E. CRITERION FIVE, HAR § 13-5-30(C)(5): "THE PROPOSED LAND USE, INCLUDING BUILDINGS, STRUCTURES, AND FACILITIES, SHALL BE COMPATIBLE WITH THE LOCALITY AND SURROUNDING AREAS, APPROPRIATE TO THE PHYSICAL CONDITIONS AND CAPABILITIES OF THE SPECIFIC PARCEL OR PARCELS[.]"

904. Astronomy facilities in the locality of the TMT Project are expressly permitted uses under HAR § 13-5-24.

905. The Astronomy Precinct is the site of many existing astronomical observatories so the TMT Project will be compatible with existing land uses. WDT White at 9-10; (White) Tr. 10/20/16 at 63:18-24, 94, 218:17-220:2; 10/24/16 at 22:11-23.

906. The TMT Project will be located on an approximately five-acre site within the Astronomy Precinct of the MKSR, which is a clearly defined, highly specialized area set aside specifically for astronomical facilities, and was first leased to the University of Hawai‘i in 1968 for this express purpose. Ex. A-1/R-1, App. A at A-3.

907. The proposed location of the TMT Observatory is in relatively close proximity to the eleven other previously developed facilities for astronomy within the Astronomy Precinct, which is the only area now designated for astronomical facilities on Mauna Kea. Ex. A-31 at 3.

908. From most vantage points within the Astronomy Precinct where the TMT Project will be visible, other astronomy facilities are already visible. Ex. C-18.

909. The TMT Project will not be visible from the culturally sensitive areas of the summit of Kūkahau‘ula, Lake Waiau, Pu‘u Līlīnoe, and Pu‘u Wēkiu. WDT Hayes at 7-8; Ex. A-36 at 2; Tr. 10/25/16 at 13:5-18.

910. The TMT Project should be assessed in the physical context within which it is proposed to be built. The Astronomy Precinct encompasses 525 acres, and the MKSR covers 11,288 acres. Ex. A-9 at 3-1. Combined, the TMT Observatory and Access Way will result in the disturbance of approximately 8.7 acres, including 2.5 acres that were previously disturbed. Ex. A- 3 at S-6. The Project proposes disturbance of only 6.2 acres of previously undisturbed land. Ex. A-9 at 3-26. New disturbance for the TMT Project represents less than 1.2% of the 525-acre Astronomy Precinct, and only about 1/20th of 1% of the MKSR.

911. The summit of Mauna Kea and other parts of Mauna Kea are substantially developed. There are 13 telescopes and related roads, structures, and buildings on the summit of Mauna Kea along with the food service and dormitory facility for 500 people and the Visitor’s Center at the approximately 9,000-foot elevation, as well as other parking facilities, roadways, and trails. Tr. 12/16/16 at 41:18-41:25.

912. The TMT Observatory dome will also be coated with a reflective aluminum-like finish which reflects the colors of the sky and ground, helping the dome to blend in with the surrounding setting. Ex. C-3. Furthermore, because the TMT Observatory will be

purposely located at a lower elevation than most of the other observatories on Mauna Kea, the Observatory will not be visible from the significant historic properties of Lake Waiau, Puʻu Līlīnoe, and the summit of Mauna Kea. WDT White at 10; Tr. 10/25/16 at 124:3-125:17, 137:9-19; Ex. C-18.

913. Mauna Kea is particularly well suited for astronomy. Due to the stability of the atmosphere above Mauna Kea, low mean temperature, atmospheric clarity, distance from light pollution, and other factors identified above, the summit area of Mauna Kea is uniquely suitable for astronomical research and for a project like the TMT Observatory. *See supra* at FOF Section II.F.

914. The existing access road from the summit ridge area to the TMT Project site follows an existing 4-wheel drive road that has existed since the 1960s. A section of approximately 200 feet of this 3,400-foot-long Access Way does not follow the current road alignment. Ex. A-1/R-1 at 1-11; Tr. 10/25/16 at 134:11-14. The Batch Plant Staging Area will be used in exactly the same manner as during past construction of other observatories and roads. Ex. A-1/R-1 at 1-13. Currently, utility services exist along the Mauna Kea Access Road to a point across the road from the SMA building. The necessary switch boxes to provide power and communication to the TMT Observatory will be placed above ground next to the existing ones across the road from the SMA building. To the extent possible utilities from that point will be placed beneath the road to reduce the footprint of disturbance. Ex. A-3/R-3 at 2-18. None of these uses will add any new elements that might be incompatible with the existing locality and surrounding areas.

915. The TMT Project should also be viewed in the context of the historical physical disturbance of the summit area by native Hawaiians. Directly adjacent to the Astronomy Precinct is the NAR, which contains most of the Mauna Kea Adze Quarry Complex, "the largest ancient quarry of its type, anywhere." Ex. A-9 at 3-15 n.9. As early as 1100 A.D., and continuing through the 1700s up until the time of Western contact, native Hawaiians utilized the mountain as a vital resource. They excavated the slopes of Mauna Kea for high quality durable stone to produce some of the best Neolithic tools in the Pacific. The Mauna Kea adze quarry, the largest in the world, offers conclusive evidence that the ancients 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. WDT Baybayan at 2; Ex. A-9 at 5-11 to 5-15.

916. The Mauna Kea Adze Quarry Complex "occupies an area of at least 4,800 acres." Ex. A-5/R-5, App. D at 33. Archaeological evidence indicates that the Mauna Kea Adze Quarry was used by prehistoric Hawaiians for obtaining basalt to make stone implements. Ex. A-9 at 3-15, n.9. The Adze Quarry Complex represents a physical disturbance of the summit area of Mauna Kea that is 774 times larger than the new disturbance proposed for the TMT Project. *Compare* Ex. A-5/R-5, App. D at 33 (noting the Adze Quarry Complex is at least 4,800 acres) *with* Ex. A-3/R-3 at S-6 (stating the TMT Project will disturb 8.7 acres, of which roughly 2.5 acres are previously disturbed).

917. Townsend claimed that the TMT Project constitutes desecration of a sacred place. Tr. 1/10/17 at 119:4-9. This testimony is unpersuasive. Ms. Townsend is not a native Hawaiian and does not engage in traditional or cultural practices related to Mauna Kea. Tr. 1/10/17 at 68:9-11. Ms. Townsend's assertion that the TMT Project constitutes desecration is contradicted by her own admission that the lower part of Mauna Kea was used as an adze quarry. Tr. 1/10/17 at 140:4-141:5. Ms. Townsend's testimony is unpersuasive based on her personal negative feelings against the TMT Project. She admitted that she would oppose the TMT Project even if there was minimal impact. Tr. 1/10/17 at 85:12-22. Ms. Townsend's credibility was questioned based on alleged inconsistent statements. Ex. A-150; Tr. 3/1/17 at 123

918. Importantly, witnesses for the Petitioners and Opposing Intervenors admitted that the summit area was already substantially, if not completely, developed for astronomy use. Townsend described the summit as follows, "There are nearly a dozen telescopes crowded together creating an industrial park atmosphere. It is "urban sprawl and intensifying of land uses". Tr. 1/10/17 at 15:10-17. She goes on to say that there are 20-25 buildings at the summit and that it is "an industrial park up there." Tr. 1/10/17 at 95:13-19. Townsend also testified that during a site visit to Mauna Kea in June 2011, she observed that the landscape at the summit was dominated by industrial land uses, including many telescope facilities and ancillary structures. WDT Townsend at 2; Tr. 1/10/17 at 15:8-15, 67:4-22.

919. Flores is more direct, acknowledging that the Astronomy Precinct is substantially developed. (Flores) Tr. 1/30/17at 234:5-8.

920. Ward testified that she "went back in 1996, and was shocked at how much change there had been in terms of development of the telescopes and the roads and the trash". Tr. 1/31/17 at 109:4-7.

921. Similarly, Pisciotta claims that "[t]he summit area is developed so much so that the TMT cannot fit on it. And the development is now... falling off the side of the summit." Tr. 2/13/17 at 198:7-10.

922. Kihoi "had no idea that all of those structures and telescopes were – had been up there. I didn't know that there was that much". Tr. 2/14/17 at 117:12-14. She admitted there were already 13 observatories atop the mountain, paved roads, power lines, and parking spaces for the various observatories. Tr. 2/14/17 at 120:6-23.

923. Prof. Osorio testified that the Astronomy Precinct is an industrial park, and, essentially a developed area. Tr. 01/12/17 at 137:1-138:12. He also testified that the whole mountain is sacred, but that things are fluid and can change, noting that aliʻi can change things; practices can change as well. Tr. 01/12/17 at 140:1-13.

924. Dr. Kahakalau argued the TMT Project is not compatible with the locality and surrounding area because TMT is not compatible with a sacred place. Tr. 1/9/17 at 125:13-125:25. Although it is undisputed that some native Hawaiians view Mauna Kea as sacred, HAR § 13-5-24 expressly permits astronomical observatories and facilities to be

constructed within the Astronomy Precinct. The Board cannot adopt Dr. Kahakalau's position that her native Hawaiian values and native Hawaiian beliefs concerning Mauna Kea should prevail over any "outsider" opinion. Tr. 1/9/17 at 95:8-95:12.

925. Dr. Abad's opinion that the CDUA does not meet the criterion stated in HAR § 13-5-30(c)(5) ("The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels") is based solely on her view that the CDUA does not meet HAR § 13-5-30(c)(4). Ex. B.08 (WDT Dr. Abad) at 20.

926. The reliable, probative, substantial, and credible evidence demonstrates that the TMT Project is compatible with the locality and surrounding areas and is appropriate to the physical conditions and capabilities of the area.

F. CRITERION SIX, HAR § 13-5-30(C)(6): "THE EXISTING PHYSICAL AND ENVIRONMENTAL ASPECTS OF THE LAND, SUCH AS NATURAL BEAUTY AND OPEN SPACE CHARACTERISTICS, WILL BE PRESERVED OR IMPROVED UPON, WHICHEVER IS APPLICABLE[.]"

927. The evidence presented demonstrates that the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon by the TMT Project. This criterion must be analyzed in the context of the purpose and goals of the resource subzone of the conservation district.

928. Visual or other impacts of a proposed project are site specific. In considering visual impacts here, the TMT Project provides information in the context of the preexisting conditions in the area proposed for a use. Ex. A-1/R-1 at 7-1 to 7-15.

929. The visual landscape in the summit area of Mauna Kea has already been substantially altered and impacted. Ex. A-1/R-1 at 7-1 to 7-2; WDT Hayes at 4-5. It will remain so with or without the TMT Project.

930. Because certain resources such as a clear night time viewing sky location are available only in particular places, limited alternatives for locating properties requiring those resources would outweigh visual or other impacts, even if such impacts are "obvious." The location for the TMT Project is dictated by the combination of natural resources that makes the Project's site uniquely ideal for astronomical observation. *See supra* at FOF Section II.F.

931. Even with some potential environmental or visual impacts to the Conservation District, the TMT Project incorporates appropriate measures and conditions to mitigate the project's adverse impacts. WDT Hayes at 7-22.

932. The TMT Project mitigation does appropriately consider measures designed to diminish although not eliminate altogether the impact of the project visually and in its effect on practices through its chosen location in Area E. Ex. A-1/R-1 at 4-26.

933. For visual impacts, "mitigation" is understood to require reducing adverse impacts, not