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DEPARTMENT OF
NATURAL RESOURCES
STATE OF HAWAII

BOARD OF LAND AND NATURAL RESOURCES

STATE OF HAWAI'I

IN THE MATTER OF Contested Case Hearing Re Conservation District Use Application (CDUA) HA-3568 for the Thirty Meter Telescope at the Mauna Kea Science Reserve, Ka'ohe Mauka, Hāmakua, Hawai'i, TMK (3) 4-4-015:009	Case No. BLNR-CC-16-002 THE UNIVERSITY OF HAWAI'I AT HILO AND TMT INTERNATIONAL OBSERVATORY, LLC'S JOINT RESPONSE TO CLARENCE KUKAUAKAHI CHING'S PROPOSED FINDINGS OF FACT, CONCLUSIONS

OF LAW, AND DECISION AND ORDER, FILED MAY 30, 2017 [DOC. 667]; APPENDICES A–B; CERTIFICATE OF SERVICE

THE UNIVERSITY OF HAWAI'I AT HILO AND TMT INTERNATIONAL OBSERVATORY, LLC'S JOINT RESPONSE TO CLARENCE KUKAUAKAHI CHING'S PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER, FILED MAY 30, 2017 [DOC. 667]

Applicant UNIVERSITY OF HAWAI'I AT HILO ("**UH Hilo**") and TMT INTERNATIONAL OBSERVATORY, LLC ("**TIO**"), through their respective counsel, jointly submit this Response to Clarence Kukauakahi Ching's Proposed Findings of Fact, Conclusions of Law, and Decision and Order, filed 05/30/17 [Doc. 667] ("**Response**").

I. STANDARD OF REVIEW FOR REVERSAL OR MODIFICATION OF ADMINISTRATIVE FINDINGS, CONCLUSIONS, DECISIONS, OR ORDERS

To prevent judicial reversal or modification of administrative findings of fact under § 91-14(g), Hawaii Revised Statutes ("**HRS**"), the Board of Land and Natural Resources ("**BLNR**") should, upon review of the record, reverse or modify findings that are "[c]learly erroneous in view of the reliable, probative, and substantial evidence on the whole record." *In re Gray Line Hawaii Ltd.*, 93 Hawai'i 45, 53, 995 P.2d 776, 784 (2000). A finding of fact is clearly erroneous when: (1) the record lacks substantial evidence to support the finding or determination, or (2) despite substantial evidence to support the finding or determination, the BLNR is left with the definite and firm conviction that a mistake has been made. *Kienker v. Bauer*, 110 Hawai'i 97, 105, 129 P.3d 1125, 1133 (2006).

Similarly, conclusions of law should be reversed or modified where the BLNR finds they are in violation of constitutional or statutory provisions, in excess of the statutory authority or jurisdiction of the Commission, or affected by other error of law. *Id.*

II. DISCUSSION

A. Responses to Clarence Kukauakahi Ching's ("Ching") Proposed FOF and COL

The UH Hilo and TIO object to each of the FOF and COL in Ching's *Proposed Findings of Fact, Conclusions of Law and Decision and Order* ("Ching's Proposed FOF/COL") to the extent that they are irrelevant, inapplicable, immaterial, mischaracterize the evidence, misstate or misrepresent the record, rely on evidence that is not credible, biased, or incomplete, and/or not supported by the evidence. UH Hilo and TIO also object to Ching's Proposed FOF/COL to the extent they assert alleged "findings" that are beyond the scope of issues set forth in Minute Order No. 19.

Appendix A contains general objections to Ching's Proposed FOF/COL, which UH Hilo and TIO hereby incorporate by reference to its response to each of Ching's FOF and COL, to the extent applicable.

In addition to the general objections in Appendix A, UH Hilo and TIO have prepared a table of specific responses and objections to Ching's proposed FOF and COL, which is attached hereto as **Appendix B**. Citations to the evidence in the record provided herein are not intended to be exhaustive or comprehensive, but demonstrate evidentiary support for UH Hilo and TIO's responses and objections.

The UH Hilo and TIO further object to Ching's Proposed FOF/COL to the extent they seek to challenge the FEIS for the TMT Project. This proceeding is not an EIS challenge under HRS Chapter 343; Ching's ability to make such a challenge expired long ago, and he cannot reopen the FEIS approval process through improper arguments of insufficiency under the statutes and rules governing the EIS process. This proceeding is entirely governed by the applicable constitutional law and the Conservation District rules that are genuinely at issue here.

The FOF/COL and page numbers referenced herein follow those as provided in Ching's Proposed FOF/COL. References to the UH Hilo and TIO's Joint [Proposed] Findings of Fact, Conclusions of Law, and Decision and Order, filed on May 30, 2017 [Doc. 671] ("**UH-TIO FOF/COL**") are denoted by the prefixes "UH-TIO FOF" and "UH-TIO COL" for the numbered FOF and COL, respectively, in the UH-TIO FOF/COL.

Acronyms and defined terms used herein are defined in the Index of Select Defined Terms, which was filed as part of the jointly-submitted UH-TIO FOF/COL.

Any specific proposed finding or conclusion not specifically referred to or addressed below is deemed denied and disputed.

B. Responses to Ching's Proposed Decision and Order

Ching's proposed Decision and Order is not supported by the record. As set forth in the UH-TIO FOF/COL, substantial evidence has been adduced to show that the CDUA satisfies the eight criteria as set forth in Hawai'i Administrative Rule ("**HAR**") § 13-5-30(c). The record also shows that the TMT Project is consistent with the UH Hilo's and the BLNR's obligations under the public trust doctrine, *Ka Pa'akai*, and Article XI, section I and Article XII, section 7 of the Hawai'i Constitution.

Ultimately, Ching is categorically opposed to the construction of TMT regardless of whether or not the TMT Project satisfies the eight criteria. No location on the mountain, and no combination of mitigation measures, will make the TMT Project acceptable to Ching. That position is not supported by the law.

III. CONCLUSION

For the reasons set forth herein and in the UH Hilo Pre-Hearing Statement, TIO's Pre-Hearing Statement, the UH-TIO FOF/COL, the testimony of the UH Hilo's and TIO's witnesses, the examination of the Petitioners' and Opposing Intervenor's witnesses, and in UH Hilo's and

TIO's other filings, UH Hilo and TIO respectfully request that the Hearing Officer adopt the UH-TIO FOF/COL, and reject Ching's Proposed FOF/COL.

DATED: Honolulu, Hawai'i, June 13, 2017.

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Appendix A

General Responses to Petitioners'/Opposing Intervenors' Proposed Findings of Fact ("FOF") and Conclusions of Law ("COL")	
Citation does not support the proposition.	The citation offered by Petitioners/Opposing Intervenors does not support the proposed FOF or COL.
Estoppel/Improper Reconsideration	The proposed FOF or COL or a portion thereof is improper to the extent it is barred by estoppel or waiver, or improperly seeks reconsideration of the Hearing Officer's or the BLNR's prior ruling,
Inaccurate/False	The proposed FOF or COL or a portion thereof is inaccurate or false.
Incomplete.	The proposed FOF or COL is materially incomplete.
Irrelevant/Inapplicable.	The information in the proposed FOF or COL is irrelevant or inapplicable in this contested case proceeding. See Minute Order No. 19 [Doc. No. 281].
Lack of Jurisdiction	The proposed FOF or COL exceeds the scope of the Hearing Officer's jurisdiction and/or delegated authority
Mischaracterization.	The proposed FOF or COL mischaracterizes legal authority or the contents of the record.
Misleading. Partial quotation.	The proposed FOF or COL contains a partial quote from legal authority or a document in the record, and the incompleteness of the quotation is likely to mislead the reader.
Misleading. Presented out of context.	The proposed FOF or COL presents law or information in the record out of context and/or in a way that is likely to mislead the reader.
Misrepresentation	The proposed FOF or COL affirmatively misrepresents legal authority or the contents of the record.
Not credible.	The proposed FOF or COL is not credible based on the totality of the evidence contained in the record and/or the demonstrated biases of the witness whose testimony is cited in support of the proposed FOF or COL.

Not in dispute.	Either (1) the proposed FOF or COL is not at issue in this proceeding, or (2) standing alone, the proposed FOF or COL is not objectionable. The designation of any individual proposed FOF or COL as "not in dispute" does not and should not be construed as an admission of said FOF or COL or a concession that said FOF or COL should be incorporated into the final FOFs and COLs. It also does not and should not be construed as assent to any inferences suggested or that may be suggested by Petitioners/Opposing Intervenors from, e.g., their misleading grouping or ordering of otherwise unrelated facts.
Not in evidence.	The proposed FOF or COL asserts "facts" and/or cites documents that are not in evidence.
Unsupported/Unsubstantiated	The proposed FOF or COL is not supported by information in the record or was not substantiated by the Petitioners/Opposing Intervenors through the contested case process.

Appendix B

Summary Table of Responses to Clarence Kukauakahi Ching's Proposed FOF/COL

FOF/ COL #	Page	FOF/COL	Response
	2-3	Preliminary Statement	Not in evidence. Unsupported / Unsubstantiated. Estoppel / Improper Reconsideration. Citations to works by Thomas King and Catie Leary and related arguments are not in evidence and not supported by the record. Ching's argument that his proposed FOF/COL may be amended because the record is allegedly "incomplete" reiterates prior arguments to extend the deadline for the submission of the FOF/COL, and is without merit. *See* Minute Order Nos. 48 [Doc. 631], 50 [Doc. 646], and 52 [Doc. 650].
1	7	Public hearings on CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka'ohe Mauka, Hamakua, Hawai'i, **TMK (3) 4-4-015:009** were held:	Not in dispute. Irrelevant/Inapplicable. Estoppel/Improper Reconsideration. While UH-TIO do not object to general references to the first contested case hearing solely for procedural background purposes (*See* UH-TIO FOF 31-33), the BLNR's April 12, 2013 decision and order was vacated, and this matter was remanded for a new contested case hearing on the CDUA. UH-TIO FOF 34-35. The Hearing

			Officer denied admission of proposed exhibits arising from the prior contested case hearing because that hearing "has been disallowed by the Supreme Court." Accordingly, the record in the prior contested case hearing is not part of the record in the current proceeding. UH-TIO do not necessarily agree with the characterization of the record in the prior proceeding, and object to the citation to, and use of, the record in the prior contested case for substantive purposes in this proceeding.
2	7	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**	Not in dispute. Irrelevant/Inapplicable. Estoppel/Improper Reconsideration. While UH-TIO do not object to general references to the first contested case hearing solely for procedural background purposes (*See* UH-TIO FOF 31-33), the BLNR's April 12, 2013 decision and order was vacated, and this matter was remanded for a new contested case hearing on the CDUA. UH-TIO FOF 34-35. The Hearing Officer denied admission of proposed exhibits arising from the prior contested case hearing because that hearing "has been disallowed by the Supreme Court." Accordingly, the record in the prior contested case hearing is not part of the record in the current proceeding. UH-TIO do not necessarily agree with the characterization of the record in the

			prior proceeding, and object to the citation to, and use of, the record in the prior contested case for substantive purposes in this proceeding.
3	7	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'ohe Mauka, Hāmakua, Hawai'i. **Ex. A059**	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1.
4	7	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**	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1.
5	7	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**	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1.
6	8	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**	Irrelevant/Inapplicable. Designation of Mr. Aoki as "Hearing Officer" or "HO" creates potential confusion with Hearing Officer Amano. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1.
7	8	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**	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1.
8	8	At the pre-hearing conference, the issue of the Petitioners' standing was	Irrelevant / Inapplicable. Not in

		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. *See supra* UH-TIO's response to Ching's proposed FOF 1.
9	8	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**	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1. Misleading. Presented out of context. Inaccurate and false. Their expertise was limited to their own individual cultural practice, and not that of others. UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.

10	8	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**	*See supra* UH-TIO's response to Ching's proposed FOF 9.
11	8	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.	Irrelevant / Inapplicable. Not in evidence. *See supra* UH-TIO's response to Ching's proposed FOF 1. As to the third sentence: Irrelevant/Inapplicable. Inaccurate/False. Unsupported/Unsubstantiated.
12	8	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)**	Not in dispute.
13	9	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.	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Estoppel/Improper Reconsideration. *See* Minute Order No. 4 [Doc. 14].
14	9	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.	Mischaracterization. Given UH Hilo's anticipation of numerous objections by Petitioners to the Hearing Officer's appointment, which would result in delays in the contested case hearing process (which came to fruition), UH Hilo, while noting that the Hearing Officer was eminently qualified and that the selection process was proper, reluctantly requested the BLNR to

			consider the appointment of another hearing officer to expedite the process. The University of Hawai'i at Hilo's Statement of Position on 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, Filed May 13, 2016 [Doc. 43].
15	9	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.	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Immaterial or moot. Not in evidence. Inaccurate / False. The Hearing Officer provided notice of the prehearing conference and conducted the conference pursuant to her authority under HAR Title 13, Chapter 1. Minute Order No. 5 [Doc. 16]. UH-TIO COL 37. Estoppel/Improper Reconsideration. At the May 16, 2016 prehearing conference, the Hearing Officer specifically asked the Petitioners' representative, Mr. Wurdeman, whether he had any objections to the prehearing conference. He answered that he had no objections. He also indicated on the record that the petitioners were unable to attend simply because the hearing

			was held on Oahu, rather than the island of Hawai'i. Tr. 5/16/16 at 5:7-12. Therefore, the Petitioners, including Ching, have waived any argument as to a lack of sufficient notice.
16	9	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"**	Not in dispute.
17	9	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.	Irrelevant/Inapplicable. Citation does not support the proposition. The Hearing Officer provided notice of the prehearing conference and conducted the conference pursuant to her authority under HAR Title 13, Chapter 1. Minute Order No. 5 [Doc. 16]. UH-TIO COL 37. By its terms, HRS § 91-9.5 pertains to notification of a "hearing" not a prehearing conference. The Hearing Officer provided the required notice of the contested case hearing in compliance with HRS § 91-9.5. Notice of Contested Case Hearing [Doc. 276] and Amended Notice of Contested Case Hearing [Doc. 325].

			Estoppel/Improper Reconsideration At the May 16, 2016 prehearing conference, the Hearing Officer specifically asked the Petitioners' representative, Mr. Wurdeman, whether he had any objections to the prehearing conference. He answered that he had no objections. He also indicated on the record that the petitioners were unable to attend simply because the hearing was held on Oahu, rather than the island of Hawai'i. Tr. 5/16/16 at 5:7-12. Therefore, the Petitioners have waived any argument as to a lack of sufficient notice.
18	9	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**	Not in dispute.
19	9	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.	Not in dispute.
20	10	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.	Unsupported/unsubstantiated. Misleading. Presented out of context. Estoppel/Improper Reconsideration. Minute Order No. 7 provided notice that the Hearing Officer would discuss scheduling issues during the prehearing

			conference on June 17, 2016. Minute Order No. 7 [Doc. 44]. None of the Petitioners and anticipated Opposing Intervenors who were present had difficulty in estimating the number of witnesses that they anticipated calling, including Wurdeman, who represented Petitioners at that point. Tr. 06/17/16 (Scheduling Hearing) at 7:8 – 12:4. Nor did Mr. Wurdeman object when asked to estimate the number of potential witnesses to be called by the Petitioners. Inaccurate/False. The Temple of Lono was represented by Mr. Lanny Sinkin and thus did not participate *pro se*.
21	10	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	Not in dispute. UH-TIO note that the citation to "Tr. Vol. III Titled: 'Request for Admissions and Motions'" should instead be to "Tr. Vol. II Titled: 'Scheduling Hearing'".
22	10	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"**	Not in dispute.
23	10	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"**	Not in dispute.
24	10	August 29, 2016, the 5th pre-hearing conference was held at Hawaii	Not in dispute.

		Community College Cafeteria, 1175 Manono, Hilo, Hawai'i. Further Motions were heard. **Tr. Vol VI, "Motions Hearings"**	
25	10	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"**	Not in dispute.
26	10	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"**	Not in dispute.
27	10	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 Kuali'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	Inaccurate/False. Maelani Lee withdrew as a party. *See* UH-TIO FOF 17. UH-TIO note that, although Stephanie Malia Tabadda and Glen Kila were admitted as parties, neither physically appeared during the evidentiary portion of the contested case hearing, which commenced on October 20, 2016 and ended on March 2, 2017. *See* UH-TIO FOF 23 and 25. Misrepresentation of the name of Intervenor as "Thirty Meter Telescope International Observatory LLC". Incomplete. Although several other individuals agreed to be witnesses for the Hearing Officer, only Ms. Holi testified as a Hearing Officer's witness

		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.	at the hearing, and all other Hearing Officer witnesses were subsequently dismissed. UH-TIO FOF 47; UH-TIO COL 25-35.
28	11	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**	Inaccurate/False. Citation does not support proposition. "TMT Observatory Corporation" will not be involved in the construction/operation of the TMT Project. Instead, TIO will occupy this role. UH Hilo is not pursuing a CDUP "on behalf" of another party, although TIO will ultimately oversee construction and operation of the Thirty-Meter Telescope Project ("**TMT Project**"). Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent it raises issues relating to arguments regarding the validity of the CDUA because it references the TMT Corporation rather than TIO. The

			reference to TMT Corporation in the CDUA does not affect the validity of the CDUA. *See* UH-TIO COL 420-426.
29	11	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**	Irrelevant / Inapplicable. Misleading. Presented out of context. *See supra* UH-TIO's response to Ching's proposed FOF 28.
30	11	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent it raises issues relating to the Petitioners' and Opposing Intervenors' arguments relating to the signatory for the CDUA. *See* Petitioners' Motion to Strike Conservation District Use Application, HA-3568, dated September 2, 2010 and/or Motion for Summary Judgment, filed July 18, 2016 [Doc. 94]. The signatory for the CDUA was proper. *See* UH-TIO's COL 416-419.
31	11	Conservation land management is not listed as a purpose of the University system. **HRS §304A-102**	*See supra* UH-TIO's response to Ching's proposed FOF 30.
32	12	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	UH Hilo and TIO take no position as to the lineal descendancy of Ching.

		voters and trustees were "certified" to be Hawaiian by blood.	
33	12	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.	Irrelevant / Inapplicable. UH-TIO object to this proposed FOF to the extent that it implicates issues of Hawaiian sovereignty, which are irrelevant to this proceeding. Minute Order No. 19 [Doc. No. 281].
34	12	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.	Not in dispute as to Ching's practices as an individual.
35	12	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 ina '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.	Not in dispute as to Ching's practices as an individual.
36	12	Petitioners Mauna Kea Anaina Hou and Kealoha Pisciotta, 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.	Not in dispute.
37	12	Thereafter, Mauna Kea Anaina Hou and Kealoha Pisciotta, Clarence Kauakahi Ching, Paul Neves, Deborah J Ward, and Flores-Case 'Ohana represented themselves pro se, and KAHEA: The Environmental Alliance was represented	Inaccurate / False. *See* UH-TIO FOF 2-8 regarding the representation of the Flores-Case 'Ohana, MKAH, Pisciotta

		by attorneys Yuklin Aluli and Dexter Kaiama.	and Neves.
38	13	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.	Not in dispute. UH-TIO note that Mauna Kea Hui Petitioners' objections filed April 15, 2016 is Doc. 5 (not Doc. 6).
39	13	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.	Not in dispute.
40	13	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.	Not in dispute. UH-TIO note that Mauna Kea Hui Petitioners' motion for reconsideration filed May 13, 2016 is Doc. 31 (not Doc. 17).
41	13	By motion dated May 31, 2016, Mauna Kea Hui Petitioners filed [Doc. 52] Petitioners' submissions and positions on record; Exhibit "A."	Not in dispute.
42	13	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.	Not in dispute.
43	13	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.	Not in dispute, except the motion was filed by TIO.
44	13	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.	Not in dispute.
45	13	By motion dated July 12, 2016, Mauna Kea Hui Petitioners filed [Doc. 83]	Not in dispute.

		Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions and next hearing date.	
46	13	By motion dated July14, 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.	Not in dispute. UH-TIO note that Petitioners Mauna Kea Anaina Hou et al.'s supplement to request for continuance on submissions on next hearing date was filed on July 12, 2016 (not July 14, 2016) and is Doc. 83 (not Doc. 87). *See* Ching's Proposed FOF 45.
47	13	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.	Not in dispute.
48	13	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.	Not in dispute.
49	14	By motion dated July 18, 2016 Mauna Kea Hui Petitioners filed [Doc.103] Petitioners Mauna Kea Anaina Hou et al.'s witness list.	Not in dispute.
50	14	By motion dated July 18, 2016, Mauna Kea Hui Petitioners filed [Doc. 104] Petitioners Mauna Kea Anaina Hou et al.'s supplemental witness list.	Not in dispute.
51	14	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.	Not in dispute.

52	14	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.	Not in dispute.
53	14	By motion dated August 1, 2016, Mauna Kea Hui Petitioners filed [Doc. 165] (email) Note for the record.	Misrepresentation. Doc. 165 is MKAH's witness list resubmitted. UH-TIO note, however, that the correct citation to this document is Doc. 168.
54	14	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.	Not in dispute.
55	14	By motion dated August 17, 2016, Mauna Kea Hui Petitioners filed [Doc. 218] Petitioners Mauna Kea Anaina Hou, et al.'s site visit recommendations.	Not in dispute.
56	14	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.	Not in dispute.
57	14	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.	Not in dispute.
58	14	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.	Not in dispute.
59	14	By motion dated September 23, 2016, Mauna Kea Hui Petitioners filed [Doc. 282] Correspondence regarding notice of contested case hearing.	Not in dispute.

60	14	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.	Not in dispute.
61	15	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.	Not in dispute.
62	15	By motion dated October 10, 2016, Mauna Kea Hui Petitioners filed [Doc. 341] Notice of withdrawal of counsel.	Misrepresentation. Notice of Withdrawal was filed by Wurdeman, not MKAH.
63	15	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.	Not in dispute.
64	15	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.	Not in dispute.
65	15	The Hearing Officer ordered Applicant and Petitioners to submit Witness Written Direct Testimony and Exhibits simultaneously on or by October 11, 2016.	Not in dispute.
66	15	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.	Unsupported/Unsubstantiated. Irrelevant/inapplicable. UH-TIO note, however, that the shared documents are designated as record documents R-1 through R-8. Exhibits

			R-1 through R-8 submitted by Brannon Kamahana Kealoha were not admitted into evidence. *See* Amended Minute Order No. 44. UH-TIO have construed any citations to "R" exhibits as citations to the record documents and the corresponding "A" exhibits.
88	15	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.	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. All exhibits were uploaded to the document library. The parties had every opportunity to inspect and compare these documents. Inaccurate / False. The individual parties had the burden of determining what exhibits to use, reviewing those exhibits in light of other exhibits as necessary, introducing those exhibits the party wished to introduce into evidence, and monitoring what exhibits were used by other parties.
67	15	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.	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Moot or otherwise resolved. Inaccurate / False. Misrepresentation. At the close of the hearing, the Hearing Officer did not state an intent "to accept all exhibits to be judged by her on weight." At the close of evidence, the Hearing Officer instructed the parties to

			move their exhibits into evidence by written motion, after which the parties could file "objections, responses, replies, joinders to the motions that were made." Tr. 03/02/17 at 287:24-288:16. The Hearing Officer stated that she would then "by Minute Order, identify all exhibits that I will be receiving in evidence." Tr. 288:17:20; *see also* arguments set forth in UH Hilo's Opp to Temple's Mot. for Recon. of Minute Order 44 at 4-5 [Doc. 599]. Estoppel/Improper Reconsideration. *See* Temple's Mot. for Recon of Minute Order No. 44 at 4-11 [Doc. 569]; Minute Order No. 51 [Doc. 647] (rejecting various arguments that the evidence admission process was improper).
68	15	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.	*See supra* UH-TIO's response to Ching's proposed FOF 67. Mischaracterization. Misleading. Presented out of context. UH and TIO filed appropriate objections to the Petitioners' and Opposing Intervenors' exhibits. *See* University of Hawai'i at Hilo's Opposition to Motions to Admit Exhibits and Written Direct Testimony [Doc. 514] and TMT International Observatory, LLC's Memorandum in

			Opposition to Motions to Admit Exhibits and Written Direct Testimonies [Doc. 511]. The Hearing Officer set forth the bases for her decisions regarding the exhibits in Minute Order No. 44 [Doc. 553].
69	16	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.	Misleading. Presented out of context. Unsupported / Unsubstantiated. UH-TIO object to this proposed FOF to the extent that it implicates any argument that Petitioners were prejudiced in their preparation of the FOF/COL. That argument has been rejected by the Hearing Officer. *See* Minute Order No. 50. The Hearing Officer issued Minute Order No. 44 nearly six weeks prior to the due date for the FOF/COL.
70	16	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**	*See supra* UH-TIO's response to Ching's proposed FOF 67. Misleading. Presented out of context. Unsupported / Unsubstantiated. Rather than "multiple uncollated lists," Minute Order No. 44 comprehensively organized the exhibits in tabular form, with columns for each exhibit, the objection(s) to each exhibit and the Hearing Officer's ruling. Minute Order No. 44 [Doc. 553]. Minute Order No. 51 granted in part and denied in part various motions for reconsideration of Minute Order No. 44 [Doc. 647]. As all parties had notice of the exhibits

			subject to the motions for reconsideration, there was no prejudice to the parties in their preparation of their FOF/COL. Amended Minute Order No. 44 [Doc. 649] merely amended Minute Order No. 44 to reflect the Hearing Officer's rulings on the motions for reconsideration on the exhibits.
71	16	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.	*See supra* UH-TIO's response to Ching's proposed FOF 67. Mischaracterization. Due to numerous issues raised by the Petitioners and Opposing Intervenors, the Hearing Officer determined during the third day of the hearing that she would permit the parties to offer the exhibits at the hearing but would wait until after all of the testimony was complete before making a determination on the receipt of the exhibits into evidence. Tr. 10/25/16 at 99:12:21. Thus, it was not inconsistent for the Hearing Officer to permit the parties to offer exhibits during the hearing but subsequently, after due consideration of the exhibit and applicable objection(s), to exclude the exhibit from evidence.
72	16	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 supra* UH-TIO's response to Ching's proposed FOF 67. Misleading. Presented out of context.

		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.	Unsupported / Unsubstantiated. There was no prejudice to Petitioners arising from the alleged contradictory rulings on the exhibits. As noted in Minute Order No. 44 [Doc. 553] at 28 and 33, the exhibits at issue (Exs. B.38, B.39, B.40, B.41, and B.42) were duplicative of other exhibits that were admitted into evidence (*See* Exs. A-9, A-10, A-11, A-12, and A-13).
73	16	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.	*See supra* UH-TIO's response to Ching's proposed FOF 67. Incomplete. Unclear as to which "petitioner" is asserting injuries. Misleading. Presented out of context. Unsupported / Unsubstantiated. UH-TIO object to this proposed FOF to the extent that it implicates any argument that Petitioners were prejudiced in their preparation of the FOF/COL. The Hearing Officer issued Minute Order No. 44 nearly six weeks prior to the due date for the FOF/COL. The motions for reconsideration on the exhibits were ruled upon by May 25, 2017 (Minute Order No. 51 [Doc. 646]), and Ching does not indicate what timely-filed dispositive motions were not ruled upon by the Hearing Officer prior to the submission of the FOF/COL.
74	16	The references from the transcript do not match the exhibits admitted by the	Unsupported/Unsubstantiated.

		Hearing Officer.	To the extent that there are differences between the exhibits references in the transcripts and the exhibits admitted by the Hearing Officer, such differences can be clarified in the applicable FOF/COL.
75	16	Some exhibits offered by witnesses who had already testified were later not received into evidence by the hearing officer.	*See supra* UH-TIO's response to Ching's proposed FOF 67. Mischaracterization. Due to numerous issues raised by the Petitioners and Opposing Intervenors, the Hearing Officer determined during the third day of the hearing that she would permit the parties to offer the exhibits at the hearing but would wait until after all of the testimony was complete before making a determination on the receipt of the exhibits into evidence. Tr. 10/25/16 at 99:12:21. Thus, it was not inconsistent for the Hearing Officer to permit the parties to offer exhibits during the hearing but subsequently, after due consideration of the exhibit and applicable objection(s), to exclude the exhibit from evidence.
76	16	Citations to exhibits may be inconsistent throughout the record and the Findings of Fact will reflect the confusion.	*See supra* UH-TIO's response to Ching's proposed FOF 67.
77	16	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	Unsupported/Unsubstantiated. Incorrect/Inaccurate.

		failed to include a number of issues important in this case.	Estoppel/Improper Reconsideration. *See* Minute Order No. 19 [Doc. 281]. Irrelevant / Inapplicable. *See* UH-TIO FOF 62-67, COL 78-125.
78	17	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.	Unsupported / Unsubstantiated. *See* UH-TIO FOF 350-1000; COL 126-293.
79	17	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."	Incomplete. Mischaracterization. Misleading. Partial quotation. The full text of HAR §13-5-1 provides: "The purpose of this chapter *is to regulate land-use in the conservation district* for the purpose of conserving, protecting, and preserving the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare." (emphasis added). Accordingly, the Conservation District rules do not prohibit development within the Conservation District; rather, the rules expressly contemplate development, and the purpose of the Conservation District rules is to appropriately regulate and manage land uses. UH-TIO COL 131.
80	17	**Azarte v. Ashcroft**, 394 F.3d 1287-88 (9th Cir. 2005) quoting **Kokoszka v.**	Mischaracterization. *See* HAR §13-5-1

		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.	and UH-TIO COL 131.
81	17	"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."	Misleading. Partial quotation. Estoppel / Improper Reconsideration. The FEIS further provides, in relevant part, that "The Project will not result in the loss or complete destruction of any historic properties within the Maunakea summit region. The physical impacts on the only historic property physically effected, Kukahauula, will be minimal and will not be significant." Ex. A-3/R-3 at 3-53. The FEIS further concluded: "Because the Project will not result in the loss or complete destruction of any archaeologic/historic resource within the Maunakea summit region, this impact is considered to be less than significant." *Id.* In addition, the time limit has passed to challenge the FEIS. *See* UH-TIO COL 386-391.
82	17	"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.**	*See supra* UH-TIO's response to Ching's proposed FOF 81.
83	17	"...Integrity plays a very big role in historic preservation law, and you see it	Not credible. On cross-examination,

		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**	Dr. Abad could not specify the specific region that the TMT Project allegedly would affect: "I'm trying to recall the map. I know the science reserve area is ginormous, and the boundaries of the historic district are also very large. I'm not absolutely certain." Tr. 01/19/17 at 130:21-24.
84	18	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 [sic]-20	Not credible. *See* UH-TIO FOF Nos. 559 and 757.
85	18	"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."	Unsupported / Unsubstantiated. No citation is provided for this FOF.
86	18	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**	Misleading. Partial quotation. Estoppel / Improper Reconsideration. The FEIS more fully provides as follows: "Based on numerous previous studies, Area E was selected in Master Plans to be a suitable location for observatory development because, for one, it would have either a limited or no adverse impact on physical cultural resources such as archaeological and historic resources. Within Area E, the site of the TMT Observatory, known as the 13N site, was selected in part because it is the portion of Area E most disturbed by previous activity." Ex. A-

			3/R-3 at 3-26. In addition, the time limit has passed to challenge the FEIS. *See* UH-TIO COL 386-391.
87	18	"Thus, while the TMT project caries 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**	Citation does not support the proposition. Estoppel / Improper Reconsideration. This citation does not appear to contain the quoted language in this FOF. In addition, the time limit has passed to challenge the FEIS. *See* UH-TIO COL 386-391.
88	18	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	Citation does not support the proposition. Incomplete. The staff report notes that the observatory footprint will be approximately 4.9 acres. Ex. B.70 at 1. *See, also* UH-TIO FOF 252. The staff report further notes that "Approximately ten percent of the 13N Site in Area E has been previously disturbed; approximately 1/3 of the existing Access Right of Way has been previously graded; and the Batch Plant site was initially graded as part of the road-paving project and was used as a staging area during the construction of several observatories." Ex. B.70 at 7. Misrepresentation. The summit area where the TMT Project will be located is already substantially developed for astronomy use. UH-FOF 344, 859-864.
89	18	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**	Not in dispute.

90	18	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)**	Citation does not support the proposition. *See* UH-TIO FOF 390-392; COL 145-150.
91	18	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)**	Mischaracterization. *See* UH-TIO FOF 390-392; COL 145-150. The TMT Project is consistent with the purpose of the Conservation District and the Resource Subzone. UH-TIO FOF 350-416.
92	18	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)**	Misleading. Presented out of context. An astronomy facility is specifically and expressly permitted as an allowed use within the Resource subzone of the Conservation District. *See* UH-TIO COL 147.
93	18	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)**	Citation does not support the proposition. Mischaracterization. Misleading. Presented out of context. HAR § 13-5-30(c) establishes eight criteria that the BLNR must apply when evaluating the merits of a proposed land use in a Conservation District. Failure to meet any one criterion does not disqualify a project from receiving a CDUP. Rather, the Board must consider each criterion and decide how to weigh each criterion in the context of the entire project. UH-TIO FOF 344.
94	19	Ensuring sustained use of Mauna Kea's natural resources necessarily means	Citation does not support the

		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**	proposition. Inaccurate / False. Mischaracterization. HAR § 13-5-30(c) does not require the application of a "no degradation" standard within the Resource (or any) subzone. The FEIS notes that the level of impact of the TMT Project after mitigation with respect to the various areas will be less than significant. *See* Ex. A-3/R-3 at S-12 – S19; UH-TIO FOF 385-416; UH-TIO COL 143-164.
95	19	Thus, the TMT project cannot comply with criterion 2 and the CDUA should be denied.	Not credible. Unsupported / Unsubstantiated. The TMT Project is consistent with the purpose of the Resource Subzone. *See* UH-TIO FOF 385-416; UH-TIO COL 143-164.
96	19	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)**	Not in dispute.
97	19	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)**	Not credible. Unsupported / Unsubstantiated. Assuming citation is to HRS 205A-2(c)(4)(E), citation and record does not support FOF. *See* UH-TIO FOF 417-432; UH-TIO COL 165-176.
98	19	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**	Not in dispute.

99	19	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**	Partial quotation. Misleading. Presented out of context. Section 6.3.4. of the CMP clarifies that "Depending on the volume and location, contaminant releases may have adverse effects" on various resources. Ex. A-9 at 6-14. This citation does not support the statement in the FOF that "groundwater rates and flows at the summit are 'unknown.'" It is extremely unlikely that the TMT Project would contaminate groundwater or drinking water. UH-TIO FOF 796-823.
100	19	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**	Mischaracterization. Partial quotation. Misleading. Presented out of context. Misrepresentation. The section cited refers to *natural* precipitation, *not* "spills and runoffs": "In the case of the Observatory, Access Way, and potential Mid-Level Facility these measures [measures to maximize groundwater recharge from natural precipitation] would result in all precipitation ultimately recharge[ing] underlying aquifers because runoff would be directly to nearby areas where it would percolate into the ground rather than enter streams that discharge to the ocean." The TMT Project is designed to implement a zero-discharge

			waste system, and no wastewater will be released from the TMT Project into the environment. Ex. A-3/R-3 at 3-120; UH-TIO FOF 802-803.
101	19	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**	Misleading. Partial quotation. In 2008, approximately 500 to 1,000 gallons of sewage from the Hale Pohaku facility overflowed into the ground. The incident was reported to the Department of Health. Ex. A-009 at 6-10. The TMT Project is designed to implement a zero-discharge waste system, and no wastewater will be released from the TMT Project into the environment. Ex. A-3/R-3 at 3-120; UH-TIO FOF 802-803. Spills that occurred in 2008 cannot be attributable to the TMT Project that has yet to be built.
102	19	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.	Not credible. There is no credible evidence in the record that the underground storage tanks raise "additional concerns." The chemical waste storage tank will be double-walled with secondary containment, and in handling all hazardous materials, TIO will comply with existing federal and state laws. UH-TIO FOF 248, 970. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431. Even in the unlikely event of a

			discharge, discharge on the summit area would be naturally treated and filtered through thousands of feet of the porous lavas, which would remove any contamination from that discharge before reaching any groundwater. UH-TIO FOF 431.
103	20	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)**	Citation does not support the proposition. Not credible. Unsupported / Unsubstantiated. The citation to HRS § 205A-2(c)(3)(E) does not exist. To the extent the citation refers to HRS § 205A-2(c)(3)(A)-(D) generally, the record reflects that these policies will be met. *See, e.g.*, UH-TIO FOF 454, 686, 775-795.
104	20	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**	Citation does not support the proposition. Not credible. Unsupported / Unsubstantiated. It is unclear what exhibit the citation references in the record. To the extent the citation and this proposed FOF refers to viewplanes between Mauna Kea and Haleakalā, the record reflects that the TMT Project will not block the view of Maui or Haleakalā from the northern summit ridge area. UH-TIO FOF 782, 785, 787. The TMT Observatory will add a visual element below and to the right side of the view of Haleakalā from Puʻu Poliʻahu, but it will not greatly interfere with that view. UH-TIO FOF 788.

105	20	**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**	Not in dispute. UH-TIO note, however, that it is unclear what exhibit the citation references in the record.
106	20	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.	Inaccurate / False. This is not the standard under the fourth criteria. *See* HAR § 13-5-30(c)(4).
107	20	"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."	Citation does not support the proposition. Since, as this proposed FOF notes, "cumulative impact" is defined by HAR § 11-200-2, the definition of "cumulative" in Webster's Dictionary is inapplicable.
108	20	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.	Citation does not support the proposition. Inaccurate / False. Not credible. Unsupported / Unsubstantiated. This proposed FOF assumes the application of an incorrect legal standard and analysis. HAR § 13-5-30(c)(4), requires consideration of whether "[t]he proposed land use will not cause *substantial adverse impact* to *existing* natural resources within the surrounding area, community or region." (emphasis added). Thus, "existing" natural resources must be considered in the analysis, and HAR § 13-5-30(c)(4) does not require the University to prove to what extent all summit region area cumulative impacts should be mitigated nor proof that a

			proposed project will reduce existing cumulative impacts to a level that is less than significant and adverse. *See* UH-TIO FOF 441-442. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
109	20	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.	*See supra* UH-TIO's response to Ching's proposed FOF 108.
110	20	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**	Misleading. Partial quotation. The summary of the cumulative environmental impacts in the FEIS further notes that: "In general, the Project will add a limited increment to the current level of cumulative impact. Therefore, those resources that have been substantially, significantly, and adversely impacted by past and present actions would continue to have a substantial, significant, and adverse impact with the addition of the Project.

			For those resources that have been impacted to less than [a] significant degree by past and present actions, the Project would not tip the balance from a less than significant level to a significant level and the less than significant level of cumulative impact would continue." Ex. A-3/R-3 at S-9. Applying the correct standard and analysis under HAR § 13-5-30(c)(4), the TMT Project meets the fourth criteria. *See* UH-TIO FOF 433-839; COL 177-217.
111	21	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**	Misleading. Presented out of context. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
112	21	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	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. The reference and the record do not support a finding of "significant harm" or an attempt to "destroy" portions of Mauna Kea arising from the TMT Project.

			Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
113	21	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).**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 433-839; COL 177-217.
114	21	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**	Citation does not support the proposition. The source of this citation does not appear to support this FOF; however, UH-TIO do not dispute this FOF.
115	21	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.	Inaccurate / False. Mischaracterization. Not credible. Unsupported / Unsubstantiated. This proposed FOF assumes the application of an incorrect legal standard and analysis. HAR § 13-5-30(c)(4), requires consideration of whether "[t]he proposed land use will not cause *substantial adverse impact* to *existing* natural resources within the

			surrounding area, community or region." (emphasis added). Thus, "existing" natural resources must be considered in the analysis, and HAR § 13-5-30(c)(4) does not require the University to prove to what extent all summit region area cumulative impacts should be mitigated nor proof that a proposed project will reduce existing cumulative impacts to a level that is less than significant and adverse. *See* UH-TIO FOF 441-442. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
116	21	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**	It is unclear what exhibit the citation references in the record. HAR § 11-200-12 sets forth the "significance criteria" that the agency is to use in most circumstances to evaluate whether a proposed action will have a significant effect on the environment.

			The TMT FEIS concluded that there will not be a substantial adverse effect on any natural or cultural resources or rare, threatened, or endangered species or habitat. *See* Ex. A-3/R-3 at § 3.
117	21	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**	Citation does not support the proposition. Misleading. Presented out of context. The FEIS notes areas of wēkiu bug displacements, but does not find that such displacements would cause "substantial adverse impacts" to the wēkiu bug or its habitat. To the contrary, the FEIS concludes that "Overall, the displacements will not have a significant impact on biological resources because species and habitat of these areas are not unique to the Project sites and are found elsewhere on Maunakea nad/or on other islands in Hawai'i. Ex. A-3/R-3 at 3-71, 3-72. *See, also* UH-TIO FOF 481-502.
118	21	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.	Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 489.
119	22	**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,	Citation does not support the proposition. Not credible. Unsupported / Unsubstantiated. The FEIS notes that the impact from habitat displaced by a potential TMT Mid-

		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 mämane 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**	Level Facility would be less than significant and the headquarters in Hilo would not have a significant impact on biological resources. Ex. A-3/R-3 at 3-73. None of the other concerns arising from "more heavily utilized" facilities as a result of the TMT Project described in this proposed FOF are supported by the record, and the impacts of a project must be viewed within the context of the applicable area. *Kilakila 'O Haleakalā v. Bd. of Land and Natural Resources*, 138 Hawai'i 383, 403, 382 P.3d 195,215 (2016) ("***Kilakila***"). The record supports that the TMT Project will not have a significant adverse impact on biological resources within the Astronomy Precinct. *See* UH-TIO FOF 481-502.
120	22	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**	Citation does not support the proposition. Misleading. Presented out of context. The FEIS notes that the "potential TMT Mid-Level Facility will not disturb any previously undisturbed areas. However, there are some māmane trees that have grown in the area that may need to be trimmed or removed." Ex. A-3/R-3 at 3-73. The FEIS further notes that one of the mitigation measures with respect to potential impacts on biological resources is that the TMT Project will

			plant two new māmane trees for each māmane tree directly impacted by possible TMT Project activities, and that the new plantings will be monitored for a period of two years to ensure that the new trees become established. Ex. A-3/R-3 at 3-76.
121	22	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 form 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.	Mischaracterization. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-795, 846-853, 871-885, 900-909; UH-TIO COL 223-225, 230-245, 255.
122	22	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**	Misleading. Partial quotation. Not credible. Unsupported / Unsubstantiated. The CDUA (referencing the FEIS) notes that "Currently, from approximately 43 percent of the island area, at least one existing observatory is visible, with the [TMT] Project that will increase by less than 1.2 percent of the island area." Ex. A-1/R-1 at 2-17.
123	22	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	Misleading. Presented out of context. Not credible. Unsupported /

		the summit.	Unsubstantiated. *See* UH-TIO FOF 775-795, 846-853, 871-885, 900-909 UH-TIO COL 223-225, 230-245, 255.
124	22	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**	Citation does not support the proposition. Misleading. Presented out of context. UH-TIO note that P. 3-129 of the FEIS does not specifically reference the chemicals propylene glycol, acetone, and methyl ethyl ketone, but it is not disputed in the record that the TMT Project will utilize vehicle and generator fuel, alcohols, liquid adhesives, various metals, lubricants, hydraulic fluid, glycol coolants, and small quantities of acids, paints and solvents. Extensive measures will be in place to manage these materials, and the chance of a spill entering the surrounding environment is negligible. *See* UH-TIO FOF 824-839.
125	23	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**	Misleading. Presented out of context. No solid waste will be disposed of at the summit. Ex. A-3/R-3 at 3-129. All solid waste will be collected and stored indoors in closed trash containers and will be disposed of appropriately off of Mauna Kea. *See* UH-TIO FOF at 969, 319-320, 831.
126	23	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**	Citation does not support the proposition. Not credible. Not in evidence. Unsupported / Unsubstantiated. Criterion 3 and the

			applicable regulations do not prohibit these materials on Mauna Kea, and the record reflects that extensive and comprehensive measures will be in place to handle these materials. *See* UH-TIO FOF 824-839.
127	23	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**	Partial quotation. Misleading. Presented out of context. The full passage in the FEIS states: "*When combined with the past actions that led to the existing conditions*, the cumulative impact of all actions at and near the summit of Maunakea, including the future TMT Observatory, on cultural resources will continue to be substantial, significant, and adverse, as detailed in Section 3.16.4." Ex. A003 at 3-34 (emphasis added). UH-TIO object to this proposed FOF to the extent that it implicates an incorrect legal standard and analysis regarding the impact of the TMT Project. HAR § 13-5-30(c)(4), requires consideration of whether "[t]he proposed land use will not cause *substantial adverse impact* to *existing* natural resources within the surrounding area, community or region." (emphasis added). Thus, "existing" natural resources must be considered in the analysis, and HAR § 13-5-30(c)(4) does not require the University to prove to what extent all summit region area cumulative impacts

			should be mitigated nor proof that a proposed project will reduce existing cumulative impacts to a level that is less than significant and adverse. *See* UH-TIO FOF 441-442. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
128	23	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**	Partial quotation. Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it implicates an incorrect legal standard and analysis regarding the impact of the TMT Project. HAR § 13-5-30(c)(4), requires consideration of whether "[t]he proposed land use will not cause *substantial adverse impact* to *existing* natural resources within the surrounding area, community or region." (emphasis added). Thus, "existing" natural resources must be considered in the analysis, and HAR § 13-5-30(c)(4) does not require the University to prove to what extent all

			summit region area cumulative impacts should be mitigated nor proof that a proposed project will reduce existing cumulative impacts to a level that is less than significant and adverse. *See* UH-TIO FOF 441-442. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; COL 177-217.
129	23	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)**	Citation does not support the proposition. Mischaracterization. HAR § 13-5-30(c)(4) and not the EPA standard cited, governs the analysis in this matter. HAR § 13-5-30(c)(4) does not require the University to prove to what extent all summit region area cumulative impacts should be mitigated nor proof that a proposed project will reduce existing cumulative impacts to a level that is less than significant and adverse. *See* UH-TIO FOF 441-442. Applying the correct legal standard and analysis, the record reflects that the University has met its burden to prove

			that in the in the context of the existing summit area cumulative impacts—and under the assumption that such cumulative impacts will continue—the TMT Project does not create or cause substantial adverse impacts to existing natural resources in the applicable area. *See* UH-TIO FOF 433-839; UH-TIO COL 177-217.
130	23	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)**.	Mischaracterization. Unsupported / Unsubstantiated. UH-TIO object to this proposed FOF to the extent that it sets an improper legal standard and analysis under *Morimoto v. BLNR*, 107 Hawai'i 296, 113 P.3d 172 (2005) ("***Morimoto***"). *Morimoto* did not require proposed mitigation measures to "directly ameliorate[] harmful impacts" "in accord with guiding documents." Ching FOF 131. Instead, *Morimoto* held that the BLNR may properly consider mitigation measures in an EIS when reviewing an application for a CDUP to determine if those mitigation measures are consistent with the criteria in HAR § 13-5-30(c), and the BLNR will incorporate any representations in the EIS (or EA) relevant to mitigation as a condition of the CDUP. *Morimoto*, 107 Hawai'i at 302-04, 113 P.3d at 178-80; UH-TIO COL 113-114, 204.
131	23	While Morimoto does not explicitly develop standards for mitigation, the	*See supra* UH-TIO's response to

		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*.	Ching's proposed FOF 130.
132	24	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**	Mischaracterization. Unsupported / Unsubstantiated. Applying the proper legal standard and analysis articulated in *Morimoto*, the analysis focuses on BLNR's consideration of the proposed mitigation measures in the FEIS to determine if the CDUP is consistent with the criteria set forth in HAR § 13-5-30(c). As noted in the record, the extensive proposed mitigation measures for the TMT Project as noted in the FEIS are consistent with (and fulfill) the criteria set forth in HAR § 13-5-30(c). *See, e.g.*, UH-TIO FOF at 304-330, 457.
133	24	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.	*See supra* UH-TIO's response to Ching's proposed FOF 132.
134	24	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	Misleading. Partial quotation. The TMT Management Plan notes that "The

		ridge. Ex. A001/R-1 CDUA, p.4-30	location of the TMT Observatory is the primary mitigation for the Project's potential visual impacts." Ex. A-1/R-1 (TMT Project Management Plan) at 4-30.
135	24	UHH says they now finally recognize that Kukahau'ula is an important traditional cultural property. **Ex A001/R-1 CDUA, p.A-8**	Misleading. Partial quotation. The TMT Management Plan notes that "The TMT Observatory project and Access Way have been designed to minimize their potential impacts on cultural resources. The observatory structure is sited in a portion of the Northern Plateau that is more than 200 feet from known historic properties. In addition, the visual effect of the observatory, including its visual impact from areas of cultural importance such as the summit of Kūkahau'ula, has been minimized through design steps such as reducing its size, finishing the support building and fixed structure exterior with a lava color, and finishing the dome with a reflective aluminum-like surface similar to that on the Subaru Observatory." Ex. A-1/R-1 (TMT Project Management Plan) at A-8.
136	24	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	Citation does not support the proposition. Not credible. Unsupported / Unsubstantiated. The FEIS notes that the modeling of wind flow over Mauna Kea indicated that the "best conditions for astronomy research may be on the summit ridge, where 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**	existing optical /infrared observatories are located," but due to cultural, biological, and visual impact concerns, this option was not further considered. Ex. A-3/R-3 at 4-5. Accordingly, the location of the TMT Project is properly deemed a mitigation measure. *See, also* UH-TIO FOF 169.
137	24	The few mitigation measures proposed for the TMT project do not directly address the anticipated harms caused by the proposal.	*See supra* UH-TIO's response to Ching's proposed FOF 132.
138	24	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**	Mischaracterization. Unsupported / Unsubstantiated. The appropriate locality to be considered is the summit area of Mauna Kea within the MKSR, and more specifically, the Astronomy Precinct of the MKSR. *See Kilakila*, UH-TIO FOF 840-867, COL 220.
139	25	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**	Mischaracterization. HAR § 13-5-30(b) states that: "*Unless provided in this chapter*, land uses shall not be undertaken in the conservation district." (Emphasis added). Astronomy facilities in the locality of the TMT Project are expressly permitted uses under HAR § 13-5-24.
140	25	Problematically, the UHH limits its consideration of the TMT's potential	Mischaracterization. The appropriate

		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.	locality to be considered is the summit area of Mauna Kea within the MKSR, and more specifically, the Astronomy Precinct of the MKSR. *See Kilakila*, UH-TIO FOF 840-867, COL 220.
141	25	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**	Mischaracterization. Misleading. Presented out of context. DOFAW did not comment that disturbances to NARS "will result" from the power line work, but did comment that access to the pill boxes will require improvements that "might not fall within the 20-foot access corridor, and movement of heavy equipment over unstable terrain." Ex. A-7/R-7 at 23. The University noted that the power line work would comply with DLNR standards and in accordance with the conditions in the grant of easement. *Id.* The University further noted numerous measures to mitigate any adverse impact resulting from the power line work. *Id.* *See* UH-TIO Recommended Decision and Order at Condition No. 12.
142	25	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	Mischaracterization. Misleading. Presented out of context. The power line work will be done pursuant to, and in accordance with the grant of the easement. Ex. A-7/R-7 at 23. *See* UH-TIO Recommended Decision and Order at Condition No. 12.

		with the existing uses of the conservation district makes approval of the CDUA improper.	
143	25	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.	Mischaracterization. The TMT Project will be consistent with and will preserve the existing physical and environmental aspects of the land directly and through the numerous mitigation commitments. The objective of the resource subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas. HAR § 13-5-13. A literal reading of HAR § 13-5-30(c)(6) as Ching suggests would mean no structure could ever be built within the Astronomy Precinct, and would render the term "Astronomy facilities" in the Resource subzone meaningless. UH-TIO FOF 886-890; UH-TIO COL 227-256.
144	25	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.	Unsupported / Unsubstantiated. *See* UH-TIO FOF 868-913.
145	26	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	Unsupported / Unsubstantiated. Neves did not demonstrate or show how the TMT Observatory would block his

		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**	view of Haleakalā view, especially since the TMT Project will be below the summit ridge. He also testified that a view plane is not by sight alone, and that one need not always travel to the Mauna Kea summit to conduct these practices. He has practiced from his home, and states that offerings can be made at lower elevations. He also admitted that there is no one particular place that you need to stand on Mauna Kea in order to view Haleakalā. *See* UH-TIO FOF 747, 868-913.
146	26	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**	Mischaracterization. The only way this criterion makes sense and gives effect to *all* provisions of HAR Title 13, Subtitle 1, Chapter 5 is to analyze this criterion consistent with considering the existing physical and environmental aspects of the land and mitigation commitments. *See* UH-TIO FOF 886-890; UH-TIO COL 227-256.
147	26	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.	Mischaracterization. Unsupported / Unsubstantiated. *See* UH-TIO FOF 886-890; UH-TIO COL 227-256.
148	26	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**	Mischaracterization. Unsupported / Unsubstantiated. The level of impacts after mitigation (if necessary) were deemed to be less than significant. Ex. A-3/R-3 at S-12 – S-19. *See* UH-TIO FOF 886-890; UH-TIO COL 227-256. There are no currently listed threatened

			or endangered species known to occur in the Astronomy Precinct. UH-TIO FOF 476.
149	26	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**	Mischaracterization. Unsupported / Unsubstantiated. *See* UH-TIO FOF 886-890; UH-TIO COL 227-256.
150	26	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 "suppor[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**	Misleading. Presented out of context. UH-TIO note that the discussion on this issue occurs on P. 57 of the staff report (Ex. A-7/R-7 at 57). The fact that the TMT Project will be on the Northern Plateau, away from the summit area and in an area of no known traditional religious uses is relevant to consideration of the sixth criterion. *See* UH-TIO FOF 868-913.
151	26	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.	Citation does not support the proposition. Misleading. Presented out of context. UH-TIO note that this citation to the staff report does not appear to support this FOF; nonetheless, it is not in dispute that TIO is committed to paying sublease rent (the first telescope developer to do so on Mauna Kea), and these funds will be used for the management of Mauna kea through OMKM. *See* UH-TIO FOF at 215. These funds will therefore be used to protect Mauna Kea and is a relevant

			factor in considering this (and other) criteria.
152	26	The TMT CDUA erroneously concluded that the "proposed TMT project does not involve the subdivision of land." **Ex. CDUA, p.2-28**	Not Credible. *See* UH-TIO COL 421. Unsupported / Unsubstantiated. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
153	27	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).	Not Credible. *See* UH-TIO COL 421. Unsupported / Unsubstantiated. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
154	27	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 intensity land use, the BLNR cannot approve it without abusing its discretion.	Not Credible. *See* UH-TIO COL 421. Unsupported / Unsubstantiated. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
155	27	Further UH has drawn arbitrary maps to describe claims to lands leased from the BLNR. **Ex. CDUA p.75-79 ref. MK MP2000**	Not Credible. *See* UH-TIO COL 421. Citation does not support the proposition. Inaccurate / False. Unsupported / Unsubstantiated. UH-TIO note it is unclear what this citation refers to. UH-TIO deny that any maps in the CDUA are "arbitrary". *See* UH-TIO FOF 914-936; UH-TIO Col 257-272.
156	27	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	Misleading. Presented out of context. Unsupported / Unsubstantiated. While it is undisputed that the Astronomy

		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."	Precinct and the MKSR are within the Conservation District, the Land Use Commission's authority does not extend to establishing or approving areas such as the MKSR or the Astronomy Precinct – it is undisputed that the BLNR has the authority to manage Conservation District lands, including subdividing lands in the Conservation District into more than one parcel. *See* HRS Chapter 183C. *See* UH-TIO COL 267-268.
157	27	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)**	Misleading. Presented out of context. It is not in dispute that HAR § 13-5-2 defines a "subdivision" as a "division of a parcel of land into more than one parcel." The references to "permanently placing materials, grading, and erecting or demolishing structures" are not relevant to this FOF.
158	27	A "subdivision" is the division of a parcel of land into more than one parcel. **HAR §15-3-2**	Irrelevant / Inapplicable. UH-TIO, however, do not in dispute the text of this rule.
159	27	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.	Not Credible. *See* UH-TIO COL 421. Mischaracterization. Misleading. Presented out of context. The Uniform Land Sales Practices Act (HRS Chapter 484) does not apply to this matter, as the chapter does not apply to offers or dispositions of an interest in land "By any government or government agency". HRS § 484-3(a)(7).
160	28	**HAR §13-5-30(c)(7)** specifically guards against the intensification of land use	Misleading. Presented out of context.

		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.	Misrepresentation. Unsupported / Unsubstantiated. HAR § 13-5-30(c)(7) speaks for itself and the TMT Project will not utilize subdivision of land to increase the intensity of land uses within the Conservation District. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272. Specifically, the Astronomy Precinct is an area identified and described by the MKSR Master Plan as a management and planning designation to *reduce* the area within the MKSR available for astronomy development. Thus, the clear intent of the designation of the Astronomy Precinct was not to divide the MKSR into more than one parcel in order to intensify the use of the MKSR, but rather to identify an area within the MKSR for planning and management of astronomical facilities. UH-TIO COL 269-270.
161	28	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.	Misleading. Presented out of context. UH-TIO note that Figure 2-3 appears on Page 2-11 of Ex. A-3/R-3. Figure 2-3 speaks for itself and illustrates Area E in relation to the other telescopes in the Astronomy Precinct.
162	28	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	Unsupported / Unsubstantiated. With respect to the allegation in this proposed FOF regarding the storage of wastes, *see* UH-TIO FOF 824-839. With respect to the allegation in this

		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**	proposed FOF regarding the visual issue, *see* UH-TIIO FOF 775-795. Although the eighth criterion of Haw. Admin. R. § 13-5-30 only states that a proposed land use should not be materially detrimental to the public health, safety, and welfare (and does not require that a proposed land use be affirmatively beneficial to public health, safety, or welfare, educational, research, and economic benefits to the public are properly part of the consideration for this criterion. There is reliable, probative, substantial, and credible evidence that several aspects of the TMT Project will be strongly beneficial to the public welfare. *See* UH-TIO FOF 937-1000.
163	28	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.	Misrepresentation. Economic benefits constitute one consideration with respect to criterion 8, and the evidence shows there are numerous public benefits from the TMT Project, including, but not limited to, economic benefits. UH-TIO FOF 937-1000.
164	28	"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**	Inaccurate / False. The consideration of relevant scientific, economic and educational benefits does not conflict with the statute and regulations governing conservation districts, as such considerations impact long-term sustainability and the public welfare. *See Kilakila*, 138 Hawai'i at 408, 382

			P.3d at 220. *See* UH-TIO COL 116-118.
165	28	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.	Inaccurate / False. The consideration of relevant scientific, economic and educational benefits does not conflict with the statute and regulations governing conservation districts, as such considerations impact long-term sustainability and the public welfare. *See Kilakila*, 138 Hawai'i at 408, 382 P.3d at 220. *See* UH-TIO COL 116-118.
166	28	**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."	HAR § 13-5-30(c)(8), states: "The proposed land use will not be materially detrimental to the public health, safety, and welfare" and speaks for itself. Although no citation is provided for this proposed FOF, UH-TIO do not dispute that native Hawaiians are members of the general public, and the exercise of traditional and customary rights are protected pursuant to, and subject to, applicable law. *See* UH-TIO COL 294-385.
167	29	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**	Not credible. Unsupported / Unsubstantiated. The preponderance of the evidence shows that the TMT Project will not be materially detrimental to the public health, safety, and welfare. *See* UH-TIO FOF 937-1000; UH-TIO COL 273-293.

168	29	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)**	Misleading. Presented out of context. U.S. Public Law 103-150 (107 Stat. 1510) speaks for itself.
169	29	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.	Misleading. Presented out of context. U.S. Public Law 103-150 (107 Stat. 1510) speaks for itself.
170	29	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.	Not credible. Unsupported / Unsubstantiated. These objections apply to the first sentence of this proposed FOF: "Observatory development on Mauna Kea's upper regions is materially detrimental to the health, safety, and welfare of the general public of Hawai'i."
171	29	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.	Not credible. Unsupported / Unsubstantiated. These objections apply to the second sentence of this proposed FOF: "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." *See* UH-TIO FOF 937-1000; UH-TIO COL 273-293.
172	29	Ethnocentric methods for assessing materially detrimental impacts on sites of historic significance are inappropriate.	Misleading. Presented out of context. Unsupported / Unsubstantiated. UH-TIO dispute that "ethnocentric methods" have been applied to any of the analyses and considerations with

			respect to the TMT Project, and the record clearly demonstrates otherwise. *See* UH-TIO FOF 937-1000. Multiple levels of consultation with native Hawaiians and other interested parties regarding the TMT Project, including cultural practices and activities, were initiated in the 2000s. These efforts built upon earlier ongoing efforts that coincided with the management of the summit area by OMKM. *See* UH-TIO FOF 210-237.
173	29	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.	*See supra* UH-TIO's response to Ching's proposed FOF 172.
174	29	"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**	Misleading. Presented out of context. Exhibit B.01p speaks for itself. The guidelines apply to considerations under NHPA, which is inapplicable to this proceeding. *See* UH-TIO COL 427-444.
175	30	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. The record confirms that the Petitioners' and Opposing Intervenors' views with respect to the TMT Project are not

			universally shared. *See* UH-TIO FOF 642 and 643. There were numerous consultations with native Hawaiians and other interested parties regarding the TMT Project and cultural practices and activities. *See* UH-TIO FOF 210-237.
176	30	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."	Lack of Jurisdiction. Unsupported / Unsubstantiated. The Hearing Officer and BLNR have no jurisdiction to consider the desecration claim and even assuming the claim could be considered, it is without merit. *See* UH-TIO COL 392-407. Ching fails to cite the authority for the second and third sentence of this proposed FOF, and UHH affirmatively denies the "flout[ing]" of any guidelines. In fact, the views of numerous individuals (native Hawaiians and other interested parties) were carefully solicited, documented, reviewed, considered and analyzed through the EIS, CDUA and during this contested case proceeding. *See, e.g.* UH-TIO FOF 210-237.
177	30	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.	Mischaracterization. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 345, 642 and 643.
178	30	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	Mischaracterization. While UH-TIO do not dispute the values of the Petitioners and Opposing Intervenors, there is no support for the proposition

		conservation agendas should given more weight than those explicitly motivated by economic concerns.	that "testimony motivated by conservation agendas should [be] given more weight than those explicitly motivated by economic concerns." Moreover, the record reflects that supporters of the TMT Project are not universally "motivated by economic concerns," and educational, scientific and other benefits of the TMT Project are relevant and important considerations. *See* UH-TIO FOF 284-290, 642-643.
179	30	"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**	Misleading. Presented out of context. The TMT Observatory site is within the proposed Mauna Kea Summit Region Historic District – Statewide Inventory of Historic Places ("SIHP") No. 50-10-23-26869 – as previously defined in SHPD's Mauna Kea Historic Preservation Plan Management Components. UH-TIO FOF 521.
180	30	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.	Not in dispute.
181	30	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	Not in dispute.

		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	31	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**	Not in dispute.
183	31	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**	Not in dispute. The correct citation is to P. 3-40.
184	31	"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**	Not in dispute. The correct citation is to P. 3-40.

185	31	"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**	Not in dispute.
186	31	There was no regional archaeological analysis done for the Proposed TMT project. **Tr. Vol. 27, May 11, 2016, p.31 7-15**	Not credible. Unsupported / Unsubstantiated. Inaccurate / False. *See* UH-TIO FOF 604-608. *See, also* Ex. B.62 and B.63 (Final AIS of MKSR), Ex. A-122 (Final AIS of NAR).
187	31	There were [sic] 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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608. Dr. Abad could not define the area and scope of the ring of shrines. *See* Tr. 01/19/17 at 134:25-135:17.
188	31	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**	Not in dispute as to text of FEIS.
189	31	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608. Dr. Abad could not define the area and scope of the ring of shrines. *See* Tr. 01/19/17 at 134:25-135:17.

190	32	"...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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
191	32	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**	Irrelevant / Inapplicable.
192	32	On January 19, 2017, KAHEA called its expert witness Dr. Kehaunani Abad. **Tr. 01/19/2017, Vol. 27, p.21**	UH-TIO note that none of the witnesses in this proceeding were formally received or qualified as expert witnesses. There is no obligation to accept the opinion of any witness simply because the witness represents that he or she has expertise in one or more areas. UH-TIO FOF 56-62. UH-TIO do not dispute that Dr. Abad is the director of Kealaiwikuamo'o at Kamehameha Schools and received her Ph.D. in anthropology with a specialization in Hawaiian archaeology from the University of Hawai'i at Manoa. However, UH-TIO note that Dr. Abad is not a land use expert or an attorney. *See* Ex. B.08a; Tr. 1/19/17 at 129:2-5. Moreover, there is evidence that Dr. Abad had a personal bias against the TMT Project, given her

			opinion that the project would cause harm no matter where it is located on Mauna Kea. UH-TIO FOF 606.
193	32	Dr. Abad is a trained anthropologist, ethnohistorian, and archaeologist specializing in Hawaiian culture and history. **Ex. Doc. B.08a (Abad WDT), p.1**	Not in dispute; however, *see supra* UH-TIO's response to Ching's proposed FOF 192.
194	32	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**	Not in dispute; however, *see supra* UH-TIO's response to Ching's proposed FOF 192.
195	32	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'a development in South Kona. **Ex. Doc. B.08a, p.3**	Not in dispute; however, *see supra* UH-TIO's response to Ching's proposed FOF 192.
196	32	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**	Incomplete. Dr. Abad's review of relevant documents was admittedly incomplete. UH-TIO FOF 605.
197	32	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
198	32	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
199	32	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.

200	32	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
201	33	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**	Not in dispute; however, *see supra* UH-TIO's response to Ching's proposed FOF 192.
202	33	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
203	33	**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**	Not in dispute.
204	33	Archaeologists following best practices will look at regional perspectives. Tr. 01/19/2017, Vol. 27, p.25: 3-6	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
205	33	"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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
206	33	This is because "studies using a smaller sized site as a unit of analysis lack	Misleading. Presented out of context.

		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**	*See* UH-TIO FOF 604-608.
207	33	"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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
208	33	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
209	33	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
210	34	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
211	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
212	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
213	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.

214	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608. UH-TIO note that there were extensive consultations. *See* UH-TIO FOF 210-237.
215	34	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**	Citation does not support the proposition. Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
216	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
217	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
218	34	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
219	34	The TMT Project CDUA lacked this kind of analysis. **Tr. 01/19/2017, Vol. 27, p.35: 8-9**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
220	34	Another example of a lack of comprehensive assessment concerns the significance of hundreds of shrines on Mauna Kea, which has been referred to	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See*

		as a ring of shrines. **Tr. 01/19/2017, Vol. 27, p.134-35**	UH-TIO FOF 604-608.
221	35	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
222	35	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
223	35	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795
224	35	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**	Inaccurate / False. *See* UH-TIO FOF 214, 570, 605.
225	35	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-795.
226	35	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**.	Citation does not support the proposition. Mischaracterization. *See* UH-TIO FOF 503-610.
227	35	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**	Not in dispute as to historic property criteria.
228	35	Bulletin 38 offered similar guidance at the federal level. **Tr. 01/19/2017, Vol. 27, p.36: 20-25**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. Irrelevant/Inapplicable. *See* UH-TIO FOF 607.
229	35	Bulletin 38 guidance states how sites should be evaluated and how to identify	Misleading. Presented out of context.

		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**	Not credible. Unsupported / Unsubstantiated. Irrelevant/Inapplicable. *See* UH-TIO FOF 607.
230	35	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 607.
231	35	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. Irrelevant/Inapplicable. *See* UH-TIO FOF 607.
232	35	"[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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
233	36	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
234	36	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
235	36	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.

236	36	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
237	36	[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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
238	36	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
239	36	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
240	36	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
241	36	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.

242	37	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
243	37	"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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
244	37	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795.
245	37	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-feet limit was determined. In fact, upon closer examination, the statement itself is false, since one of the 17 sites depicted, the Kūkahau'ula 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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795. *See, also* Tr. 132:4 – 134:3 (noting that the CDUA considered portions of Kūkahau'ula in its potential impacts analysis and that Kūkahau'ula is not part of the TMT project site).
246	37	The TMT CDUA apparently excluded Kūkahau'ula as a site for inclusion in their analysis under the belief that the portion of Kūkahau'ula located within the arbitrary 500-feet 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). It greater significance, scale, and complexity than other sites identified in the area. **Ex. Doc. B.08a, p.7-8**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795. *See, also* Tr. 132:4 – 134:3 (noting that the CDUA considered portions of Kūkahau'ula in its potential impacts analysis and that Kūkahau'ula is not part of the TMT project site).

247	37	**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**	Not in dispute as to text of rule.
248	37	"The Kūkahau'ula 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**	Not in dispute.
249	37	"Approximately 1,100 feet of the 3,400-foot long Access Way serving the TMT Observatory would cross Kūkahau'ula." 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'ula. **Ex. Doc. B.08a, p.7-8 ¶8**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 775-795. *See, also* Tr. 132:4 – 134:3 (noting that the CDUA considered portions of Kūkahau'ula in its potential impacts analysis and that Kūkahau'ula is not part of the TMT project site).
250	37	Mauna Kea is a wahi kupuna of the highest sort. **Tr. 01/19/2017, Vol. 27, p.52:21-23**	Not in dispute as to beliefs of certain individuals.
251	38	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**	Not in dispute as to beliefs of certain individuals.
252	38	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**	Not in dispute as to beliefs of certain individuals.

253	38	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
254	38	Psychological harms caused by desecration of a site considered sacred cannot be mitigated. **Tr. 01/19/2017, Vol. 27, p.81: 15-17**	Lack of Jurisdiction. Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; UH-TIO COL 957.
255	38	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
256	38	Chair Ailā asked, "How would you be impacted? Would you still go up there?" **Tr. 01/19/2017, Vol. 27, p.42:12-20**	Not in dispute.
257	38	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608.
258	38	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**	Misleading. Presented out of context. *See* UH-TIO FOF 604-608.
259	38	Archaeologists for the TMT mischaracterize the importance of view planes	Misleading. Presented out of context.

		that connect Mauna Kea to Haleakala. **Tr. Vol. 27, May 11, 2016, p.35 11-14**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-608; 454; 641; 775-795.
260	38	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 611-774; 775-795.
261	39	"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)**	Misleading. Partial quotation. Although Ex. B.12c was not offered into evidence, UH-TIO do not dispute that this partial quotation is contained within the *Guidelines for Assessing Cultural Impacts*, Environmental Council, State of Hawaii (November 19, 1997) at 11.
262	39	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**	Not in dispute as beliefs of certain individuals.
263	39	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**	Inaccurate / False. *See* UH-TIO FOF 776-778.
264	39	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**	Misleading. Presented out of context. *See* UH-TIO FOF 559, 757.
265	39	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-795.

266	39	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 210-237; 503-774.
267	39	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**	Citation does not support the proposition. The record citation does not support that Dr. Abad testified that the emic perspective is "required by law". Further, Dr. Abad noted that she is not an attorney. Tr. 01/19/17 at 129:4-5.
268	39	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**	Mischaracterization. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 210-237.
269	39	The CDUA relied on those two documents and did not cover the Cultural Impact Assessment sides adequately. **Tr. May 11, 2017, Vol. 27**	Mischaracterization. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 210-237; 503-774.
270	39	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**	Mischaracterization. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 604-605.
271	40	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**	Not in dispute that Prof. Mills was called as a witness. UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was

			agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
272	40	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
273	40	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	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
274	40	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**	UH-TIO do not dispute that this was Professor Mills's testimony. However, the federal and Massachuetts EIS processes are inapplicable to the present CDUA.
275	40	At UHH, Professor Mills developed a Heritage Management graduate	UH-TIO object to the extent that this

		program that deals with issues such as the ones raised by the TMT CDUA. **Tr. 01/25/2017, Vol.30, p. 12:20-25**	FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
276	40	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**	Not in dispute.
277	40	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**	Not in dispute.
278	40	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**	Not in dispute.
279	40	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**	Not in dispute.
280	41	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	Not in dispute. Not in Evidence. Ex. B.12c was not offered into evidence. However, UH-TIO do not dispute that this partial quotation is contained within the *Guidelines for Assessing Cultural Impacts*, Environmental

		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)**	Council, State of Hawaii (November 19, 1997) at 11.
281	41	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**	Not in dispute.
282	41	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**	Not in dispute.
283	41	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 210-237; 611-774.
284	41	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 559, 757.
285	41	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 559, 757; 611-774.
286	41	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)**	Misleading. Partial quotation. Although Ex. B.12c was not offered into evidence, UH-TIO do not dispute that this partial quotation is contained

			within the *Guidelines for Assessing Cultural Impacts*, Environmental Council, State of Hawaii (November 19, 1997) at 11.
287	41	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**	Mischaracterization. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-779.
288	41	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**	Misleading. Presented out of context. *See* UH-TIO FOF 559, 757.
289	42	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-779.
290	42	That assessment is not in the CDUA. **Tr. 01/25/2017, Vol.30, p.15:16**	Inaccurate/False. Misrepresentation. Unsupported / Unsubstantiated. *See* Ex. A-1/R-1 at 7-1 – 7-15 and portions of FEIS (Ex. A-3/R-3) incorporated by reference; UH-TIO FOF 775-779.
291	42	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 775-795.
292	42	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**	Mischaracterization. UH-TIO affirmatively note that such impacts were identified and considered. *See* UH-TIO FOF 775-795.

293	42	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 559; 775-795.
294	42	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 559; 775-795.
295	42	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**	Not credible. Unsupported / Unsubstantiated. *See* UH-TIO FOF 559; 611-774; 775-795.
296	42	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. Prof. Mills testified that the map prepared by PCSI was allegedly cropped for the CDUA application, and two sites (SIHP 16169 and 21447) were omitted. Ex. B12a. During cross examination, however, Prof. Mills conceded that the sites were in fact in Figure 4.1 in Ex. A-1/R-1 at 4-2. *See* Tr. 01/25/17 at 149:21-25; 150:9-20. *See, also* UH-TIO FOF 559. Two find spots were identified in Area E. Neither of the find spots located within the TMT Project area is considered a Historic Property. *See* UH-TIO FOF 555.
297	42	For a project of this magnitude and visibility around the island, Professor Mills	Not credible. Unsupported /

		found this limited presentation and discussion of cultural impacts inadequate. **Ex. B.12a, p.2**	Unsubstantiated. *See* UH-TIO FOF 559.
298	42	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 775-795.
299	42	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 776-778.
300	43	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 776-778.
301	43	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 775-795.
302	43	*No proposed FOF / COL.*	No proposed FOF / COL.
303	43	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF. 611-795.
304	43	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**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
305	43	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.**	Misleading. Presented out of context. UH-TIO affirmatively note that such

			impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
306	43	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**	Irrelevant / Inapplicable. Bulletin 38 (Ex. B.01i) is not applicable; TMT is not a federal project. UH-TIO FOF 607.
307	43	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**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
308	43	A cultural impact assessment must evaluate the significance of the region, whether natural or build features, within the mindset of the cultural practitioners. I**Tr. 01/25/2017, Vol.30, p.84:13-18**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
309	43	The CDUA did not adequately address intangibles. **Tr. 01/25/2017, Vol.30, p.97-98**	Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-795.
310	43	The TMT CDUA is incomplete in regard to its archaeological assessments. **Tr. 01/25/2017, Vol.30, p.85: 5-9**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-795.
311	43	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**	Misleading. Presented out of context. Not credible. All AIS reports prepared in relation to the TMT Project comply with Haw. Rev. Stat. Chapter 6E, and its implementing regulations found in HAR §§ 13-275 through 282. *See* UH-TIO FOF 505. The AIS fieldwork was

			carried out in accordance with the prevailing professional standards. UH-TIO FOF 577. *See, also* Ex. A-055 at 9-1 – 9-12 (noting prior studies and references).
312	44	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**	Misleading. Presented out of context. All AIS reports prepared in relation to the TMT Project comply with HRS Chapter 6E, and its implementing regulations found in HAR §§ 13-275 through 282. *See* UH-TIO FOF 505. The AIS fieldwork was carried out in accordance with the prevailing professional standards. UH-TIO FOF 577. Prof. Mills acknowledged that the period to challenge the AIS has expired. UH-TIO FOF 559.
313	44	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.**	*See supra* UH-TIO's response to Ching's proposed FOF 312.
314	44	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**	Misleading. Presented out of context. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See, also* UH-TIO's response to Ching's proposed FOF 312.
315	44	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**	*See supra* UH-TIO's response to Ching's proposed FOF 312.
316	44	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**	*See supra* UH-TIO's response to Ching's proposed FOF 312.

317	44	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**	*See supra* UH-TIO's response to Ching's proposed FOF 312.
318	44	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**	Misleading. Presented out of context. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See, also* UH-TIO's response to Ching's proposed FOF 312.
319	44	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**	Misleading. Presented out of context. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See, also* UH-TIO's response to Ching's proposed FOF 312.
320	44	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**	Misleading. Presented out of context. Misrepresentation. Not credible. Unsupported / Unsubstantiated. *See, also* UH-TIO's response to Ching's proposed FOF 312.
321	44	"[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**	Misleading. Presented out of context.
322	44	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**	Misleading. Presented out of context. Misrepresentation. Not credible. Unsupported / Unsubstantiated. Prof. Mills testified that the map prepared by PCSI was allegedly cropped for the CDUA application, and two sites (SIHP 16169 and 21447) were omitted. Ex. B12a. During cross examination, however, Prof. Mills conceded that the sites were in fact in Figure 4.1 in Ex.

			A-1/R-1 at 4-2. *See* Tr. 01/25/17 at 149:21-25; 150:9-20. *See, also* UH-TIO FOF 559. Two find spots were identified in Area E. The determination of what sites were historic versus modern "find spots" was made using the criteria established by Dr. McCoy in 1995, based on reasonable scientific certainty. The definition of find spots was developed during earlier archaeological studies for rock constructions on Mauna Kea that are less than 50 years old. Those are not considered historic properties, and neither of the find spots located within the TMT Project area is considered a Historic Property. *See* UH-TIO FOF 511-512, 551, 555.
323	45	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**	Not in dispute. *See* UH-TIO FOF 512.
324	45	"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**	Not in dispute. UH-TIO note, however, that find spots are not given any sort of significance in terms of impacts when archaeological surveys are done and reviewed. *See* UH-TIO FOF 511.
325	45	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**	Not in dispute. UH-TIO note, however, that SHPD is not notified when modern cultural sites are located because they do not fall under historic preservation; OMKM and KKM handle those more

			recent sites. New (find spots) as well as old sites that are identified are reported to SHPD via reports completed after the survey is done. Find spots are documented and photographed, but not evaluated. UH-TIO FOF 528.
326	45	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**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
327	45	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated.
328	45	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**	*See supra* UH-TIO's response to Ching's proposed FOF 322.
329	45	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**	*See supra* UH-TIO's response to Ching's proposed FOF 322.
330	45	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. The impacts were not approached as strictly a mathematical problem of size or height. UH-TIO FOF 775-795.

331	45	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**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
332	45	Further, for the CDUA to determine that there would be no effect on archeo-astronomy, 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**	Misleading. Presented out of context. UH-TIO affirmatively note that such impacts were properly identified and considered. *See* UH-TIO FOF 611-795.
333	45	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**	Not in dispute. *See infra* UH-TIO's response to Ching's proposed FOF 334.
334	46	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**	Not credible. Unsupported / Unsubstantiated. The record shows that pre-contact native Hawaiians recognized the importance of Mauna Kea's rich resources and its ability to serve its community by producing the tools to sustain daily life. They ventured to Mauna Kea, shaped the environment by quarrying rock, left behind evidence of their work, and took materials off the mountain to serve their communities, within the presence and with full consent of their gods. UH-TIO FOF 856-857.
335	46	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	Misleading. Presented out of context. Burials on Mauna Kea were extensively reviewed and considered as part of the EIS process. UH-TIO FOF 214-216.

		were exposed in 1892 to no longer be visible on the surface." **Tr. 01/25/2017, Vol.30, p.20: 5-8**	The TMT Project site has been extensively and intensively surveyed. There are no known pre-existing burials or human remains located in the TMT Project area. *See, e.g.* UH-TIO FOF 564.
336	46	Not all burials on the summit are cinder-cone related. **Tr. 01/25/2017, Vol.30, p.20: 9-14**	*See supra* UH-TIO's response to Ching's proposed FOF 335.
337	46	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	*See supra* UH-TIO's response to Ching's proposed FOF 335.
338	46	On January 9, 2017, KAHEA called its expert witness Dr. Candace Fujikane. **Tr. 01/09/2017, Vol. 23, p.205**	UH-TIO note that none of the witnesses in this proceeding were formally received or qualified as expert witnesses. There is no obligation to accept the opinion of any witness simply because the witness represents that he or she has expertise in one or more areas. UH-TIO FOF 56-62.
339	46	Dr. Fujikane is an English professor specializing in Hawai'i literary and cultural studies. **Ex. B.13a (Fujikane WDT), p.1**	Not in dispute.
340	46	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her

			testimony. *See* Tr. 10/20/16 at 52:24-53:21.
341	46	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**	Misleading. Presented out of context. None of the trails described by Prof. Fujikane in her testimony are near the proposed TMT Project site or the access roadway. Since the TMT Project will only occupy five acres of the Northern Plateau site and will not prevent or prohibit Huaka'i I Na Aina Mauna from traversing or walking across the remaining open areas on the Northern Plateau. UH-TIO FOF 759.
342	46	This cultural practice of ka'apuni māka'ika'i is also critical to the stewardship and monitoring of sacred sites.	Not in dispute as to beliefs of certain individuals.
343	47	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'o'āina land divisions, where relationships between land forms are unseverable.	UH-TIO do not dispute that Prof. Fujikane's testimony related to rhetorical and cultural issues. UH-TIO object to the substance of Prof. Fujikane's testimony as misleading, not credible, unsupported by the record and other objections as noted in more detail below. Prof. Fujikane testified that she had not read the Hawai'i Supreme Court's *Kilakila* opinion and thus, her testimony was uninformed by the Court's ruling in that decision. UH-TIO FOF 452. Although Prof. Fujikane testified as to various land use principles, she has no degrees in urban planning, land use or similar areas. Tr. 01/11/17 at 63:3-5. Prof. Fujikane is an

			English professor with a degree in English literature. She testified that she essentially looked at the CDUA and corrected -- or graded -- it. Tr. 01/11/17 at 63:11-19.
344	47	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**	Inaccurate / False. Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. Prof. Fujikane's opinion focused on a limited view of the cumulative impact of the TMT Project, with all existing observatories, as an added impact on the cultural concerns of certain native Hawaiian practitioners. This is not the proper standard for evaluating this criterion.
345	47	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**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. UH-TIO object to this proposed FOF to the extent that Prof. Fujikane used this as part of the basis for her opinion focusing on the limited view of the cumulative impact of the TMT Project, with all existing observatories, as an added impact on the cultural concerns of certain native Hawaiian practitioners. UH-TIO FOF 452.
346	47	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	*See supra* UH-TIO's response to Ching's proposed FOF 345.

		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	47	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
348	47	**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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
349	47	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. The FEIS and CDUA complied with all legal requirements and consistent with the Master Plan that identified the types and locations of astronomy development within the Astronomy Precinct. UH-TIO FOF 168-169.
350	48	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 (MKSR)." **Ex. A001, p.1-6**	Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. The FEIS and CDUA complied with all legal requirements and consistent with the Master Plan that identified the types and locations of astronomy development within the Astronomy Precinct. UH-TIO FOF

			168-169. The TMT Project does not utilize a subdivision of land increasing the intensity of land uses within the Conservation District. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
351	48	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**	Citation does not support the proposition. Mischaracterization. Misleading. Presented out of context. Not credible. Unsupported / Unsubstantiated. Given the application of the correct legal standards pursuant to HAR § 11-13-5-30(c)(4) and (5), the CDUA is not contradictory. *See* UH-TIO FOF 433-867; UH-TIO COL 177-226. *See, also, Kilakila* 138 Hawai'i at 403, 382 P.3d at 215 (upholding the BLNR's analysis that the impact of the ATST Telescope on cultural and visual resources would be incremental and not substantial because the ATST Telescope "must be viewed in the context of the HO," which housed astronomy facilities since the 1950s, was created specifically for astronomy uses, and currently housed eleven facilities.) Prof. Fujikane did not review *Kilakila*. UH-TIO FOF 452.
352	48	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**	Not in dispute.

353	48	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**	*See supra* UH-TIO's response to Ching's proposed FOF 351.
354	48	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**	Misleading. Presented out of context. Unsupported / Unsubstantiated. Prof. Fujikane's opinions do not reflect the standard for evaluating whether the TMT Project is consistent with the purpose of the Conservation District, and her opinion is contradicted by her testimony that Mauna Kea is "overbuilt". UH-TIO FOF 381-382. In addition, the DLNR staff report noted that "Approximately ten percent of the 13N Site in Area E has been previously disturbed; approximately 1/3 of the existing Access Right of Way has been previously graded; and the Batch Plant site was initially graded as part of the road-paving project and was used as a staging area during the construction of several observatories." Ex. B.70 at 7.
355	48	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
356	48	Dr. Fujikane cites Maly and Maly who explain that all of the mountain lands	*See supra* UH-TIO's response to

		of Mauna Kea, including the northern plateau itself, is sacred. **Ex. B.13a, p.7**	Ching's proposed FOF 345.
357	48	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
358	49	Hawaiian cultural value of the integrity of land embodied in the mo'o'āina 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'o'āina." **Tr. 01/9/2017, Vol. 23, p.214-215**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
359	49	"Mo'o'āina" 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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
360	49	Mo'o'āina as a series of smaller land divisions that is part of a larger land base. Mo'o'āina foreground the relationality between land formations. Mo'o'āina are defined by what lies on their borders, by their relationality to other mo'o'āina. **Ex. B.13c is LCA Award 3131 illustrating a mo'o'āina land division**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
361	49	Key here is that mo'o'āina are not defined by abstract cardinal directions north, south, east or west but in their relation to other land formations.	*See supra* UH-TIO's response to Ching's proposed FOF 345.
362	49	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'o 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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
363	49	In this illustration, we see the mo'o'āina embodied as reptilian deities who are connected through the mo'okū'auhau, the genealogical line of Mo'oinanea; as the great mo'o family marches across O'ahu two by two, the mo'o represent	*See supra* UH-TIO's response to Ching's proposed FOF 345.

		the mo'o'āina, the smaller land divisions that are lined up, 'ohana to each other.	
364	49	The term "mo'oāina," 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'ohe represents an even higher expression of this integrity of land. **Ex. B.13.m, p.2-5, cited in Ex B.13a, p.10**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
365	49	As surveyor Curtis J. Lyons explained in 1875, "The whole main body of Mauna Kea belongs to one land from Hamakua, viz., Ka'ohe." Ex. B.13o, p.14, cited in Ex. B.13a, p.10	*See supra* UH-TIO's response to Ching's proposed FOF 345.
366	49	Siting the TMT on the northern plateau would violate this integrity of the land.	Mischaracterization. This does not state the proper legal standard for evaluating the CDUA.
367	49	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
368	49	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**	Misleading. Presented out of context. All AIS reports prepared in relation to the TMT Project comply with Haw. Rev. Stat. Chapter 6E, and its implementing regulations found in Haw. Admin. Rules §§ 13-275 through 282. *See* UH-TIO FOF 505. The AIS fieldwork was carried out in accordance with the prevailing professional standards. UH-TIO FOF 577.
369	49	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**	Not in dispute.

370	50	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
371	50	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
372	50	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"**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
373	50	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**	*See supra* UH-TIO's response to Ching's proposed FOF 345.
374	50	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**	Lack of Jurisdiction. Not credible. Unsupported / Unsubstantiated. The Hearing Officer and BLNR have no jurisdiction to consider the desecration claim and even assuming the claim could be considered, it is without merit. *See* UH-TIO COL 392-407. Prof. Fujikane testified that she is not an expert in criminal law. Tr. 01/11/17 at 65:13-14. Estoppel/Improper Reconsideration. *See* Minute Order No. 53 [Doc. 654]

			(holding "this contested case hearing is an improper venue to adjudicate criminal law violations")
375	50	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**	Lack of Jurisdiction. Not credible. Unsupported / Unsubstantiated. The Hearing Officer and BLNR have no jurisdiction to consider the desecration claim and even assuming the claim could be considered, it is without merit. *See* UH-TIO COL 392-407. Prof. Fujikane testified that she is not an expert in criminal law. Tr. 01/11/17 at 65:13-14. UH-TIO also object to this proposed FOF to the extent that Prof. Fujikane used this as part of the basis for her opinion focusing on the limited view of the cumulative impact of the TMT Project, with all existing observatories, as an added impact on the cultural concerns of certain native Hawaiian practitioners. UH-TIO FOF 452. Estoppel/Improper Reconsideration. *See* Minute Order No. 53 [Doc. 654] (holding "this contested case hearing is an improper venue to adjudicate criminal law violations")
376	50	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**	*See supra* UH-TIO's response to Ching's proposed FOF 375.

377	50	Fujikane stated that the CDUA fails to address Mauna Kea itself as a cultural resource. **Tr. 01/9/2017, Vol. 23, p.249-250**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-774.
378	51	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-774.
379	51	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-774.
380	51	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."	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is used to support Prof. Fujikane's opinion that the CDUA fails to address Mauna Kea itself as a cultural resource.
381	51	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.	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-774. In addition, The Hearing Officer and BLNR have no jurisdiction to consider the desecration claim and even assuming the claim could be considered, it is without merit. *See* UH-TIO COL 392-407.

382	51	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**	Inaccurate / False. Misrepresentation. Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 611-774.
383	51	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**	UH-TIO note that visual and aesthetic resources and impact on viewplanes are relevant issues in this proceeding; however, the City and County of Honolulu ordinances regarding viewplanes do not govern this proceeding and are not relevant.
384	51	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**	Irrelevant / Inapplicable. The City and County of Honolulu ordinances regarding viewplanes do not govern this proceeding and are not relevant.
385	52	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**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is used to support Prof. Fujikane's opinions regarding the alleged inadequacy of the CDUA. Viewplanes in connection with the TMT Project were extensively considered and reviewed. UH-TIO FOF 775-795.

386	52	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**	Unsupported / Unsubstantiated. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
387	52	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**	UH-TIO object to this proposed FOF to the extent that it is used to support Prof. Fujikane's opinion regarding the seventh criterion. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
388	52	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**	Unsupported / Unsubstantiated. *See* UH-TIO FOF 914-936; UH-TIO COL 257-272.
389	52	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**	*See supra* UH-TIO's response to Ching's proposed FOF 387.
390	52	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**	*See supra* UH-TIO's response to Ching's proposed FOF 387.
391	52	On February 28, 2017, KAHEA called witness Brian Cruz. **Tr. 02/28/2017, Vol. 42, p.100**	Not in dispute.
392	52	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with

			the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
393	52	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
394	53	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**	Misleading. Presented out of context. Cruz was one of the authors of the Preliminary Draft CIA. UH-TIO FOF 203.
395	53	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**	Not in dispute.
396	53	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**	Misleading. Presented out of context. The Preliminary Draft CIA included Cruz's opinion that the project proponents should consider no further development atop Mauna Kea. UH-TIO FOF 203.
397	53	Criteria used to select interviewees were: knowledge of Mauna Kea, history	Not in dispute.

		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	53	Ethnicity and race were not criteria in determining interviewees. **Tr. 02/28/2017, Vol. 42, p.**123: 11-16	Not in dispute.
399	53	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**	Not in dispute.
400	53	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**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that Petitioners and Opposing Intervenors argue that the DEIS did not comply with HRS Chapter 343 because the Draft CIA did not include Cruz's recommendation. The record and law reflects that the DEIS complied with Chapter 343. UH-TIO FOF 203. Not Credible. UH-TIO FOF 203.
401	53	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
402	53	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
403	53	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
404	53	"[A]ny agency that is going to make a decision, they need all the information	*See supra* UH-TIO's response to

		and by leaving this information out, they could make the wrong decision." **Tr. 02/28/2017, Vol. 42, p.107: 19-22**	Ching's proposed FOF 400.
405	53	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
406	53	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.**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
407	54	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
408	54	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
409	54	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
410	54	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**	Not in dispute.
411	54	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
412	54	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**	*See supra* UH-TIO's response to Ching's proposed FOF 400.
413	54	On January 12, 2017, KAHEA called its expert witness Dr. Jonathan Kay Kamakawiwo'ole Osorio. **Tr. 01/12/2017, Vol. 25b, p.11**	UH-TIO note that none of the witnesses in this proceeding were formally received or qualified as expert

			witnesses. There is no obligation to accept the opinion of any witness simply because the witness represents that he or she has expertise in one or more areas. UH-TIO FOF 56-62.
414	54	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
415	54	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
416	54	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**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was

			agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
417	54	His publications include *Dismembering Lāhui: A History of the Hawaiian Nation to 1887* (University of Hawai'i Press, 2002). **Ex. B.07b, p2**	UH-TIO object to the extent that this FOF is an improper attempt to qualify witnesses as "experts." This contested case proceeding was conducted with the assumption that no witnesses would be considered "experts." Instead, it was agreed that the background, education, experience, etc. of a particular witness would go to the weight of his/her testimony. *See* Tr. 10/20/16 at 52:24-53:21.
418	55	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**	Irrelevant / Inapplicable. Prof. Osorio is not a cultural practitioner, has never been to the summit of Mauna Kea, and has not observed the telescopes. He testified that the TMT Project would violate native Hawaiian cultural practices; however, he had no knowledge or evidence that anyone practiced any traditional or cultural acts in the location of the TMT Project. He had no direct evidence as to how the TMT Project would result in significant adverse impacts to any protected historical traditional practice. In large part, Prof. J. Osorio's testimony was immaterial and irrelevant to the core issues set forth in Minute Order No. 19.

			UH-TIO FOF 763.
419	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
420	55	"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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
421	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
422	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
423	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
424	55	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,**	Irrelevant / Inapplicable. UH-TIO FOF 763.

		Vol. 26, p.22: 9-11	
425	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
426	55	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
427	56	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**	Misrepresentation. UH-TIO FOF 115.
428	56	"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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
429	56	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
430	56	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 350-384.
431	56	There is evidence of, "messing around with regulation and the spirit of regulations that have been set up since the State was first formed" because this	Irrelevant / Inapplicable. UH-TIO FOF 763.

		"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	56	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 350-384.
433	56	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**	Not credible. Unsupported / Unsubstantiated. The CDUA and the criteria set forth in HAR § 13-5-30(c) set forth a rational process for considering the TMT Project. *See, generally,* UH-TIO FOF/COL.
434	56	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**	Not credible. Unsupported / Unsubstantiated. UH-TIO FOF 937-1000.
435	56	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
436	57	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	Not credible. Unsupported / Unsubstantiated. The record reflects careful and through consideration and analysis of the TMT Project by the

		national lands." **Ex. B07, p.3**	DLNR staff. UH-TIO FOF 340-343.
437	57	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
438	57	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
439	57	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
440	57	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**	Irrelevant / Inapplicable. UH-TIO FOF 763.
441	57	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.**	Mischaracterization. Irrelevant / Inapplicable. Comments of counsel are not evidence.

		05/11/2017, Vol. 26, p.137: 2-15	
442	57	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**	Not credible. Mischaracterization. Unsupported / Unsubstantiated. UH-TIO FOF 763, 864.
443	57	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**	Not in dispute as to Prof. Osorio's beliefs. UH-TIO FOF. 864.
444	57	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**	Not in dispute as to Prof. Osorio's beliefs.
445	58	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**	Misleading. Presented out of context. Improper EIS challenge. Ex. B01 speaks for itself. UH-TIO object to this proposed FOF to the extent that Ching argues that the FEIS did not take into account tangible and intangible aspects of cultural significance within the historic district. UH-TIO FOF 503-774.
446	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
447	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.

448	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
449	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
450	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
451	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
452	58	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 445.
453	59	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	*See supra* UH-TIO's response to Ching's proposed FOF 445.
454	59	The authors of the archeological analysis for the FEIS failed to take into	Misleading. Presented out of context.

		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-**	Not credible. Unsupported / Unsubstantiated. Improper EIS Challenge. UH-TIO FOF 503-774.
455	59	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**	Not in dispute.
456	59	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**	Citation does not support proposition. Lacks evidentiary support from the record.
457	59	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**	Citation does not support proposition. Lacks evidentiary support from the record.
458	59	*No proposed FOF / COL.*	No proposed FOF / COL.
459	59	"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**	Irrelevant/Inapplicable. Correct citation should be to Appendix A4.
460	59	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	Irrelevant/Inapplicable.

		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**	Correct citation should be to Appendix A4.
461	60	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**	Irrelevant/Inapplicable.
462	60	Few sites posses [sic] better credentials to justify their national significance than does Mauna Kea." **Ex. A003 FEIS, p.3-106**, quoting a Mauna Kea NNL program.	Irrelevant/Inapplicable.
463	60	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).	Irrelevant/Inapplicable. Citation does not support proposition.
464	60	"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**	Irrelevant/Inapplicable.
465	60	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**	Irrelevant/Inapplicable.

466	60	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**	Irrelevant/Inapplicable.
467	60	Though located in the tropic, indisputable evidence of glaciation is present above the 11,000 foot level. Lastly, possible 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**	Irrelevant/Inapplicable. Citation does not support proposition. Unsupported/Unsubstantiated.
468	60	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**	Citation does not support proposition. Lacks evidentiary support from the record.
469	60	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**	Irrelevant/Inapplicable. Citation does not support proposition.
470	61	"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**	Irrelevant/Inapplicable.
471	61	Hawaiian Hotspot' magmas, pushed up through the oceanic crust, began building Mauna Kea approximately 750,000 years ago. Throughout its building	Irrelevant/Inapplicable. Citation should be to Appendix A4.

		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	61	"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 Waiau) below the summit." **Ex. A009 CMP Appendix 4, p.9**	Citation does not support proposition.
473	61	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	Not in dispute.
474	61	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**	Citation does not support proposition.
475	61	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**	Not in dispute.
476	61	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 Waiau, one of the highest lakes in the United States. **Ex. A048, IV-2**	Citation does not support proposition that "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 Waiau[.]"
477	61	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 or alkali-rich basalt). **Ex. A003 FEIS, Vol. 1 p.108**	Citation does not support proposition.
478	62	"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**	Not in dispute.
479	62	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**	Not in dispute.
480	62	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**	Not in dispute.
481	62	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**	Not in dispute.
482	62	"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 in dispute.

		not rise above the inversion level and do not cause any interference at the summit." **Ex. A003 FEIS, p.3-182**	
483	62	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**	Not in dispute.
484	62	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**	Not in dispute.
485	62	"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**	Not in dispute.
486	63	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**	Not in dispute.
487	63	The 300 feet wide, approximately 10 foot deep, alpine lake, Wai'au, is "unique and revered." **Ex. A009 2000 Master Plan, p.IV-2**	Citation does not support proposition.
488	63	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**	Citation does not support proposition.
489	63	Seemingly barren, desolate, and unchanging, the natural environment of the upper slopes and summit area are actually very much alive, revealing through	Not in dispute.

		its topography, geology, and climate an impressive history of geomorphic process and ecosystem development. **Ex. A009 CMP, p.5-24**	
490	63	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**	Misleading. Presented out of context. There are no species of flora unique to the TMT Project site. UH-TIO FOF 466-479. There are no currently listed threatened or endangered species known to occur in the Astronomy Precinct. UH-TIO FOF 475-476.
491	63	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**	Not in dispute.
492	63	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**	Citation does not support the proposition. *See supra* UH-TIO's response to Ching's proposed FOF 490.
493	63	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**	Citation does not support proposition. *See supra* UH-TIO's response to Ching's proposed FOF 490.
494	63	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**	Citation does not support the proposition. Misrepresentation. Reference states that Hawaiian bentgrass, Douglass' bladder fern, 'iwa'wa and pili uka occur in the alpine shrubland, which goes **up to (not above)**. 12,800 feet in elevation. *See also* Ex. A-3/R-3 at S-4 (stating that alpine shrublands and grasslands are located between 9,500

			and 12,800 feet in elevation. *See supra* UH-TIO's response to Ching's proposed FOF 490.
495	63	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**	*See supra* UH-TIO's response to Ching's proposed FOF 490.
496	63	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**	Citation does not support proposition. Lacks evidentiary support from the record. Misleading. Presented out of context. None of the lichen or moss species detected at the TMT Project site are unique to Hawai'i. UH-TIO FOF 471. *See supra* UH-TIO's response to Ching's proposed FOF 490.
497	64	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**	Misleading. Partial quotation. The reference goes on to state that the two indigenous species of mosses detected at the Northern Plateau can be found elsewhere in the world. Ex. A-3/R-3 at 3-61. *See supra* UH-TIO's response to Ching's proposed FOF 490.
498	64	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**	Citation does not support proposition. *See* UH-TIO FOF 466-502. Misleading. Presented out of context. None of the lichen or moss species detected at the TMT Project site are

			unique to Hawai'i. UH-TIO FOF 471. *See supra* UH-TIO's response to Ching's proposed FOF 490.
499	64	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**	*See supra* UH-TIO's response to Ching's proposed FOF 490.
500	64	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**	Citation does not support proposition. Misleading. Presented out of context. This FOF suggests that Rhizocarpon geopraphicum and Lecidea baileyi occur only at the proposed TMT site. However, there are no species of flora unique to the TMT Site. UH-TIO FOF 474. *See supra* UH-TIO's response to Ching's proposed FOF 490.
501	64	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**	*See supra* UH-TIO's response to Ching's proposed FOF 490.
502	64	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**	*See supra* UH-TIO's response to Ching's proposed FOF 490.
503	64	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	Not in dispute.

		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	64	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**	Misleading. Presented out of context. Although Mr. Hansen was the leader of the "field crew," Mr. Hansen was overseen by Dr. Grant Gerrish, who was the principle investigator for this study. Tr. 1/19/17 at 194:7-19, 199:4-7.
505	65	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.	Unsupported/Unsubstantiated. Misleading. Presented out of context. Although Mr. Hansen was the leader of the "field crew," Mr. Hansen was overseen by Dr. Grant Gerrish, who was the principle investigator for this study. Tr. 1/19/17 at 194:7-19, 199:4-7.
506	65	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**	Not in dispute.
507	65	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 Botanical Baseline Survey (2011) of the University of Hawai'i's Managed Lands on Mauna Kea. **Ex. B.64**	Not in dispute.

		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	65	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**	Misleading. Presented out of Context. Mr. Hansen did not identify any non-lichen species that are unique to the proposed TMT site. *See* UH-TIO FOF 474, 477-479.
509	65	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**	Misleading. Presented out of Context. Mr. Hansen did not identify any non-lichen species that are unique to the proposed TMT site. *See* UH-TIO FOF 474, 477-479.
510	65	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**	Citation does not support proposition. Misleading. Presented out of context. *See* UH-TIO FOF 476 (stating that Area E is not considered critical habitat for the Douglas' bladderfern). Additionally, the Douglas' bladderfern is widespread, occurring on all main Hawaiian Islands. Ex. A-3/R-3 at 3-65.
511	65	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**	Unsupported/Unsubstantiated. Incorrect/Inaccurate. There is no evidence of "unique assemblages" at the proposed TMT site. *See*, Tr. 12/1/16 at 155:25-156:5 (Dr. Clifford Smith stating that there are no special communities located within the

			proposed TMT Project site). In fact, Mr. Hansen's supervisor for the 2011 baseline wrote a report which Mr. Hansen admits did not recognize any plant communities or assemblages as significant. *See* UH-TIO FOF 474, 478-479. Not credible. Hansen, who is not a trained entomologist and admitted that he is not an expert on lichen, testified that these species of lichen can be found elsewhere on Mauna Kea and that the particular assemblages of lichens found at the TMT Project site could be found elsewhere. UH-TIO FOF 478. Hansen further testified that his superior, Dr. Gerrish, did not consider the lichen assemblage to be significant. UH-TIO FOF 479.
512	65	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**	*See supra* UH-TIO's response to Ching's proposed FOF 511.
513	66	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**	Misleading. Presented out of context. This FOF implies that large boulders exist only in Area E. Mr. Hansen did not testify to this fact. There is no evidence that large boulders exist only in Area E.

			Misleading. Presented out of context. The record reflects that Hansen's overall study also included areas that extended well beyond Area E. Tr. 01/19/17 at 191:8:15.
514	66	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**	Misleading. Presented out of context. The record reflects that Hansen's overall study also included areas that extended well beyond Area E. Tr. 01/19/17 at 191:8:15. Misleading. Presented out of context. The pahoehoe lava flows and other pohaku are different from the cinder substrate, but are not "unique" to Area E. *See generally* Ex. A-5/R-5, App. H at 7; Ex. A-5/R-5, App. G at 4, UH-TIO FOF 447. Lacks evidentiary support from the record.
515	66	(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**	Misrepresentation as to the added text in parentheses. Misleading. Presented out of Context. There are no species of flora unique to the TMT Project site. Species and habitat found in the TMT Project site are not unique to that site and are found elsewhere on Mauna Kea and/or on other islands of Hawai'i. UH-TIO FOF 474.

			Wēkiu bugs are generally concentrated on the cinder cones in the summit area down to roughly 11,700 feet. There are no currently-listed threatened or endangered species known to occur in the Astronomy Precinct. Ex. A-3/R-3 at S-4. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496. The TMT Project will not have a significant impact on botanical resources because species and habitat of these areas are not unique to the Project site and are found elsewhere on Mauna Kea and/or on other islands of Hawai'i. UH-TIO FOF 466-474.
516	66	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**	Incomplete. *See* UH-TIO FOF 466-502.
517	66	No proposed FOF / COL.	No proposed FOF / COL.
518	66	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**	Citation does not support proposition. *See* UH-TIO FOF 466-502. Lacks evidentiary support from the

			record. Misleading/Presented out of context. Ex. A-48 is a document created in 2000. Since that time, many studies have been conducted that have increased the scientific understanding of arthropod species on Mauna Kea. *See generally*, Ex. A-5/R-5 at App. K (Arthropod and Botanical Inventory and Assessment prepared in 2009), A-16 to 22. The record reflects that the TMT Project will not be built in a critical habitat for the wēkiu bug or any species of concern. UH-TIO FOF 342. The wēkiu bug was removed as a candidate from the Federal Endangered Species Act, but in any case, OMKM has an overarching plan to restore the wēkiu bug habitat, which is currently being implemented. UH-TIO FOF 481-483. Moreover, there are no currently-listed threatened or endangered species known to occur in the Astronomy Precinct. Ex. A-3/R-3 at S-4.
519	66	Little information exists about the habits of arthropod species in the summit area, except the wēkiu bug. **Ex. A0101CMP, p.5-39**	*See supra* UH-TIO's response to Ching's proposed FOF 518.
520	66	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**	Citation does not support proposition. *See supra* UH-TIO's response to

		3-62	Ching's proposed FOF 518.
521	66	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**	Unsupported/Unsubstantiated. Misleading. Presented out of context. Inaccurate/Incorrect. *See* UH-TIO FOF 484 (Wēkiu bugs are uncommon in Type 4 and Type 5 habitat. Type 6 habitat is unsuitable for the Wēkiu bug). The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496. *See supra* UH-TIO's response to Ching's proposed FOF 518.
522	66	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**	Incomplete. *See* UH-TIO FOF 466-502. Misleading. Presented out of context. Measures are in place to mitigate the impacts of dust. UH-TIO FOF 309, 321, 490, 494. *See supra* UH-TIO's response to Ching's proposed FOF 518.
523	67	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).	Incomplete. *See* UH-TIO FOF 466-502. Unsupported/Unsubstantiated. Not in evidence.

			Misleading. Presented out of context. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496. *See supra* UH-TIO's response to Ching's proposed FOF 518.
524	67	Arthropod and Botanical Inventory and Assessment, by Pacific Analytics, L.L.C. **Ex. A-005 Appendix K FEIS Vol III**	Incomplete. *See supra* UH-TIO's response to Ching's proposed FOF 518.
525	67	Information on relationships between wind and climate variables and wēkiu bug food availability is lacking. **Ex. A-010 CMP NRMP, p.2.1-44**	Citation does not support proposition. *See* UH-TIO FOF 466-502. Irrelevant/Inapplicable. This FOF has no bearing on the TMT Projects impact on wēkiu bug populations. Misleading. Presented out of contact. Numerous studies have been conducted on the wēkiu bug since the NRMP was published in 2009. *See* Exs. 17 at 4, A-18 at 4-5; Ex. A-22 at 7 - 10. *See supra* UH-TIO's response to Ching's proposed FOF 518.
526	67	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**	Incomplete. *See* UH-TIO FOF 466-502. Misleading. Presented out of context. The TMT Project will not significantly

			impact wēkiu bug populations. UH-TIO FOF 481-496. *See supra* UH-TIO's response to Ching's proposed FOF 518.
527	67	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**	Incomplete. *See* UH-TIO FOF 466-502. Citation does not support proposition. Misleading. Presented out of contact. Numerous studies have been conducted on the wēkiu bug since the NRMP was published in 2009. *See* Exs. 17 at 4, A-18 at 4-5; Ex. A-22 at 7 - 10. *See supra* UH-TIO's response to Ching's proposed FOF 518.
528	67	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.	Unsupported/Unsubstantiated. Not credible Mischaracterization. No citation is provided for this proposed FOF. The TMT Project will not harm the aquifers. *See* Tr. 12/13/16 at 112:14-113:12. Because the TMT Observatory will use a zero-discharge wastewater system, wastewater will not be released from the TMT Project so no percolation of

			wastewater will reach the aquifer. UH-TIO FOF 431, 805.
529	67	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**	Not in dispute as to statement. Misleading with respect to any conclusions implied therefrom. The reliable, probative, and credible evidence establishes that the TMT Project will cause minimal surface runoffs, and the impacts of such runoff will not be significant. *See* WDT Nance at 2; Tr. 12/13/16 at 98:5-14 Misleading. Presented out of context. The evidence has shown that precipitation on Mauna Kea above 9,000 is low and evaporation rates are high. The majority of water runoff at or near the TMT Project would be lost to evaporation and therefore does not become groundwater recharge. Ex. A-10, 2.1.34 – 2.1-35, 2.1-39; *see also* UH-TIO FOF 804-805.
530	67	The Astronomy Precinct is located entirely above the Waimea Aquifer. **Ex. A010 NRMP 2.1-38**	Misleading. Presented out of context.
531	67	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**	Misleading. Presented out of context. Misleading. Partial quote. The reference continues on to state that the regional aquifer beneath the summit, which is "much deeper."

			Citation does not support the proposition. Misleading. Presented out of context. The reference to water continuing "its downward migration to the regional aquifer" in the FEIS refers to the situation that would occur if the impermeable layer under Lake Waiau did not create a perched aquifer. *See* Ex. A-3/R-3 at 3-115.
532	67	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**	Not in dispute.
533	68	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**	Not in dispute.
534	68	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**	Not in dispute.
535	68	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	Not in dispute.
536	68	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**	Misleading. Presented out of context. This FOF pertains specifically to runoff from the Mauna Kea Access Road. Additionally, the evidence has shown that precipitation on Mauna Kea above 9,000 is low and evaporation rates are

			high. The majority of water runoff at or near the TMT Project would be lost to evaporation and therefore does not become groundwater recharge. Ex. A-10, 2.1.34 – 2.1-35, 2.1-39; *see also* UH-TIO FOF 804-805.
537	68	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 is Hawaii p.3**	Misleading. Presented out of context. This FOF suggests that ground water exists at high elevations on Mauna Kea. However, Exhibit B17w references "high water levels," which is not the same as bodies of water at high elevations. Not credible. There was no expert testimony to explain how this information is relevant to the TMT Project.
538	68	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**	Not in dispute. Misleading with respect to any conclusions implied therefrom. The reliable, probative, and credible evidence establishes that the TMT Project will cause minimal surface runoffs, and the impacts of such runoff will not be significant. *See* WDT Nance at 2; Tr. 12/13/16 at 98:5-14.
539	68	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	Misleading. Presented out of context. *See* UH-TIO FOF 804-805.

		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	68	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)**	Incomplete. *See* UH-TIO FOF 796-823. *See supra* UH-TIO's response to Ching's proposed FOF 536.
541	69	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)**	Incomplete. *See* UH-TIO FOF 796-823.
542	69	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)**	Misleading. Presented out of context (this portion of Ex. A-3/R-3 is in reference to the surface runoff from the Mauna Kea Access Road, not all surface runoff on Mauna Kea).
543	69	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)**	Misleading. Presented out of context. The primary watershed recharge areas for Mauna Kea occur at lower levels below the summit, not in alpine deserts. UH-TIO FOF 805. There is no reasonable prospect of the TMT Project impacting groundwater. UH-TIO FOF 804. Misleading. Partial quotation. Excerpt

			goes on to state: "Scientific dating tests of the spring's water indicate that it is recent, meaning that the water is not from the melting of ancient subsurface ice or permafrost, and analyses of the water shows it to be identical to rainfall at the summit. 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. Hale Pohaku is located above the Onomea Aquifer system (Figure 3-30). **There are no wells in the vicinity of Hale Pohaku, because, similar to the summit area, the groundwater is at such a great depth that it is not considered economical to use it.**" (emphasis added). The reliable, probative, and credible evidence establishes that the TMT Project will cause minimal surface runoffs, and the impacts of such runoff will not be significant. *See* WDT Nance at 2; Tr. 12/13/16 at 98:5-14.
544	69	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)**	Misleading. Presented out of context. The primary watershed recharge areas for Mauna Kea occur at lower levels below the summit, not in alpine deserts. UH-TIO FOF 805. There is no reasonable prospect of the TMT Project

			impacting groundwater. UH-TIO FOF 804.
545	69	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)**	Misleading. Presented out of context. The primary watershed recharge areas for Mauna Kea occur at lower levels below the summit, not in alpine deserts. UH-TIO FOF 805. There is no reasonable prospect of the TMT Project impacting groundwater. UH-TIO FOF 804.
546	69	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**	Unsupported/Unsubstantiated. Exhibit B.17x is merely an abstract of a study conducted regarding the groundwater between the Mauna Loa and Mauna Kea volcanoes. The entire study/report is not in evidence. Misrepresentation. This study was not conducted anywhere near the summit of Mauna Kea. The abstract indicates that the drilling conducted occurred in the saddle region between Mauna Kea and Mauna Loa, starting at an elevation of 1,946 meters above mean sea level, which is approximately 6,384 feet. This is nowhere near the summit of Mauna Kea. Ching attempts to misrepresent this exhibit as suggesting that water can be found only 150 meters below the summit of Mauna Kea, where the TMT Project will be constructed.

			Misleading. Partial quotation. Ex. B17x also states that, "in the deeper interior of the volcano, compaction of the flow boundaries (the major carrier of water in the shallow stratigraphy) leads to a progressive decrease in permeability and reduction in the transport rates of recharge toward the shoreline aquifers." Misleading. Presented out of Context. When asked about this portion of the study, Mr. Nance testified that perching water formations in the shallow column probably did not play a larger role in groundwater transport than had been recognized in the past. Tr. 12/13/16 at 141:1-142:14.
547	69	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**	Incomplete. Misleading. Presented out of context. Does not state that Mauna Kea is a "very young postshield rock." Not credible. There was no expert testimony to explain how this information is relevant to the TMT Project.
548	69	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	Not in dispute.

		intruded dikes that create high level groundwater. Nance Tr.12.13.16 V16	
549	70	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**	Mischaracterization. Misleading. Presented out of context. Misleading. Partial quotation. Testimony in response to line of questioning was as follows: Q: Now, there have been a lot of claims that TMT will harm the aquifer. First, could you explain to the Judge what an aquifer is from a hydrologist's perspective? A: Let me try to do that two different ways. An aquifer is a groundwater body typically defined by boundaries, defined by the type of groundwater occurrence of maybe high level groundwater that I just referred to, maybe basal groundwater, that's basically a lens of fresh, brackish water floating on saltwater, or it may actually even be a small little perched water body. How they fit physical on this island, I couldn't tell you, but there are many. The other way to look at that is the State Water Commission is the agency responsible for regulating low developed groundwater use has divided the island up into 24 separately identified and delineated aquifer systems. There are more actual aquifers

			then there are regulated aquifer systems. **Q: Now, based upon your review of Mauna Kea and your knowledge of the TMT project, will the TMT project in any way harm any of these aquifers?** **A: It should not at all.** Tr. 2/13/2016 at 112:14 – 113:12 (emphasis added).
550	70	Three potable wells are tapped into high level dike-confined groundwater. **Nance Tr.12.13.16 V16 at 113:7-8**	Citation does not support proposition. Misleading. Partial quotation. Nance testified as to the existence of four potable wells. Tr. 12/13/16 at 113:13-22. Nance further testified that the TMT Project would not affect any of these possible water sources. Tr. 12/13/16 at 114:14-16.
551	70	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**	Citation does not support proposition.
552	70	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**	Misrepresentation. Mischaracterization. Unsupported/Unsubstantiated. Citation does not support the proposition that the views to and from Mauna Kea are "significant."

			The TMT Project will not have a substantial adverse impact on the visual resources of Mauna Kea. *See* UH-TIO FOF 775-795.
553	70	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	Not in dispute.
554	70	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)**	Not in dispute.
555	70	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**	Citation does not support proposition. UH-TIO note that the correct citation for this proposed FOF is Ex. A-3/R-3 at 3-82 Misleading. Presented out of context. Appropriate excerpt states: "Eighteen representative viewpoints within the northern portion of the island have been identified as places that are of visual significance to the three viewer groups. The viewpoints are all located in the northern portion of the island because the location of the TMT Observatory is such that it will not be visible from the southern portion . . . From approximately 43 percent of the island area a viewer is able to potentially see at least one existing observatory. According to 2000 U.S.

			Census data, 72 percent of the population of the Island of Hawai'i, or about 107,000 people reside within the viewshed of the existing observatories." Ex. A-3/R-3 at 3-81 – 3-82.
556	70	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**	Not in dispute.
557	70	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**	Not in dispute.
557	70	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**	Citation does not support the proposition (correct citation should be to Ex. A-3/R-3). Misleading. Presented out of context (this section of Ex. A-3/R-3 goes on to state that "[t]he **direct long-term visual impact of the TMT Observatory will be less significant**." Ex. A-3/R-3 at 3-103). The FEIS further notes that "When the TMT Observatory is combined with the existing conditions, the cumulative visual impact of development on and near the summit of Maunakea will continue to be significant, as discussed in detail in Section 3.16.4." Ex. A-3/R-3 at 3-101. The incremental increase in cumulative visual impact due to the

			TMT Project will be less than significant. UH-TIO FOF 795.
558	71	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.17n Mae Mull Elepaio 1974**	Not credible. Unsupported/Unsubstantiated. Mull's statement over 40 years ago does not reflect measures taken since, and should be given little weight in light of the record of this proceeding.
559	71	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 Waiau. 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 CDUA p.2-4**	Misleading. Partial quote. The reference goes on to state that the construction period will not entail long lasting land disturbance and is consistent with the preservation and continued use of the Batch Plant Staging Area.
560	71	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,	Misleading. Presented out of context. Excerpt is followed by the following: "Though no archaeological surveys were conducted prior to the construction of the summit road, which was completed in the mid-1960s, there is no indication that any archaeological sites on the "summit" were destroyed at that time, or at any time thereafter in the construction of the existing observatories. In 1998 Kepa Maly

		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**	interviewed two Hawaiian men, Theodore "Teddy" Bell, who had worked for Morrsion-Knudsen on the road to the summit, and Alika Lancaster, who had worked on the construction of the first observatories in the 1960s. Neither one had seen or heard of any human bones uncovered along the road, or on the summit (Maly 1999 Appendix A:123, A-232). **The most important observation to be made about the summit (Kūkahau'ula) is the meager evidence of human activity prior to the historic period.** Indeed, with the exception of Site 21209, which is comprised of two features, a small rock outline and mound on the southeast rim of Pu`u Wekiu, there are no other known sites of probable pre-Contact age on the summit." Ex. A-122 at 7-13 (emphasis added). No known traditional and customary practices are associated with the proposed 5-acre TMT Project site. The TMT Project will not have a substantial effect on shrine worship, pilgrimage, prayer, and offerings in the summit area. The principal areas traditionally used for these practices would not be affected by the TMT Project. *See* UH-

			TIO FOF 611-641. The reliable, substantial, and credible evidence demonstrates that the TMT Project will not result in any substantial adverse impact on native Hawaiian traditional and customary practices on Mauna Kea, and will not have a substantial adverse impact on any historic properties within the MKSR. Ex. A-3/R-3 at 3-37, 3-48 to 3-55. *See* instead UH-TIO FOF 646-647.
561	72	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**	Unsupported/Unsubstantiated. Not credible. *See* UH-TIO FOF 499, 748-49. Misrepresentation. Incomplete/Vague and Ambiguous (the FOF is written from a "first person" perspective, with Ward as the apparent source, and is an improper FOF). Not credible. Unsupported / Unsubstantiated. Ward is not a native Hawaiian practitioner. While Ward's interest in Mauna Kea is for recreation and hiking, she had no prior experience of hiking in the rough lava areas of the TMT Project. Ward's use of Mauna Kea for recreation purposes began when there were telescopes already existing on Mauna Kea. During the 1980s and 1990s, Ward did not witness

			any native Hawaiians engaging in traditional or cultural practices on Mauna Kea. UH-TIO FOF 748-749. In any case, evidence in the record supports the conclusion that at least some native Hawaiian practices are facilitated, rather than hindered, by the existence of the observatories and infrastructure on Mauna Kea. UH-TIO FOF 345. The impacts complained of by Ward are present with or without the TMT Project.
562	72	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**	Misleading. Partial quotation. Quoted excerpt is followed by the following: "The Pu'u Wekiu/Kukahuau'ula Summit and Trailhead measurement locations experienced measured noise levels of 47 and 49 dBA L, and 50 and 53 dBAL. Sounds from existing observatory HVAC exhaust systems were not noticeable during the summit location field measurement; despite its remote location, the summit was not completely silent. **The dominant noise source for sound levels measured at recreational use sites was due to a steady wind of 5 to 14 mph moving from the direction of the nearby observatories toward the measurement locations. Winds in this range are typical for this area and generally dominate the ambient noise levels.**"

			Ex. A-3/R-3 at 3-176 (emphasis added). Misleading. Presented out of context. Operation of the TMT Project will not contribute to a noticeable increase in noise levels at the identified recreational sites in the surrounding area recongized as sensitive to noise, and any noise impact from the project will be less than significant. UH-TIO FOF 978-983.
563	72	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**	Misleading. Presented out of context. Operation of the TMT Project will not contribute to a noticeable increase in noise levels at the identified recreational sites in the surrounding area recognized as sensitive to noise, and any noise impact from the project will be less than significant. UH-TIO FOF 978-986.
564	72	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.	Misleading. Presented out of context. The General Lease further provides that the land is leased for a scientific complex and for activities inimical to the scientific complex. UH-TIO FOF 113-114.
565	72	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**	*See supra* UH-TIO's response to Ching's proposed FOF 564. The TMT Project will not have a

			significant impact on archaeological and historic resource. UH-TIO FOF 503-610. Misleading. Presented out of context. Paragraph 4 of the General Lease states that "[t]he land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex." Ex. B.17f at 3.
566	72	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**	Irrelevant/Inapplicable. Lack of Jurisdiction. *See supra* UH-TIO's response to Ching's proposed FOF 564.
567	72	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**	Misleading. Presented out of context. Misleading. Partial quotation. *See supra* UH-TIO's response to Ching's proposed FOF 564.
568	73	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 BLNR. **Ex. B.17f, p.4**	Misleading. Presented out of context. Misleading. Partial quotation. *See supra* UH-TIO's response to Ching's proposed FOF 564. TIO has committed to performing under the Decommissioning Plan. The

			TIO Sublease also requires TIO to decommission, remove its improvements, and restore the site at the end of the useful life of the proposed TMT Observatory, or in the event the General Lease between the University and BLNR is not extended or renewed. UH-TIO FOF 159, 208.
569	73	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**	Misleading. Presented out of context. Misleading. Partial quotation. *See supra* UH-TIO's response to Ching's proposed FOF 564. The TMT Project will not result in pollution fo the waters of Lake Waiau. UH-TIO FOF 799-801.
570	73	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**	Misleading. Presented out of context. The General Lease allows UH Hilo to use the lease lands "as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex. Activities inimical to said scientific-complex shall include light and dust interference to observatory operation and certain types of electric or electronic installation on the demised lands, but shall not necessarily be limited to the foregoing." Ex. B.17f at 3.

			Citation does not support the proposition. Except for actual construction areas while the Project is being built (and, once it is completed, the TMT Observatory site), Petitioners, Opposing Intervenors, and everyone else will have continued access to the summit area of Mauna Kea, for religious practices and for any other permitted activity. UH-TIO FOF 679, 681; UH-TIO COL 363. The TMT Project will even improve access to the Northern Plateau. UH-TIO FOF 910.
571	73	"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**	Misleading. Presented out of context. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the scope and/or adequacy of the Master Plan, CMP, any of the sub plans; the University's process in developing and/or implementing those plans; the University's management of Mauna Kea in general; and/or the BLNR's supervision and management of Mauna Kea, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their

			proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 118-190.
572	73	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**	*See supra* UH-TIO's response to Ching's proposed FOF 571.
573	73	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**	*See supra* UH-TIO's response to Ching's proposed FOF 571.
574	73	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. *See supra* UH-TIO's response to Ching's proposed FOF 571.
575	73	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**	Irrelevant/Inapplicable. *See supra* UH-TIO's response to Ching's proposed FOF 571.
576	73	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. *See supra* UH-TIO's response to Ching's proposed FOF 571.
577	74	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	Citation does not support the proposition. *See* UH-TIO FOF 123-135.

		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**	Misleading. Presented out of context. The 1977 Management Plan is merely a policy guide not intended to impose rigid standards. *See* UH-TIO FOF 339.
578	74	The plan was prepared by DLNR staff, and approved on February 11, 1977 following two public hearings. **Ex. B.17g, p.2-3**	Misleading. Presented out of context. The 1977 Management Plan is merely a policy guide not intended to impose rigid standards. *See* UH-TIO FOF 339. Citation does not support proposition. Irrelevant/Inapplicable. *See supra* UH-TIO's response to Ching's proposed FOF 577.
579	74	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**	Citation does not support the proposition. UH-TIO note, however, that the Mauna Kea Plan is a policy guide that is not intended to impose rigid development standards. UH-TIO FOF 339. Irrelevant / Inapplicable. *See supra* UH-TIO's response to Ching's proposed FOF 577.
580	74	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**	Inaccurate/False. Certain portions of quotation are incorrect. Quotation properly reads: "The area covered by this plan shall extend from the summit down to about the 6,000-foot elevation and shall include all conservation district land from the summit of Mauna

			kea down to the Saddle Road." Ex. B.17g at 1. Citation does not support proposition. UH-TIO note, however, that the Mauna Kea Plan is a policy guide that is not intended to impose rigid development standards. UH-TIO FOF 339. Irrelevant/Inapplicable. *See supra* UH-TIO's response to Ching's proposed FOF 577.
581	74	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**	Inaccurate/False. Citation is incorrect. Ex. B.17g at 1. Citation does not support proposition. Irrelevant/Inapplicable. *See supra* UH-TIO's response to Ching's proposed FOF 577.
582	74	Any use of the lands will be, however subject to regulations under County, State and Federal laws. **Ex. B.17g, p.5**	Misleading. Incomplete quotation "Any use of the lands will be, however, subject to regulation under County, State, and Federal laws on Historic Sites, Natural Area Reserves, and conservation districts." Ex. B.17g at 5. *See supra* UH-TIO's response to Ching's proposed FOF 577.
583	74	No application for any proposed facility shall have final approval without the applicant having first filed, with the board, adequate security equal to the	Unsupported/Unsubstantiated. Misleading. Presented out of context.

		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 Mauna Kea Plan is a policy guide that is not intended to impose rigid development standards. There is no requirement for the posting of a bond for the TMT Project before the CDUA can be approved. *See* UH-TIO FOF 339. Irrelevant/Inapplicable.
584	74	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)**	Incomplete. Misleading. Presented out of context. The 1995 Management Plan (or "Revised Management Plan") was superseded by the 2009 Comprehensive Management Plan. Ex. A-9 at 2-3. Citation does not support the proposition. There is no Ex. D-10 in the record. UH-TIO note that the correct citation is Ex B.17h at i.
585	75	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**	Irrelevant/Inapplicable. Citation does not support the proposition. Citation is incorrect. Ex B-H at i. Misleading. Presented out of context.

			The 1995 Management Plan (or "Revised Management Plan") was superseded by the 2009 Comprehensive Management Plan. Ex. A-9 at 2-3 While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the scope and/or adequacy of the Master Plan, CMP, any of the sub plans; the University's process in developing and/or implementing those plans; the University's management of Mauna Kea in general; and/or the BLNR's supervision and management of Mauna Kea, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 118-190.
586	75	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585.
587	75	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585. Irrelevant/Inapplicable. The TMT Project will be subject to management through the BLNR-approved CMP and

			sub-plans. *See, e.g.*, UH-TIO FOF 359.
588	75	The 2000 Master Plan was never adopted nor approved by BLNR. **Ex. A003 FEIS, p.3-146**	Misleading. Presented out of context. The Master Plan is an internal policy and planning guide for the University to promote the goal of balanced stewardship of the UH Management Area. Therefore, it was adopted by the BOR and there was no requirement that it be adopted or approved by BLNR. UH-TIO FOF 123. Misleading. Partial quotation. Full quotation states: "Similar to the 1983 Master Plan, the 2000 Master Plan was not adopted nor approved by BLNR."
589	75	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585; s*ee also* UH-TIO FOF 123 ("[t]he Master Plan is an internal policy and planning guide for the University . . .") (emphasis added).
590	75	The objective of the 2000 Master Plan is to preserve and protect the cultural, natural, recreational and scientific resources on UH lands. **Ex. A048**	Misleading. Presented out of context. The 2000 Master Plan presented many objectives, some of which provide for the development of astronomy/science on Mauna Kea. *See generally*, Ex. A at II-2 to II-4; UH-TIO FOF 124. *See supra* UH-TIO's response to Ching's proposed FOF 585.
591	75	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585.

592	75	In accordance with the 2000 Master Plan, UH-Hilo Chancellor established the OMKM on August 1, 2000. **Ex. A-009 CMP, p.3.8**	Misleading. Presented out of context. *See* UH-TIO FOF 125. *See supra* UH-TIO's response to Ching's proposed FOF 585.
593	75	OMKM is the office charged with ensuring compliance with and implementation of the 2000 Master Plan. **Ex. A-009 CMP, p.3.8**	Misleading. Presented out of context. *See* UH-TIO FOF 125. *See supra* UH-TIO's response to Ching's proposed FOF 585.
594	75	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. Excerpt is followed by statement that "[m]anagement actions to improve coordinated management and develop collaborative partnerships are detailed in Section 7" of the CMP. Ex. A-9 at 3-9. Misleading. Presented out of context. Management actions to improve coordinated management and develop collaborative partnerships are detailed in Ex. A-9 at 7-1 to 7-69. *See supra* UH-TIO's response to Ching's proposed FOF 585.
595	76	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**	Misleading. Presented out of context. Excerpt subsequently states: "[t]he MKMB serves in an advisory capacity to the UH Hilo Chancellor. The

			MKMB has also established several advisory committees, including the MKMB Environmental Committee and the MKMB Hawaiian Cultural Committee." Ex. A-9 at 3-9. *See supra* UH-TIO's response to Ching's proposed FOF 585.
596	76	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**	Misleading. Presented out of context. The MKMB recently approved the transfer of the management and oversight of MKSS to OMKM. Ex. A-9 at 3-11; *see also* Tr. 12/12/16 at 129:10-13 (Mauna Kea ranger services are under the control of OMKM). *See supra* UH-TIO's response to Ching's proposed FOF 585.
597	76	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**	Misleading. Presented out of context. Excerpt continues that "[t]he remaining 10,763 acres (4,356 ha) are designated a Natural/Cultural Preservation Area in order to protect natural and cultural resources within the UH Management Area." Ex. A-9 at 3-1. *See supra* UH-TIO's response to Ching's proposed FOF 585.
598	76	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**	Misleading. Presented out of context. Excerpt is preceded by: "[i]n addition to the potential construction of new observatories, other possible changes to the astronomy facilities include

			redevelopment of existing sites (i.e., dismantling an existing facility and replacing it with a new one on the existing footprint), upgrades to or expansions of existing observatories, and removal of some obsolete observatories. Changes could also involve improving utility service." Ex. A-9 at 6-8. *See supra* UH-TIO's response to Ching's proposed FOF 585.
599	76	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**	Citation does not support the proposition. The cited page of the CMP states in relevant part: "Using these criteria, the 2000 Master Plan updated designated telescope siting areas within the Astronomy Precinct for existing observatories, proposed redeveloped facilities, and potential new facility sites. The most probable scenarios will be to site all new proposed astronomy facilities in the area within the Astronomy Precinct identified as the north plateau." Ex. A-009 at 7-57. Misleading. Presented out of context. There are numerous siting criteria, other than consideration of updated cultural and natural resource information, defined in the 2000 Master Plan. *See, e.g.*, Ex. A-9 at 7-56.

600	76	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 as facility. **Ex. A-003 FEIS Section 3.10, p.3-142**	Citation does not support proposition. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the scope and/or adequacy of the Master Plan, CMP, any of the sub plans; the University's process in developing and/or implementing those plans; the University's management of Mauna Kea in general; and/or the BLNR's supervision and management of Mauna Kea, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.* UH-TIO FOF 118-190. UH-TIO further note that the CMP was approved by the BLNR on April 9, 2009 and the sub plans were all approved by the BLNR on March 25, 2010. Ex. A-3/R-3 at 3-142. *See, also,* UH-TIO FOF 893. Misleading. Presented out of context. Excerpt is followed by: "[a] CMP for UH's Management Areas on Maunakea [sic] was approved by the BLNR on April 9, 2009. The BLNR placed conditions on their approval, including the production of . . . CMP sub plans within a year or prior to submittal of a

			CDUP application by a project . . . UH prepared these sub plans and they were all approved by the BLNR on March 25, 2010." Ex. A-3/R-3 at 3-142 – 3-143.
601	76	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**	Mischaracterization. The quoted excerpt states: "Astronomy facilities are an identified use in the Resource subzone (see HAR § 13-5-24(c) [R3/D1]) under an approved management plan. This means that astronomy facilities with appropriate management have been deemed to be consistent with proper management of the natural resources in that subzone. In addition to being an identified use, as discussed throughout this CDUA, both the University and the TMT Observatory Corporation are committed to managing the natural and cultural resources throughout the MKSR in a way that fulfills the objective of the Resource subzone of the Conservation District. The proposed TMT Project would help meet the objectives of the Resource subzone by using the excellent astronomical resources that Mauna Kea possesses to maintain the MKSR at the forefront of astronomical research while implementing and supporting overall management activities that will promote the sustained use of the natural

			resources in the subzone. The proposed project would be developed and operated in compliance with the Conservation District Rules and with all conditions that may be attached to the Conservation District Use Permit. 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-1/R-1, Exhibit B at 3-11.
602	76	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**	Incomplete. Citation does not contain pin cite. Misleading. Presented out of context. The quoted excerpt states: "This CMP provides the framework for managing multiple existing and future activities, such as astronomy, recreational and commercial activities, scientific research, and cultural and religious activities. More importantly, the CMP provides a guide for protecting Mauna Kea's many unique cultural and natural resources. Once the CMP is adopted by the BLNR, it will also provide management guidelines and specific management recommendations to be included in BLNR's CDUPs."

			Ex. A-9 at 2-1. *See* UH-TIO FOF 136.
603	76	The TMT Management Plan is a "project-specific management plan." **Ex. A-001 UH/TMT CDUA, p.2-3**	Misleading. Presented out of context. The TMT Management Plan is the management plan required under HAR § 13-5-24 and complements the CMP and sub plans. UH-TIO FOF 367-371. The quoted excerpt states: "In addition to supporting the implementation of the CMP, the TMT project has also developed a project-specific management plan. The TMT Management Plan provides a general description of the proposal, the existing conditions on the parcel, proposed land uses on the parcel and reporting schedule; it also adopts the approach, goals, objectives and management strategies and actions of the CMP and subplans in their entirety. Specifically, the TMT Management Plan implements all relevant action items and plans of the CMP and subplans on a site-specific basis ensuring that the management actions called for in the CMP and subplans which are applicable to the TMT project are effectively and responsibly implemented. Additionally, the TMT Management Plan sets forth mitigation measures in

			the form of Best Management Practices and conservation methods intended to mitigate the impacts of the TMT project on Mauna Kea's varied resources. The TMT Management Plan is intended to provide site-specific information and be an extension of the CMP and subplans and together (CMP, subplans and TMT Management Plan), these documents are intended to fulfill the purpose of the Conservation District concerning the TMT project." Ex. A-1/R-1 at 2-3.
604	76	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. Given the BLNR's approval of the CMP and sub plans (*See* UH-TIO FOF 893), which are the current, approved and operative plans, this proposed FOF is not relevant to the consideration of the CDUA. Mischaracterization. The CMP is in accordance with Judge Hara's decision; not "is described as being".
605	77	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.	*See supra* UH-TIO's response to Ching's proposed FOF 604.

		Haw. Jan, 19, 2007))	
606	77	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)	*See supra* UH-TIO's response to Ching's proposed FOF 604.
607	77	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585.
608	77	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**	*See supra* UH-TIO's response to Ching's proposed FOF 585.
609	77	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**	Irrelevant/Inapplicable. The 1995 Management Plan was superseded by the 2009 Comprehensive Management Plan. Ex. A-9 at 2-3. *See supra* UH-TIO's response to Ching's proposed FOF 604.
610		No proposed FOF / COL.	No proposed FOF / COL.
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698		No proposed FOF / COL.	No proposed FOF / COL.
699		No proposed FOF / COL.	No proposed FOF / COL.
700	77	"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**	Misleading. Presented out of context. The TMT Project is consistent with the CMP, sub plans and all other applicable plans. UH-TIO FOF 359. False/Inaccurate. The CMP is the approved management plan for any future land use. Ex. A-9 at 2-3.
701	77	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**	Citation does not support proposition. UH-TIO note that the correct citation for this Proposed FOF is Ex. A-9 at 7-55. Misleading. Presented out of context. The Decommission Plan addresses such issues. *See* UH-TIO FOF 151-153. The TMT Project is consistent with the CMP, sub plans and all other applicable plans. UH-TIO FOF 359. Misleading. Presented out of context. Citation is incorrect. Quoted excerpt states: "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. The University's official position on proposed observatory and support facility development for the period of 2000-2020 was outlined in the 2000 Master Plan (Group 70 International 2000). The role of the CMP in considering future land use is to guide the evaluation of proposed projects from the standpoint of potential impacts to cultural and natural resources, and to provide management actions that can be adopted by BLNR as special conditions in any CDUPs that it may issue. The Board of Land and Natural Resources shall have final approval over all land uses on conservation lands pursuant to the Conservation District Use Permitting Process." Ex. A-9 at 7-55. False/Inaccurate. The CMP is the approved management plan for any future land use. Ex. A-9 at 2-3.
702	77	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**	Citation does not support the proposition. *See* UH-TIO FOF 136-158.

			Misrepresentation. The Comprehensive Management Plan contains design guidelines, as well as siting criteria. Ex. A-9 at 7-48. *See supra* UH-TIO's response to Ching's Proposed FOF 701. The CMP further notes that the plan is to manage resources and that each "redevelopment or proposed new facility, including non-astronomy facilities, will undergo individual project reviews, that will include an environmental analysis pursuant to Chapter 343, HRS, and a comprehensive analysis of the potential cultural impact. Ex. A-009 at 7-55. The TMT Project is consistent with the CMP, sub plans and all other applicable plans. UH-TIO FOF 359.
703	77	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**	Citation does not support the proposition. *See* UH-TIO FOF 136-158. Misleading. Presented out of context. The reference sections do not set forth concrete requirements. In fact, the majority of the provisions and sections merely state "additional considerations." Burial treatment plan: A burial treatment plan was prepared

			for the entire MKSR and Mauna Kea Access Road Corridor, including the TMT Project site, which was approved by HIBC and SHPD. UH-TIO FOF 570; Ex. A-022 at 30; Ex. A-138, Ex. A-138a; Ex. A-139. Buffer zones: Management Action CR-12 requires buffer zones to "be established". Ex. A-009 at 7-10. The creation of buffer zones around known historic sites is ongoing. Ex. A-022 at 30. Kahu Kū Mauna determined that the establishment of buffer zones should be determined on a case-by-case basis instead of immediate implementation. Ex. A-17 Appendix A at 4. Invasive species: Management Action NR-2 requires the limit of damage caused by invasive species through creation of an invasive species prevention and control program. This action is ongoing, and the TMT Project will develop an invasive species prevention and control program and has policies in place to control invasive species. Ex. A-022 at 31; UH-TIO FOF 457, 490-492. An invasive species management plan was prepared and approved in 2015. Ex. A-40; Ex. A-22 at 7.

			Hazardous spill protocol: Updating and implementing an emergency response plan is ongoing. Ex. A-009 at 7-62; Ex. A-022 at 28, 36. The TMT Project will implement a Materials Storage / Waste Management Plan, including a Spill Prevention and Response Plan, and there are extensive measures planned to store and dispose of all waste. UH-TIO FOF 320, 424-428, 824-839. Traditional and customary practices: Development of plans for the exercise of culturally appropriate placement and removal of offerings, visitation of shrines and constructing new cultural resources are in progress and ongoing. Ex. A-022 at 30. The TMT Project will comply with requirements for public access and there will be no prohibitions on access to the areas outside of the TMT Observatory. UH-TIO FOF 679-682. Kahu Ku Mauna developed policies related to cultural practices, such as the appropriateness of construction of new cultural features, placement and removal of offerings. They were brought before MKMB at which time individuals opposed these policies. The

			MKMB recommended that Kahu Ku Mauna do some additional consultation. Previously, the MKMB approved guidelines for the visitation and use of ancient shrines. Ex. L-17; Ex. L-18; Ex. L-19; Ex. L-20; Tr. 12/12/2016 at 19: 20 – 23:7; 12/12-2016 at 60:17 – 61:9.
704	77	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**	Irrelevant/Inapplicable. Citation does not support proposition. Misrepresentation. *See, e.g.,* UH-TIO FOF 136. Misleading. Presented out of context. There is no requirement that such a timeline or process must be established under HRS Chapter 91. Additionally, included in the first annual report to the BLNR, was an estimated timeline for implementation of each CMP management action. Ex. A-16, App. B. OMKM is required to produce an annual progress report on the management goals, objectives and actions to the BLNR. *See* Ex. A-022. The report in the record notes that major components of the plan are completed, ongoing or in progress. Ex. A-022. The BLNR is not required by law to hold a contested case hearing

			with respect to BLNR's review and oversight of the CMP. *See Mauna Kea Anaina Hou v. University of Hawai'i*, 126 Haw. 265.
705	78	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**	Citation does not support the proposition. *See* UH-TIO FOF 136-158. Development of plans for the exercise of culturally appropriate placement and removal of offerings, visitation of shrines and constructing new cultural resources are in progress and ongoing. Ex. A-022 at 30. The TMT Project will comply with requirements for public access and there will be no prohibitions on access to the areas outside of the TMT Observatory. UH-TIO FOF 679-682. The TMT Project considers and provides efforts to mitigate any negative impacts to culture. TR. 11/15/16 at 136:16-137:7.
706	78	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**	Misleading. Presented out of context. Complete excerpt states: OMKM is charged with the day-to-day management of the MKSR. OMKM works closely with the Mauna Kea Management Board (MKMB), the Kahu Kū Mauna Council, and several advisory committees. Seven members of the community who are nominated

			by the UH Hilo Chancellor and approved by the UH BOR comprise the MKMB. 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, non-voting members on the MKMB. MKMB guides the operations of OMKM and advises the Chancellor on activities, operations, and development. Kahu Kū Mauna - in Hawaiian, Guardians of the Mountain - is a nine-member council named by MKMB, and advises the MKMB, OMKM, and the UH Hilo Chancellor on cultural matters. Other advisory councils formed to advise the MKMB include an Environment Committee, a Hawaiian Culture Committee, a Public Safety and Conduct Committee, and a Wēkiu bug Scientific Committee. Ex. A-3/R-3 at 3-147. Citation does not support the proposition. *See* UH-TIO FOF 136-158.
707	78	"OMKM's responsibilities are complicated by the fact that the UH Management areas are governed by two overarching documents—the Master	Misleading. Presented out of context. The 1995 Management Plan was

		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**	superseded by the 2009 Comprehensive Management Plan. Ex. A-9 at 2-3; *see also* UH-TIO FOF 123. The CRMP goes on to note OMKM's management initiatives to address these issues. Ex. A-011 at 3-3 – 3-5. UH-TIO FOF 123: In response to the concerns raised in an audit performed in 1998 that was critical of the University's management of the cultural and environmental resources in the MKSR, the University began preparing a new master plan for the MKSR. Ex. B.17e. On June 16, 2000, after nearly two years of work by an advisory committee and two series of public meetings, the University Board of Regents ("**BOR**") adopted the Mauna Kea Science Reserve Master Plan ("**Master Plan**"), which established management guidelines for the UH Management Area. The process reflected the Hawai'i Island community's deeply rooted concerns over the use of Mauna Kea, including respect for Hawaiian cultural beliefs and practices, protection of environmentally sensitive habitat, recreational use of the mountain, as well as astronomical research. The

			Master Plan is an internal policy and planning guide for the University to promote the goal of balanced stewardship of the UH Management Area through on-island community based management. WDT Nagata at 2; Tr. 12/8/16 at 27:6-8, 28:3-9; WDT Heen at 1; Ex. A-48 at Chapter XII. Citation does not support the proposition. *See* UH-TIO FOF 136-158.
708	78	The University of Hawaii is an educational institution, not a land management agency. **HRS 304A-102**	Mischaracterization. HRS § 304A-102 is not an exhaustive list of the permitted actions the University of Hawai'i (and its various branches) may take in pursuing its stated purpose. HRS § 304A-103(2) provides in relevant part that the University shall have the general power to: "To acquire in any lawful manner any property, real, personal, or mixed, tangible or intangible, or any interest therein; to hold, maintain, use, and operate that property; and to sell, lease, or otherwise dispose of that property at such time, in such manner, and to the extent deemed necessary or appropriate to carry out its purposes[.]" Additionally, the General Lease authorizes UH Hilo to manage the demised lands on Mauna Kea and to

			develop the lands into a scientific complex. See Ex. B.17f at 3-4. Moreover, the BLNR Approved CMP and subplans require UH Hilo to exercise land management responsibilities. *See generally*, Exs. A-9 to A-13. Irrelevant/Inapplicable.
709	78	The rangers who work for OMKM, but work closely with Mauna Kea Support Services, do not have the primary enforcement authority. **Tr. McLaren**	Irrelevant / Inapplicable. Citation does not support proposition (incomplete cite). Misleading. Presented out of context.
710	78	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)**— accessed on November 13, 2011 at minute 43:29.	Irrelevant/Inapplicable. Misleading. Partial quotation Misleading. Presented out of Context Not in evidence. UH-TIO note, however, that the record in the separate proceeding speaks for itself. *See* UH-TIO FOF 136-158.
711	78	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)**— accessed on November 13, 2011, at minute 41:46.	Not in evidence. UH-TIO note, however, that the record in the separate proceeding speaks for itself. *See* UH-TIO FOF 136-158, 179-190. The CMP specifically states the development of the CMP used *Ka Pa'akai* as a framework for the development of the CMP, including: 1) the identification and scope of valued cultural, historical or natural resources

			that are found within the UH Management Areas, including the extent to which traditional and customary Native Hawaiian rights are exercised in the areas; 2) The extent to which those resources – including traditional and customary Native Hawaiian rights – will be affected or impaired by the proposed action; and 3) The feasible action, if any, to be taken by the agency to reasonably protect Native Hawaiian rights if they are found to exist. Ex. A-9 at 2-7.
712	78	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**	Irrelevant/Inapplicable. Citation does not support proposition. *See* UH-TIO FOF 136-158. Unsupported/Unsubstantiated. Misleading. Presented out of context. The CMP and sub plans are clearly relevant and material to the BLNR's *Ka Pa'akai* analysis in connection with its consideration of the CDUA. *See* UH-TIO COL 324-354. The CMP specifically outlines the *Ka Pa'akai* framework used to develop the plan. *See* Ex. A-9 at 2-6 to 2-8.
713	79	All of the 11,288 acres leased by the University on Mauna Kea are designated as a conservation district. **Ex. A009, p.3-1**	Not in dispute.
714	79	"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,**	Misleading. Presented out of context. More specifically, the TMT Project is within the resource subzone of the Conservation District. UH-TIO FOF

		p.3-1 (citations omitted)	385-395.
715	79	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**	Citation does not support the proposition. *See* UH-TIO FOF 136-158.
716	79	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**	Misleading. Presented out of context. The quoted excerpt states: "Within Area E, the TMT Observatory will be located on a roughly 5-acre site near the end of the existing 4-wheel drive road, at an elevation of approximately 13,150 feet (Figure 2-4). This site is known as 13N in reference to its elevation and its location on the northern plateau." Ex. A-3/R-3 at 2-10.
717	79	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**	Misleading. Presented out of context. Quoted excerpt states: "Based on numerous previous studies, Area E was selected in Master Plans to be a suitable location for observatory development because, for one, it would have either a limited or no adverse impact on physical cultural resources such as archaeological and historic resources. Within Area E, the site of the TMT Observatory, known as the 13N site, was selected in part because it is the portion of Area E most disturbed by previous activity. The Access Way maximizes the use of previously

			disturbed areas as well. Overall, roughly 6.2 acres of previously undisturbed land will be disturbed by the TMT Observatory and Access Way, with slight variations depending on which Access Way Option is selected." Ex. A-3/R-3 at 3-26. Misleading. Presented out of context. The proposed TMT Project site was selected in part because it is the portion of area that is most disturbed by previous activity. The access way maximizes the use of previously disturbed areas as well. Ex. A-3/R-3 at 3-26
718	79	There are no current developments on the Northern Plateau.**Ex. A-007 Staff Report Feb 25, 2011, p.7**	Mischaracterization. Presented out of context. The exhibit states that there are no current developments in "the main part of the Northern Plateau." Incorrect/Inaccurate. The Smithsonian Submillimeter Array occupies part of the Northern Plateau. Ex. A-48 at IX-12. *See supra* UH-TIO's response to Ching's proposed FOF 717.
719	79	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**	Citation does not support proposition. Misleading. Presented out of context. The Smithsonian Submillimeter Array occupies part of the Northern Plateau.

			Ex. A-48 at IX-12. Mischaracterization. As described in the Master Plan, "Area E" within the Astronomy Precinct was identified as the anticipated location for the next generation large telescope. *See* UH-TIO FOF 169. *See supra* UH-TIO's response to Ching's proposed FOF 717; *see also* UH-TIO FOF 238-240.
720	79	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**	Misleading. Presented out of context. The staff report notes that the observatory footprint will be approximately 4.9 acres. Ex. B.70 at 1. *See, also* UH-TIO FOF 252. The staff report further notes that "Approximately ten percent of the 13N Site in Area E has been previously disturbed; approximately 1/3 of the existing Access Right of Way has been previously graded; and the Batch Plant site was initially graded as part of the road-paving project and was used as a staging area during the construction of several observatories." Ex. B.70 at 7. Citation does not support the proposition that the Thirty-Meter Telescope will be built on "a pristine

			plateau." Indeed, portions of the northern plateau have been previously disrupted. The proposed TMT Project site was selected in part because it is the portion of area that is most disturbed by previous activity. The access way maximizes the use of previously disturbed areas as well. Ex. A-3/R-3 at 3-26 Additionally, the FOF is misleading and presented out of context. The 8.5 acre (approx.) footprint includes not only the observatory dome and the Access Way, but also the support building, parking area, area disturbed by constriction. *See* Ex. A-1/R-1 at 3-5. Moreover, 2.5 acres of the total 8.5 acre footprint has previously been disturbed. *See* UH-TIO FOF 850.
721	79	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	Not in dispute.
722	79	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).	Not in dispute. However, this is more properly a COL.
723	79	The TMT will have significant power requirements. **Ex. A-007 Staff Report Feb 25, 2011, p.45**	Misleading. Presented out of context. Reference goes on to state that the

			TMT Project will not be a major contributor to greenhouse gases. The staff report makes it clear that BLNR considers this requirement within the context of the use of natural resources and contribution to greenhouse gases. The BLNR staff concluded that the TMT Project "will not be a major contributor of greenhouse gases in and of itself," and the staff further concluded that the TMT Project "does not extract resources, nor consume significant resources once constructed." Ex. A-7 at 45.
724	80	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**	Misleading. Presented out of context. The FEIS further clarifies, however, that "the average power usage at the TMT Observatory is likely to be similar to the average power usage at the Keck observatory, 350 kW, because the two facilities will be similar in size when you consider both of the Keck domes." Ex. A-3/R-3 at 3-170.
725	80	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**	Misleading. Presented out of context. The FEIS further clarifies, however, that "the average power usage at the TMT Observatory is likely to be similar to the average power usage at the Keck observatory, 350 kW, because the two facilities will be similar in size when you consider both of the Keck domes."

			Ex. A-3/R-3 at 3-170.
726	80	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**	Not in Evidence. UH-TIO note that transcripts from the 2011 contested case proceeding are not evidence here.
727	80	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**	Mischaracterization. Misleading. Presented out of context. The exhibit does not state that the TMT Project alone necessitates the planned upgrades. The CDUA further clarifies that the "new transformers will replace the existing transfers on a one-to-one basis, and the existing fenced compound will not be expanded." Ex. A-1/R-1 at 1-13.
728	80	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**	*See supra* UH-TIO's response to Ching's proposed FOF 727. Misleading. Presented out of context. The CDUA further clarifies that existing underground conduits will be used and because existing pull boxes are available, no new ground disturbance will be needed for the upgrade. Ex. A-1/R-1 at 1-14. As part of the mitigation measures, existing utility pull boxes in certain locations will be camouflaged to reduce their visibility. UH-TIO FOF 909.
729	80	DOFAW notes... Not knowing the actual alignment makes it difficult to assess the potential impacts of the project, although, the powerline will pass through	Misleading. Partial quotation. This FOF omits UH Hilo's response

		the Mauna Kea Ice Age Reserve in some locations. **Ex. A-007 Staff Report Feb 25, 2011, p.23**	addressing the DOFAW note. Misleading. Presented out of context. UH noted that the power line work would comply with DLNR and Department of Accounting and General Services standards and in accordance with the conditions in the grant of easement (including for the NAR) that was previously approved by the BLNR. Ex. A-7/R-7 at 23.
730	80	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-degredation 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**	Misleading. Presented out of context. UH-TIO recognized that the TMT Project would be subject to other regulations as well, and TMT would comply with all federal, state and county rules and regulations. Ex. A-7/R-7 at 25.
731	80	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**	Misleading. Partial quotation. The quoted excerpt states thereafter: "The sublease will be negotiated after the Project receives a CDUP and will be consistent with the existing Master Lease between UH and the BLNR, adopted under HRS Chapter 171." Ex. A-3/R-3 at 3-159. *See* UH-TIO FOF 208-209.
732	80	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**	Not in dispute as per cite in exhibit only.

		Plans, Policies and Controls, p.3-160	
733	80	The TMT would take approximately five years to decommission. **Sanders Tr. August 15, 2011, p.82: 2-5**	Citation does not support the proposition. *See* UH-TIO FOF 375. Not in evidence. The record of the prior CDUA proceeding is not in evidence. UH-TIO note, however, that the record in this proceeding reflects that the TMT will take approximately 3-4 years to decommission, and decommissioning will be in compliance with the Decommissioning Plan. UH-TIO FOF 331.
734	80	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**	Not in evidence. Misleading. Presented out of context. Not in evidence. The record of the prior CDUA proceeding is not in evidence. UH-TIO note, however, that the record in this proceeding reflects that the University executed a written sublease with TIO for a portion of the UH Management Area. UH-TIO FOF 208.
735	81	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**	Not in evidence. Misleading. Presented out of context. The terms of the 2014 sublease between TIO and UH Hilo are known. *See* Ex. B.02f. Not in evidence. The record of the prior CDUA proceeding is not in evidence. Inaccurate/False.

			UH-TIO note, however, that the evidence regarding the TIO Sublease is set forth at UH-TIO FOF 208-209, and the TIO Sublease is in evidence as Ex. B.02f.
736	81	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**	Misleading. Presented out of Context While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the scope and/or adequacy of the biological review, the development of mitigation measures, and/or to dispute a finding that the TMT Project will have no significant adverse impact on biological resources, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 466-502. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road

			and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. The Maunakea Invasive Species Management Plan has a risk assessment of all of the most probable/likely invasive/invading species. A-40 at 11-28.
737	81	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**	Misleading. Presented out of Context Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to

			Ching's proposed FOF 736.
738	81	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**	Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to Mauna Kea. Misleading. Presented out of Context The great majority (greater than 95 percent) of the area that would be disturbed by construction of the proposed TMT Observatory and Access Way is free of wēkiu bugs. The total population of the species will not be significantly impacted by the disturbance of a small area of habitat along the TMT Access Way. UH-TIO FOF 484-502. *See supra* UH-TIO's response to Ching's proposed FOF 736.
739	81	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**	Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to Mauna Kea. Misleading. Presented out of Context Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. For example, equipment and materials will be inspected for invasive species at lower

			elevations, below Hale Pōhaku. TIO follows the Mauna Kea Invasive Species Management Plan and has additional invasive species controls that augment OMKM's requirements. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to Ching's proposed FOF 736.
740	81	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**	Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to Mauna Kea. Misleading. Presented out of Context Irrelevant/Inapplicable: non-native species identified before the TMT Project is even built cannot be the attributed to the TMT Project Introduction of invasive species will be mitigated by the TMT Project's

			planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. *See supra* UH-TIO's response to Ching's proposed FOF 736.
741	81	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**	Misleading. Presented out of Context. The FEIS notes that because the TMT Project is not located on a cinder cone and wēkiu bugs are not normally present in the area, this requirement is not applicable to the project. Ex. A-3/R-3 at 3-70. Misleading. Incomplete Quotation. The next sentence in the FEIS states: "Because the TMT Observatory is not located on a cinder cone and wēkiu bugs are not normally present in the area, **this requirement is not applicable to the Project**." Exhibit A-3/R-3 at 3-70 (emphasis added).
742	81	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**	Mischaracterization. Inaccurate/False Misleading. Partial quotation. Mr. White testified that the impact on air quality would be "temporary." *See* Tr. 10/20/16 at 74:22-25; *see also* UH-TIO FOF 681. Dust generated from excavation and

			site preparation will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-492 494, 692.
743	81	Climate modeling predicts that the intensity of warming is positively related to altitude. **Ex. A-010 CMP NRMP, p.2.2.23**	Irrelevant/Inapplicable. There is no evidence that the TMT Project contributes to climate change. *See supra* UH-TIO's response to Ching's proposed FOF 736.
744	82	Increase in CO2 concentration may increase the competitive edge by fast growing invasive species. **Ex. A-010 CMP NRMP, p.2.2-25**	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to Mauna Kea. Misleading. Presented out of Context. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of

			biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to Ching's proposed FOF 736.
745	82	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**	Misrepresentation. The Final Environmental Impact Statement ("**FEIS**") does not state that UH Hilo "failed" to fully determine the significance of impact to the alpine stone desert ecosystems from activities to date. The FEIS merely states that such a determination had not yet been made. Ex. A-3/R-3 at S-8. Additionally, the FEIS does not state that all resources have been substantially and adversely impacted. For example, the FEIS states that the past cumulative impact on other resources such as water, sonic environment, and traffic has been less than significant. Ex. A-3/R-3 at S-8. Misleading. Presented out of context. The FEIS states: "the Project will add a limited increment to the current level of cumulative impact.... For those resources that have been impacted to a less than significant degree by past and present actions, the Project would not tip the balance from a less than significant level to a significant level and the less than significant level of cumulative impact would continue."

			Ex. A-3/R-3 at S-9; *see also* UH-TIO FOF 466-502. The displacement of roughly 6 acres of alpine stone desert lava habitat is less than significant because this represents less than 0.5% of this type of habitat available. UH-TIO FOF 474. Citation does not support the proposition. The TMT Project will not have a substantial adverse impact on the biological resources within the alpine stone desert ecosystem. *See* UH-TIO FOF 474-475, 484-486.
746	82	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**	Citation does not support proposition (incorrect cite). Misleading. Proposed FOF does not address specific impacts of TMT. Presented out of context. The quoted excerpt states: "The Project impacts will occur within the context of the current conditions at Project sites. That context includes the presence of observatories and roads in the summit region that have had direct impacts to roughly 63 acres of the cinder cones. As detailed in Section 3.16.2, the past actions on Maunakea have resulted in substantial, significant, and adverse impacts to geologic

			resources, primarily due to the alteration of the cinder cone morphology. "The TMT Observatory and the Access Way will unavoidably remove any surface geologic structures present, such as lava flow morphology and glacial features in the summit region. However, such geologic features are not unique on Maunakea and are better developed at many other areas, especially on the southern summit area adjacent to the Mauna Kea Access Road in the MKSR Natural/Cultural Preserve Area and the Ice Age NAR. Nevertheless, the destruction of any surface geologic features denigrates the Mauna Kea NNL; **however, the Project will destroy less than 0.01 percent, roughly 6.2 acres** (with slight variations depending on which Access Way Option is selected), of the surface geology within the 83,900 acre Mauna Kea NNL. At most, this destruction of surface geologic features would only include roughly 0.2 acres of a cinder cone." Ex. A-3/R-3 at 3-111 – 3-112 (emphasis added). Misleading. Presented out of context. The FEIS notes that the potential environmental impacts will occur

			within the context of current conditions, which include the context of impacts upon cinder cones, and past actions that have resulted in substantial, significant, and adverse impacts to geologic resources, primarily due to the alteration of the cinder cone morphology. Ex. A-3/R-3 at 3-111.
747	82	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**	Mischaracterization Misrepresentation Misleading. Presented out of Context Misleading. Partial Quotation. Mr. White's full response was: "**The decommissioning commitment upon the end of facilities used is to restore the site as nearly as possible to the way it is now**. I am not aware of any of the -- of any sites, historic sites that are on that property that would be destroyed and could not be -- so could you get it back so that you -- there was absolutely no evidence that it had ever been there? That's kind of doubtful, but given the nature of the terrain, it could be restored to the point I think where those looking at it from a distance would not recognize a big scar on the land. **So in that sense, I would say, yes, it is restorable**." *See* Tr. 10/20/16 at 80:21-81:7 (emphasis added).

			TIO Sublease requires TIO to restore the site at the end of the useful life of the TMT Observatory. UH-TIO FOF 208, 322-323, 331-337.
748	82	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**	Misleading. Presented out of Context. Already-existing impacts caused by past activity cannot be attributable to the TMT Project that has yet to be built. The TMT Project will not have a significant impact on botanical resources because species and habitat of these areas are not unique to the Project site and are found elsewhere on Mauna Kea and/or on other islands of Hawai'i. UH-TIO FOF 466-474. *See supra* UH-TIO's response to Ching's proposed FOF 736.
749	82	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.)	Misleading. Inaccurate and Incomplete Quotation. Misleading. Presented out of Context. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the development of biological mitigation measures, and/or to dispute a finding that the TMT Project will have no significant adverse impact on biological resources, UH-TIO believe their

			proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 466-502. With respect to the parenthetical that the TMT Access Way will not be fully paved, UH-TIO object that this proposed FOF is misleading and presented out of context. As part of the mitigation measures, The TMT Access Way will be paved where adjacent to sensitive wēkiu bug habitats, and the paving will not have a significant adverse impact on wēkiu bug populations. UH-TIO FOF 494-495. "The paving has reduced dust formation to the point and the rocks and biota demonstrate little to no dust." Ex. B.64 at APP-D9. The existing roadway is required to be paved where adjacent to sensitive habitats to reduce dust-related impacts. UH TIO FOF 494.
750	82	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**	Misleading. Provided out of Context. The TMT Project will not have a significant impact on botanical resources because species and habitat of these areas—including lichens—are not unique to the Project site and are

			found elsewhere on Mauna Kea and/or on other islands of Hawai'i. UH-TIO FOF 466-474. *See supra* UH-TIO's response to Ching's proposed FOF 736.
751	82	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**	Misleading. Provided out of Context. The TMT Project contains measures that minimize habitat disturbance. UH-TIO FOF 466-502. *See supra* UH-TIO's response to Ching's proposed FOF 736.
752	82	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. 1/19/12017, Vol 27:159:22-25, 160:1-3**	Not credible. UH-TIO FOF 474, 477-480. Hansen testified that "From my knowledge, there is no published data to say what is the recolonization rate." Tr. 01/19/17 at 159:22-25. Further, Hansen admitted that he is not an expert on lichen. Accordingly, his opinion on the recolonization rate is speculative and not credible. UH-TIO FOF 478.
753	82	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**	Mischaracterization Not credible. UH-TIO FOF 477-480. Mr. Hansen qualified this statement with the phrase, "in my experience." However, Mr. Hansen is not a lichenologist and lacks the requisite education and experience make a

			credible statement on this subject. Ex. B.10b. Hansen testified that "From my knowledge, there is no published data to say what is the recolonization rate." Tr. 01/19/17 at 159:22-25. Further, Hansen admitted that he is not an expert on lichen. Accordingly, his opinion on the recolonization rate is speculative and not credible. UH-TIO FOF 478.
754	83	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**	Not credible. UH-TIO FOF 477-480. Hansen is not an expert on lichen and his opinion is speculative and not credible. UH-TIO FOF 478. Most, if not all, types of the vegetation found in the summit region can be found at lower elevations on Mauna Kea. There are no endangered or threatened species of flora in the TMT Project area. UH-TIO FOF 471-474.
755	83	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.	Unsupported/unsubstantiated. There is no evidence that the TMT Project contributes to climate change. The TMT Project will not have a significant impact on botanical resources because species and habitat of these areas are not unique to the Project site and are found elsewhere on

			Mauna Kea and/or on other islands of Hawai'i. UH-TIO FOF 466-474. There is a very low diversity and cover of plants in Area E and that all of the species are found at lower elevations. UH-TIO FOF 471.
756	83	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**	Irrelevant/Inapplicable. Misleading. Presented out of Context Dr. Smith, a botanist with 32 years of teaching experience, concluded that the TMT Project will not have a significant adverse impact on the flora on Mauna Kea, and the reliable, probative, substantial and credible evidence supports Dr. Smith's opinions. UH-TIO FOF 466-474. There is a very low diversity and cover of plants in Area E and that all of the species are found at lower elevations. UH-TIO FOF 471.
757	83	Dust can impact lichens, mosses, and ferns and is believed to degrade Wēkiu bug habitat. **Ex. A005, (TMT FEIS), App. K, p.31**	Misleading. Partial Quotation Misleading. Presented out of Context. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the development of biological mitigation measures, and/or to dispute a finding

			that the TMT Project will have no significant adverse impact on biological resources, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 466-502. As part of the mitigation measures, The TMT Access Way will be paved where adjacent to sensitive wēkiu bug habitats, and the paving will not have a significant adverse impact on wēkiu bug populations. UH-TIO FOF 494-497.
758	83	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**	Citation does not support proposition (incorrect cite). UH-TIO note that the correct citation for this proposed FOF is Ex. A-3/R-3 at 3-74. Misleading. Presented out of Context. Paragraph states that "However, because the lichens, mosses, and plants that will be impacted are found elsewehere . . . the overall impact to the flora will be less than significant." Ex. A-3/R-3 at 3-74. The FEIS concluded that "because the lichens, mosses, and plants that will be impacted [from the dust] are found elsewhere in the Mauanakea summit region and Hawai'i, the overall impact

			to the flora will be less than significant." Ex. A-3/R-3 at 3-74. *See also* UH-TIO FOF 494-497.
759	83	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**	Misleading. Presented out of Context. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the development of biological mitigation measures, and/or to dispute a finding that the TMT Project will have no significant adverse impact on biological resources, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See, e.g.*, UH-TIO FOF 466-502. OMKM has been involved in extensive measures regarding the removal of fireweed and other invasive species. *See* UH-TIO FOF 186. There is no evidence this will occur as a result of the TMT Project. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-

			491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148.
760	83	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**	Irrelevant. Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to the TMT Project. For example, the presence of Mullein begins to taper off in higher altitudes. It is not found in the higher elevation alpine stone desert, where the TMT Project will be located. Ex.-64 at 19. Misleading. Presented out of Context. Non-native species currently present on Mauna Kea cannot be attributable to the TMT Project that has yet to be built. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various

			mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to Ching's proposed FOF 759.
761	83	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**	Irrelevant/Inapplicable. Misleading. Presented out of Context. Non-native species currently present on Mauna Kea cannot be attributable to the TMT Project that has yet to be built. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of

			removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to Ching's proposed FOF 759.
762	83	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**	Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Ching provides no evidence to support this statement as it relates to the TMT Project. For example, the presence of Mullein begins to taper off in higher altitudes. It is not found in the higher elevation alpine stone desert, where the TMT Project will be located. Ex.-64 at 19. Misleading. Presented out of Context. Non-native species currently present on Mauna Kea cannot be attributable to the TMT Project that has yet to be built. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various

			mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. OMKM is continually in the process of removing fireweed and other invasive species from the Hale Pōhaku area road and summit areas. UH-TIO FOF 185-187. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. *See supra* UH-TIO's response to Ching's proposed FOF 759.
763	83	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**	Irrelevant/Inapplicable. Misleading. Presented out of Context. While the cited portion of the record speaks for itself, to the extent this proposed FOF is intended to support a finding and/or conclusion regarding the development of biological mitigation measures, and/or to dispute a finding that the TMT Project will have no significant adverse impact on biological resources, UH-TIO believe their proposed FOF are more comprehensive (and placed in the proper context), and therefore request the entry of their proposed FOF on these matters. *See,*

			e.g., UH-TIO FOF 466-502. The TMT Project will implement extensive mitigation measures to protect arthropods and their habitat. *See, e.g.*, UH-TIO FOF 492. No evidence the TMT Project will adverse effect arthropod population, including wēkiu bugs. UH-TIO FOF 481-502.
764	84	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**	Irrelevant/Inapplicable. Citation does not support proposition. Not Credible. While UH-TIO do not dispute that there have been impacts on cinder cones from prior telescopes, Ward is not an expert in this area and her opinions are not credible on this subject. UH-TIO FOF 499. The great majority (greater than 95 percent) of the area that would be disturbed by construction of the proposed TMT Observatory and Access Way consists of Type 4, 5, and 6 habitats. UH-TIO FOF 485-489.
765	84	The TMT Observatory would displace 5.9 acres of Wēkiu bug habitat. **Ex. A003 FEIS, p.3-72**	Misleading. Presented out of Context. The FEIS further concludes that the displacement will not have a significant impact on biological resources, because species and habitat of the affected areas are not unique to the TMT Project site and are found elsewhere on Mauna Kea

			and in Hawai'i. Further, although approximately 5.6 acres of Type 4 wēkiu bug habitat and .3 acre of Type 5 wēkiu bug habitat will be displaced, the mix of Type 4 and 5 habitats is not considered optimal for wēkiu bugs. Ex. A-3/R-3 at 3-72. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488-489. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources. UH-TIO FOF 466-502.
766	84	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**	Misleading. Presented out of Context. The FEIS states that the habitat of the 5.9 acres is "not considered optimal for wēkiu bugs; they may only occupy this area during extreme population explosions that push the insects into marginal habitats." Ex. A-3/R-3 at 3-72. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496. *See supra* UH-TIO's response to Ching's proposed FOF 765.
767	84	The potential impacts to the biological resources would include replacement of	Misleading. Presented out of Context.

		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**	The FEIS further concludes that the displacement will not have a significant impact on biological resources, because species and habitat of the affected areas are not unique to the TMT Project site and are found elsewhere on Mauna Kea and in Hawai'i. Further, although approximately 5.6 acres of Type 4 wēkiu bug habitat and .3 acre of Type 5 wēkiu bug habitat will be displaced, the mix of Type 4 and 5 habitats is not considered optimal for wēkiu bugs. Ex. A-3/R-3 at 3-72. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources. UH-TIO FOF. 466-502. Further, as part of the mitigation measures, The TMT Access Way will be paved where adjacent to sensitive wēkiu bug habitats, and the paving will not have a significant adverse impact on wēkiu bug populations. UH-TIO FOF 494-495. Paving the Access Way would reduce dust, which is beneficial for wēkiu bug habitat. UH-TIO FOF 494-495. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496.

768	84	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**	Misleading. Presented out of Context. Mischaracterization. The relevant testimony is: "Q: Would the project affect the habitat of endemic and unique insects or other life forms in any way? A: I'm not aware of any endangered insects that would be affected. Q: Not endangered, endemic. A: Yes." Tr. 10/20/16 at 74:11-17. The relevant criteria is not whether resources would be affected "in any way," but whether there will be "substantial adverse impact." *See* UH-TIO FOF 433; HAR § 13-5-30(c)(4). Citation does not support proposition. UH-TIO note that the proper citation for this proposed FOF is Tr. 10/20/16 at 74: 11:17. White further testified, however, that the TMT Project would not cause substantial adverse impact to existing natural resources within the surrounding area in compliance with criterion 4. WDT White at 7-8.
769	84	Dr. Fred Stone conducted an entomology study for the proposed telescope	Irrelevant/Inapplicable.

		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**	The CDUA and FEIS address possible impacts on the wēkiu bug habitat and mitigation measures. UH-TIO FOF 466-502. Dr. Fred Stone's concerns / investigation related to the construction of the Subaru and Gemini telescopes over 20 years ago. The TMT Project is not related to those telescopes.
770	84	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**	Irrelevant/Inapplicable. Dr. Fred Stone's concerns / investigation related to the construction of the Subaru and Gemini telescopes over 20 years ago. The TMT Project is not related to those telescopes.
771	84	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**	Irrelevant/Inapplicable. Misleading. Presented out of context. UH-TIO note that the correct citation for this proposed FOF is Ex. A-009 at 5-41. The CMP further notes that "However, ten years of study following the 1997-98 surveys suggest that wēkiu bugs are still abundant on Mauna Kea, and that they are able to reside in both undeveloped and developed areas of the summit." Ex. A-009 at 5-41. There is

			no scientific evidence that the wēkiu bug population on Mauna Kea has declined since 1982. *See* UH-TIO FOF 496. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502.
772	85	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.	Misleading. Presented out of Context. Irrelevant/Inapplicable. Misrepresentation. There is no dispute that the U.S. Forest and Wildlife Service formally the removed wēkiu bug from the candidate endangered species list. UH-TIO FOF 481. Although the wēkiu bug was previously proposed as a candidate species for Federal listing under the Endangered Species Act. On October 26, 2011, the FWS formally removed the wēkiu bug as a candidate from the Federal Endangered Species Act stating threats to the wēkiu bug did not put the species in danger of extinction throughout all or a significant portion of its range. UH-TIO FOF 481. There are no currently listed threatened or endangered species known to occur in the Astronomy Precinct. UH-TIO FOF 476. There is no scientific evidence that the wēkiu

			bug population on Mauna Kea has declined since 1982. *See* UH-TIO FOF 496. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502
773	85	Until recently the Wēkiu bug (*Nysius wekiucola*) was proposed as a Candidate species for Federal listing under the Endangered Species Act. The Wēkiu bug (*Nysius wekiucola*) 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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Unsupported/Unsubstantiated. Not Credible. UH-TIO FOF 499. There is no dispute that the U.S. Forest and Wildlife Service formally the removed wēkiu bug from the candidate endangered species list. UH-TIO FOF 481. Ward is not an expert in entomology. Ward WDT. Although the wēkiu bug was previously proposed as a candidate species for Federal listing under the Endangered Species Act. On October 26, 2011, the FWS formally removed the wēkiu bug as a candidate from the Federal Endangered Species Act stating threats to the wēkiu bug did not put the species in danger of extinction throughout all or a significant portion of its range. UH-TIO FOF 481. There are no currently listed threatened or endangered species known to occur in the Astronomy Precinct. UH-TIO FOF

			476.
774	85	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**	Misleading. Presented out of Context. Any potential adverse impacts on the wēkiu bug and its habitat, such as dust generated from excavation and site preparation, and wind-blown debris, will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-492. Although approximately 5.6 acres of Type 4 wēkiu bug habitat and .3 acre of Type 5 wēkiu bug habitat will be displaced through the TMT Project, the mix of Type 4 and 5 habitats is not considered optimal for wēkiu bugs. Ex. A-3/R-3 at 3-72. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502.
775	85	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**	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 774.

		CMP NRMP, p.2.2-44	
776	85	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**	Paving the Access Way would reduce dust, which is beneficial for wēkiu bug habitat. UH-TIO FOF 494-495. The TMT Project will implement mitigation measures to reduce dust and wind-blown debris. UH-TIO FOF 490-492. *See supra* UH-TIO's response to Ching's proposed FOF 774.
777	85	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**	Citation does not support proposition (incorrect cite) Otherwise, not in dispute. The citation to this proposed FOF is not clear; however, UH-TIO do not dispute this proposed FOF. UH-TIO FOF 254.
778	85	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**	Citation does not support proposition (incorrect cite) The impact to wēkiu bugs resulting from construction of the TMT Access Way will be less than significant. UH-TIO FOF 489. The great majority (greater than 95 percent) of the area that would be disturbed by construction of the proposed TMT Observatory and Access Way consists of Type 4, 5, and 6

			habitats. Surveys conducted in 2008 and 2009 show these to be free of wēkiu bugs. Only one percent of the area that would be disturbed consists of Type 3 habitat. UH-TIO FOF 486, 489-490. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496.
779	85	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**	The TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502. Construction-phase measures will be implemented to reduce impacts to sensitive habitat. UH-TIO FOF 492. TIO plans to relocate as little material from the mountain as possible. The Project will use excavated material from the grading and excavations for the building foundations and will stockpile excess material at the Batch Plant for future use in

			restoration. UH-TIO FOF 493.
780	86	"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**	Misleading. Presented out of Context The great majority (greater than 95 percent) of the area that would be disturbed by construction of the proposed TMT Observatory and Access Way consists of Type 4, 5, and 6 habitats. Surveys conducted in 2008 and 2009 show these to be free of wēkiu bugs. Only one percent of the area that would be disturbed consists of Type 3 habitat. UH-TIO FOF 486, 489-490. Nevertheless, the TMT Project is implementing extensive mitigation measures with respect to biological resources, including the wēkiu bug. UH-TIO FOF 466-502. The disturbance of prime wēkiu bug habitat (Type 3) for the TMT Project would be limited to 0.2 acres. UH-TIO FOF 488; *see also* UH-TIO FOF 483-496.
781	86	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**	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 780.

782	86	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**	Misleading. Presented out of Context. Misrepresentation. In addition to monitoring, the TMT Project will implement significant mitigation measures with respect to protecting the wēkiu bug habitat and other biological resources. UH-TIO FOF 466-502. "TMT will work with OMKM on the development and implementation of a habitat restoration study. Depending on the results of this study, it could be used to support the design and implementation of a Habitat Restoration Plan in the future." Ex. A-3/R-3 at 3-73; *see also* UH-TIO FOF 457, 492. Inaccurate/False. A multi-year habitat restoration plan was initiated in 2015. Ex. A-22 at 7.
783	86	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**	Mischaracterization as to addition of "only" to the quoted language. Misleading. Presented out of Context. In addition to monitoring, the TMT Project will implement significant mitigation measures with respect to protecting the Wēkiu bug habitat and other biological resources. UH-TIO FOF 466-502.

			Citation does not support proposition that two years is insufficient. Furthermore, TIO will develop and implement an invasive species prevention and control program. UH-TIO FOF 492, 497.
784	86	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**	Misleading. Presented out of Context. The TMT Project will implement an Invasive Species Prevention and Control Program, and imposes requirements on materials shipped to the site from any country and any supplier to control invasive species. In other words, despite varying standards for invasive species control in other countries, the TMT Project will impose the most stringent requirements for all shipments to the site. UH-TIO FOF 490-492 Non-native species currently present on Mauna Kea cannot be attributable to the TMT Project that has yet to be built. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491.

			The Invasive Species Prevention and Control Plan will ensure that proper measures are taken to prevent introduction of alien species. UH-TIO FOF 458. As part of the MISMP, all vehicle operators are asked to inspect their vehicles daily. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. No legal support for the proposition that the mere possibility of the introduction of invasive species bars a proposed use. If that were the law, then no land use would ever be permissible.
785	86	Invasive species, including spiders (*Lepthyphantes 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**	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 784.
786	86	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**	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 784.
787	86	"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	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 784.

		Resource Management p.4-13. **Ex. A004 FEIS Vol II**	
788	87	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**	*See supra* UH-TIO's response to Ching's proposed FOF 784.
789	87	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 Wekiu-Rep 12-9 p.29) **Ex. A-005 FEIS Vol III**	Citation does not support proposition. Incorrect cite and no support for the proposition that the mere possibility of the introduction of invasive species bars a proposed use. If that were the law, then no land use would ever be permissible. Misleading. Presented out of context. The only recent evidence of invasive species introduction to the UH Management Area is the identification of the fire ant near the hale constructed by persons opposing the TMT Project across from Hale Pōhaku. Camara testified that he has never seen red fire

			ants on the summit and acknowledged that the summit is a harsh environment not only for the fire ant, but for arthropods and other insects as well. UH-TIO FOF 501. Introduction of invasive species will be mitigated by the TMT Project's planned implementation of various mitigation measures listed in the TMT FEIS and CDUA. UH-TIO FOF 490-491. As part of the MISMP, all vehicle operators are asked to inspect their vehicles daily. A DLNR-approved biologist inspects all large vehicles or any sign of biological material, plant, soil, seed, and/or insects. UH-TIO FOF 146-148. The Invasive Species Prevention and Control Plan will ensure that proper measures are taken to prevent introduction of alien species. UH-TIO FOF 458.
790	87	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	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF

		Mauna Kea's flanks, as well as the fresh water aquifers beneath the mountain. **Ex. A-010 CMP NRMP, p.2.1-38**	796-823. The NRMP states that the pathway for introduction is unknown. The reliable, probative, and credible evidence establishes that the TMT Project will cause minimal surface runoffs, and the impacts of such runoff will not be significant. *See* WDT Nance at 2; Tr. 12/13/16 at 98:5-14 TMT Project will not have a substantial adverse impact on the water resources and hydrology of Mauna Kea, including Lake Waiau and the groundwater underlying Mauna Kea. UH-TIO FOF 796-823. It is not physically possible for surface runoff from the TMT Observatory to flow to and over the Pu'u Waiau crater rim into the lake. UH-TIO FOF 799-801. The TMT Observatory will have a zero-discharge wastewater system. UH-TIO FOF 802. Mr. Lee testified that the waters "have always been clean," even despite the presence of the existing observatories. UH-TIO at 811.

791	87	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**	Misleading. Presented out of Context. Ward admitted that she was unaware of any previous spills on Mauna Kea resulting from vehicles overturning en route to the MKSR. UH-TIO 835. The chance of a spill entering the surrounding environment is negligible. UH-TIO FOF 824-839. The TMT Project will employ mitigation measures to minimize the potential for an accidental spill while waste materials are in transit down the mountain to a proper disposal site. UH-TIO FOF 427. Implementation of a Ride-Sharing Program that will reduce the number of vehicle trips per day to the summit. UH-TIO FOF 492.
792	88	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**	Misleading. Presented out of Context. This finding of fact does not pertain to specific impacts caused by TMT. The document states, following the quoted excerpt: "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. Recognizing that most of these activities are not OMKM's responsibility, natural resource management staff nonetheless must be aware of materials being stored, used, and transported, to assist them in responding to potential contaminant releases and minimizing impacts to natural and cultural resources." Ex. A-10 at 4.2.13. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834. In handling all hazardous materials, TIO will comply with existing federal and state laws. Hazardous materials will be stored in areas with secondary

			containment that will capture any material that may accidentally escape the primary storage unit. The TIO will utilize Environmental Protection Agency-licensed contractors to transport any hazardous waste off of Mauna Kea to be disposed of appropriately. UH-TIO FOF 828, 970.
793	88	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**	Misleading. *See supra* UH-TIO's response to Ching's proposed FOF 792.
794	88	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**	Misleading. Presented out of Context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. This is a general proposition not connected to the TMT Project by any evidence. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430.

			The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
795	88	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. This is a general statement that has not been shown to specifically apply to the TMT Project. The cited document does not specifically refer to Mauna Kea. The evidence in the record regarding hydrology and water resources is more material and credible. UH-TIO FOF 796-823. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823.
796	88	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	Misleading. Presented out of Context. Irrelevant/Inapplicable. This is a general statement that has not been shown to specifically apply to the TMT Project. The cited document does not specifically refer to Mauna Kea. The evidence in the record regarding hydrology and water resources is more material and credible. UH-TIO FOF 796-823.

			Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823.
797	88	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**	Citation does not support proposition. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834. No mercury will be used by or at the Observatory, and no hazardous waste is anticipated to be generated at the TMT Observatory. UH-TIO FOF 824-828.
798	88	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be

			attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
799	88	An unknown amount of diesel fuel leaked from a generator in the construction staging area in 1982. **Ex. A-0091 CMP, p.6-9**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials

			Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
800	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. No mercury will be used at the TMT Observatory. UH-TIO FOF 428, 824. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built.
801	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
802	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be

			attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
803	89	Hydraulic fluid leaked from the Caltech Submillimeter Observatory (CSO) from approximately 1990 through 2000. **Ex. A-009 CMP, p.6-10**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials

			Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
804	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
805	89	Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed hydraulic fluid to leak in 2003. **Ex. A-009 CMP, p.6-10**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO

			FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
806	89	From 1998-2004, sewage overflows of several liters occurred five times at the CSO facilities. **Ex. A009 CMP, p.6-10**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management includes a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
807	89	Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed diesel fuel to leak in 2004. **Ex. A-009 CMP, p.6-10**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement

			measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management includes a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
808	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management includes a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
809	89	Telescope mirror washing entails removing mirrors from a protective girdle that contains mercury. Seven documented mercury spills have occurred in	Citation does not support proposition. Irrelevant/Inapplicable.

		association with mirror washing. **Ex. A-009 CMP, p.6-8**	No mercury will be used at the TMT Observatory. UH-TIO FOF 428, 824. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. Mirror washing wastewater is not a hazardous waste. However, the TMT Observatory has been designed to ensure that the possibility of mirror wash wastewater entering the surrounding environment will be negligible. UH-TIO FOF 826-828
810	89	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**	Not in Dispute. UH-TIO FOF 824-830.
811	89	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430.

			The TMT Project's storage and waste management includes a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
812	90	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management includes a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
813	90	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**	Misleading. Presented out of Context. Irrelevant/Inapplicable. The Project will not utilize a septic system to dispose of domestic wastewater. All wastewater will be trucked off the mountain for disposal. Ex. A-3/R-3 at 3-33.

			Spills that occurred in the past cannot be attributable to the TMT Project that has yet to be built. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
814	90	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**	Misleading. Presented out of Context. Proposed FOF does not pertain to specific impacts of the TMT Project. The quoted document states, in relevant part: "The cesspools, septic tanks, and associated leach fields at the summit and Hale Pohaku have been designed to meet State DOH permit requirements for sanitary waste systems. With telescope facility upgrades, many of the original cesspools have been replaced with septic tanks. Currently there are eight septic tanks with leach fields or disposal pits and three cesspools

			(NASA 2005). Solid and liquid waste discharged into these approved systems should minimize direct discharge of solid waste in the effluent and into the ground and allow for physical and bio-processing." Ex. A-10 at 3-33 – 3-34. Irrelevant/Inapplicable. The Project will not utilize a septic system to dispose of domestic wastewater. All wastewater will be trucked off the mountain for disposal. Ex. A-3/R-3 at 3-33. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
815	90	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**	Irrelevant/Inapplicable Misleading. Presented out of Context. Proposed FOF does not pertain to specific impacts of the TMT Project.
816	90	Large sized tank trucks have carrying capacities ranging from 5,500 to 9,000	Citation does not support the

		gallons. **Ex. A-003 FEIS Vol 1: 3-120**	proposition. Irrelevant/Inapplicable.
817	90	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**	Misleading. Presented out of Context. The TMT Project will employ mitigation measures to minimize the potential for an accidental spill while waste materials are in transit down the mountain to a proper disposal site. UH-TIO FOF 427. Ward admitted that she was unaware of any previous spills on Mauna Kea resulting from vehicles overturning en route to the MKSR. UH-TIO 835. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834. Implementation of a Ride-Sharing Program that will reduce the number of vehicle trips per day to the summit.

			UH-TIO FOF 492.
818	90	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**	Misleading. Presented out of Context. Unsupported/Unsubstantiated. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology or biological resources. The credible evidence shows that the TMT Project will not have a significant or adverse impact on area water resources. UH-TIO FOF 373, 427, 431-432, 796-823. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804. The overall impact of the TMT Project to flora and fauna will be less than significant. UH-TIO FOF 466-502.
819	90	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**	Misleading. Presented out of Context. This citation does not pertain to specific impacts of the TMT Project. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology or biological resources. *See*

			UH-TIO FOF 466-502, 796-823. The TMT Project will implement measures to mitigate the risk of an accident spill to the extent logically and reasonably practicable based on best means and methods available to mitigate against such events. UH-TIO FOF 426-430. The TMT Project's storage and waste management include a Spill Prevention and Response Plan and a Materials Storage/Waste Management Plan. UH-TIO FOF 430, 829-834.
820	90	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**	Citation does not support proposition. Lacks evidentiary support. Misleading. Presented out of Context. No support for proposition that the use, handling, and storage of hazardous materials disqualifies a project from receiving a CDUP. The TMT Project has protocols in place for the use, handling, and storage of hazardous materials. *See* UH-TIO FOF 320, 425, 430, 824-839. UH-TIO note that 3-129 of the FEIS does not specifically reference the chemicals propylene glycol, acetone,

			and methyl ethyl ketone, but it is not disputed in the record that the TMT Project will utilize vehicle and generator fuel, alcohols, liquid adhesives, various metals, lubricants, hydraulic fluid, glycol coolants, and small quantities of acids, paints and solvents. Extensive measures will be in place to manage these materials, and the chance of a spill entering the surrounding environment is negligible. *See* UH-TIO FOF 824-839.
821	90	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**	Misleading. Presented out of Context. Misleading. Partial quotation. Dr. Nance testified that the TMT Observatory and a portion of the access road would create less than two acres of impervious surfaces. Tr. 12/13/16 at 98:5-14. Relevant testimony was as follows: "The TMT Observatory and a portion of the access road would create less than two acres of impervious surfaces that would cause runoff to occur during precipitation events. This runoff, because of the location of the observatory on the north flank and below the summit, the runoff would start downhill to the north. **It's very likely it wouldn't traverse very far before being lost to percolation into the permeable natural ground, and**

			otherwise wouldn't be an issue." Tr. 12/13/16 at 98:5-14 (emphasis added). The reliable, probative, and credible evidence establishes that the TMT Project will cause minimal surface runoffs, and the impacts of such runoff will not be significant. *See* WDT Nance at 2; Tr. 12/13/16 at 98:5-14 Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. It is not physically possible for surface runoff from the TMT Observatory to flow to and over the Pu'u Waiau crater rim into the lake. UH-TIO FOF 799-801. The TMT Observatory will have a zero-discharge wastewater system. UH-TIO FOF 802. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804.
822	90	TMT facilities will be designed to maximize groundwater recharge to the extent possible. Site grading and landscaping will be designed to direct	Citation does not support proposition (incorrect cite).

		stormwater to pervious areas so that it may percolate into the ground and thus into the aquifer. **Ex. A001 CDUA 6-1**	Misleading. Presented out of Context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. It is not physically possible for surface runoff from the TMT Observatory to flow to and over the Pu'u Waiau crater rim into the lake. UH-TIO FOF 799-801. The TMT Observatory will have a zero-discharge wastewater system. UH-TIO FOF 802. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804. It is extremely unlikely that any spill would be large enough to have any

			impact on the drinking water for Hawai'i County. The main threats to Mauna Kea's aquifer occur at lower elevations in areas of heavier population and use. *See* UH-TIO FOF 805, 796-823.
823	91	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**	Misrepresentation. Citation does not support proposition. Unsupported/Unsubstantiated. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. It is not physically possible for surface runoff from the TMT Observatory to flow to and over the Pu'u Waiau crater rim into the lake. UH-TIO FOF 799-801. The TMT Observatory will have a zero-discharge wastewater system. UH-TIO FOF 802. Any discharge on the summit would be

			naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804. It is extremely unlikely that any spill would be large enough to have any impact on the drinking water for Hawai'i County. The main threats to Mauna Kea's aquifer occur at lower elevations in areas of heavier population and use. *See* UH-TIO FOF 805, 796-823.
824	91	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**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. Ex. A-71 describes other mitigation measures to prevent spills of wastewater and hazardous waste. *See* Ex. A-71 at 8-9. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. Any discharge on the summit would be

			naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804.
825	91	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**	Misrepresentation. Misleading. Presented out of context. Mr. Nance's statement was that "it would traverse thousands of feet vertically downward before it ever reached the underlying groundwater, maybe by 6, 7000 feet." Tr. 12/13/16 at 99:24 – 100:2. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804. It is extremely unlikely that any spill would be large enough to have any impact on the drinking water for Hawai'i County. The main threats to Mauna Kea's aquifer occur at lower elevations in areas of heavier population and use. *See* UH-TIO FOF

			805, 796-823.
826	91	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**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. Misleading. Contamination of groundwater is extremely remote and very unlikely from the TMT Project. UH-TIO FOF 431-432; 796-823. Any discharge on the summit would be naturally treated and filtered through thousands of feet of the porous lavas, thereby removing any contamination in that discharge by the time it reaches groundwater. UH-TIO FOF 804.
827	91	TMT project managers anticipate the generation of approximately 120 cubic feet of trash per week. **Ex. A-003 FEIS Vol.1, p.3-129**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on hydrology resources. *See* UH-TIO FOF 796-823. Document states in relevant part: "Trash and other solid waste generated as part of the activities associated with

			the TMT at both the TMT Observatory and at Hale Pohaku will result in a minor increase in the generation and disposal of solid waste from Maunakea. It is anticipated that the TMT will generate trash at a rate similar to that of the Keck observatory, approximately 120 cubic feet per week. Solid waste and trash generated by the daily operation will be primarily composed of waste paper, spent containers, and limited amounts of food waste. "Like the existing observatories, in compliance with the existing regulations, the Project's waste or leftover material will be recycled and reused to the extent possible. Scrap metal, plastic, and glass will be collected for recycling, and the remaining solid waste rubbish will be removed and trucked off the mountain for disposal in a landfill. Between pickups, rubbish will be stored indoors in lidded trash containers. Cans, plastic, and glass bottles, paper and cardboard, and scrap metal will be collected in separate containers and transported to Headquarters for reuse or recycling. Wastes such as used oil and glycol, will be removed to also be recycled by licensed contractors. No solid waste will be disposed of at the

			summit." Ex. A-3/R-3 at 3-129.
828	91	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**	Misleading. Presented out of context. UH-TIO note that this FOF refers to potable water, and the use is less than significant. Ex. A-3/R-3 at 3-120. Document states in relevant part: "The Project will slightly increase the amount of freshwater used island-wide due to water use by employees at the various Project facilities. Assuming a maximum daily use of 20 gallons a day per person at the work place, the following daily uses of potable water are estimated 480 gallons at the TMT Observatory, possibly 200 gallons at the potential TMT Mid-Level Facility, and 1,600 gallons at the Headquarters. This **represents less than 0.01 percent of the current island-wide daily potable water pumpage, and 0.0001 percent, of the estimated sustainable use of freshwater from the island's aquifers**. Also, in compliance with the existing requirements, **water efficient fixtures will be installed and water efficient practices implemented** to reduce the demand on freshwater resources. Therefore, **this impact will be less than significant.**" Ex. A-3/R-3 at 3-120 (emphasis added).

829	91	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**	Citation does not support proposition. Unsupported/Unsubstantiated. Misleading. Presented out of context. Proper measures will be taken to ensure the safe transport of materials off-site, thereby minimizing potential spills. UH-TIO FOF 427.
830	91	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**	Misleading. Presented out of context. Dr. Sanders also testified that the process from detection of the leak to remedying the leak would be done as quickly as possible, depending upon the weather and the nature of the leak. Tr. 01/04/17 at 85:5 – 86:21. A Spill Prevention and Response Plan will be implemented to address any chemical leaks. Ex. A-1/R-1 at 3-218; UH-TIO FOF 320-430.
831	91	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**	Misleading. Presented out of context. Dr. Sanders also testified that the process from detection of the leak to remedying the leak would be done as quickly as possible, depending upon the weather and the nature of the leak. Tr. 01/04/17 at 85:5 – 86:21.
832	92	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.	Not in dispute.

		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**	
833	92	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**	Not in dispute.
834	92	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**	Incomplete. UH-TIO does not dispute that this was Mr. Sanders's testimony.
835	92	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**	Not in dispute.
836	92	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**	Irrelevant/Inapplicable. Misleading. Partial quotation. Dr. Sanders testified that the mirror washing effluent would be removed from the underground storage tank "by a contractor who's licensed, you know, by the EPA or whatever other authorities are needed to properly process it, but I don't know how that processing is done." Tr. 01/03/17 at 231:10:15. Dr. Sanders further clarified that the work would be done by a "properly licensed contractor". Tr.

			01/03/17 at 231:24-25.
837	92	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**	Misleading. Presented out of context. FOF fails to demonstrate how this relates to the TMT Project. The FEIS goes on to conclude that "the impact of the Project on air quality and the climate will be less than significant." Ex. A-3/R-3 at 3-185. Misleading. Partial quotation. Quoted language is preceded by the following statement: "Air quality monitoring has been performed at the Mauna Loa Observatory at an elevation of approximately 11, 140 feet since its construction in 1956. This monitoring station provides data most representative of the conditions at Maunakea. The data gathered at this station indicate that the air quality at the Mauna Loa Observatory is excellent and in attainment status with State and National Ambient Air Quality Standards (NAAQS). Given the similarities between the two locations (Maunakea and Maunaloa), **it has been inferred that the overall air quality at Maunakea is excellent as well**." Ex. A-3/R-3 at 3-182 (emphasis added). Incomplete. *See* UH-TIO FOF 433-

			464.
838	92	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**	Misleading. Misleading. Presented out of context. *See* UH-TIO FOF 978 – 983. This Proposed FOF does not address specific impacts of the TMT Project. The FEIS states that "the impact of the Project on air quality and the climate will be less than significant." Ex. A-3/R-3 at 3-185. The noise impacts from the TMT Project will be less than significant. UH-TIO FOF 978-983; Ex. A-3/R-3 at 3-201 to 203. Incomplete. *See* UH-TIO FOF 433-464.
839	92	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**	Misleading. Partial quote. Ex. A-1/R-1 states that "Although the TMT Observatory will not be visible from the summit of Mauna Kea (#16) or from Lake Waiau (#17) as shown on Figure 7.1, it will be visible from other locations within the summit region, primarily the northern plateau and the northern ridge of Kūkaha'ula" where existing telescopes are located. Ex. A-1/R-1 at 7-9. Ex. A-1/R-1 goes on to state that "The TMT Observatory will also be hidden from Pu'u Līlīnoe and Lake Waiau, culturally important areas

			from which a number of the existing observatories are visible. However, the TMT Observatory will be visible within the northern portion of the summit region, including the northwestern portion of Kūkahau'ula, referred to as Pu'u Hau'oki, Pu'u Pōhaku, and Pu'u Poli'ahu. Many of the existing observatories are also visible from these areas." Ex. A-1/R-1 at 7-11. *See also*, UH-TIO FOF 306, 586, 771, 780, 781, 900-905. The CDUA is more accurately noted in Ching proposed FOF 840.
840	93	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**	Misleading. Presented out of context. UH-TIO object to this proposed FOF to the extent that it is intended to imply that the TMT Project will have a substantial adverse impact on visual resources. *See* UH-TIO FOF 775-795. Ex. A-1/R-1 states that "Although the TMT Observatory will not be visible from the summit of Mauna Kea (#16) or from Lake Waiau (#17) as shown on Figure 7.1, it will be visible from other locations within the summit region, primarily the northern plateau and the northern ridge of Kūkaha'ula" where existing telescopes are located. Ex. A-1/R-1 at 7-9. Ex. A-1/R-1 goes on to state that "The TMT Observatory will

			also be hidden from Pu'u Lilinoe and Lake Waiau, culturally important areas from which a number of the existing observatories are visible. However, the TMT Observatory will be visible within the northern portion of the summit region, including the northwestern portion of Kūkahau'ula, referred to as Pu'u Hau'oki, Pu'u Pōhaku, and Pu'u Poli'ahu. Many of the existing observatories are also visible from these areas." Ex. A-1/R-1 at 7-11. *See also*, UH-TIO FOF 306, 586, 771, 780, 781, 900-905.
841	93	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**	Misleading. Presented out of context. These comments were made with regards to the Draft Environmental Impact Statement (during the comment period). The Department of Land and Natural Resources' concerns regarding visual impacts were specifically addressed in the FEIS, as noted in Ex. A-4/R-4 at 21 of 531. Among other revisions, the FEIS included a new visualization and discussed other viewplanes. The FEIS noted that the TMT Observatory would not block or substantially obstruct the identified views and viewplanes and its impact is considered less than significant. Ex. A-004 at 21.
842	93	The TMT would intrude upon the currently unobstructed view of Haleakala	Not credible (Ward is not a cultural

		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**	practitioner). Unsupported/Unsubstantiated. *See* UH-TIO FOF 704, 775-795, 868-913. Assumes facts not in evidence as it was not established by any evidence that such view planes were part of any bundle of rights traditionally and culturally exercised. UH-TIO FOF regarding visual and aesthetic resources is more credible and supported by the record. UH-TIO FOF 775-795.
843	93	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**	Incomplete/Vague and Ambiguous (the FOF is written from a "first person" perspective, with Ward as the apparent source, and is an improper FOF). Misleading. Presented out of context. Ward is not a cultural practitioner and her practices are not protected under the Hawai'i Constitution. Additionally, Ward's hiking practices do not occur at the proposed TMT Project site. *See* UH-TIO FOF 748. Unsupported/Unsubstantiated as to Ward's "belief" that she is not alone in her opinion. *See supra* UH-TIO's response to Ching's proposed FOF 842.

844	93	Applicant does not define "noise sensitive areas." **Ex. A-003 FEIS Section 3.13 Noise, p.3-179**	Inaccurate/False. The FEIS provides various descriptions of "noise sensitive" locations, areas, and sites. *See, e.g.*, Ex. A-3/R-3 at 3-173 (identifying noise sensitive sites near the TMT Project), 3-175 (identifying Kūkahau'ula as a noise sensitive location), 3-179 (describing all noise sensitive areas located in the summit region); *see also*, UH-TIO FOF 980. The noise impact from the TMT Project will be less than significant. UH-TIO FOF 978-983.
845	93	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**	Inaccurate/False. Misrepresentation. The TMT Project operations are not expected to cause a significant noise impact, and although no mitigation measures (beyond compliance with applicable regulations are required), mitigation measures will be employed. The finding of less than significant impact to noise sensitive areas addresses the cultural impact. Ex. A-3/R-3 at 3-179-180. UH-TIO FOF 978-983.
846	93	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**	Misrepresentation. Misleading. Presented out of Context. UH did not concede that "significant" noise would result. Noise impacts from construction will

			be mitigated through compliance with conditions in Noise Permits and the Noise Variance. Construction noise at the TMT Observatory site is likely to be inaudible from a relatively short distance from the source due to the existing background noise associated with the strong wind conditions at the summit. Ex. A-3/R-3 at 3-203.
847	93	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**	Misleading. Misrepresentation. The EIS states that proper steps will be taken to ensure that construction complies with all applicable noise regulations. *See* Ex. A-3/R-3 at 3-203. A noise variance would be obtained in connection with noise permits so that construction noise will comply with the variance and permits, and the TMT Project will comply with all variance and permit conditions. Ex. A-3/R-3 at 3-203.
848	94	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**	Misleading. Presented out of context. UH-TIO clarified that no explosives or blasting will be done to construct the TMT Project. *See* UH-TIO FOF 283. The sound does not project very far under most conditions. UH-TIO FOF 978. The noise impacts from the TMT

			Project will be less than significant. Construction noise at the TMT Observatory site is likely to be inaudible from a relatively short distance from the source due to the existing background noise associated with the strong wind conditions at the summit. UH-TIO FOF 978-983; Ex. A-3/R-3 at 3-201 to 203.
849	94	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**	Misleading. Presented out of context. The noise generated by the TMT Observatory will be minimal. UH-TIO FOF 978-986. The sound does not project very far under most conditions. UH-TIO FOF 978. The noise impacts from the TMT Project will be less than significant. UH-TIO FOF 978-983; Ex. A-3/R-3 at 3-201 to 203. Misleading. Partial quotation. The quoted portion is followed by this statement: "The Pu'u Wekiu/Kukahau'ula Summit and Trailhead measurement locations experienced measured noise levels of 47 and 49 dBA Leq, and 50 and 53 dBA Ll0. Sounds from existing observatory HVAC exhaust systems

			were not noticeable during the summit location field measurement; despite its remote location, the summit was not completely silent. **The dominant noise source for sound levels measured at recreational use sites was due to a steady wind of 5 to l4 mph moving from the direction of the nearby observatories toward the measurement locations. Winds in this range are typical for this area and generally dominate the ambient noise levels."** Ex. A-3/R-3 at 3-176 (emphasis added).
850	94	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**	Citation does not support proposition (incomplete citation). This citation to the record is unclear. UH-TIO do not dispute, however, that, as a mitigation measure, TMT Observatory operations will be minimized for up to four days per year to accommodate cultural activities on culturally sensitive days of the year. UH-TIO FOF 686; Ex. A-3/R-3, at S-12. Misleading. Presented out of context. The noise generated by the TMT Observatory will be minimal. UH-TIO FOF 978-986.
851	94	The Conservation District Use Application (CDUA), HA-3568, for this contested case hearing was signed on September 2, 2010. **Ex. R-1, p.2**	Not in dispute.

852	94	The CDUA was signed on behalf of the Applicant UH-Hilo by Chancellor Donald Straney. **Ex. R-1, p.2**	Not in dispute.
853	94	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**	Not in dispute.
	94	**Conclusions of Law** • Conservation District Use Application (CDUA HA-3568) is subject of this contested case hearing. **FOF 851-3** • The CDUA was signed by Dr. Donald Straney on September 2, 2010. **FOF 851-3**	Not in dispute.
854	95	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**	Inaccurate / False. The pertinent language is quoted in Ching proposed FOF 855.
855	95	The CDUA, at 1.2 Overview of the Proposed Use, specifically states: On behalf of the TMT Observatory Corporation, the University of Hawa'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**	Not in dispute.
856	95	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**	Not in dispute.
857	95	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**	Inaccurate / False. Lemmo confirmed that the language quoted in proposed FOF 855 appeared in the CDUA. Tr. 02/27/17 at 248:22 – 249:3.

858	95	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence.
859	95	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**	Misleading; Presented out of Context. White confirmed that the language quoted in proposed FOF 855 appeared in the CDUA. Tr. 10/20/16 at 106:14-23.
	95	**Conclusion of Law** • The Third Party Beneficiary of CDUA HA-3568 is TMT Observatory Corporation. **FOF 854-859**	Mischaracterization. Inaccurate/False. The CDUA speaks for itself. *See, also* UH-TIO FOF 206-207.
860	95	Noting that CDUA HA-3568 was executed on September 2, 2010. **Ex. R-1, p.2**	Not in dispute.
861	95	TMT International Observatory LLC (TIO) was incorporated in May 2014. **Ex. C-1, p.1**	Not in dispute.
862	96	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**	Misleading. Presented out of context. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
863	96	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**	Misleading; Partial quotation. Misleading; Presented out of context. White testified that he did not believe TIO existed as of the date of the application. Tr. 113:13-20. White subsequently clarified his

			understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
864	96	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**	Misleading; Presented out of Context. UH-TIO note that the correct citation to the record is Tr. 10/20/16 at 113:1-5. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
865	96	Witness for the Applicant, Perry White, states that "TIO encompasses what formerly was TMT." **Tr. October 20, 2016, Vol. 1, p.114**	Not in dispute. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
866	96	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**	Misleading. Presented out of context. White testified that he was not the appropriate person to address this matter. Tr. 10/20/16 at 10-15. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
867	96	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**	Misleading. Presented out of context. White testified that "As discussed in the TMT CDUA, the University of Hawaii'i at Hilo (the "University") and TMT International Observatory, LLC ("TIO") (formerly, TMT Observatory Corporation) are both committed to

			achieving this purpose [compliance with HRS 183C-1] through appropriate management and mitigation measures." WDT White at 2-3. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
868	96	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**	Misleading. Presented out of context. White testified that the use of TIO was his attempt to communicate. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
869	96	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence.
870	96	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.**	Misleading. Presented out of context. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207.
	96	**Conclusions of Law:** • The TMT International Observatory LLC is not the Third Beneficiary stated in the CDUA (HA-3568). **FOF 860-870** • The TMT International Observatory LLC is not the Third Party Beneficiary. **FOF 860-870**	Mischaracterization. Inaccurate/False. Unsupported / Unsubstantiated. *See, also* UH-TIO FOF 206-207.

871	97	Robert Rechtman is the Chief Operating Officer and principal archaeologist of ASM Affiliates. **Tr. December 20, 2016, Vol. 19, p.37**	Not in dispute.
872	97	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**	Not in dispute.
873	97	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**	Not in dispute.
874	97	ASM Affiliates, through its CEO Robert Rechtman, worked with TMT Observatory Corporation contact person, Paul Gillet. **Tr. December 20, 2016, Vol. 19, p.62**	Not in dispute.
875	97	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**	Citation does not support the proposition. Regardless of Ching's "correction" of the transcript, the record speaks for itself.
876	97	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, 1016, Vol. 19, p.63**	Citation does not support the proposition. Regardless of Ching's "correction" of the transcript, the record speaks for itself.
877	97	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**	Not in dispute.

878	97	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	Misleading. Presented out of context. Rechtman testified that Gillet was his contact; he did not personally know Gillet's affiliation as between TMT and TIO. Tr. 12/20/16 at 64:11-18.
879	98	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**	Inaccurate / False. Misrepresentation. Rechtman did not testify he had "difficulties deciding" on the corporate entity. Misleading. Presented out of context. Rechtman testified that Gillet was his contact; he did not personally know Gillet's affiliation as between TMT and TIO. Tr. 12/20/16 at 64:11-18.
880	98	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**	Inaccurate / False. Rechtman did not testify he was working with TMT and TIO "simultaneously". Rechtman testified that Gillet was his contact; he did not personally know Gillet's affiliation as between TMT and TIO. Tr. 12/20/16 at 64:11-18.
881	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.
882	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.

883	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.
884	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence.
885	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence.
886	98	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence.
		Conclusions of Law • [1] TMT Observatory Corporation (TMT) **AND** TMT International Observatory LLC (TIO) are two separate and distinct corporations that exist and operate simultaneously. **FOF 871-886** • [2] TMT International Observatory LLC (TIO) did not supplant TMT Observatory Corporation (TMT) for purposes of the CDUP (HA-3568). **FOF 871-886**	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL: [1] - Not in dispute. [2] - Misleading. Presented out of context. Inaccurate/False. UH-TIO FOF 206-207.
887	99	A Letter of Intent between Caltech, University of California, the Canadian University and the National Astronomy Observatory of Japan was executed in 2011. T**r. December 19, 2016, Vol. 18, p.12**	Not in dispute.
888	99	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	Not in dispute.

		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	99	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**	Misleading; Presented out of Context. TMT Corporation's interests, assets and personnel were transferred to TIO. UH-TIO FOF 206-207; UH-TIO COL 420-426.
890	99	The TMT Observatory Corporation was designated as the Third Party Beneficiary when, and if, the CDUA were approved and the CDUP granted. **Ex. A001**	Inaccurate / False. The pertinent language is quoted in Ching proposed FOF 855. TMT Corporation's interests, assets and personnel were transferred to TIO. UH-TIO FOF 206-207; UH-TIO COL 420-426.
891	99	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**	Not in dispute. *See, also* UH-TIO FOF 206-207; UH-TIO COL 420-426.
892	99	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**	*See supra* UH-TIO's response to Ching's proposed FOF 866.
893	99	Witness for the Applicant, Perry White, admitted that he did not reference TIO (TMT International Observatory LLC) in his written testimony in the contested	*See supra* UH-TIO's response to Ching's proposed FOF 866.

		case hearing of 2011. **Tr. October 20, 2016, Vol. 1, p.168**	
894	99	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**	*See supra* UH-TIO's response to Ching's proposed FOF 866.
895	100	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**	*See supra* UH-TIO's response to Ching's proposed FOF 866.
896	100	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**	*See supra* UH-TIO's response to Ching's proposed FOF 866.
897	100	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 CDUA (HA-3568). **Tr. October 20, 2016, Vol. 1, p.167**	*See supra* UH-TIO's response to Ching's proposed FOF 866.
898	100	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.
899	100	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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.

	100	**Conclusions of Law** • [1] 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 CDUA. **FOF 887-899** • [2] The Third Party Beneficiary designate TMT Observatory Corporation should have been the Sublessee of the TMT Sublease. **FOF 887-899** • [3] 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** • [4] The Applicant University, as Sublessor, executed the TMT Sublease to the TMT International Observatory LLC as Sublessee. **FOF 887-899** • [5] 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** • [6] 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 Interntional Observaory LLC to be that Sublessee, indicates that some kind of illegal behavior took place. **FOF 887-899**	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL: [1] - Irrelevant / Inapplicable. Inaccurate/False. Unsupported / Unsubstantiated. White used TIO for clarification purposes. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207. [2] - Misleading. Presented out of context. Unsupported / Unsubstantiated. *See* UH-TIO FOF 206-209. [3] - Misleading. Presented out of context. Unsupported / Unsubstantiated. Not in evidence. *See* UH-TIO FOF 206-209. [4] – Misleading. Presented out of context. *See* UH-TIO FOF 206-209. [5] - Inaccurate / False. Misrepresentation. Unsupported / Unsubstantiated. *See* UH-TIO FOF 206-209.

		• [7] 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**	[6] - Inaccurate / False. Misrepresentation. Unsupported / Unsubstantiated. *See* UH-TIO FOF 206-209. [7] - Mischaracterization. The consent to the sublease was vacated. The order in the Flores Appeal speaks for itself. *See* UH-TIO COL 408.
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**	Irrelevant / Inapplicable. Counsel's statement is not evidence. *But see* UH-TIO FOF 206-207.
901	101	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**	Not in evidence. The citation refers to Ching's testimony regarding his summary of Lemmo's testimony. An examiner's statements are not evidence.
902	101	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**	Mischaracterization as to "a stranger corporation to the CDUA." UH-TIO FOF 206-209.
903	101	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**	Mischaracterization to the extent this COL is intended to imply that the BLNR pre-determined that a consent would be granted. UH Hilo and TIO followed the proper regulatory procedure in seeking the BLNR's consent.

904	101	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**	Not in dispute.
905	101	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.	Citation does not support the proposition. Mischaracterization as to "a stranger corporation." The record speaks for itself.
		Conclusions of Law • [1] 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** • [2] Applicant University, TMT Observatory Corporation, TMT International Observatory LLC and BLNR/DLNR have engaged in irregular actions. • **FOF 900-905** • [3] 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** • [4] 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	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL: [1] - Irrelevant / Inapplicable. Unsupported / Unsubstantiated. White used TIO for clarification purposes. White subsequently clarified his understanding of the relationship between TMT and TIO. Tr. 10/24/16 at 13:18 - 14:18. *See, also* UH-TIO FOF 206-207. [1] - Inaccurate / False. Misrepresentation. Unsupported / Unsubstantiated. *See* UH-TIO FOF 206-209. [2] - Inaccurate / False. Misrepresentation. Unsupported / Unsubstantiated. *See* UH-TIO FOF 206-209. [3] - Mischaracterization. The consent to the sublease was vacated. The order

		LLC. **FOF 900-905**	in the Flores Appeal speaks for itself. *See* UH-TIO COL 408. [4] - Mischaracterization. Only the BLNR's consent to the sublease was vacated. The order in the Flores Appeal speaks for itself. *See* UH-TIO COL 408.
906	102	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**	Not in dispute.
907	102	TMT International Observatory LLC also graded and made improvements upon the so-called Access Road pursuant to the CDUA and CDUP. **Ex. A001**	Misleading. Presented out of context. Permitted grading and other improvements were made to the Access Way. Ex. A-1/R-1.
908	102	With the termination of the Sublease, the Site Decommissioning Plan is triggered. **Ex. A013**	Inaccurate / False. Mischaracterization. Misleading. Presented out of context. The Decommissioning Plan presumes that there is an existing "observatory facility" to be decommissioned when, among other triggers, a sublease "expires". *See* Ex. A-013 at 1 ("Decommissioning refers to a process that results in the *partial or total* removal of all structures associated with an *observatory facility* and the restoration of the site, to the *greatest extent possible*, to its pre-construction condition.") (emphasis on "observatory facility" added; footnote omitted). Thus, the vacatur of the consent to the Sublease in the Flores Appeal (which is

			currently on appeal with no final judgment entered) does not constitute the "expiration" of the Sublease; nor does it trigger the Decommissioning Plan. *See* UH-TIO COL 408.
909	102	2.2.3 Terminating Subleases: "Subleases are terminated [by] ... revocation of a sublease by U.H." **Ex. A013**	*See supra* UH-TIO's response to Ching's proposed FOF 908. Misrepresentation. The TIO Sublease has not been revoked by the University.
910	102	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**	*See supra* UH-TIO's response to Ching's proposed FOF 908.
911	102	4.2.1 Notice of Intent: "The first component of the decommissioning process is the preparation of a Notice of Intent (NOI)." **Ex. A013**	*See supra* UH-TIO's response to Ching's proposed FOF 908.
912	103	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**	*See supra* UH-TIO's response to Ching's proposed FOF 908.
913	103	The Record contains no indication that a Notice of Intent has been filed.	*See supra* UH-TIO's response to Ching's proposed FOF 908.
	103	**Conclusions of Law** • [1] 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. • [2] Now that the TMT Sublease has been terminated, the Site	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL: [1] - Not in dispute.

		Decommissioning Plan has been triggered. **FOF 906-913** • [3] 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** • [4] The TMT International Observatory LLC is in violation of the Site Decommissioning Plan. **FOF 906-913** • [5] The TMT International Observatory LLC is in violation of the now revoked Sublease. **FOF 906-913** • [6] The TMT International Observatory LLC is in violation of the now revoked CDUP. **FOF 906-13** • [7] 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**	[2] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-TIO's Response to Ching's Proposed FOF 908. [3] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-TIO's Response to Ching's Proposed FOF 908. [4] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-TIO's Response to Ching's Proposed FOF 908. [5] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-TIO's Response to Ching's Proposed FOF 908. [6] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-TIO's Response to Ching's Proposed FOF 908. [7] - Inaccurate / False. Mischaracterization. Misrepresentation. *See supra* UH-

			TIO's Response to Ching's Proposed FOF 908.
914	103	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**	Irrelevant / Inapplicable. Not in evidence. While UH-TIO do not object to general references to the first contested case hearing solely for procedural background purposes (*See* UH-TIO FOF Nos. 31-33), the BLNR's April 12, 2013 decision and order was vacated, and this matter was remanded for a new contested case hearing on the CDUA. UH-TIO FOF Nos. 34-35. Accordingly, the record in the prior contested case hearing is not part of the record in the current proceeding. UH-TIO do not necessarily agree with Ching's characterization of the record in the prior proceeding, and object to Ching's citation to, and use of, the record in the prior contested case for substantive purposes in this proceeding.
915	103	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**	*See supra* UH-TIO's response to Ching's proposed FOF 914.
916	103	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**	*See supra* UH-TIO's response to Ching's proposed FOF 914.
917	104	[T]hat this condition would commence with construction also suggests that	*See supra* UH-TIO's response to

		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**	Ching's proposed FOF 914.
918	104	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**	*See supra* UH-TIO's response to Ching's proposed FOF 914.
919	104	"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**	*See supra* UH-TIO's response to Ching's proposed FOF 914.
920	104	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**	Not in dispute.
	104	**Conclusions of Law** • [1] 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** • [2] BLNR made its decision in a two-step process, 1) BLNR approved the CDUA, and 2) BLNR issued the CDUP. **FOF 914-920** • [3] BLNR [1] approved the CDUA AND [2] issued the CDUP. **FOF 914-920** • [4] On October 14, 2016, the Board [BLNR] declared and affirmed the CDUP HA- 3568 is void. **FOF 914-920** • [5] On October 14, 2016, BLNR voided only the CDUP. **FOF 914-920**	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL: [1] - Irrelevant / Inapplicable. [2] - Irrelevant / Inapplicable. [3] - Irrelevant / Inapplicable. [4] - Not in dispute. [5] – Not in dispute. [6] - Irrelevant / Inapplicable. An

		• [6] On October 14, 2016, BLNR DID NOT void the approved CDUA. **FOF 914-920** • [7] The approved CDUA continues to exist on the Record. **FOF 914-920** • [8] 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 • [9] 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** • [10] 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** • [11] 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,	"approved CDUA" would logically result in a CDUP, and – conversely – the vacatur of a CDUP would logically rescind the approval of an underlying CDUA. Thus, Ching's attempt to distinguish between a CDUP and an "approved CDUA" is illogical and irrelevant. In *Kilakila*, the Supreme Court made it clear that the granting of a *CDUP* in connection with a contested case hearing must comport with due process requirements. *See Kilakila* 138 Hawai'i at 409, 382 P.3d at 221. Thus, the due process inquiry with respect to this issue focuses on the *CDUP*, and the BLNR's decision (out of an abundance of caution) to void the first *CDUP* with respect to the TMT Project comports with due process. *Id.* Accordingly, there was no legal requirement for the BLNR to additionally declare that it was vacating an "approved CDUA". *Id.* [7] – Irrelevant / Inapplicable. *See* response to No. 6 of this COL above. [8] - Irrelevant / Inapplicable. *See* response to No. 6 of this COL above. [9] - Irrelevant / Inapplicable. *See* response to No. 6 of this COL above.

		must be a denial. **FOF 914-920**	[10] - Irrelevant / Inapplicable. *See* response to No. 6 of this COL above. [11] - Irrelevant / Inapplicable. *See* response to No. 6 of this COL above.
921	105	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).	Not in dispute as stated in the rule.
922	105	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.	Misleading. Presented out of context. Unsupported/Unsubstantiated. As a result of Petitioners' appeal, the BLNR's April 12, 2013 decision and order was vacated, and this matter was remanded for a new contested case hearing on the CDUA. UH-TIO FOF Nos. 34-35. Accordingly, the record in the prior contested case hearing is not part of the record in the current proceeding. The record in this current contested case hearing complies with HAR § 13-1-32.4.
923	105	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?	Misleading. Presented out of context. Unsupported/Unsubstantiated. *See* response to Ching's proposed FOF 922 above.
	105	**Conclusions of Law** • [1] 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,	UH-TIO have inserted numbers into the bullet points of this proposed COL for convenience. With respect to the numbered bullet points in this COL:

		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** • [2] 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** • [3] 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**	[1] - Citation does not support the proposition. HAR § 13-1-32.4 does not refer to the "Second Contested Case Hearing". [2] - Misleading. Presented out of context. *See* response to Ching's proposed FOF 922 above. [3] – Misleading. Presented out of context. *See* response to Ching's proposed FOF 922 above.

BOARD OF LAND AND NATURAL RESOURCES

FOR THE STATE OF HAWAI'I

IN THE MATTER OF A Contested Case Hearing Re Conservation District Use Permit (CDUP) HA-3568 for the Thirty Meter Telescope at the Mauna Kea Science Reserve, Kaohe Mauka, Hamakua District, Island of Hawaii, TMK (3) 4-4-015:009	Case No. BLNR-CC-16-002 **CERTIFICATE OF SERVICE**

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing document was served upon the following parties by the means indicated:

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