
398. Ethnicity and race were not criteria in determining interviewees.  
**Tr. 02/28/2017, Vol. 42, p.123: 11-16**
399. In March 2009, Cruz submitted a recommendation of no further action along with nine other recommendations for mitigation measures to as part of his preliminary draft to Jim Hayes of Parsons Brinckerhoff. **Tr. 02/28/2017, Vol. 42, p.102-03**
400. Hayes asked Cruz to remove his “no further action” recommendation from the CIA, but Cruz refused. **Tr. 02/28/2017, Vol. 42, p.103:2-10**
401. Removal of a recommendation “is unheard of in [Cruz’s] industry[,]” and he has never done so for any other CIA. **Tr. 02/28/2017, Vol. 42, p.105: 7-12**
402. Cruz checked with his supervisor, Lisa Gollin, who agreed with his decision to refuse to remove the recommendation, “because that was the truth of the results of our research.”  
**Tr. 02/28/2017, Vol. 42, p.106: 1-5**
403. Cultural Surveys Hawaii (CSH), the consultancy hired to prepare the CIA for the TMT, supported Cruz’s decision. **Tr. 02/28/2017, Vol. 42, p.108:23**
404. “[A]ny agency that is going to make a decision, they need all the information and by leaving this information out, they could make the wrong decision.”  
**Tr. 02/28/2017, Vol. 42, p.107: 19-22**
405. Hayes told Cruz that he wanted CSH to conduct interviews with Native Hawaiians who supported the TMT to obtain a “balanced report,” but the purpose of a CIA is not to balance a report, rather it is “designed to find impacts.” **Tr. 02/28/2017, Vol. 42, p.109-10**
406. Although CSH disagreed with Hayes’ request, they included a separate section in the CIA to report on interviews with TMT supporters who had been identified by Parsons Brinckerhoff. **Tr. 02/28/2017, Vol. 42, p.110: 6-16.**

407. Cruz requested to have his name removed from the CIA because he did not want to be associated with a flawed CIA. **Tr. 02/28/2017, Vol. 42, p.134: 6-9**

408. On March 9, 2009, the CIA was published as part of the draft TMT FEIS without Cruz's recommendations, including the one that the TMT not be built.  
**Tr. 02/28/2017, Vol. 42, p.103:9-10**

409. Cruz's version of the CIA had been printed, his "do not build" recommendation removed, and then re-digitized, resulting in a document that had no traces of manipulation.  
**Tr. 02/28/2017, Vol. 42, p.109: 7-12**

410. In May 2010, the final TMT FEIS was published with a CIA that included Cruz's recommendations. **Tr. 02/28/2017, Vol. 42, p.103:11-13**

411. Key components—mitigation measures and alternative proposals—were not included in the draft TMT EIS. **Tr. 02/28/2017, Vol. 42, p.117: 12-17**

412. Cruz complained about the discrepancy to OEQC, who responded that, "there was not much they could do[.]" **Tr. 02/28/2017, Vol. 42, p.103:18-20**

### **Jonathan Kay Kamakawiwo'ole Osorio**

413. On January 12, 2017, KAHEA called its expert witness Dr. Jonathan Kay Kamakawiwo'ole Osorio. **Tr. 01/12/2017, Vol. 25b, p.11**

414. Dr. Osorio is a Professor of Hawaiian Studies at the University of Hawai'i, specializing in the history of the Hawaiian Kingdom, music, law, and literature.  
**Ex. B.07a, Osorio WDT, p.1**

415. Since 1998, Professor Osorio has worked in temporary and permanent capacities as the Director of the University of Hawai'i Mānoa (UHM) Center for Hawaiian Studies.  
**Ex. B.07b**

416. Professor Osorio also teaches Hawaiian political and governmental histories at UHM and is the President of the Board of Directors for KAHEA.  
**Tr. 05/11/2017, Vol. 26, p.13:5-9**

417. His publications include *Dismembering Lāhui: A History of the Hawaiian Nation to 1887* (University of Hawai'i Press, 2002). **Ex. B.07b, p2**

418. Dr. Osorio stated that the struggle over the future of Mauna Kea is not a conflict between Hawaiians and non-Hawaiians, nor is it a clash between western science and Hawaiian cultural beliefs. It is a conflict between different people who see the history and future of Hawai'i very differently from one another. He states, "The issue is about how we manage resources and how we align our laws, our economy and the values of a whole, yet diverse society in Hawai'i in order to connect a ruptured past, contentious present, and a very uncertain future." **Ex. B.07a, p.1**

419. Historically, Hawaiians were oceanic people who, as they journeyed and settled new lands, completely confident, they could make a home, prosper, and thrive wherever they went because of their observations of the world around them.

**Tr. 05/11/2017, Vol. 26 p.31: 1-6**

420. "This is not an anti-science kind of perspective. This is a deep respect for science in all of its ways." **Tr. 05/11/2017, Vol. 26, p.31:7-9**

421. Hawaiians were rational people who were discerning about the kinds of technologies and tools they sought to develop. **Tr. 05/11/2017, Vol. 26, p.32: 10-12**

422. Dr. Osorio recounts the history of Mauna Kea lands, that Mauna Kea is a part of the 5F Ceded Lands, designated in the 1959 Admissions Act that accompanied statehood. **Ex. B.07a, p.1**

423. The summit of Mauna Kea, which now comprises the conservation district were Hawaiian Kingdom Government lands, created as public property of the government by the Māhele of 1847. Dr. Osorio states, "Since the takeover of our country, we Kānaka Maoli have witnessed the steady and lately, spectacular erosion of our presence on the land that only 4 generations ago was exclusively ours. But of far greater concern, is that neither government nor public interests today effectively regulate the use of our lands in any meaningful way. To put this boldly—the lands of Hawai'i have been offered up for speculations and to fuel expensive capital projects and neither environmental cautions (Ho'opili, GMOs); community concerns (Rail Transit, HPLDC, Kaka'ako) have been able to balance the political trend away from the knee-jerk approvals of development, particularly when large, expensive projects are involved." **Ex. B07a, p.2**

424. Dr. Osorio points out that these are not solely Kanaka Maoli issues. The crown and government lands belong to the Kingdom of Hawai'i. **Tr. 05/11/2017, Vol. 26, p.22: 9-11**

425. The difficulty this presents is pilikia that the United States and the State of Hawai'i must figure out and act upon. **Tr. 05/11/2017, Vol. 26, p. 22-23**

426. Dr. Osorio further states that public resistance to the construction of the TMT on Mauna Kea must be understood in the context of the significant rise in Native Hawaiian political activity and assertions to rights of self-determination that include claims to the Ceded Lands now controlled by the United States government agencies and the State of Hawai'i. **Ex. B07a, p.2**

427. Dr. Osorio emphasizes that the reason this current permitting process has begun again is because the State Supreme Court recognized the lack of actual and meaningful public consultation during the previous application process. **Ex. B07, p.2**

428. “Difficult decisions have to be made about how we use resources, about how we allow investment. All sorts of things that have to do with our economy and our society going forward, and yes, I’m saying that state agencies from the governor all the way down really have to take— they really have to understand they have a kuleana for this.” **Tr. 05/11/2017, Vol. 26, p.37:9-15**

429. Dr. Osorio pointed out that the concerns raised by the TMT CDUA were not only the cultural concerns of Native Hawaiians, “but also the political processes and procedures of the State.” **Tr. 05/11/2017, Vol. 26, p.14: 13-15**

430. The TMT, particularly in addition to existing telescopes on Mauna Kea, is not consistent with the purpose of the conservation district. **Tr. 05/11/2017, Vol. 26, p.24: 10-19**

431. There is evidence of, “messaging around with regulation and the spirit of regulations that have been set up since the State was first formed” because this “lessens people’s respect for government and governance . . . when the government presents incidents like this where what you think is meaningful really is not.” **Tr. 05/11/2017, Vol. 26, p.24-25**

432. Dr. Osorio states that the “TMT will add to the significant, sustained and adverse affects that already resulted from the previous 13 telescopes on the mountain.” **Ex. B07, p.3**

433. Dr. Osorio commented on the approval of multiple industrial telescope projects in the Mauna Kea summit region: “If one wants to have confidence in government, if one wants to have confidence in political society, then decisions should be made and approvals should be given in a way that makes sense that is rational. I don’t believe that this is – when you – on the face of it, it doesn’t look rational to me.” **Tr. 05/11/2017, Vol. 26, p.25: 13-20**

434. Dr. Osorio states that the TMT would have a “devastating” impact on Hawaiian emotional, mental and physical health. Dr. Osorio goes on to state that, “It is especially offensive for the TMT, building a 16-story monstrosity on a sacred place, to claim a cultural connection with the Native people because astronomy looks at the same stars as our voyager ancestors.” **Ex. B07, p.3**

435. He points out that there have been extensive efforts on the part of those who find the TMT culturally, environmentally, and legally offensive to protect Mauna Kea, and that evidence of this can be found in “a few hundred reasons in the form of men and women who braved the elements and the possibility of arrest last year in order to proclaim their commitment to the mountain.” **Ex. B07, p.3**



436. Dr. Osorio states that approval of the TMT by the DLNR evidences, “the state’s failure to protect vulnerable communities and willingness to ignore inconvenient regulations in its rush to approve sizable capital projects,” as well as “Hawaiians’ increasing impatience with the state’s management of our national lands.” **Ex. B07, p.3**

437. As a historian, Dr. Osorio compares the movement to protect Mauna Kea with the magnitude of the civil rights movement. He states, “So this brings to mind much more the civil rights movement, where you really have a broad base of people, not just Hawaiians, but people from many different communities who participate because they consider this an issue of involving really an important statement about being human.”  
**Tr. 05/11/2017, Vol. 26, p.59: 6-12**

438. He goes on to point out that this movement to protect Mauna Kea has garnered international support: “I think that this movement has shown a tremendous—that it has a tremendous impact on people in many, many parts of the world.”  
**Tr. 05/11/2017, Vol. 26, p.59: 16-19**

439. Dr. Osorio concludes in his written direct testimony that if the DLNR approves the permit in this contested case hearing, there will be consequences for the State of Hawai‘i government: “The conduct of the those telescope companies, DLNR, and the University of Hawai‘i, in terms of the mountain’s stewardship have already created a climate of mistrust within the Native Hawaiian Community. And the renewal of the protest on the mountain, should the TMT prevail in these hearings and try to resume construction, will shake the political foundation of this state.” **Ex. B07, p.3-4**

440. He adds in his oral testimony, “We have seen the public respond really powerfully and positively. I believe that—and that is certainly one of the things I’m talking about in talking about in terms of shaking the foundations to this state.” **Tr. 05/11/2017, Vol. 26, p.134: 4-7**

441. In cross-examination, Mr. Ing representing the TMT/TIO Corporation quoted Dr. Osorio’s testimony that, “Telescopes and the TMT would turn the summit into an industrial park” in order to mischaracterize Dr. Osorio’s conclusion. Mr. Ing asked Dr. Osorio if, “the summit is a developed piece of property. **Tr. 05/11/2017, Vol. 26, p.137: 2-15**

442. Dr. Osorio corrected him by saying, “I would say that it is not so much a developed area as an area that is being harmed by development.” **Tr. 05/11/2017, Vol. 26, p.138: 6-7**

443. Mr. Ing also asked Dr. Osorio if he felt the whole mountain is sacred. Dr. Osorio agreed. **Tr. 05/11/2017, Vol. 26, p.139: 10-18**

444. Mr. Ka‘iama, on redirect, clarified with Dr. Osorio that there is a distinction in the level of sacredness between the Wao Akua, the realm of the gods, and the Wao Kanaka, the realm of the people. **Tr. 05/11/2017, Vol. 26, p.140: 1-18**

## **The National Register of Historic Places / Bulletin 38**

445. The National Register of Historic Places contains a wide range of historic property types, reflecting the diversity of the nation's history and culture. "...groups of buildings, structures or sites forming historic districts; landscapes; and individual objects are all included..."

**Ex. Register MKAH B.01, p.1**

446. "One kind of cultural significance a property may possess, and that may make it eligible for inclusion in the Register, is traditional cultural significance. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice."

**Ex. Register MKAH B.01, p.1**

447. "A historic property, then, is significantly derived from the role the property plays in a community's historically rooted beliefs, "customs, and practices."

**Ex. Register MKAH B.01, p.1**

448. "A traditional cultural property, then, can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community."

**Ex. Register MKAH B.01, p.1**

449. "Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self respect". **Ex. Register MKAH B.01, p.2**

450. "Traditional cultural properties are often hard to recognize. A traditional ceremonial location may look like merely a mountaintop, a lake, or a stretch of river."

**Ex. Register MKAH B.01, p.2**

451. "Properties to which traditional cultural value is ascribed often take on this kind of vital significance, so that any damage to or infringement upon them is perceived to be deeply offensive to, and even destructive of, the group that values them."

**Ex. Register MKAH B.01, p.2**

452. "In the 1980 amendments to the National Historic Preservation Act, the Secretary of the Interior, with the American Folklife Center, was directed to study means of: preserving and conserving the intangible elements of our cultural heritage such as arts, skills, folklife, and folkways." **Ex. Register MKAH B.01, p.2**

453. Ethnocentrism is a means of viewing the world and the people in it only from the point of view of one's own culture and being unable to sympathize with the feelings, attitudes, and beliefs of someone who is a member of a different culture. It is particularly important to understand, and seek to avoid, ethnocentrism in the evaluation of traditional cultural properties. Bulletin 38 Ex. Register MKAH B.01, p.4

454. The authors of the archeological analysis for the FEIS failed to take into account intangible aspects of the cultural significance of the proposed project that is in the historic district. Tr. May 11, 2017, Vol. 27, p.36 22-25, p.37 1-

## **C. EVIDENTIARY HEARING**

### **The Conservation District of Mauna Kea**

455. The Mauna Kea summit region is designated as part of the State of Hawai'i Conservation District Resource subzone and as such, uses on the land are subject to the Conservation District rules (HAR 13-5) and permit conditions. The conservation district is administered by the State of Hawaii Department of Land and Natural Resources (DLNR) as directed by the Board of Land and Natural Resources (BLNR). Effective January 1, 1968, the BLNR leased the land (General Lease S-4191) to the University of Hawaii; the lease terminates on December 31, 2033. A001 p.1-1

456. The Conservation District is comprised of areas in which natural resource conservation is a recognized concern on Mauna Kea, encompassing at least 106,000 acres (11,308 acres of UH managed lands, 3,894 acres of NAR, 52,500 Mauna Kea Forest Reserve, and 38,300 acres of the Hakalau Refuge). A010, NRMP, p.1-11,1-12

457. Extending into a portion of the Mauna Kea Science Reserve is the Mauna Kea Ice Age Natural Area Reserve, between 10,400 and 13,200 feet elevation. The NAR designation was approved by the BLNR on November 9, 1978, a CDUA for the area was approved in 1981, and the executive order establishing the reserve was signed in that year. A012, Public Access Subplan, p.2-2

### **National Natural Landmark: Geologic features**

459. "Rising nearly 33,000 feet from the ocean floor, with a peak elevation of 13,796 feet, Mauna Kea is the highest point in the Pacific Basin and the highest island mountain in the world. Ex. A009 CMP Appendix 4, p.9

460. Mauna Kea was listed as a National Natural Landmark in 1972. One of the reasons given for placing the mountain on this register by the National Park Service is that Mauna Kea is the "Most majestic expression of shield volcanism in the Hawaiian Archipelago, if not the world." Ex. A009 CMP Appendix 4, p.9

461. Since 1972, Mauna Kea has been designated as a National Natural Landmark and listed in the registry of National Natural Landmarks as a result of its singular topography, morphology, and geology. **Ex. A003 FEIS, p.3-106**

462. “Few sites possess [sic] better credentials to justify their national significance than does Mauna Kea.” **Ex. A003 FEIS, p.3-106**, quoting a Mauna Kea NNL program.

463. Abundant evidence of glacial striae, boulders, **police** and grooves shows that an ice cap covered Mauna Kea’s summit during the Pleistocene era.

**Ex. A003 FEIS Vol. 1, p.3-106** (citing the U.S. National Park Service’s description of Mauna Kea National Natural Landmark).

464. “Mauna Kea is currently estimated to be between 600,000 and 1.5 million years old and is considered by the U.S. Geological Survey (USGS) to be an active post-shield volcano. While there has been no recent volcanic activity at Mauna Kea, volcanologists believe that it “is likely to erupt again.” **Ex. A009 CMP, p.5-24,5-25**

465. First and foremost, Mauna Kea is the exposed portion of the highest insular mountain in the United States, rising up over 30,000 feet above its submerged base in the Pacific Ocean. Second, on its slopes is found Lake Waiau, the highest lake in the United States. Third, though located in the tropics, indisputable evidence of glaciations is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities, is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago, if not in the world.

Rory Westberg, Acting Regional Director, NPS **Ex. A004 FEIS Vol II p.4 of 531**

466. The objectives of the NNL program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation’s natural heritage. Laura Thielen, Chair, DLNR **Ex. A003 FEIS Vol II, p.19 of 531**

467. Though located in the tropic, indisputable evidence of glaciation is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. **Ex. A003 TMT EIS Vol. II, p.3-6**

468. The Mauna Kea National Natural Landmark is held in trust by the State of Hawai‘i, and its 83,900 acre boundary incorporates the lands within the conservation district, including the Mauna Kea Science Reserve, Ice Age Natural Area Reserve, and the Mauna Kea Forest Reserve. **Ex. A003 TMT EIS Vol. II, p.3-6**

469. Other unique geologic features of Mauna Kea include numerous cinder cones (pu‘u) that rise above lavas of the upper plateau, and evidence of glaciers that covered nearly 27-square miles of the summit region during the Pleistocene Epoch (Ice Ages) approximately 18,000 years before present.” **Ex. A009 CMP Appendix 4, p.9**

470. “Because of its elevation, Maunakea’s summit was repeatedly glaciated during the past few hundred thousand years, and preserves the best glacial record of any oceanic volcano on Earth.” Ex. A003 FEIS, p.3-105

471. Hawaiian Hotspot’ magmas, pushed up through the oceanic crust, began building Mauna Kea approximately 750,000 years ago. Throughout its building stages, a’a and pahoehoe lavas flowed from three main rift zones, forming a volcano resembling a warrior’s shield. Towards the end of the post-shield stage eruptions became more explosive, discharging magma referred to as tephra. These eruptions created the numerous cinder cones dotted across the highest elevations of Mauna Kea. Ex. A009 CMP Appendix 4, p.9

472. “Three cinder cones (pu’u) make up the summit of Mauna Kea (Pu’u Hau’oki, Pu’u Wēkiu, and Pu’u Haukea), collectively referred to as Pu’u o Kūkahau’ula, a traditional deity associated with fisherman families. There are additional cinder cones (e.g., Pu’u Keonehehe’e, Pu’u Makanaka, Pu’u Poepoe, Pu’u Poli’ahu, Māhoe, and Pu’u Waiiau) below the summit.” Ex. A009 CMP Appendix 4, p.9

473. Mauna Kea has two series of volcanic rocks. The older Hamakua series, mostly composed of olivine basalts, forms the bulk of the mountain. The Laupahoehoe series consists of “hawaiites” and comprises a veneer that overlays the upper part of the mountain. Ex. A048 2000 Master Plan, p.IV-1

474. Subglacial volcanic eruptions gave rise to lava flows that cooled quickly, yielding a fine grained, dense black rock called obsidian, prized by Hawaiians for adzes, at a site known as Keanakako’i. Ex. A048 2000 Master Plan, p.IV-2

475. Due to glaciation during the last ice age of the Pleistocene era, ice covered approximately 27 square miles of the summit and ranged in thickness from 200-350 feet, to elevations of 10,500 feet, where ash and cinder were scraped away by glacial flow erosion. Ex. A048, p.IV-1

476. Glacial moraine and meltwater deposits of fine sediments, and glacially sculpted features of cinder cones are evidence of summit glaciation that led to the formation of Lake Waiiau, one of the highest lakes in the United States. Ex. A048, IV-2

477. The proposed TMT location is entirely underlain by a single lava flow. A single chemical analysis of this lava flow shows the flow to be of typical “hawaiite” composition (a type of alkali-rich basalt). Ex. A003 FEIS, Vol. 1 p.108

## Natural Resources of Mauna Kea

### Aeolian Ecosystem

478. “The summit of Mauna Kea (12,800 to 13,796 ft) is considered an Alpine Stone Desert. Several species of mosses and lichens, an unknown number of species of algae, some vascular plants constitute the plant community in this region. Most of the species of plants found in the region are endemic (occurring only in Hawai‘i) or indigenous (native to Hawai‘i but occurring elsewhere). A few non-native plant species have also become established here, even at the summit.” Ex. A009 CMP, p.5-37, 5-38

479. During the Pleistocene era, an ice cap covered approximately 27 square miles of the upper regions of Mauna Kea and “scour[ed]” the area it covered.  
Ex. A048 2000 Master Plan, p.IV-1

480. Classic terminal, polished rock outcrops, and glacial till deposits resulted from glacial-scouring. These features, combined with snowfall and wind patterns of the summit area, “support various forms of plant and animal life.” Ex. A048 2000 Master Plan, p.IV-1, IV-2

481. The landscape that exists today [on Mauna Kea] was formed by volcanic and glacial activity and is a unique environment for insects, spiders, lichens, ferns, and mosses. Rocky outcrops, loose cinder, and smooth lava flows make up habitats that combine with snowfall and wind patterns of the summit area to support various forms of plant and animal life.”  
Ex. A048 2000 MP p.IV-1

482. “The Maunakea summit area is well above the atmospheric temperature inversions that occur around 7,000-feet. Particulates and aerosols like vog (volcanic gas), smog, dust, smoke, salt particles, and water vapors generated below the inversion level are “capped” by the temperature inversion, so they do not rise above the inversion level and do not cause any interference at the summit.” Ex. A003 FEIS, p.3-182

483. High winds are common at the summit, but wind velocities usually range from 10 to 30 miles per hour. Winds gust up to 100 miles per hour in the upper regions of Mauna Kea, creating an aeolian (influenced by wind) ecosystem. Ex. A003 FEIS Vol. 1, p.3-183

484. Anabatic winds occasionally penetrate the inversion layer, bringing insects and small volumes of air from lower elevations. Ex. A003 FEIS Vol. 1, p.3-183 to 3-184

485. “Wind vectors (direction and speed) across the summit area play a large role in the aeolian environment, transporting small debris including bugs from lower elevations up to the summit area. Obstructions to wind flow such as at the crests of the pu‘u can redirect the wind or slow it, creating eddies or small vortexes that reduce the energy, or holding capacity, of the wind, allowing debris in the air parcel to fall out. The aeolian environment of the summit area is unique, the persistent wind forcing resident fauna to adapt (see Section 2.2.2.2).” Ex. A010 CMP NRMP, p.2.1-43

486. Winter temperatures in the upper regions of Mauna Kea range from 10-40 degrees Fahrenheit. Summer temperatures range approximately between 30 to 60 degrees.  
Ex. A003 FEIS Vol. 1, p.3-183

487. The 300 feet wide, approximately 10 foot deep, alpine lake, Wai'au, is "unique and revered." Ex. A009 2000 Master Plan, p.IV-2

488. The southern rim of Lake Wai'au is the rim of a subglacially-formed cinder cone, Pu'u Wai'au. Ex. A003 FEIS, Vol. 1, p.3-115

### **Floral Communities**

489. Seemingly barren, desolate, and unchanging, the natural environment of the upper slopes and summit area are actually very much alive, revealing through its topography, geology, and climate an impressive history of geomorphic process and ecosystem development. Ex. A009 CMP, p.5-24

490. Although it may appear barren to the casual observer, the summit of Mauna Kea supports an interesting variety of species, many of which are found nowhere else in the world. Ex. A009 CMP, p.5-38

491. UH Management Areas on Mauna Kea contain two ecosystems: the Alpine Stone Desert above 12,800 feet; and the Alpine Shrublands and Grasslands from roughly 9,500 feet to 12,800 feet. Ex. A003 FEIS Vol. 1, S-4

492. Vegetation above 12,800 feet in the upper regions of Mauna Kea consists primarily in the lichens, moss, and ferns that have adapted to its severe climatic conditions.  
Ex. A003 FEIS Vol. 1, p.3-80

493. An unknown number of algal species and some vascular plants of species found at lower elevations also inhabit the summit region. Ex. A009 CMP, p.5-37

494. Native grass species—Hawaiian bentgrass (*Agrostis sanwicensis*), pili uka (*Trisetum glomeratum*), and fern species ('iwa'iwa (*Asplenium adiatum-nigrum*) and Douglas' bladderfern (*Cystopteris douglasii*) are found at elevations above 12,800 feet as well.  
Ex. A009 CMP, p.5-38

495. The highest density of the 21 known species of lichens in the alpine stone desert region of Mauna Kea grow on north and west faces of rocks, away from direct morning sunlight.  
Ex. A003 FEIS Vol. 1, p.3-61

496. In 1982, 25 lichen species were found on Mauna Kea. Half of those species are endemic to Hawai'i, two of which occur only on Mauna Kea.  
Ex. A048 2000 Master Plan, p.IV-3

497. Twelve species of mosses have adapted to the alpine stone desert region and tend to cluster under rock overhangs, where moisture concentrates. Two indigenous species of mosses were detected in a recent botanical survey of the proposed Northern Plateau site for the TMT. **Ex. A003 FEIS Vol. 1, p.3-61**

498. Of the 25 different lichens found in 1982, half of the species were endemic to Hawai'i, with two occurring only on Mauna Kea. Of the twelve mosses found in the summit area, less than a quarter were endemic. The fern *Cystopteris douglasii* was one of six vascular plants found at the summit, and the Mauna Kea Silversword, a sub-species unique to the mountain, was once reported in the summit region. **Ex. A048 2000 Master Plan, p.IV-2,3**

499. Lichens at the summit of Mauna Kea are the dominant element of the vegetation even though they provide only a trace of cover in this severe essentially unvegetated landscape. It appears that the only limiting factor of lichen growth is the physical environment.  
**Ex. B. 64 Appendix D1**

500. Lichens in the TMT area include a macrolichen community dominated by foliose *Umbilicaria decussate*; where it occurs it is growing over 50% of vertical surfaces with a north to northeast aspect. *Umbilicaria decussate* is nearly always accompanied by *Pseudephebe miniscula*, *Rhizocarpon geographicum*, and *Lecidea baileyi* on vertical rock faces of andesite blocks, which suggests that special conditions allow growth there and not elsewhere. **Ex. B.64, APP D-5,6**

501. The most common species in the Mauna Kea crustose flora are *Lecanora polytropa*, *Lecidea baileyi*, and *Candelariella vitellina*, which are widely dispersed throughout the area.  
**Ex. B.64 APP-D5**

502. There are four principal environmental factors that determine the lichen and moss vegetation and species composition: substrate, moisture, temperature, and ultraviolet radiation. **Ex. B.64 APP D2**

503. There are four principal substrate types in the summit area:

- a) Andesite slabs and blocks of grey rock, with few blisters, which form the large large lava flows; water drains off rapidly;
- b) Glaciated pahoehoe with numerous blisters where water can accumulate; lichens can accumulate
- c) Glacial rubble, rocks under the surface layer often have lichen growing
- d) Cinder and ash is too unstable to support lichen growth

**Ex. B.64 APP D2**

504. In May of 2011, Eric Hansen, witness for KAHEA, began working as the field crew leader for the Mauna Kea baseline botanical survey commissioned by the Office of Mauna Kea Management. **B.10a at 1, B.10b at 3, Tr. 01/19/2017, V. 27 p.143:12-14, 144:22-25, 145: 1-3, 150: 9-15, 19-21**



505. Mr. Eric Hansen was responsible for leading a field crew in conducting an intensive study of the entire Mauna Kea Science Reserve in the alpine and subalpine zones, and he helped establish vegetation survey transects.

506. Mr. Hansen testified that eleven of the 67 plant species identified in the OMKM Botanic Baseline Survey (Exhibit 64) were recorded in the summit region.

**Tr. 01/19/2017, V. 27 p.157:18-21**

507. During the time of the 2011 baseline botanical study, fieldwork for a subcontracted lichen study of the proposed Thirty-Meter Telescope site (Area E) was also conducted by Mr. Hansen's field crew for Pacific Analytics, a subcontractor of Parson's Brinkerhoff who were contracted by UH Hilo. The lichen study, authored by Dr Cliff Smith, is included as Appendix D to the OMKM Botanic Baseline Survey (2011) of the University of Hawai'i's Managed Lands on Mauna Kea. **Ex. B.64**

**B.10a at 1, Tr. 01/19/2017 Vol 27:145:18-24 Vol. 27: 146: 16-25, 147: 1-6, 155: 15-18, 178: 18-21, 179: 1-6**

508. While performing the lichen study at the proposed TMT site, Mr. Hansen and his crew also documented non-lichen species in the region; these included two endemic (only found in Hawai'i) grasses, *Agrostis sandwicensis*, *Trisetum glomeratum* and two endemic ferns, *Cystopteris douglasii* and *Asplenium trichomanes*; as well as three indigenous (naturally arrived to Hawai'i on their own but found in other places) ferns, *Asplenium adiantum-nigrum*, *Dryopteris wallichiana*, and *Pellaea ternifolia*.

**B.10a at 1, Tr. 01/19/2017, V. 27 at 146: 16-25, 147: 1-6, 155: 15-18, 178: 18-21, 179: 1-6**

509. Currently considered a species of concern by the USFWS, the Douglas' bladderfern (*Cystopteris douglasii*), are known to occur in the Maunakea summit region. The Douglas' bladderfern was found throughout Area E. **Ex. A005, TMT FEIS, p.3-65**

510. Species of Concern are those species about which regulatory agencies have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act.

**Ex. A005, TMT FEIS, p.3-65**

511. Though not apparent at a distance, when examined closely, unique assemblages of botanical communities exist at the proposed TMT site (Area E).

**B.10a at 1, Tr. 01/19/2017, V. 27 at 147:7-14, 151:24-25, 152:1, 155: 10-18, 156:4-16, 157:9-17, 183:7-13**

512. During the 2011 Botanical Baseline Survey fieldwork, Mr. Hansen and his team did not find the distinct assemblage of botanical species found at Area E in other areas at the same or similar elevations of Mauna Kea.

**B.10a at 2, Tr. 01/19/2017, V. 27 at 147:15-17, 194:4-6**

513. The presence of large boulders in Area E (including the site of the proposed TMT) that have small pockets where moisture (include melted snow) can collect beneath them allows for unique botanical assemblages; these pockets are shaded, protected from direct exposure to the sun and high winds which allows for lower evapotranspiration rates.

**B.10a at 2, Tr. 01/19/2017, V. 27 at 147:18-25, 151:15-23, 152:4-19, 155:10-18, 156:4-16, 20-24, 170:20-25, 171:1-3, 179:7-12**

514. The substrate in Area E which includes a pahoehoe lava flow and other pohaku that are unique from the cinder substrate of the pu'u of Mauna Kea.

**Tr. 01/19/2017, V. 27 at 154:3-18, 156:25, 157:1-8, 184:3-11, 185:11-15**

515. (Unlike the TMT project area), Cinder cones are not conducive for providing habitat for species of botanical origins. **Tr. 01/19/2017, V. 27 at 180:14-16**

### **Arthropod Fauna**

516. The only resident animal species in the summit area are arthropods. At least ten indigenous Hawaiian arthropod species are residents of this area: wēkiu bugs (*Nysius wēkiuicola*), lycosid wolf spiders (*Lycosa sp.*), two sheetweb spiders (genus *Erigone*), two mites (Family Aystidae and Family Eupodidae), two springtails (Family Entomobryidae), a centipede of the *Lithobius* species, a noctuid moth (*Agrotis sp.*).

**Ex. A001 UH/TMT CDUA, p.3-6**

518. Despite their rarity, critical habitat for arthropod species is unknown or poorly defined because very little is known about their life cycle, population size, fecundity, and area distribution. **Ex. A048, p.XI-22**

519. Little information exists about the habits of arthropod species in the summit area, except the wēkiu bug. **Ex. A0101CMP, p.5-39**

520. Wēkiu bugs have adapted to Mauna Kea's aeolian ecosystem; their food supply consists of insects blown from lower elevations towards the summit. **Ex. A-308 3-62**

521. Wēkiu bugs are generally concentrated on the cinder cones in the summit area, habitats include snow patches (Type 1), tephra ridges and slopes (Type 2), loose, steep tephra slopes on the outer flanks of the cones, known as Type 3 habitat, Lava flows (Type 4) talus slopes and rock outcrops (Type 5) and compacted fine-grained material (Type 6).

**Ward WDT B.17a p.11**

522. Dust can impact lichens, mosses, and ferns and is believed to degrade Wēkiu bug habitat. **Ex. A005, App. K, p.31; A003 FEIS Vol. 1, p.3-70**

523. It has become clear that while Wēkiu bugs can range broadly over the summit when food sources and climate are favorable, the prime habitat is rims and inner craters of cinder cones. These are ice-free areas that rose above the once surrounding glacier (nunataks), as described by Englund and Porter 2006, sometimes on the flanks and base where cinder has accumulated (Eiben 2010).

524. Arthropod and Botanical Inventory and Assessment, by Pacific Analytics, L.L.C.  
**Ex. A-005 Appendix K FEIS Vol III**

525. Information on relationships between wind and climate variables and wēkiu bug food availability is lacking. **Ex. A-010 CMP NRMP, p.2.1-44**

526. In 1982, wēkiu bugs were found in abundance above 13,450 ft and on undisturbed areas on Pu‘u Wēkiu and Pu‘u Ha‘oki and on stable accumulations of loose cinders and tephra rocks with interstitial spaces that allowed the bugs to access moisture and shelter.  
**Ex. A-010 CMP NRMP, p.2.2-34**

527. Such hospitable environments for wēkiu bugs are found on cinder cones on the Mauna Kea summit as well as the flanks and bases of cinder cones. **Ex. A009 CMP, p.5-39**

### **Water Resources**

528. On an ocean island two thousand miles from the next nearest land mass, fresh water is the source of life. Protection of the aquifer is tantamount to providing the generations to come with life-giving sustenance. The summit of Mauna Kea, the highest point in the Pacific, is the apex of the aquifers that radiate from the summit.

529. The regional aquifer beneath the summit of Mauna Kea is entirely fresh water. As evidenced by most seeps and springs, shallow groundwater does exist in the mountains flanks below the summit area. Analysis of spring water shows it to be recent and identical to rainfall at the summit. At least some of the water percolates downward to ultimately discharge as a spring or seep.

**Ex. A003 FEIS Section 3.7 Water Resources and Wastewater p.3-115,3-117**

530. The Astronomy Precinct is located entirely above the Waimea Aquifer.  
**Ex. A010 NRMP 2.1-38**

531. Applicant’s evidence indicates that, except for Lake Waiau, which has an impermeable layer beneath it, rainwater and snowmelt at the summit “continues its downward migration to the regional aquifer” of Hawai‘i Island.

**Ex. A003 FEIS Section 3.7 Water Resources and Wastewater p.3-115**

532. Applicant’s evidence indicates that drainage at the summit occurs through percolation of rainfall through cinder and broken rock substrates.

**Ex. A003 FEIS Section 3.7 Water Resources and Wastewater p.3-117**

533. Applicant states that, “In the summit region, annual precipitation ranges from approximately 20 inches at the Very Long Baseline Array (VLBA) at an altitude of 12,600 feet to approximately 15.5 inches (including snowfall) at the Subaru Observatory at an altitude of 13,575 feet. Storms, including wintertime cold-fronts, upper-level and surface low-pressure systems, tropical depressions, and hurricanes provide the majority of annual precipitation over a very short period of time.” Ex. A003 FEIS Vol. 1 at 3-183

534. Significant snowfall is known to occur during any month of the year, but is concentrated during January through March. Ex. A003 FEIS Vol. 1 at 3-183

535. Buried ground ice in two of the summit cinder cones show that permafrost exists near the summit. Ex. A048 2000 Master Plan at IV-1

536. Applicant’s evidence also indicates that surface runoff at the summit does not extend below an elevation of 6,000 feet, which means that “the majority of the water ultimately ends up percolating and becoming groundwater recharge with only a small amount lost to evaporation.” Ex. A003 FEIS section 3.16 Cumulative Impacts p.3-219

537. The Island of Hawai‘i contains high water levels in the rift zones of Kilauea and Kohala Volcanoes. High water levels, possibly associated with a buried rift zone of Hualalai Volcano or fault scarps draped with lava flows, are also present along the western coast. Areas of high water levels also are found along the northern flank and eastern flanks of Mauna Kea and on the southeastern flank of Mauna Loa. These high water levels are not fully understood. Ex. B17w USGS Groundwater in Hawaii p.3

538. Four components of the hydrology of the Mauna Kea summit region remain unknown: 1) watershed calculations of snow-water distribution, 2) outcomes of leachate and liquid waste from septic and cesspool systems, 3) distribution and impacts of permafrost, and 4) groundwater maps of water levels, flow paths, and recharge rates. Ex. A010 CMP NRMP, p.2.1-39

539. Applicant states that Groundwater transportation rates in the summit region of Mauna Kea are unknown, and no flow paths have been identified. It is generally believed that groundwater flows along the direction of the ground surface slope, although the presence of variable subsurface features, such as dikes and sills, with low hydraulic conductivity, likely alter groundwater flow rates and flow paths. Groundwater flow-paths are important to understanding the potential movement of leachate from underground waste water systems. Ex. A009 CMP 5-32 (pdf p.82)

540. Although the amount of precipitation that infiltrates into the ground is unknown, it is generally accepted, and is reported by the NRCS (Sato et al. 1973), that surface infiltration rates in the summit region are high, and that during heavy precipitation events, water reaching the ground surface infiltrates quickly. The depth and rate of transmission of water that infiltrates is unknown and most likely varies depending on the rock type and the subsurface structure. Ex. A009 CMP 5-32 (pdf p.82)

541. Applicant states that the regional aquifer beneath the summit is what is referred to in Hawai'i as "high-level," which means that the aquifer is entirely fresh water, not fresh water floating on salt water, and geologic structures, such as a volcanic sills and dikes, isolate the water. **Ex. A003 FEIS Vol I 3-115 (pdf p.203)**

542. The surface runoff does not extend to or below an elevation of 6,000 feet, which means that the majority of the water ultimately ends up percolating and becoming groundwater recharge with only a small amount lost to evaporation.  
**Ex. A003 FEIS Vol I 3-219 (pdf p.307)**

543. As evidenced by modest spring and seeps, shallow groundwater does exist in the mountain's flanks below the summit area. The most prominent of these springs and seeps are the series of springs found near Pōhakuloa and Waikahalulu Gulch. This indicates that at least some of the rainfall and snow melt at the summit percolates downward to a perching layer to ultimately discharge at the ground surface as a spring or seep.  
**Ex. A003 FEIS Vol I 3-117 (pdf p.205)**

544. Groundwater flowing downslope is the water source for seeps and streams found between 8,500 and 11,000 ft (2,591 and 3,353 m), near Pōhakuloa and Waikahalulu Gulches (Woodcock 1980; Arvidson 2002). **Ex. A009 CMP 5-30 (pdf p.80)**

545. There is evidence that the water discharging at the seeps and springs is derived from recent rainfall and snow melt across the upper slopes of Mauna Kea (Arvidson 2002; Ehlmann et al. 2005). **Ex. A009 CMP 5-30 (pdf p.80)**

546. Hydrologic conditions were strikingly different from those predicted by conventional models for ocean islands: the formation was dry down to only ~150 m where the first, thin, perched aquifer was encountered; a second, more substantial, perched aquifer was reached at only ~220 m depth that extended to ~360 m where a sequence of (remarkably thin) perching formations were recovered in the core down to about 420 m where unsaturated rocks were again encountered. Initial analysis of the core suggests that thin, clay-rich, perching formations in the shallow stratigraphic column play a much larger role in groundwater transport than has generally been recognized.  
**Ex. B.17x SAO Mauna Kea Aquifer studies on PTA p.2**

547. Aquifers formed of postshield-stage rocks have been generally regarded to have lower permeability than shield-stage lava flows, but the very young postshield rocks on the Big Island have some of the highest hydraulic conductivities (tens of thousands of feet per day) reported for volcanic rocks in the Hawaiian Islands.  
**Ex. B.17y Hawaii Volcanic Rock Aquifer Study p.3**

548. Volcanic intrusives, or dikes, on Mauna Kea create compartments which are essentially permeable (sic, transcript error) so when you get recharge (or runoff) it is deposited in dike-confined compartments. That's what we call the existence of high-level groundwater, and its relative impermeability of these intruded dikes that create high level groundwater.  
**Nance Tr.12.13.16 V16**

549. Mr. Nance stated that an aquifer is a groundwater body defined by boundaries, high-level or basal. How they fit together on this island he couldn't say. There are more aquifers than there are regulated aquifer systems. **Nance Tr.12.13.16 V16 p.112:19-25, 113:1-2**

550. Three potable wells are tapped into high level dike-confined groundwater.  
**Nance Tr.12.13.16 V16 at 113:7-8**

### **Recreational Resources of Mauna Kea**

551. Mauna Kea kuahiwi ku ha'o i ka mālie (Mauna Kea is the astonishing mountain that stands in the calm). Ōlelo No'eau. **Ex. A001 CMP**

552. The views of Mauna Kea and the view from Mauna Kea are significant and have been for centuries. **Ex. A-010 CMP NRMP, p.2.1-47**

553. The unique topography, location and views draw many hikers to Mauna Kea to explore the few established, but unmarked trails in the summit region.  
**Ex. A001 CDUA TMT Mgt Plan, p2-5**

554. Residents from around the island value the changing colors of Mauna Kea throughout the day, with people from the eastern side describing the mountain's beauty at sunrise, while those on the northwestern side experience the sunsets.  
**Ex. A-302 CMP NRMP, p.2.1-47, quoting Kepā Maly (1999)**

555. Approximately 72 percent of the Hawai'i Island population resides in an area impacted by views of telescopes on Mauna Kea. **Ex. A-308 FEIS, p.3-82**

556. Numerous recreational activities take place on Mauna Kea. Visitors come to Mauna Kea each year to sightsee, view the stars, tour the world-class observatories.  
**Ex. A001 CDUA TMT Mgt Plan 2-5**

557. Different categories of people that view Mauna Kea (e.g. residents, sightseers, and cultural practitioners) have differing expectations, and these differences greatly affect their perception of the observatories. **Ex. A001, p.7-2**

557. The Applicant concedes that the visual impact of past actions on Mauna Kea, such as the 11 observatories currently located within the Astronomy Precinct, is considered substantial, significant, and adverse.  
**Ex. A-308 FEIS Section 3.5 Visual and Aesthetic Resources p.3-101**

558. Sierra Club member Mae Mull was an ardent advocate for a Mauna Kea Master Plan for long term land use and natural resource protection. She said, “The primary goals of the master plan should be permanent protection of Mauna Kea’s natural beauty and rare native ecosystems and to provide for public recreational use. Big island residents, conservationists, hunters, public planners and most of Hawai‘i’s people have special regard and respect for Maun Kea. ...To destroy the unique natural values of the mountain for the sake of astronomical observation of outer space is not progress by any **measure**. **Just** because other countries won’t permit desecration of their mountaintops...these are not good reasons to turn our precious mountain into a playground for astronomers.”

**Ex. B.17 n Mae Mull Elepaio 1974**

559. Several trails traverse the Mauna Kea summit region. Among these are the Mauna Kea Humu‘ula Trail and the Mauna Kea Umikoa Trail. The Mauna Kea Humu‘ula Trail begins near Hale Pohaku and ends near Lake Waiiau. A modern trail around the western side of Pu‘u Haukea connects the Mauna Kea Humu‘ula Trail with the Mauna Kea Access Road close to the Batch Plant Staging Area. Proposed TMT-related use of the Batch Plant Staging Area will be visible to trail users during the construction period. **Ex. A001 Cдуа p.2-4**

560. Based on the large number of shrines in the summit area it is clear that Hawaiians went to the top of the mountain with a sacred purpose in mind, but it is doubtful that large numbers were involved at any one time. The ritual landscape that exists today is almost certainly the result of journeys by a number of families and adze makers over many generations. The cluster of overlapping cinder cones that forms the “summit” of Mauna Kea, including those now called Pu‘u Wēkiu, Pu‘u Kea, Pu‘u Hau Oki, and others that are not easily distinguished as discrete landforms (Porter 1979), has been designated an historic property (Site 21438) based on ethnographic information and archaeological data. Ethnographic information suggests that the “summit,” as just defined, was most probably known in the past by a single name, Kūkahau‘ula, that on present evidence referred to both a legendary figure and to a character in traditional histories and genealogies. The latter includes references to Kūkahau‘ula as the husband of Līlīnoe and as an ‘aumakua (family deity) of fishermen. The place name evidence thus indicates that the “summit” was at the very least a legendary place (wahi pana Pukui and Elbert 1971, 1986). The archaeological evidence indicates that it was much more than that. While there is little archaeological evidence of human activity on the “summit” itself, the large numbers of shrines that encircle the mountain, just below indicate that the top of the mountain was the focal point of ritual practices. There is no knowledge of what these practices entailed, but it is reasonable to infer that they were centered on the worship of local mountain gods and goddesses, such as Poli‘ahu and Līlīnoe, and presumably Kūkahau‘ula as well. The summit is thus interpreted to have been the focal point of a major pilgrimage site or center.

**Ex. A122 Archaeological Survey of Mauna Kea NAR p.7-12,13**

561. The cumulative impact of intensified industrial land use at the summit has impacted my recreational enjoyment and spiritual practice. The cumulative impact of the destruction of habitat, widespread waste accumulation, obstruction of viewplane, constant sound, alteration of the geology, and negative impact to the cultural practice of my colleagues is a source of personal grief. The summit would be silent if there was no development at all. It is not silent. The noise of observatory air conditioning, blowers, generators, associated vehicles and industrial activity is present and disturbing to recreational users who hope for the pristine silence of wilderness. **Ex. B.17a Ward WDT p.2**

562. Noise level in the vicinities of the existing observatories varied from 38 dBA to 77dBA Leq, and 40-78 dBA L10, with noise levels at or below 60 dBA Leq beyond a distance of 50 feet from HVAC exhausts. The loudest noise levels of 68 and 77 dBA Leq and 69 and 78 dBA L10, were measured at locations within 15 feet of HVAC exhaust outputs. **Ex. A003 FEIS Section 3.13 Noise p.3-175, 176**

563. Threats to Mauna Kea's air quality and sonic environment primarily revolve around the presence of humans and their levels of activity. Potential future increases in the number of people visiting, working, and recreating at the UH Management Areas may increase the levels of these impacts. **Ex. A-010 CMP NRMP p.2.1-46**

#### **Cultural Resources of Mauna Kea**

This section will be best addressed by other parties in this hearing.

#### **Oversight of UH Activities on Mauna Kea**

##### **General Lease**

564. The site on which the TMT is proposed is within the Mauna Kea Science Reserve (the "Science Reserve"), which the University holds and manages pursuant to General Lease No. S-4191 (the "Master Lease") from the BLNR. The University also holds and manages the Hale Pohaku Mid-Level Facilities under General Lease No. S-5529 and the Summit Access Road under Grant of Easement No. S-4697.

565. The General Lease (S-4191), dated June 21, 1968, states that the university: 12.) "shall not damage, remove excavate, disfigure, deface, or destroy and object of antiquity, prehistoric ruin, or monument of historic value." **Ex. B.17f, General Lease (S-4191), p.5**

566. The General Lease (S-4191) requires that, 5.) "The lessee shall not sub-lease, subrent, assign or transfer any rights there under without the prior written approval of the BLNR." **Ex. B.17f, General Lease (S-4191), p.4**

567. The General Lease (S-4191) states that, 2.) "The lessee shall keep the demised premises and improvements in a clean, sanitary, and orderly condition. **Ex. B.17f, p.3**



568. The General Lease (S-4191) states that, “Improvements shall be such improvements may be abandoned in place.... removed or disposed of by the Lessee at the expiration or sooner termination of the lease, provided, that with the approval of the Chairman requires that items be removed before the lease termination, or be abandoned with prior approval from the DLNR. **Ex. B.17f, p.4**

569. The General Lease (S-4191) states that, 1a)”No activity shall be permitted which will result in the pollution of the waters of Lake Waiau” **Ex. B.17f, p.2**

570. General Lease S-4191 from DLNR to the University for the use of the Mauna Kea Science Reserve does not confer an expectation of exclusivity onto the University.  
**Ex. B.17f, p.4**

### **Scope of the Mauna Kea Conservation District**

571. “Because living things, ecosystem processes, and cultural practices are not usually confined by administrative boundaries, it is important for the NRMP for the UH Management Areas to consider the user activities, management issues and regulations (or lack thereof) on lands adjacent to the focus area.” **Ex. A-010 CMP NRMP, p.1-11**

572. The 1977 Management Plan for Mauna Kea (see below) identified the scope of the Mauna Kea conservation district as from the summit down to the 6,000-foot elevation and including all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Kaohe Game Management Area.  
**Ex. B.17g, p.1**

573. The Mauna Kea Ice Age Natural Area Reserve (NAR) was established in 1981 and is comprised of two parcels that abut the Mauna Kea summit region. One is 143.5 acres and a larger, triangle shaped parcel is 3,750 acres. These areas contain Lake Wai’au and the Mauna Kea Adze Quarry. **Ex. A-010 CMP NRMP, p.1-12**

574. The approximately 52,500 acre Mauna Kea Forest Reserve surrounds the UH managed areas and the NAR, and contains critical māmane habitat for the endangered Palila bird.  
**Ex. A-010 CMP NRMP, p.1-12**

575. The Hakalau Forest National Wildlife Refuge encompass 33,000 acre Hakalau forest Unit and the 5,300 acre Kona Forest Unit. **Ex. A-010 CMP NRMP, p.1-12**

576. Pōhakuloa Training Area (PTA) lands total 108,863 acres that extend up the lower slopes of Mauna Kea to an approximate altitude of 6,800 ft. PTA contains critical Palila bird habitat, fifteen federally listed threatened and endangered plants, three federally listed endangered bird species, and one federally listed bat species.  
**Ex. A-010 CMP NRMP, p.1-12**

## **Mauna Kea Plan, May 1977**

577. In 1974, George Ariyoshi expressed concerns that “social pressures for more intensive use of Mauna Kea for scientific, recreational, and other purposes pose a threat to the priceless qualities of that mountain...” He wrote to Sunao Kido, then Chairman of the BLNR, directing that the agency “develop and promulgate, as expeditiously as possible, a Master Plan for all of Mauna Kea above the Saddle Road.” This Master Plan was directed to include provide for Plan enforcement and amendment.

**Ex. B.17g DLNR, The Mauna Kea Plan (May 1977), p.2**

578. The plan was prepared by DLNR staff, and approved on February 11, 1977 following two public hearings. **Ex. B.17g, p.2-3**

579. The Mauna Kea Plan is a policy guide on land use and management adopted by the board of Land and Natural Resources; the plan shall be reviewed annually, and any proposed amendments shall be in accordance with procedures adopted by the Board. **Ex. D-3 p.10**

580. The area covered by this plan extends from the summit down to about 6,000 feet, and includes all conservation district land from the summit of Mauna Kea down to the Saddle Road. **Ex. B.17g, p.1**

581. The objectives of the plan were to determine the capability of Mauna Kea’s resources to accommodate various uses without unacceptable damage to biotic and other natural values and historic values, and the visual appearance of the mountain, and to recognize the significance of MK’s summit for astronomical research and let a limitation on facilities based on need and environmental concerns. **Ex. D-3, p.1**

582. Any use of the lands will be, however subject to regulations under County, State and Federal laws. **Ex. B.17g, p.5**

583. No application for any proposed facility shall have final approval without the applicant having first filed, with the board, adequate security equal to the amount of the contract to construct the telescope facilities, support facilities and to cover any other direct or indirect costs attributed to the project. **Ex. B.17g, p.5**

## **The 1995 Revised Mauna Kea Management Plan**

584. In 1995 the BLNR and the University sought to amend the MKSRCDP to address Commercial Use and Public Access. It states, “This revised public access management plan supersedes and replaces the management plan approved by BLNR on Feb. 22, 1985 in CDUA HA1573. This plan differs from the plan approved in 1985 in the following manner”:

- Management and enforcement of public and commercial use of MK is the responsibility of DLNR except for specific rights reserved for UH.
- Permitted Commercial uses and management controls are incorporated in the Plan.
- Some controls are eliminated and/or modified and new ones added to reflect UH’s

experience in the past ten years, especially since the major portions of the road have been paved. The primary criterion for controls, however, has been and continues to be public safety. **Ex. D-10 1995 Management Plan, p.(i)**

585. The 1995 Management Plan, in turn, directly relies on the 1977 DLNR Mauna Kea Plan, the (1983) Science Reserve Complex Development Plan, and the Hale Pokaku Master Plan, for astronomy related uses. **Ex. B.17h 1995 Management Plan, p.7**

586. DLNR has the authority to determine permitted public and commercial uses of the UH Management Area-subject to terms of Lease between UH and DLNR. Management and enforcement of public and commercial use of Mauna Kea is the responsibility of DLNR—except for specific rights reserved to UH. **Ex. B.17h 1995 Management Plan, p.1**

587. The 1995 Revised Plan—Part III: Management and Controls on page 7, states: “Astronomy-related uses in the UH Management Area are controlled by the 1977 DLNR Mauna Kea Plan, the Hale Pohaku Master Plan, the SRCDP, and the CDUA process.” **Ex. B.17h 1995 Management Plan, p.7**

## **2000 Master Plan**

588. The 2000 Master Plan was never adopted nor approved by BLNR. **Ex. A003 FEIS, p.3-146**

589. In the 2000 Master Plan, the University concluded that there was a need for a single entity to manage the comprehensive plan for the Science Reserve. **Ex. A009 CMP, p.3.8**

590. The objective of the 2000 Master Plan is to preserve and protect the cultural, natural, recreational and scientific resources on UH lands. **Ex. A048**

591. The 2000 Master Plan calls for the management organization to be housed within the University system and funded as an ongoing program unit of the University of Hawai‘i at Hilo (UH-Hilo). **Ex. A-009 CMP, p.3.8**

592. In accordance with the 2000 Master Plan, UH-Hilo Chancellor established the OMKM on August 1, 2000. **Ex. A-009 CMP, p.3.8**

593. OMKM is the office charged with ensuring compliance with and implementation of the 2000 Master Plan. **Ex. A-009 CMP, p.3.8**

594. The 2000 Master Plan acknowledged that joint management by DLNR and the University, and layers of management requirements and recommendations outlined in historical leases, plans, permits and written or verbal commitments, have created a complex and often confusing pattern of management responsibility (Group 70 International 2000). **Ex. A-009 CMP, p.3.9**

595. The acceptance of the 2000 Master Plan by the UH Board of Regents prompted the creation of OMKM, the MKMB, and Kahu Kū Mauna. **Ex. A-009 CMP, p.3-9**

596. Under the 2000 Master Plan, at least some of MKSS' services are to be transferred to OMKM, but no deadline was specified and the transfer has not occurred.  
**Ex. A009 CMP, p.3-11**

597. The University's 2000 Master Plan for the UH Management Area designated approximately 525 acres (212 ha) of the leased land as an "Astronomy Precinct," where development is to be consolidated to maintain a close grouping of astronomy facilities, roads and support infrastructure (Group 70 International 2000). **Ex. A-009 CMP, p.3-1**

598. Any future development would occur within the Astronomy Precinct portion of the UH Management Areas, as delineated in the 2000 Master Plan (Group 70 International 2000). **Ex. A-3009 CMP, p.6-8**

599. Any potential future observatories will be located inside the Astronomy Precinct. The goal of this process is to refine telescope siting areas defined in the 2000 Master Plan based on updated cultural and natural resource information (see Section 7.1.1 and Section 7.1.2).  
**Ex. A-009 CMP, p.7-57**

600. An approved management plan must be in place prior to the construction and operation within a resource subzone (HAR 13-5-39); a BLNR- approved comprehensive management plan must also be developed prior to construction and operation of such a facility. **Ex. A-003 FEIS Section 3.10, p.3-142**

### **The University's Comprehensive Management Plan (UH CMP)**

601. The Applicant relies on the UH CMP and its four subplans and the TMT Management Plan to fulfill the "approved management plan" requirement for its CDUP application (CDUA HA-3568) under HAR §13-5-24. The Applicant claims the proposed use is consistent with the provisions of the CMP and subplans, the approved management documents for the UH Management Areas on Mauna Kea.

**Ex. A-001 CDUA TMT Management Plan Section 3 Management and Controls, p.3-11**

602. The CMP is described as "the framework for managing multiple existing and future activities, such as astronomy, recreational and commercial activities, scientific research, and cultural and religious activities." **Ex. A009**

603. The TMT Management Plan is a "project-specific management plan."  
**Ex. A-001 UH/TMT CDUA, p.2-3**

604. The CMP is described as being in accordance with the Third Circuit Court's ruling in 2007 regarding the inadequacy of the University's management plan proposal at the time.  
**Ex. A009**

605. In its 2007 decision and order, the Third Circuit Court found that the the definition of management plan in HAR 13-5-2 requires the plan to be HAR 13-5-2 “comprehensive,” that is an “all-covering, all-embracing, all-inclusive” “plan for carrying out multiple land uses” for the conservation of resources on Mauna Kea. *Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan, 19, 2007))

606. The Third Circuit Court also found that the “resource that needs to be conserved, protected, and preserved is the summit area of Mauna Kea,” *Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan, 19, 2007)

607. As identified in the first management plan for the mountain, the Mauna Kea conservation district the extends from the summit down to the 6,000-foot elevation and includes all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Ka`ohe Game Management Area. **Ex. B.17g, p.1**

608. The CMP only applies to the “UH Management Areas” (described as “the Mauna Kea Science Reserve (Science Reserve), the mid-level support facilities at Hale Pohaku, and the Summit Access Road...”). **Ex. A009 p.2-1**

609. The Third Circuit Court also found that where the 1995 management plan “was virtually silent” on the number and size of future telescopes on Mauna Kea, it did not satisfy the requirement for a comprehensive management plan. (*Mauna Kea Anaina Hou v. BLNR*, Civ. No. 4-1-397, 7; **3rd Cir. Haw. Jan, 19, 2007, p.3-4**)

700. “Proposed new development on Mauna Kea, including the Thirty Meter Telescope (TMT)” is outside of the scope of the CMP. **Ex. A-009 CMP, p.2-3**

701. The Applicant acknowledges that “This CMP does not address development plan issues related to future observatories, including whether new observatories should be located on Mauna Kea to support the astronomy program or if observatories should have their leases extended or be decommissioned.” **Ex. A009, p.7-54**

702. The CMP does not provide a limit on the number or size of future telescopes in the Mauna Kea Conservation District. **Ex. A009, p.7-56**

703. The CMP describes the need to complete, among other things:

- a burial treatment plan because Mauna Kea is a known burial site **Ex. A009, p.7-10**
- buffer zones to protect archaeological sites **Ex. A009, p.7-10, 7-56**
- invasives species control plan **Ex. A009, p.7-16 thru 7-18**
- emergency hazardous spill protocol **Ex. A009, p.7-44**
- permitting process for traditional and customary practices deemed appropriate **Ex. A009, p.7-8 thru 7-10**

704. The CMP does not provide a timeline for completing these tasks and provides no process for public or agency oversight consistent with Chapter 91, HRS. **Ex. A009**

705. The CMP specifically identifies the following measures as being among those Native Hawaiian rights for which access will be maintained insofar as they are consistent with other management actions:

- Gathering of cultural resources,
- Access for families to visit iwi kupuna,
- Access to scatter ashes,
- Access through trails for hunting and gathering,
- Access to deposit piko,
- Access for traditional, religious, and spiritual observances,
- Pilgrimage, offerings, and prayers,
- Access to Lake Waiau to gather water for religious and spiritual purposes.

**Ex. A-007 Staff Report Feb 25, 2011, p.11**

706. Upon approval of the CMP, the BLNR made the UH BOR responsible for implementing the CMP. In accepting that responsibility, the UH BOR delegated implementation of the CMP through normal UH governance channels to UH Hilo, OMKM, and MKMB and also assigned two members of the UH BOR to sit as ex-officio, nonvoting members on the MKMB.

**Ex. A-003 FEIS section 3.10 Land Use Plans, Policies and Controls, p.3-148**

707. “OMKM’s responsibilities are complicated by the fact that the UH Management areas are governed by two overarching documents—the Master Plan 2000, which was not approved by the Board of Land and Natural Resources, thus requiring UH to continue to comply with the rights and responsibilities outlined in the 1995 Revised Management Plan.” **Ex. A-011 CRMP 3.2.1 OMKM Mission and Responsibilities, p.3-3**

708. The University of Hawaii is an educational institution, not a land management agency.  
**HRS 304A-102**

709. The rangers who work for OMKM, but work closely with Mauna Kea Support Services, do not have the primary enforcement authority. **Tr. McLaren**

710. At the oral arguments before the Intermediate Court of Appeals on the appeal of the BLNR’s decision to deny a contested case hearing on the CMP to some of the Petitioners in the present case, counsel for the University conceded that the CMP “do[es] not take action.” ([www.courts.state.hi.us/courts/oral\\_arguments/archive/oaica30397.html](http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html))—accessed on November 13, 2011 at minute 43:29.

711. University counsel said: “The management plan itself demonstrates these are management measures that the University has been doing for quite some time and can do.” ([www.courts.state.hi.us/courts/oral\\_arguments/archive/oaica30397.html](http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html))—accessed on November 13, 2011, at minute 41:46.

712. Neither the BLNR’s April 9, 2009 approval of the CMP or the March 25, 2010 approval of the 4 subplans document any specific findings by the BLNR regarding the 3-part analysis required by the Court’s decision in Kapa’akai. **Ex. B-41, B-42**

713. All of the 11,288 acres leased by the University on Mauna Kea are designated as a conservation district. **Ex. A009, p.3-1**

714. “The University’s 2000 Master Plan for the UH Management Area designated (approximately) 525 acres (212 ha) of the leased land as an “Astronomy Precinct,” where development is to be consolidated to maintain a close grouping of astronomy facilities, roads, and support infrastructure.” **Ex. A009, p.3-1** (citations omitted)

715. In addition, the CMP directs decision-makers “to site all new proposed astronomy facilities in the area within the Astronomy Precinct identified as the north plateau.” **Ex. A009, p.7-56**

### **Legislative Auditor’s Reports regarding Management**

#### **The Thirty Meter Telescopes Observatory Proposal**

716. The proposed site for the TMT Observatory is a roughly 5-acre area at the end of a four-wheel drive road at an elevation of 13,150 feet on the Northern Plateau of Mauna Kea. **Ex. A-003 FEIS, Vol. 1 p.2-10**

717. Roughly 6.2 acres of previously undisturbed land will be disturbed by the TMT Observatory and Access Way. **Ex. A-003 FEIS Section 3.2 Cultural Resources, p.3-26**

718. There are no current developments on the Northern Plateau.  
**Ex. A-007 Staff Report Feb 25, 2011, p.7**

719. TMT is is being proposed for an area on the North Plateau of Mauna Kea that has not hosted permanent facilities or developments. It is opening up a new area.  
**Ex. A-007 Staff Report Feb 25, 2011, p.59**

720. The TMT's footprint will be a minimum of 8.5 acres on a pristine plateau.  
**Ex. A-007 DLNR staff report Feb 25, 2011, p.K-1**

721. The total dome height will be 184 feet above finished grade, with an exterior radius of 108 feet. **Ex. A-007 Staff Report Feb 25, 2011, p.15**

722. HAR 11-200-12 states: “In Determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short term and long term effects of an action. In most instances, an action shall be determined to have significant impact if it: (13) Requires significant energy consumption.”  
**HRS 11-200-12 (Significance Criteria).**

723. The TMT will have significant power requirements.  
**Ex. A-007 Staff Report Feb 25, 2011, p.45**

724. The existing peak demand load documented by HELCO at the substation, including all the observatories and the Hale Pohaku facilities, is 2,230 kW, approximately less than half of the capacity of the substation. Of this current use, the Keck observatory uses approximately 350 kW of power on average.

**Ex. A-003 FEIS Section 3.12 Power and Communications, p.3-169**

725. Preliminary design electrical load estimates indicate that the TMT Observatory will operate with a “Peak Demand” of 2.4 MW. To adequately support the peak power requirement... two transformers will be upgraded at the existing HELCO substation at Hale Pohaku. **Ex. A- 308 FEIS Section 3.12 Power and Communications, p.3-169**

726. The HELCO transformers at Hale Pohaku need to be upgraded because the anticipated power demand from TMT and the other observatories necessitates upgrading the equipment. **Sanders Tr. 8.15.11 p86 20-25, p.87 1-2**

727. The TMT Project would result in HELCO having to upgrade the two transformers with the Hale Pohaku Substation. **Ex. A-001, CDUA, p.1-13**

728. The TMT Project would result in HELCO having to also upgrade the existing electrical service by replacing the existing wire conductors with new higher-capacity conductors in the underground conduits that run from the Hale Pohaku Substation to the summit area. **Ex. A-001, CDUA, p.1-14**

729. DOFAW notes... Not knowing the actual alignment makes it difficult to assess the potential impacts of the project, although, the powerline will pass through the Mauna Kea Ice Age Reserve in some locations. **Ex. A-007 Staff Report Feb 25, 2011, p.23**

730. The Department of Health Clean Water Branch (CWB) notes that the project will need to be compliant with the criteria set out in the Anti-degradation Policy (HAR ss11-54-1.1) and Designated uses (HAR ss11-54-1.1) regarding impacts on state waters. **Ex. A-007 Staff Report Feb 25, 2011, p.25**

731. The building and operation of the TMT Observatory on Maunakea will require a sublease from UH, which lease this ceded land from DLNR. The sublease will be subject to approval first from the TMT board and the UH BOR followed by approval from BLNR. **Ex. A-003 FEIS section 3.10 Land Use Plans, Policies and Controls, p.3-159**

732. The current UH lease expires in 2033 and the TMT Observatory will be required to be decommissioned and restore the site at that time, unless a new lease is obtained from the BLNR. **Ex. A- 003 FEIS section 3.10 Land Use Plans, Policies and Controls, p.3-160**

733. The TMT would take approximately five years to decommission. **Sanders Tr. August 15, 2011, p.82: 2-5**

734. The TMT will require a sublease for use of the land on Mauna Kea leased to the University. **Sanders, Tr. August 15, 2011, p.100:11-13**



735. The terms of the sublease to the TMT Observatory Corporation are not known, but are expected to be similar to the terms of current subleases for telescopes on Mauna Kea. Sanders, Tr. August 15, 2011, p.82:12-24, 99:24-101:4, Nagata, Tr. August 16, 2011, p.211:21-25

## **Impacts of the Proposed Project**

### **Threats Posed by the TMT Project to the Natural Environment**

#### **Aeolian Ecosystem Impacts**

736. It is impossible to accurately predict the exact plant species which will invade the subalpine and alpine zones on Mauna Kea in the future, but managers must be especially aware of plant species that are adapted to dry climates, early successional habitats, high elevation climates, have wind dispersed seeds, and or that originate from the temperate zone. Ex. A-010 CMP NRMP, p.2.2-21

737. There are several invasive plant species that may become established in the subalpine and alpine zone in the future, particularly if anthropogenic climate change affects rainfall regimes in the Hawaiian Islands. Ex. A-010 CMP NRMP, p.2.2-21

738. Habitat alteration threatens native invertebrate communities by directly removing habitat (through development) or changing it to the extent that the invertebrates are no longer able to live there (for example, by changing host-plant abundances). Ex. A-010 CMP NRMP, p.2.2-43

739. A threat to high elevation environments on Mauna Kea exists in invasion by new plant species that are adapted to subalpine, alpine or arid environments. These can be introduced through...accidental introduction through human activities (such as seeds stuck to vehicles or visitors' shoes). Ex. A-010 CMP NRMP, p.2.2.20

740. Approximately 9% of non-native species found growing at high elevations in the Hawaiian Islands were first recorded in the past thirty years. Ex. A-010 CMP NRMP, p.2.2.20

741. The CMP requires (Management Action FLU-5) that an airflow analysis be performed on the design of proposed structures to assess potential impacts to aeolian ecosystems. The aeolian ecosystem is related to the wēkiu bug and the fact that its food supply consists of insects blown from lower elevations to the summit, where they come to rest and become wēkiu bug prey. Ex. A003 FEIS, p.3-70

742. Mr Perry White acknowledged that the dust caused by extraction and movement of thousands of tons rock would have an impact on air quality. Tr. 10/1/16 Vol 1:74:22-25

743. Climate modeling predicts that the intensity of warming is positively related to altitude. Ex. A-010 CMP NRMP, p.2.2.23

744. Increase in CO<sub>2</sub> concentration may increase the competitive edge by fast growing invasive species. **Ex. A-010 CMP NRMP, p.2.2-25**

745. The FEIS noted that University has failed to fully determine the significance of cumulative impact to the alpine stone desert ecosystem from activities to date. The project will add an increment to the current level of cumulative impact to all resources that have been substantially, significantly, and adversely impacted by present and future actions. **Ex. A003 FEIS S-8-9**

### **Impacts to Geology**

746. Telescope activities on Mauna Kea have resulted in substantial, significant, and adverse impacts to geologic resources, primarily due to alteration of the cinder cone morphology. **Ex. A-308 FEIS Section 3.6 Geology, soils, and Slope Stability, p.3-111**

747. Mr White stated that it was doubtful that, given the terrain, it could be restored to the point that those looking at it from a distance would not recognize a big scar on the land. **Tr. 10/1/16 Vol 1:81:3-7**

### **Impact to Floral Community**

748. The construction of the observatories has had a permanent impact on the biological resources in the immediate area as well as the batch plant areas, roads, and associated areas. No new lichens have become established in the area as a consequence of the construction. **Ex. B-64 APP-D8**

749. The road traffic associated with construction of each observatory is a matter of concern. Dust from vehicular traffic was considerable before the upper reaches of the summit road were paved. **Ex. B. 64 APP D-8**  
(Note the TMT access road will not be fully paved.)

750. The long term stability of the lichen and moss communities is dependent on minimizing disturbance in the area. The colonization rate of species is extremely low. **Ex. B-64 APP-D9**

751. Habitat Disturbance should be minimized. The rocks and cinder within Area E are home to lichens, mosses, and endemic arthropods, therefore disturbance should be minimized at the construction site and in the surrounding habitats. **Ex. A005, TMT FEIS, Arthropod and Botanical Inventory and Assessment, App. K, p.31**

752. Mr Eric Hansen stated that after substrate disturbance in Area E, recolonization of the highly evolved, unique lichen and moss assemblages in the area would be very slow, if possible at all. **Tr. 1/19/2017, Vol 27:159:22-25, 160:1-3**

753. Mr. Eric Hansen stated that a lichen community cannot be restored once the substrate in which they grow has been disturbed. **Tr. 01/19/2017, V. 27 at 160: 11-13**

754. Hansen stated that there is no mitigation that could take place to mitigate damage to floral communities should the TMT be developed. **Tr. 01/19/2017, V 27. at 163: 1-5**

755. The stability of the lichen and moss flora at the summit of Mauna Kea revolves around three different factors; human disturbance, long-term stability and climate change.

756. Dr. Smith disclosed that, “A concise determination of some species is not possible under the time constraints of this study even though fruiting bodies may be present. Species growing in such severe habitats, particularly those growing on rocks, produce spores only during favorable conditions. The only sure way of finding good specimens would be to conduct monthly collections for at least one year.” **Witness C. Smith, WDT, p.9**

757. Dust can impact lichens, mosses, and ferns and is believed to degrade Wēkiu bug habitat. **Ex. A005, (TMT FEIS), App. K, p.31**

758. Wind-blown dust that covers plants, lichens and mosses, deprives them of needed sunlight. The potential impact of excessive dust could have a moderate effect on the flora in habitats adjacent and downwind of the Access Way and TMT Observatory. **Ex. A005, TMT FEIS, p.3-74**

759. Non-native plant species can impact native plant communities by altering the environment, by lowering the groundwater table changing fire regimes, increasing or decreasing shade, smothering plant growth. **Ex. A010 CMP NRMP 2.2-18**

760. Invasive plants currently found in the in the subalpine and alpine plant communities at Hale Pohaku include the non-native grasses and invasive herbs such as common mullein (*Verbascum thapsus*) and fireweed (*Senecio madagascariensis*). **Ex. A-010 CMP NRMP 2.2-19**

761. Although not recorded in plant surveys in 1979, 1985, 1990, or 1999, fireweed (*Senecio madagascariensis*) was found in 2007 at Hale Pohaku, the summit access road, MK Ice Age NAR, and near the summit. **Ex. A-010 CMP NRMP 2.2.-20**

762. Invasive plants are spreading up the mountain. This can be easily observed by the way many invasive plants, such as common mullein, line the roadways up the mountain. **Ex. A-012 CMP Mauna Kea Public Access Plan (PAP) p.2-24**

## **Impacts to Arthropods**

### **Habitat loss**

763. It has been estimated that since 1963, approximately 62 acres (25 hectares) of potential arthropod habitat have been lost to astronomy-related development on the summit. **Ex. A010 CMP, Natural Resources Management Plan, p.2.2-43**

764. The bulk of human impact has occurred on cinder cones (Types 1,2,3) near the summit of Mauna Kea, and this is where construction of existing observatories and supporting infrastructure and other human modifications have taken place.

**Ward WDT B.17a p.11**

765. The TMT Observatory would displace 5.9 acres of Wēkiu bug habitat.

**Ex. A003 FEIS, p.3-72**

766. The TMT project would impact Wēkiu bugs in Type 3, 4, and 5 habitats. The Wēkiu bugs are present on the cinder slopes of Pu'u Hau Oki, and construction of the TMT and Access Way would impact 5.9 acres of Wēkiu bug habitat, a 10% additional increment of impacted habitat to the cumulative impact on the natural resources.

**Ex. A003 FEIS 3.4, p.3-73**

767. The potential impacts to the biological resources would include replacement of existing habitat with the TMT observatory and Access Way, dust generated by vehicles travelling along the unpaved Access Way, and paving a portion of the Access Way.

**Ex. R-3 FEIS 3.4, p.3-69**

768. Mr Perry White stated that if the project were implemented, the habitat of endemic and unique insects would be affected. **Tr. 10/1/16 Vol 1:74:22-25**

769. Dr. Fred Stone conducted an entomology study for the proposed telescope development area, in 1982, that study was incorporated into the FEIS for the MKSRCDP. They made recommendations for biological inventory, habitat mitigation and monitoring which were approved in the Mauna Kea Management Plan by BLNR in 1985. Subsequently Mike Wilson, Chair of DLNR, admitted that the impacts had occurred, and that mitigation measures had not been implemented, but declined to administer penalties because permits had been issued for the construction activities. He also said that the CDUA permit applications by UHIfA did not include possible impact to Wēkiu bug habitat, nor mitigation measures, so there was no way for DLNR and BLNR to know about or evaluate the potential impacts. **Ex. B.17q, B.17s, B.17r, B.17p, B.17t**

770. DLNR in 1996 determined that the Gemini Northern 8-meter telescope, Japan National Large Telescope (Subaru), and the Smithsonian (SMA) had destroyed habitat beyond that disclosed in the FEIS or allowed in the approved management plan. Wēkiu bug habitat on the crater and slope of Pu'u Hau Oki was severely impacted by construction of the Keck I and II telescopes which resulted in removal of approximately 35 feet of the summit ridge of Pu'u Hau Oki and side-casting the material on the crater slopes.

**Ex. B.17q, B.17r, B.17s, B.17p, B.17t**

771. Wēkiu bug capture rates appear to be heavily influenced by climactic conditions such as presence of snow, which makes it difficult to compare capture rates across studies that were conducted during different conditions or time of year.”

**Ex. A009 CMP, p.5-39,5-40**

772. The Wēkiu bug was listed as a candidate for the endangered species list based on two criteria; its known threats are impacting the population of the organism, and evidence of significant population decline. The Wēkiu bug was listed as a candidate for Federal protection on June 13, 2002. **Ex. A001 CDUA Section 2.3**

Note: The CDUA has not been updated, and does not reflect regulatory changes to the Wēkiu status since that document was produced.

773. Until recently the Wēkiu bug (*Nysius wekiuicola*) was proposed as a Candidate species for Federal listing under the Endangered Species Act. The Wēkiu bug (*Nysius wekiuicola*) has garnered significant attention, through inventory, monitoring, autecology study, and public awareness, since its discovery over thirty years ago. Two of the two greatest threats to Wēkiu bug identified by the scientists who have contributed to this study effort are habitat loss and predation by alien invasive ant species. **Ward WDT B.17 a p.11**

774. A prime example of habitat loss through development is the loss of Wēkiu bug habitat on the summit through construction of telescope facilities. Wēkiu bug habitat is easily altered by vehicular traffic and construction activity, as tephra cinders preferred by the bug are easily crushed into dust-sized particles. Prime habitat can be quickly degraded to compacted silt and mud by use of off-road vehicles. Wēkiu bug habitat may also be altered by dust blown up from road grading and other construction activities on the summit. **2.2.2.3 Threats to Invertebrate Communities on Mauna Kea. Ex. 010 CMP NRMP p.2.2-43**

775. Dust blown up from road grading and other construction activities on the summit can reduce surface porosity and fill pockets between cinders. This may degrade wēkiu bug habitat by inhibiting movement and by decreasing the accumulation of bugs blown up for wēkiu bug food consumption. **Ex. A010 CMP NRMP, p.2.2-44**

776. Wēkiu bug habitat is easily altered by vehicular traffic and construction activity, as the tephra cinders preferred by the bug are easily crushed into dust-sized particles. **Ex. A010 CMP NRMP, p.2.2-44**

777. The southern-most roughly 700 feet of the Access Way would be located on the Pu‘u Hau‘Oki cinder cone. **Ex. A001 TMT CDUA, p.141**

778. It should be noted here that the access way will alter, and destroy, known Type 3 Wēkiu bug habitat. DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, CDUA Comments for the Thirty Meter Telescope wrote on November 29, 2010. **Ex. A007 Staff Recommendations, p.2-6**

779. The Arthropod and Botanical Inventory and Assessment recommends minimizing disturbance by limiting construction activities to the footprint pad and road improvements, and not side-casting cinder or other materials into adjacent habitat. **Ex. A005 FEIS Vol. 3, p.942, Appendix K, p.31**

780. “The cinder [in Access Way Option #3] is considered ideal Wēkiu bug habitat... option [3] would require disturbing the cinder cone and Wēkiu bug habitat, and the road would also bisect and isolate a portion of the habitat. While Wēkiu bugs have been observed crossing existing dirt roads, none have ever been observed on pavement. Because this option disturbs and displaces Wēkiu bug habitat, mitigation measures similar to those proposed in the Keck Outrigger would likely have to be implemented.”  
**Ex. A005 FEIS Vol. 3, Appendix K, p.24**

781. Option 3 is the proposed plan for the TMT Access Way.  
**Ex. A-311 TMT CDUA, p.4-29**

“Option 3, developing the existing 4-wheel drive road as the Access Way, should be avoided because it disturbs, displaces, and isolates portions of Wēkiu bug habitat. However, as redesigned the impact would be lessened. It would likely require mitigation measures similar to those suggested for the Outrigger Telescopes project, such a habitat restoration.”  
**Ex. A-005 FEIS Vol. 3, Appendix K, p.32**

782. In lieu of a habitat restoration plan, the TMT Project plan is to monitor arthropod activity in the vicinity of the portion of the Access Way that will impact Type 3 Wēkiu bug habitat. **Ex. A003 FEIS, p.3-73**

783. Arthropod monitoring will be performed prior to, during and for [only] two years following construction in the area of the access Way on the alpine cinder cone habitat (the flank of TCP Pu’u Hau’oki). **Ex. A071, Summary of Mitigation Measures, p.5**

### **Alien Arthropods**

784. Alien arthropods can arrive at Project sites from localities on the Island of Hawai’i where they are already established, or in crates, boxes, containers, or construction equipment that are shipped from off the island. **Ex. A003 FEIS, p3-75**

785. Invasive species, including spiders (*Leptyphantus tenuis* and *Meriola arcifera*), and beetle (*Hippodamia convergens*) that compete with arthropods including the Wēkiu bug for food and may also prey on [other] native species at the summit.  
**Ex. A010 CMP NRMP, p.2.2-36**

786. Non-indigenous arthropods may pose a threat to native species that are residents of the higher elevations of Mauna Kea through predation or as competitors for food resources.  
**Ex. A005 FEIS Vol. 3, Appendix K, p.19**

787. “It is possible that the introduction of an alien invasive species may occur in any area impacted by the construction process, and such invasion would ultimately impact the entire alpine ecosystem.” DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, in his CDUA Comments for the Thirty Meter Telescope wrote, on November 29, 2010, in response to 4.1.2 Natural Resource Management p.4-13. **Ex. A004 FEIS Vol II**

788. Incremental habitat fragmentation, exacerbated by biotic challenges, puts small isolated species at further risk of extinction. Invasions of non-native weeds can further degrade an altered habitat and landscape. Predatory insects, and those feeding on the same food sources as the species at risk, can have rapid and devastating consequences. Invasive invertebrates are perhaps the greatest threat to native invertebrates in Hawaii, through competition, predation, habitat alteration, and parasitism. At the summit of Mauna Kea the greatest threat to the arthropod populations is the introduction of invasive arthropods that are adapted to alpine conditions. The potential of introduction of new invasive species to Hale Pohaku and the summit through the importation of goods from similar climates (such as astronomical equipment), construction equipment and fill, road grading equipment and gravel accidental transport on vehicles, clothing and equipment, and biological control agents. Ex. A-010 NRMP 2.2, 4.2

789. Since 2005, several new alien predatory species that could adversely impact the Wēkiu bug have been found, and Englund reported that alien ant species are the greatest potential threat in the summit area. ... Because of the predatory and social nature of ants, and because ants have caused the extinction and decline of native arthropods throughout Hawaii, both the endemic wolf spider (*Lycosa sp.*) and the Wēkiu bug would be expected to precipitously decline if ants ever become established. (Englund Wēkiu-Rep 12-9 p.29)

Ex. A-005 FEIS Vol III

## **Water Resources**

### **Human Threats to high level aquifers on Mauna Kea.**

790. Threats to the hydrology of Mauna Kea include those associated with human presence and activity on the mountain and climate change. Human activities that have the potential to impact water resources quality, and to a lesser degree quantity, include any actions that add to the current wastewater volume or that change in-situ patterns of water movement. Examples are: leaking facility pipes; accidental spills of contaminants; and improperly filtered wastewater. These contributions may affect the quality of water seeped to springs along Mauna Kea's flanks, as well as the fresh water aquifers beneath the mountain.

Ex. A-010 CMP NRMP, p.2.1-38

791. Risk assessment and spill response planning provides a measure of safety for human health and for the protection of the cultural and natural resources of Mauna Kea. Although the observatories have individual spill response plans, such plans are lacking for other transporters or users, such as those that might result from vehicle accidents.

Ex. A-010 CMP NRMP 4.2-14

### **History of Hazardous Materials Release (Examples)**

792. Observatory facilities and support operations housing any potentially hazardous materials are required by law to have spill response and associated safe handling protocols in place. Situations in which a potential release might occur include discharge of liquid waste from septic tanks and cesspools, malfunction of sewage pipes, transport of sewage and hazardous materials, activities requiring the handling of potential contaminants, and vehicle use. **Ex. A-010 CMP NRMP 4.2-13**

793. Threats to the natural environment due to escape and possible subsequent migration of contaminants vary depending upon the type of contaminant, release volume, and location. The fate and transport of byproducts and potentially hazardous materials used on Mauna Kea have not been determined, and an assessment of the potential risks following a release has not been developed. **Ex. A-010 CMP NRMP 4.2-13**

794. Applicant states that Hydrology information gaps include the fate of leachates or liquid waste containing dissolved or suspended contaminants from septic and cesspool systems. **Ex. A010 NRMP 2.1-39**

795. The two main ground-water-related problems in the State of Hawaii are contamination by organic or inorganic chemicals associated with both agricultural and non-agricultural activities, and the availability of potable fresh ground water. Both problems are ultimately related to ground-water quality. All of the main islands in the State of Hawaii have large amounts of ground water contained in volcanic-rock aquifers. However, the quality of the ground water may not be suitable for all uses. In particular, not all ground water is potable. Some of the ground water is contaminated by chemicals associated with human activities and some contains high concentrations of salts.

**Ex. B.17z Ground Water Atlas Hawaii HA 730-N, p.1**

796. Contamination of ground water by human activities can take place in several ways. In some agricultural areas, crops are irrigated with water that might contain large concentrations of dissolved minerals. If such water percolates downward, an underlying aquifer can be contaminated. In addition, fertilizers and pesticides applied to crops can move downward through the unsaturated zone to an aquifer and affect the quality of the water in the aquifer. Wastes from septic-tank systems, sewers, industry, and storm runoff also can introduce undesirable constituents into the aquifers.

**Ex. B.17.z Ground Water Atlas Hawaii HA 730-N, p.1**

797. Spills of oil, sewage and hazardous chemicals have been repeatedly reported by researchers working at the summit, and they note that oil, in particular, will take a long time to biodegrade because of cold and dry conditions (Howarth 2003).

**Ex. A-005 App K Englund**

798. About 0.5 gallons of hydraulic fluid spilled in the Canadian France-Hawai'i Telescope (CFHT) facilities in 1979. **Ex. A-009 CMP, p.6-9**

799. An unknown amount of diesel fuel leaked from a generator in the construction staging area in 1982. **Ex. A-0091 CMP, p.6-9**



800. Mercury spills occurred in the NASA IRTF (1989), CFHT facility (1990), W.M. Keck Observatory (1995), CFHT (1998) and the UH 2.2-m telescope facility (1998).  
**Ex. A-009 CMP, p.6-9, 6-10**

801. Approximately 60 gallons of diesel fuel, engine and hydraulic oil were spilled onto surface cinder near the VLBA, requiring the removal of cinder, in 1995.  
**Ex. A-009 CMP, p.6-9**

802. In 1996, 110 gallons (two 55 gallon containers) ruptured and spilled onto cinder surrounding the Subaru telescope, requiring removal of excavated cinder.  
**Ex. A-009 CMP, p.6-9**

803. Hydraulic fluid leaked from the Caltech Submillimeter Observatory (CSO) from approximately 1990 through 2000. **Ex. A-009 CMP, p.6-10**

804. In 2003 at Hale Pōhaku, crankcase oil and hydraulic fluid leaks onto the ground requiring soil excavation and transmission oil leaked onto surface cinder, which likewise had to be excavated. **Ex. A-009 CMP, p.6-10**

805. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed hydraulic fluid to leak in 2003. **Ex. A-009 CMP, p.6-10**

806. From 1998-2004, sewage overflows of several liters occurred five times at the CSO facilities. **Ex. A009 CMP, p.6-10**

807. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed diesel fuel to leak in 2004. **Ex. A-009 CMP, p.6-10**

808. Twenty to thirty gallons of propylene glycol spilled at the W.M. Keck Observatory in 2004, with approximately two-thirds of that volume introduced into the outside environment. The contamination required removal of cinder. **Ex. A-009 CMP, p.6-10**

809. Telescope mirror washing entails removing mirrors from a protective girdle that contains mercury. Seven documented mercury spills have occurred in association with mirror washing. **Ex. A-009 CMP, p.6-8**

810. The Applicant for the TMT maintains that mirror washing wastewater is not a hazardous waste. Waste from mirror washing will be collected, removed, and transported off site for treatment and disposal. **Ex. A-003 FEIS Vol. 1, p.3-129**

#### **Sewage/Wastewater Release**

811. “A two-gallon sewage spill from an incorrectly installed septic line contaminated cinder and snow in wēkiu bug habitat in the Pu’u Hauoki crater in 1998.”  
**Ex. A-010 CMP NRMP, p.3-34**

812. Approximately 500–1,000 gallons of sewage overflowed from the septic tank at Hale Pōhaku and was allowed to percolate into the surrounding environment in 2008.

**Ex. A-009 CMP, p.6-10**

813. In 1998, a septic tank spilled approximately 2 gallons of sewage onto the ground snow near the Subaru telescope. **Ex. A-009 CMP, p.6-9**

814. There are eight septic tanks with leach fields or disposal pits and three cesspools in the UH Managed Areas. **Ex. A-010 CMP NRMP, p.3-33**

815. Approximately 53,990 gallons of wastewater are generated each month by existing telescopes on the summit. Calculations based on: **Ex. A-010 CMP NRMP, p.3-9**

816. Large sized tank trucks have carrying capacities ranging from 5,500 to 9,000 gallons. **Ex. A-003 FEIS Vol 1: 3-120**

### **Impacts of proposed TMT to Water Resources**

817. The main activities that have potential to result in a release of contaminants include vehicle travel (on and off road) and accidents; release of hazardous material and petroleum product use by observatories and support operations; sewage generation; and transport of hazardous materials and sewage off-site. **Ex. A-009 CMP, p.6-14**

818. Transport of contaminants through the substrate has the potential to impact the quality of both surface water and groundwater. Direct toxic impacts on flora or fauna are also possible. **Ex. A-009 CMP, p.6-14**

819. The highest probability of impact [on surface water, groundwater, and flora or fauna] is from petroleum products (e.g., fuel for vehicles and backup generators, lubricants, and cleaning fluids) and human waste. **Ex. A-009 CMP, p.6-14**

820. The TMT project would require the use, handling and storage of hazardous materials at Mauna Kea including: propylene glycol, acetone, methyl ethyl ketone, at least 2,000 gallons of diesel fuel, ethylene glycol, hydraulic fluid, liquid adhesives, coating metals, acids, paints, solvents, and other cleaning chemicals. **Ex. A-003 CMP FEIS Vol. 1, p.3-129**

821. The TMT Observatory and a portion of the access road would create two acres of impervious surfaces that would cause runoff. Runoff would percolate into permeable natural ground. **Nance Tr.12.13.16 V16, p.98**

822. TMT facilities will be designed to maximize groundwater recharge to the extent possible. Site grading and landscaping will be designed to direct stormwater to pervious areas so that it may percolate into the ground and thus into the aquifer.

**Ex. A001 CDUA 6-1**

823. The TMT Project's design features will include the use of stormwater dry wells and grading to maximize groundwater recharge. The release of fuel or chemicals, including mirror washing wastewater, from an accidental spill could degrade surface and groundwater resources. **Ex. A003 FEIS Vol I 3-121, pdf p.209**

824. Exhibit A071, page 8 Summary of TMT Mitigation Measures says that the project will use storm-water dry wells and grading to maximize groundwater recharge. Mr. Nance stated that the runoff would percolate downward, but he didn't know if it would be confined. **Nance Tr.12.13.16 V16, p.145**

825. Runoff would move downward through the unsaturated lava, traversing vertically downward to underlying groundwater. We don't know the distance because we don't know exactly where the groundwater is. **Nance Tr.12.13.16 V16, p.99-100**

826. The runoff from the TMT site will go downslope to the North, following topography, on the northern flank of Mauna Kea. **Nance Tr.12.13.16 V16, p.110**

#### **TMT Resource Use and Waste**

827. TMT project managers anticipate the generation of approximately 120 cubic feet of trash per week. **Ex. A-003 FEIS Vol.1, p.3-129**

828. UH estimates 2,080 gallons per day will be used by the (480 gpd) TMT Observatory and the Headquarters. (1,600 gpd). **Ex. A-003 FEIS Vol. 1, p.3-120**

829. To transport 14,600 gallons of water generated by the TMT Observatory down the mountain each month would require a tanker truck to use the Access Way at least 1-2 times each month. **Ex. A-003 FEIS Vol 1: 3-120**

#### **Accidental spills from TMT chemical storage tank**

830. Mr. Gary Sanders, TMT project manager, was asked about the protocol for addressing a leak in the underground 5,000 gallon chemical storage tank. He stated, "It depends on where the leak is. We might have to excavate. We might have to go to the location and then we'd have to remove the material." **Tr. 01/3/2017, V. 20 at 77, 6-9**

831. Mr Sanders stated, "It depends upon the nature of the leak, but presumably immediate action to pump out the contents of the tank and then to do whatever had to be done to repair. And if the ground was impacted in any way, to remove the affected material." Depending on the weather and the nature of the leak, such clean-up would require days. **Tr. 01/4/2017, V. 21 at 84-85: 25, 1-4, 86: 20-21**

832. When asked about the disposal of hazardous wastes from mirror stripping, Mr. Sanders stated, “And all of the effluent from the stripping and coating process will be collected and stored in a 5,000-gallon, double wall with leak detection equipment, underground storage tank and all of that effluent will be treated as if it is hazardous waste, zero discharge and it will be removed periodically. Perhaps once a week, or once every two weeks, by a trucking company that’s licensed and permitted to do hazardous waste removal and properly transport and dispose of the materials.” **Tr. 01/3/2017, V. 20 at 75-76: 25, 1-9**

### **Hazardous/Non-Hazardous Waste**

833. Mr. Sanders explained the process for stripping and recoating the mirrors. When asked what kind of chemicals would be used to strip the mirrors, Mr. Sanders replied, “Common chemicals, they’re caustic chemicals, some acid and bases. None of which are hazardous chemicals, although they do dissolve the coatings, and this is a well-established process.” **Tr. 01/3/2017, V. 20 at 75: 21-24**

834. Mr. Sanders states, “It’s my understanding that they are not classified as hazardous waste.” **Tr. 01/3/2017, V. 20 at 97: 11-12**

835. Sanders continues, “But we are not paying attention to that, we are treating all it [sic] as if it were hazardous waste and handling it as if it was hazardous waste and disposing of it as if it was hazardous waste.” **Tr. 01/3/2017, V. 20 at 97: 14-17**

836. When asked if there is currently a facility on Hawai‘i Island that could reprocess that kind of effluent collected from the silver recovering of the plates, Mr. Sanders replied, “I don’t know the answer.” **Tr. 01/3/2017, V. 20 at 231: 4-10**

### **Impacts to Air Quality**

837. Locally generated contributors to air pollution above the inversion level include vehicle exhaust, chemical fumes from construction and maintenance activities, and fugitive dust from various sources, including vehicles traveling on unpaved surfaces and road grading and construction or other activities conducted on unpaved areas. Rapid dispersion of pollutants is aided by strong winds. **Ex. A-003 FEIS, p.3-182**

838. Threats to Mauna Kea’s air quality and sonic environment primarily revolve around the presence of humans and their levels of activity. Potential future increases in the number of people visiting, working, and recreating at the UH Management Areas may increase the levels of these impacts. **Ex. A-010 CMP NRMP, p.2.1-46**

### **Visual Impacts**

839. The TMT Observatory will be visible from locations within the summit region, primarily the northern plateau and northern ridge of Kukahau‘ula. **Ex. A001 CDUA, 7-9**

840. The TMT Observatory will add a new visual element to a relatively undeveloped portion of the summit region. That element will be visible from viewpoints along the northern ridge of Kukahu'ula and from roadways within the northern portion of the summit region. **Ex. A001 CDUA 7-11 TMT Mgt Plan 2-5**

841. The DLNR feels that the visual impacts have been downplayed in the analysis. The analysis does not seem to account for the visual impact of the project on the individuals that move within and between impacted viewplanes, impact on visitors, and more importantly, the impact of viewing a new very large observatory from the perspective within the summit area. Laura Thielen, Chair, DLNR **Ex. A-004 FEIS Vol II, p.21 of 531**

842. The TMT would intrude upon the currently unobstructed view of Haleakala Mountain as well as the primary view of the setting sun from the mountain. It will also obstruct viewplanes used for traditional and cultural spiritual and religious Native Hawaiian practice. The Northern Plateau is one of the last un-hindered open space areas with views down to the sea, along the coasts, and across the island chain. The TMT would neither preserve nor improve upon Mauna Kea's natural beauty; the eighteen-story building would be twice the highest allowable structure in Hawai'i County, and would forever change the wilderness experience in the summit region. **Ex. B.17a Ward WDT, p.15**

843. Development of six acres of industrial infrastructure with twice the County of Hawai'i's allowable height limit (FEIS calls it a "new visual element on the northern plateau") on the last remaining unobstructed view plane facing Haleakala will significantly negatively affect my recreational practices. The view of Mauna Kea's summit, from my vantage point at my residence, from the beach at Hilo bay, from my hiking trails on Mauna Loa, all are fettered by the presence of multiple domes on the skyline; it is almost impossible to find a location on the island of Hawai'i where one cannot see a telescope in one's view of Mauna Kea. I believe I am not alone in finding these visual obstructions a significant annoyance and an adverse impact. **Ex. B.17a Ward WDT, p.3**

## **Noise**

844. Applicant does not define "noise sensitive areas."  
**Ex. A-003 FEIS Section 3.13 Noise, p.3-179**

845. Applicant does not conduct an analysis the cultural impacts of noise levels and offers no analysis of noise from culturally significant places like Pu'u Poliahu.  
**Ex. FEIS Section 3.13 Noise, p.3-179**

846. The Applicant concedes that significant noise would result from construction activities such as excavation, trenching, grading, pouring of foundations, and erection of structures.  
**Ex. FEIS Section 3.15 Construction and Decommissioning, p.3-202**

847. Construction of the proposed project would violate noise regulations, such that a noise variance would be required under HAR 11-46-8 for construction of the TMT Observatory. **Ex. FEIS Section 3.15 Construction and Decommissioning, p.3-202**

848. The Applicant acknowledges the proposed project would generate construction-related noise in the 80-100 dBA range at 50 feet for front-end loaders, backhoes, tractors, scrapers, graders, pavers, trucks, concrete mixers, concrete pumps, cranes, compressors, pneumatic wrenches, jack hammers, and rock drills. Short periods of blasting may also be necessary to dig foundations for the TMT Observatory.

**Ex. FEIS Section 3.15 Construction and Decommissioning, p.3-202**

849. Noise level in the vicinities of the existing observatories varied from 38 dBA to 77dBA Leq, and 40-78 dBA L10, with noise levels at or below 60 dBA Leq beyond a distance of 50 feet from HVAC exhausts. The loudest noise levels of 68 and 77 dBA Leq and 69 and 78 dBA L10, were measured at locations within 15 feet of HVAC exhaust outputs.

**Ex. A-003 FEIS Section 3.13 Noise, p.3-175, 176**

850. At the public hearing, OCCL Staff acknowledged that telescope activities do interfere with the quiet enjoyment of the mountain and thus added a condition to the TMT CDUA requiring that 4 days be set aside for reduced activities at the TMT. The OCCL staff said: "Shut the lights down a bit; shut the process down so that on certain days Native Hawaiians can have even more solitude." **Ex. BLNR Minutes, p.8**

### **Cultural Impacts of the Proposed TMT Project**

This subject will be best addressed by other parties in this hearing.

### **Furthur Findings and Conclusions of Law**

#### **The CDUA**

#### **Findings of Fact**

851. The Conservation District Use Application (CDUA), HA-3568, for this contested case hearing was signed on September 2, 2010. **Ex. R-1, p.2**

852. The CDUA was signed on behalf of the Applicant UH-Hilo by Chancellor Donald Straney. **Ex. R-1, p.2**

853. Perry White, the drafter of the CDUA, testified that the CDUA was signed by Dr. Straney on September 2, 2010. **Tr. October 20, 1016, Vol. 1, p.105**

#### **Conclusions of Law**

- Conservation District Use Application (CDUA HA-3568) is the subject of this contested case hearing. **FOF 851-3**
- The CDUA was signed by Dr. Donald Straney on September 2, 2010. **FOF 851-3**

## **TMT Observatory Corporation is the Designated Third Party Beneficiary of the CDUP**

### **Findings of Fact**

854. The CDUA designates, at 1.2 Overview of the Proposed Use, that the TMT Observatory Corporation is the Third Party Beneficiary of the CDUP.

**Ex. R-1, p.1-5**

855. The CDUA, at 1.2 Overview of the Proposed Use, specifically states: On behalf of the TMT Observatory Corporation, the University of Hawai'i is seeking a Conservation District Use Permit (CDUP) from the State of Hawai'i Board of Land and Natural Resources (BLNR) that will allow the construction, operation, and eventual decommissioning of the Thirty Meter Telescope (TMT) Observatory within an area below the summit of Mauna Kea that is known as "Area E." **Ex. R-1, p.1-5**

856. Exhibit R-7 is the OCCL (Office of Conservation and Coastal Lands, the department of DLNR that administers Mauna Kea) staff report regarding Conservation District Use Application HA-3568 for the Thirty Meter Telescope. **Ex. R-7**

857. Sam Lemmo, the Administrator of OCCL testified that the University of Hawaii is seeking the permit for construction of the TMT observatory for Third Party Beneficiary TMT Observatory Corporation.

**Tr. February 27, 2017, Vol. 41, p.248 to 249**

858. Attorney Richard Wurdeman stated "And TMT Observatory Corp is listed, and it's in my Exhibit B in their application as the party upon which the CDUP application is being brought." **Tr. June 17, 2016, Vol. II, p.26**

859. Witness for the Applicant, Perry White, the drafter of the CDUA, acknowledged that the University of Hawai'i is seeking a CDUP "on behalf of the TMT Observatory Corporation." **Tr. October 20, 2016, Vol. 1, p.106**

### **Conclusion of Law**

- The Third Party Beneficiary of CDUA HA-3568 is TMT Observatory Corporation. **FOF 854-859**

**TMT International Observatory LLC (TIO), relative to CDUA HA-3568, is a foreign corporation.**

### **Findings of Fact**

860. Noting that CDUA HA-3568 was executed on September 2, 2010. **Ex. R-1, p.2**

861. TMT International Observatory LLC (TIO) was incorporated in May 2014.

**Ex. C-1, p.1**

862. Witness for the Applicant, Perry White, admits that TMT International Observatory LLC (TIO) is not mentioned in CDUA HA-3568.  
**Tr. October 20, 2016, Vol. 1, p.106,107, 165**

863. Witness for the Applicant, Perry White, states that TMT International Observatory LLC (TIO) did not exist when CDUA HA-3568 was executed.  
**Tr. October 20, 2016, Vol. 1, p.113**

864. Witness for the Applicant, Perry White, states that TMT is the proposed developer of the TMT Observatory, and that it “now has a new slightly different title which is the TIO (TMT International Observatory LLC).” **Tr. October 20, 2016, Vol. 1, p.114**

865. Witness for the Applicant, Perry White, states that “TIO encompasses what formerly was TMT.” **Tr. October 20, 2016, Vol. 1, p.114**

866. Witness for the Applicant, Perry White, erroneously suggests that the name of TMT Observatory Corporation (TMT) had a legal change of name to TMT International Observatory LLC (TIO). **Tr. October 20, 2016, Vol. 1, p.166**

867. Witness for the Applicant, Perry White, in his WDT, mentions numerous times that TIO will perform all of the required actions that the Third Party Beneficiary is required to perform. **Perry White WDT, p.3-8, 12, 13**

868. Witness for the Applicant, Perry White, states that his use of the term TIO in his WDT was a linkage or bridge to later documents. **Tr. October 20, 2016, Vol. 1, p. 114**

869. Attorney Richard Wurdeman states that TMT International Observatory LLC, “is not the party upon which the application was brought.”  
**Tr. June 17, 2016, Vol. II, p.21**

870. Witness for the Applicant, Perry White, testifies that when he stated that TIO was “formerly TMT Observatory Corporation” in his WDT, that he thought that it was true. **Tr. October 20, 2016, Vol. 1, p.114.**

**Conclusions of Law:**

- The TMT International Observatory LLC is not the Third Party Beneficiary stated in the CDUA (HA-3568). **FOF 860-870**
- The TMT International Observatory LLC is not the Third Party Beneficiary. **FOF 860-870**



**Two separate corporate entities—TMT Observatory Corporation and TMT International Observatory LLC—exist and operate simultaneously.**

**Findings of Fact**

871. Robert Rechtman is the Chief Operating Officer and principal archaeologist of ASM Affiliates. **Tr. December 20, 2016, Vol. 19, p.37**

872. ASM Affiliates, as negotiated by and through Robert Rechtman, was contracted by TMT Observatory Corporation to conduct archaeological studies and prepare reports. **Tr. December 20, 2016, Vol. 19, p.62**

873. ASM Affiliates, for TMT Observatory Corporation, did a report in 2013 and two reconnaissance studies in 2015. **Tr. December 20, 2016, Vol. 19, p.62**

874. ASM Affiliates, through its CEO Robert Rechtman, worked with TMT Observatory Corporation contact person, Paul Gillet. **Tr. December 20, 2016, Vol. 19, p.62**

875. ASM Affiliates, as negotiated by and through Robert Rechtman, was contracted by Thirty Meter Telescope Corporation [sic, should have been TMT International Observatory LLC] to conduct archaeological monitoring for geotechnical boring, grading of the groundbreaking ceremony pad, conducting two field reconnaissance studies and for evaluating a find spot and implementing protection measures around that find spot. **Tr. December 20, 2016, Vol. 19, p.63**

876. ASM Affiliates conducted archaeological monitoring for geotechnical boring in 2013, monitored the grading of the groundbreaking ceremony pad, conducted two field reconnaissance studies, evaluated a find spot and implemented protection measures around that find spot in December 2015 for TMT International Observatory LLC. **Tr. December 20, 2016, Vol. 19, p.63**

877. ASM Affiliates, through its CEO Robert Rechtman, worked with TMT International Observatory LLC contact person, Paul Gillet and a person whose first name was Pratheep. **Tr. December 20, 2016, Vol. 19, p.64**

878. ASM Affiliates CEO Robert Rechtman, at overlapping times, worked with TMT Observatory Corporation AND TMT International Observatory LLC contact person Paul Gillet—who dually represented both the TMT Observatory Corporation and the TMT International Observatory LLC relative to ASM Affiliates dual contracts with both TMT Observatory Corporation AND TMT International Observatory LLC. **Tr. December 20, 2016, Vol 19, p.64**

879. ASM Affiliates CEO Robert Rechtman had difficulties deciding which corporate entity, TMT Observatory Corporation **OR** TMT International Observatory LLC, he was dealing with at any particular time when dealing with dual contact person—for both TMT Observatory Corporation **OR** TMT International Observatory LLC—at any particular time. **Tr. December 20, 2016, Vol. 19, p.64**

880. ASM Affiliates, through CEO Robert Rechtman, worked with two corporations, TMT Observatory Corporation **AND** TMT International Observatory LLC, during the same period. **Tr. December 20, 2016, Vol. 19, p.61-64**

881. Attorney Douglas Ing, attorney for both TMT Observatory Corporation **AND** TMT International Observatory LLC, mentions both corporations (TMT Observatory Corporation **AND** TMT International Observatory LLC simultaneously). “He can’t say it was valid for purposes of either TMT or TIO being untimely...”  
**Tr. June 17, 2016, Vol. II, p.15**

882. Attorney Douglas Ing stated that TMT Observatory Corporation **AND** TMT International Observatory LLC are two different corporations.  
**Tr. June 17, 2016, Vol. II, p.23**

883. Attorney Douglas Ing stated that the people involved in either the TMT Observatory Corporation **OR** TMT International Observatory LLC are not the same people. **Tr. June 17, 2016, Vol. II, p.23**

884. Attorney Richard Wurdeman states that “two separate entities”—TMT Observatory Corporation **AND** TMT International Observatory LLC—are being discussed.  
**Tr. June 17, 2016, Vol. II, p.17**

885. Attorney Richard Wurdeman compares one entity, TMT Observatory Corporation, with the other entity, TMT International Observatory LLC.  
**Tr. June 17, 2016, Vol. II, p.20**

886. Attorney Richard Wurdeman says TMT International Observatory LLC “is not the party upon which the application was brought.” **Tr. June 17, 2016, Vol. II, p.21**

### **Conclusions of Law**

- TMT Observatory Corporation (TMT) **AND** TMT International Observatory LLC (TIO) are two separate and distinct corporations that exist and operate simultaneously. **FOF 871-886**
- TMT International Observatory LLC (TIO) did not supplant TMT Observatory Corporation (TMT) for purposes of the CDUP (HA-3568). **FOF 871-886**

**The Applicant and TMT International Observatory LLC, with consent of BLNR/DLNR, have erroneously and intentionally attempted to switch the genuine Third Party Beneficiary that is TMT Observatory Corporation to the stranger corporation, TMT International Observatory LLC.**

**Findings of Fact**

887. A Letter of Intent between Caltech, University of California, the Canadian University and the National Astronomy Observatory of Japan was executed in 2011. **Tr. December 19, 2016, Vol. 18, p.12**

888. Witness for the Applicant, Edward Stone, testified that the Letter of Intent stated that “this group of six institutions would work together to essentially establish the TIO (TMT International Observatory LLC)” that included a master agreement and a company agreement which defined the nature of this LLC, and the voting nature ... and the commitments ... for each partner, which became official in 2014 when things were transferred from TMT Observatory Corporation to TMT International Observatory LLC. **Tr. December 19, 2016, Vol. 18, p.12**

889. The CDUA provides that if a CDUP is granted, that it should be granted to TMT Observatory Corporation (TMT) (A03). **Tr. January 24, 2017, Vol. 29, p.205; Ex. A-001**

890. The TMT Observatory Corporation was designated as the Third Party Beneficiary when, and if, the CDUA were approved and the CDUP granted. **Ex. A001**

891. Witness for the Applicant, Edward Stone, testified that both the TMT Observatory Corporation and TMT International Observatory LLC continued to exist, TMT International Observatory LLC did not replace TMT Observatory Corporation, but that their roles had changed. **Tr. December 19, 2016, Vol. 18, p.21**

892. Witness for the Applicant, Perry White, testified that he didn't know whether the former TMT Observatory Corporation had morphed into TMT International Observatory LLC as he had written in his WDT. **Tr. October 20, 2016, Vol. 1, p. 116**

893. Witness for the Applicant, Perry White, admitted that he did not reference TIO (TMT International Observatory LLC) in his written testimony in the contested case hearing of 2011. **Tr. October 20, 2016, Vol. 1, p.168**

894. Witness for the Applicant, Perry White, testified that he did not know of the legal documents by which TMT Observatory Corporation was transitioned into TMT International Observatory LLC as his WDT stated, and that he was only repeating what he had been told. **Tr. October 20, 2016, Vol. 1, p.116 and 117**

895. Witness for the Applicant, Perry White, admitted that he was advised, instructed, or should otherwise substitute TIO (TMT International Observatory LLC for TMT Observatory Corporation in his WDT by Carlsmith staff (applicant's attorney).

**Tr. October 20, 2016, Vol. 1, p.168**

896. Witness for the Applicant, Perry White, apologized to have "introduced confusion into his WDT by referring to TIO (TMT International Observatory LLC) instead of TMT (TMT Observatory Corporation)." **Tr. October 20, 2016, Vol. 1, p.119**

897. Witness for the Applicant, Perry White, admitted that "it's confusing" that his mention of TIO (TMT International Observatory LLC) in his WDT when it was really TMT Observatory Corporation (TMT) that developed the TMT Management Plan in the Cдуа (HA-3568). **Tr. October 20, 2016, Vol. 1, p.167**

898. Attorney for the Applicant, Ian Sandison, stated that "It's common knowledge that TIO (TMT International Observatory LLC) is successor in interest to the TMT Observatory Corporation" and that "Mr. White has explained is what has been explained to him ...." **Tr. October 20, 2016, Vol. 1, p.120**

899. Attorney for the Applicant, Ian Sandison, also stated that "TIO has assumed the obligation of its predecessor (assumably TMT Observatory Corporation, the real Third Party Beneficiary)." **Tr. October 20, 2016, Vol. 1, p.120**

### **Conclusions of Law**

- The Applicant University's Attorney Carlsmith & Ball instructed the Applicant's witness Perry White to switch the name of TMT International Observatory LLC into his WDT in place of the name of the Third Party Beneficiary, TMT Observatory Corporation, as designated by the Cдуа. **FOF 887-899**
- The Third Party Beneficiary designate TMT Observatory Corporation should have been the Sublessee of the TMT Sublease. **FOF 887-899**
- The Applicant University and the Chair of BLNR/DLNR should each have had actual knowledge that Third Party Beneficiary designate TMT Observatory Corporation should have been the rightful Sublessee on the TMT Sublease. **FOF 887-899**
- The Applicant University, as Sublessor, executed the TMT Sublease to the TMT International Observatory LLC as Sublessee. **FOF 887-899**
- The Applicant University, with knowledge that the Third Party Beneficiary designate TMT Observatory Corporation should have been the Sublessee on the TMT Sublease, but seemingly deliberately and intentionally otherwise executed the Sublease to the stranger corporation TMT International Observatory LLC to be that Sublessee, indicates that some kind of illegal behavior took place. **FOF 887-899**

- The BLNR/DLNR, as the agency of the Trustee of State of Hawai'i's so-called "ceded lands" with knowledge that the Third Party Beneficiary designate TMT Observatory Corporation should have been the Sublessee on the TMT Sublease, but seemingly deliberately and intentionally otherwise executed its Consent to the stranger corporation TMT International Observaory LLC to be that Sublessee, indicates that some kind of illegal behavior took place. **FOF 887-899**
- The Chair of BLNR's Consent to the TMT Sublease was revoked by the Circuit Court appeal decision dated Jan. 6, 2017, which effectively revoked the TMT Sublease. **FOF 887-899**

**The Applicant has not submitted any testimony or other evidence to establish TMT International Observatory (TIO) as the real Third Party Beneficiary.**

### **Findings of Fact**

900. Upon being asked by Hearing Officer Amano whether "there be forthcoming testimony about that?" Mr. Sandison said: "Yes, there will."

**Tr. October 20, 2016, Vol. 1, p.120**

901. Sam Lemmo, Administrator of OCCL, testified that there have been "no" amendments to the CDUA, or "any" assignment or other document of transfer of rights in order to execute the substitution of Third Party Beneficiary designate TMT Observatory Corporation by TMT International Observatory LLC or any other entity.

**Tr. January 24, 2017, Vol. 29, p.205,206**

902. The TMT Sublease, that would provide the parcel of land on which to build the TMT observatory was executed by Applicant University to TMT International Observatory LLC (a stranger corporation to the CDUA) on July 28, 2014. **Ex. B.02f**

903. The TMT Sublease is presumed to have been consented to by the attachment of a unsigned "Consent," the original supposedly signed by the Chair of BLNR/DLNR.

**Ex. B.02f**

904. The Chair of BLNR/DLNR's Consent to the TMT Sublease was revoked by the Third Circuit Court on appeal on January 6, 2017. **Ex. B.19h**

905. The Scientific Cooperation Agreement executed between Applicant University and the stranger corporation TMT International Observatory LLC was effective until the termination of the TMT Sublease.

### **Conclusions of Law**

- The Applicant, TMT Observatory Corporation, TMT International Observatory LLC, and DLNR have seemingly conspired to engage in the improper substitution of the stranger corporation TMT International Observatory LLC for the CDUA designated TMT Observatory Corporation in TMT observatory transactions is indeed irregular—as the appearance of an improper TIO Sublease and an improper Scientific Cooperation Agreement that benefits TIO—and not TMT—is evidence that an illegality has probably taken place. **FOF 900-905**
- Applicant University, TMT Observatory Corporation, TMT International Observatory LLC and BLNR/DLNR have engaged in irregular actions.
- **FOF 900-905**
- The revocation of BLNR's/DLNR's Consent to the TMT Sublease by the Third Circuit Court essentially revokes the TMT Sublease. **FOF 900-905**
- The revocation of BLNR's/DLNR's Consent to the TMT Sublease by the Third Circuit Court essentially revokes the TMT Sublease and essentially revokes the Scientific Cooperative Agreement executed between Applicant University and the stranger corporation TMT International Observatory LLC. **FOF 900-905**

**TMT International Observatory LLC's improvements done at times when the now-revoked CDUP was effective now that the CDUP and the Sublease have been revoked are now in violation.**

### **Findings of Fact**

906. Contract Archaeologist Robert Rechtman testified that he did archaeological monitoring for geotechnical boring and grading of a pad for the groundbreaking ceremony. **Tr. December 20, 2016, Vol. 19, p.63**

907. TMT International Observatory LLC also graded and made improvements upon the so-called Access Road pursuant to the CDUA and CDUP. **Ex. A001**

908. With the termination of the Sublease, the Site Decommissioning Plan is triggered. **Ex. A013**

909. 2.2.3 Terminating Subleases: "Subleases are terminated [by] ... revocation of a sublease by U.H." **Ex. A013**

910. 4-2 Site Decommissioning Plan: "A Site Decommissioning Plan (DSP) documents ... an approach to decommissioning, and proposes a plan for site restoration .... Each SDP shall be developed in stages consisting of the following four components: 1) Notice of Intent ..." **Ex. A013**

911. 4.2.1 Notice of Intent: "The first component of the decommissioning process is the preparation of a Notice of Intent (NOI)." **Ex. A013**

912. Table 5 of the Site Decommissioning Plan states the process begins: “At least five years prior to either the termination date of a sublease ... or as soon as is feasible if decommissioning is to take place less than five years after a decision is made to cease operation. Ex. A013

913. The Record contains no indication that a Notice of Intent has been filed.

### **Conclusions of Law**

- TMT International Observatory LLC’s activities relative to the now-revoked CDUP, at times when it was effective, resulted in the physical existence of an improved Access Road leading to Area E, geotechnical boring and the groundbreaking ceremony pad.
- Now that the TMT Sublease has been terminated, the Site Decommissioning Plan has been triggered. **FOF 906-913**
- Now that the TMT Site Decommissioning Plan has been triggered, the Notice of Intent to decommission the Access Road, the geotechnical boring and the groundbreaking ceremony pad is overdue. **FOF 906-913**
- The TMT International Observatory LLC is in violation of the Site Decommissioning Plan. **FOF 906-913**
- The TMT International Observatory LLC is in violation of the now revoked Sublease. **FOF 906-913**
- The TMT International Observatory LLC is in violation of the now revoked CDUP. **FOF 906-913**
- The TMT International Observatory LLC, with multiple violations of agreements and documents of the out-moded CDUA, the revoked Sublease, the revoked CDUP and the Site Decommissioning Plan is, or should be, disqualified from any present and future consideration for granting of Third Party Beneficiary status of this Contested Case Hearing. **FOF 906-913**

### **The CDUA process is determined by a two-step procedure.**

### **Findings of Fact**

914. BLNR advised UHH, Mauna Kea Anaina Hou, Deborah Ward (Chairperson of Sierra Club, Hawai’i Chapter), Miwa Tamanaha (Executive Director of KAHEA), Fred D. Stone, and Clarence Kukauakahi Ching that BLNR would “consider” the application [CDUA] at its regularly-scheduled meeting on February 25, 2011, .... **Mauna Kea Anaina Hou v Bd.of Land & Nat.Res., 136Hawaii376, 363P.3d224 (2015),p9**

915. On February 25, 2011, BLNR’s Chair began BLNR’s regularly-scheduled public board meeting ... **Mauna Kea Anaina Hou v Bd.of Land & Nat.Res., p.9**

916. In its decision of **Mauna Kea Anaina Hou v Bd.of Land & Nat.Res.**, the Hawai’i Supreme Court, in discussing this transaction, said: “BLNR then voted unanimously to [1] approve the application and [2] issue a permit.” **Mauna Kea Anaina Hou v Bd.of Land & Nat.Res., p.12**

917. [T]hat this condition would commence with construction also suggests that even without construction, the application had been [1] approved and [2] a permit had been issued. **Mauna Kea Anaina Hou v .Bd.of Land & Nat.Res., p.36**

918. BLNR argues that when it [1] approved the CDUA and [2] issued the CDUP at the February 25, 2011 meeting, a request for a contested case hearing was not perfected, ... **Mauna Kea Anaina Hou v Bd.of Land & Nat.Res., p.56**

919. “BLNR put the cart before the horse when it approved [issued] the permit before the contested case hearing was held.”  
**Mauna Kea Anaina Hou v Bd.of Land & Nat.Res., p.33**

920. By Minute Order 36, filed as Document 376 on October 14, 2016, the Board issued its Order Voiding Permit - CDUP HA-3568 that was issued in February 2011. “The Board now declares and affirms the CDUP HA-3568 is void.” **Minute Order 36**

### **Conclusions of Law**

- BLNR’s decision to [1] approve the CDUA and [2] issue the CDUP was made at the duly held regularly-scheduled public board meeting on February 25, 2011.  
**FOF 914-920**
- BLNR made its decision in a two-step process, 1) BLNR approved the CDUA, and 2) BLNR issued the CDUP. **FOF 914-920**
- BLNR [1] approved the CDUA AND [2] issued the CDUP. **FOF 914-920**
- On October 14, 2016, the Board [BLNR] declared and affirmed the CDUP HA-3568 is void. **FOF 914-920**
- On October 14, 2016, BLNR voided only the CDUP. **FOF 914-920**
- On October 14, 2016, BLNR DID NOT void the approved CDUA. **FOF 914-920**
- The approved CDUA continues to exist on the Record. **FOF 914-920**
- With the continued existence of the duly “approved CDUA” on its (BLNR/DLNR) books (in the Record), and is, at present, conducting this “Contested Case Hearing” - the approved CDUA continues to be deliberated with “the cart before the horse” status on the Record. **FOF 914-920**
- While BLNR on October 14, 2016, in Minute Order 36 voided the second part of the October 14, 2016 two-step decision to 2) issue the CDUP, the first part of the two-step decision, 1) to approve the CDUA, continues to be in place, like the CDUP was, as discussed in the deliberations of the Hawai’i Supreme Court in Mauna Kea Ananina Hou et v. BLNR et al, that revoked the CDUP, continuing the “cart before the horse” irreversible error that the Supreme Court’s rationale in revoking the issued CDUP was founded upon, AND continues to be fully alive in the Record.  
**FOF 914-920**
- The World and the Hearing Officer on this Contested Case Hearing are on notice that the pre-determined outcome of this Contested Case Hearing, as the present Record indicates, is, by BLNR’s official indication, that it will illegally grant the applied-for CDUP. This is an irreversible error! **FOF 914-920**



- This Contested Case Hearing need not look any further to decide that the irreversible error of BLNR/DLNR's official position of "approving the CDUA" continues at BLNR/DLNR (the cart before the horse), AND that further consideration of the outcome of this CDUA/CDUP Contested Case Hearing process, must be a denial. **FOF 914-920**

**The Hearing Officer committed a major violation when she declared that "nothing" from the "First Contested Case Hearing" of CDUA HA-3568 will be considered in this "Second Contested Case Hearing."**

### **Findings of Fact**

921. HAR §13-1-32.4 **Records on file with board.** Records directly relating to the application that are on file with the board, including, but not limited to, the record of the public hearing (if held), shall be a part of the record of the contested case; provided, however, that any party may object, in the manner provided in section 13-1-35, to any part of such record. [Eff and comp 2/27/09] (Auth: HRS §§91-2, 171-6) (Imp: HRS §§91-2, 91-9, 171-6).

922. The Hearing Officer stated numerous times that the Second Contested Case Hearing will have nothing to do with the First Contested Case Hearing—and that "nothing" in the "First Contested Case Hearing" would be used in this, the Second Contested Case Hearing. Common knowledge, that was mentioned multi-times during the Second Contested Case Hearing.

923. There were no objections voiced by any Party in the Second Contested Case Hearing relative to HAR §13-1-32.4. Common knowledge. How can one find any facts in the Record if there is none to find?

### **Conclusions of Law**

- HAR §13-1-32.4 says that: All "[r]ecords directly relating to the application {CDUA HA-3568} that are on file with the board, including ... the record of the public hearing, shall be a part of the record of the (Second Contested Case Hearing) contested case." **FOF 921-923**
- The Hearing Officer, relative to HAR §13-1-32.4, and her non-compliance with its common constructive interpretation, and her refusal to consider any and all of that body of records, documents and evidence for admission into evidence in this Second Contested Case Hearing, committed irreversible error. **FOF 921-923**
- Because of the Hearing Officer's gross mis-interpretation and refusal to deal with any material from the First Contested Case Hearing based on HAR §13-1-32.4, I am complying with the statute by using those records, documents, and evidence here in this Findings of Fact and Conclusions of Law document, complete with the designations of source information of the First Contested Case Hearing, in compliance with the statute. **FOF 921-923**

### **III. PROPOSED DECISION**

Given that the objectivity of this proceeding was compromised from the beginning (of Contested Case Hearing 2) and that there was really nothing the BLNR intended to do to correct that taint (from the beginning and during the progression of the Hearing), the Hearing Officer finds that the process initiated by the BLNR in response to the Supreme Court ruling in this case does not meet the constitutional tests for due process.

Additionally, given that the proposed project violates the state law on desecration, the Hearing Officer recommends that the BLNR deny or dismiss the CDUA (HA3568).

Given that the BLNR initiated this proceeding because BLNR violated the due process rights of those opposed to the application and given that the conduct of this proceeding including numerous similar violations of due process rights of the application opponents, the Hearing Officer recommends to the BLNR that this proceeding be vacated as defective based on the conduct of the proceeding.

The overly-firm and unreasonable stick-to-it-ness of the Hearing Officer to deliver on possible promises she has made to complete this Contested Case Hearing “on schedule” despite the need for necessary flexibilities and exigencies that can be expected in any giant endeavor like this, is unfair and unreasonable, and a violation of due process.

Despite the Record not being complete, with many Motions on the table and Hearings Officer’s responses that have been made as late a 4 days ago, the original deadline for filing of this Findings of Fact and Conclusions of Law, in the face of these irregularities, have not resulted in any leeway and consideration being given in order to try to get a more complete Record in place. I protest this further violation of due process and request that further time be allowed for me (and others) to complete this very incomplete document. Crimes have been committed.

### **IV. PROPOSED ORDER**

Based on the entire record, the Hearing Officer recommends that BLNR order the CDUA in this proceeding be dismissed or denied.

DATED: May 23, 2017  
at Kamuela, Hawai’i Island  
so-called “State of Hawaii”

Respectfully submitted,

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Clarence Kukauakahi Ching









