

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawaii 96813

December 12, 2014

Chairperson and Members
Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Land Board Members:

SUBJECT: REQUEST FOR APPROVAL IN CONCEPT OF A LONG TERM DIRECT LEASE AND PERMIT USE OF STATE LAND TO THE NATIONAL ECOLOGICAL OBSERVATORY NETWORK, INC. FOR A CORE ECOLOGICAL MONITORING SITE IN THE UPPER WAIAKEA FOREST RESERVE TMK# (3) 2-4-008:001 AND TWO RELOCATABLE SITES IN THE PUU WAA WAA FOREST RESERVE TMK#: (3) 7-1-001:006 ON HAWAI'I ISLAND

BACKGROUND

The National Ecological Observatory Network (NEON) will create new national observatories across the United States including Alaska, Puerto Rico and would like to include Hawai'i. The NEON Project is funded solely by the National Science Foundation and managed by NEON, Inc. a 501(C)(3) non-profit organization. The goal of NEON is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental scale ecology by providing infrastructure to support research, education and environmental management in these areas. This approach will standardize scientific ecological efforts and will enable integrated observatory operations at a continental scale.

NEON has partitioned the U.S. into 20 eco-climatic domains, each of which represents different regions of vegetation, landforms, climate and ecosystem performance. Within these domains, NEON infrastructure and sensor systems will be used to collect site-based data about climate and atmosphere, soils, streams and ponds, and a variety of organisms. NEON will use distributed sensor networks, coordinated airborne observations and experiments – integrated by a communications, command, and control system – to collect ecological data across the continental United States, Alaska, Puerto Rico and Hawai'i. Each domain will host a fully instrumented core site in a minimally managed “wildland” area to operate for the thirty five (35) year lifetime of NEON and two “relocatable” sites that will operate for a limited duration of (15) years.

In May of 2011 NEON visited Hawai'i to meet with DOFAW and US Forest Service (USFS) representatives and identified the proposed site locations both in Upper Waiakea (UW) and Puu Waa Waa (PWW) Forest Reserves (Attachment A). Following this visit, on March 18, 2013 NEON sent Hawaii a “Request for Approval in Concept of Direct Lease” (Exhibit 1).

In September 2014, NEON sent Hawaii a detailed project proposal, created three dimensional renderings of the site infrastructure and has continued discussions with DOFAW and started discussions with USFS to determine the permitting process at the proposed site locations (Exhibit 2). These efforts have led to this submission for an approval in concept. If approval, NEON will work with state and federal agencies to complete the required environmental compliance activities, including completion of the HRS Chapter 343 and a Conservation District Use Permit. NEON will work with DOFAW to develop a scope of work for the environmental assessment including the designation of an "Area of Potential Effect" for each project area. Upon completion of the environmental compliance process, DOFAW will develop a new board submittal for a Direct Lease and Permit to use State Land.

LEGAL REFERENCE:

Section 171-43.1, Hawaii Revised Statutes (HRS), as amended.

"The board may lease, at a nominal consideration, by direct negotiation and without recourse to public auction, public lands to an eleemosynary organization which has been certified to be tax exempt under sections 501(c)(1) or 501(c)(3) of the Internal Revenue Code of 1986, as amended. The lands shall be used by such eleemosynary organizations for the purposes for which their charter was issued and for which they were certified by the Internal Revenue Service. [L 1970, c 83, §5; am L 1971, c 100, §1; am L 1982, c 202, §1; am L 1991, c 212, §3]"

LOCATION:

UW Sites: Portion of Government land situated on Hawai'i Island in North Hilo in the Upper Waiakea Forest Reserve TMK: (3) 2-4-008-001 (Exhibits A & B)

PWW Sites: Portion of Government lands situated on Hawai'i Island in North Kona at PWW Forest Reserve TMK: (3) 7-1-001: portions of 006 (Exhibits C & D).

AREA ACREAGE: (Exhibit E)

UW Site: (Core Site): 5 acre direct lease; 2594 acre Permit to use State Land

PWW Sites: (Remote Sites) 10 acre direct lease; 1725 acre Permit to use State Land

PROPERTY CHARACTERISTICS:

UW Site:

Utilities –The installation of power will be coordinated with the local utility provider and will either be trenched to the site, placed on grade in rigid galvanized steel conduit, a combination of both or the use of solar power.

Slope – Gently sloping

Elevation – 4,400 to 4,500

Rainfall – Approximately 120 inches

Access and Permits – Any Conservation district use permits must be obtained through the Office of Conservation and Coastal Lands and shall be the responsibility of the Applicant. Applicant shall be granted non-exclusive access to the proposed lot along existing roads as part of a potential lease agreement.

PWW Sites:

Utilities – Water, telephone, and electricity are accessible. The relocatable towers may not require grid power and can be operated utilizing a solar array with battery storage, if space is available. If grid power is used at these sites the installation will be coordinated with the local utility provider and will be either trenched or placed on grade in rigid galvanized steel

conduit or a combination of both.

Slope – Gently sloping to steep

Elevation – 2800 to 2930 feet

Rainfall - 19 to 29 inches

NRCS Soil Series – 1) Puu Pa series consists of moderately deep, well drained soils that formed in material weathered from volcanic ash. 2) Mawae series consists of moderately deep, well drained soils that formed in organic material mixed with minor amounts of basic volcanic ash in aa lava.

Subdivision and Access – Legal access to the proposed US Forest Service research areas shall be the responsibility of the Applicant. Applicant shall be granted non-exclusive access to the proposed lot along existing roads as part of a potential lease agreement.

ZONING: State Land Use District:

UW Site: Conservation District - Protective Subzone

PWW Sites: Agriculture

TRUST LAND STATUS:

UW Site: Section 5(b) lands of the Hawai‘i Admission Act - YES

DHHL 30% entitlement lands pursuant to the Hawai‘i State Constitution - NO

PWW Sites: Section 5(b) lands of the Hawai‘i Admission Act - YES

DHHL 30% entitlement lands pursuant to the Hawaii State Constitution - NO

CURRENT USE STATUS:

UW Site: Part of the Upper Waiakea Forest Reserve

PWW Sites: Part of the Puu Waa Waa Forest Reserve

CHARACTER OF USE:

UW Site: Predominantly native forest land; public hunting area

PWW Sites: Forest grassland and grassland; watershed and natural resources research, education; public hunting area

LEASE TERM:

UW Site: 35 years

PWW Sites: 15 years

COMMENCEMENT DATE: The first day of the month to be determined by the Chairperson.

ANNUAL RENT: To be determined

CHAPTER 343 – ENVIRONMENTAL ASSESSMENT

This action is a request for the Land Board’s approval in concept of a lease to the NEON and to instruct the NEON to comply with Chapter 343, Hawai‘i Revised Statutes, as amended.

APPLICANT REQUIREMENTS: Applicant shall be required to prepare process or obtain at its own cost:

- 1) All necessary studies and documentation for compliance with Chapter 343, Hawai‘i

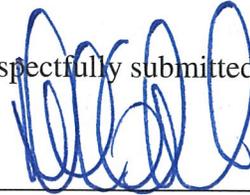
- Revised Statutes, as amended;
- 2) The NEON shall provide survey maps and descriptions according to State Department of Accounting and General Services Survey Division standards and at NEON's own cost.

RECOMMENDATIONS:

That the Board of Land and Natural Resources:

- 1) Approves in concept, a direct lease to NEON for the purposes of research subject to the following:
 - a) At its own cost the NEON shall be responsible for compliance with Chapter 343, Hawai'i Revised Statutes, as amended and the Conservation District permit processes.
 - b) The NEON shall provide survey maps and descriptions according to State Department of Accounting and General Services Survey Division standards at NEON's own costs;
 - c) The NEON shall be responsible to process subdivision of the proposed sites, should they be necessary, while following all requirements of the Office of Conservation and Coastal Lands and the County of Hawai'i Island;
 - d) Such other terms and conditions as may be prescribed by the Chairperson or the Department of the Attorney General that best serve the interests of the State;
 - e) That NEON provides recent evidence of 501(c)(3) Non-Profit status and complies with the mandated goals of this organization.

Respectfully submitted,



 Lisa J. Hadway, Administrator
Division of Forestry and Wildlife

APPROVED FOR SUBMITTAL:


WILLIAM J. AILA, JR., Chairperson
Board of Land and Natural Resources

Attachment A: Hawaii Island Proposed Site Locations
Exhibit A & B: Waiakea Site Locations
Exhibit C & D: PWW Site Locations
Exhibit E: Table of Total Acreage of Sites
Exhibit 1: NEON Request Letter Jul 22, 2013

Exhibit 2: NEON Research Proposal dated September 2014

Attachment A Proposed Site Locations



Hawaii Candidate Sites NEON Domain 20 - Pacific Tropical



Sources: Esri, GEBCO, NOAA, National Geographic, Belorus, NAVTEQ, Geonames.org, and other contributors.

Scale: 1:900,000

- Candidate Core Tower
- Candidate Retocatable Tower
- Tax Map Key Parcel

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July 22, 2013

Mr. Roger Imoto
Division of Forestry and Wildlife
1151 Punchbowl St., Room 325
Honolulu, HI 96813

Reference: Approval in Concept of Direct Lease to National Ecological Observatory Network, Inc. for the construction and operation of three ecological monitoring sites at Pu'uWa'awa'a Forest Reserve and Upper Waiakea Forest Reserve, Hawaii.

Dear Mr. Imoto:

The National Ecological Observatory Network, Inc. (NEON) would like to submit a request for an "Approval in Concept" of Direct Lease for the construction and operation of three NEON ecological monitoring sites in Hawaii. NEON is requesting Approval in Concept for a Direct Lease at two locations in Pu'u Wa'awa'a and for one location in the Upper Waiakea Forest Reserve.

NEON will create a new national observatory to collect ecological and climatic observations across the continental United States, including Alaska, Hawaii and Puerto Rico. NEON has partitioned the U.S. into 20 eco-climatic domains, each of which represents different regions of vegetation, landforms, climate, and ecosystem performance. Within these domains, NEON infrastructure and sensor systems will be used to collect site-based data about climate and atmosphere, soils, streams and ponds, and a variety of organisms. NEON will use distributed sensor networks, coordinated airborne observations and experiments—integrated by a communications, command, and control system—to collect ecological data across the continental United States, Alaska, Hawaii and Puerto Rico. Each domain will host a fully instrumented core site in a minimally managed "wildland" area to operate for the 35 year lifetime of NEON and two "relocatable" sites that will operate for a limited duration of 12 years.

The goal of NEON is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental scale ecology by providing infrastructure to support research, education and environmental management in these areas. The NEON approach will standardize scientific ecological efforts and will enable integrated observatory operations at a continental scale. NEON is funded by the National Science Foundation (NSF).

The NEON site selection parameters in Hawai'i are fundamental in understanding the connectivity of the ecology among the NEON Domains and will also support the study of immediate ecosystem responses to the stressors. Equally important will be NEON's ability to provide key, basic data to support local land use, conservation, preservation, and policymaking. The Pacific Tropical Domain, encompassing the Hawaiian Islands, is significant in helping to understand the interplay of human and natural systems.

The Division Of Forestry and Wildlife (DOFAW) focuses its resources to protect, manage, restore, and monitor the natural resources of the Forest Reserve System, which aligns with NEON's overall mission to enable the understanding and forecasting of the impacts of climate change, land use change and invasive species on continental-scale ecology – by providing infrastructure and consistent methodologies to support research and education in these areas. In addition, NEON will make all data, infrastructure for research, and educational tools free and publicly accessible. This open-access approach to sharing data will enable the local and greater Pacific Island research community to map, understand, and predict the effects of human activities on ecology and effectively address ecological questions and issues specific to the local ecology.

In May of 2011 NEON visited Hawaii to meet with DOFAW and USFS representatives and identified the proposed site locations. Following this visit NEON developed a detailed project proposal, created three dimensional renderings of the site infrastructure, and has continued discussions with DOFAW and USFS to determine the permitting process at the proposed site locations. These efforts have led to this submission for an approval in concept. If an approval in concept is received NEON will work with state and federal agencies to complete the required environmental compliance activities, including completion of the HRS Chapter 343 process. NEON will work with DOFAW to develop a scope of work for the environmental assessment including the designation of an Area of Potential Effect for each project area. Once the environmental compliance process is complete NEON will develop a new board submittal for a Direct Lease.

Proposed Site Locations:

Core Site:

Following the development of the Hilo Forest Reserve in 1904, and the addition of portions of the Tract to the reserve system in 1905 and 1913, there was also set aside, the upland portions of Waiākea as a reserve. This established a contiguous line of forest across the Hilo District, and adjoining the Puna District.

In the Upper Waiākea Forest Reserve, NEON has identified a location to be used as the NEON Core site. At the proposed core site, a tower will be utilized to mount NEON infrastructure. An instrument hut will be built near the tower to house gas analyzer instruments and other equipment. The hut will also contain communications and control hardware that transmits data back to the NEON central repository. There will be a double fence intercomparison reference (DFIR) precipitation gauge installed at the site across the road from the proposed tower location and a temporary soil horizon test pit for the collection of soil horizon and belowground biomass data. The soil pit and DFIR locations are shown on the attached maps. NEON also proposes to deploy terrestrial sampling near the tower site location and within the boundary shown on the attached maps.

NEON is requesting a direct lease of a 5 acre area in the Upper Waiākea Forest Reserve for the construction and implementation of the NEON tower and its related infrastructure for the 35 year duration of the project. The boundary depicted in the attached maps totals 2594 acres and would be utilized for the terrestrial sampling activities. The larger boundary of 2594 acres would be permitted through the special use permitting process for non-exclusive use.

Relocatable Sites:

The Pu'uWa'awa'a Experimental Forest Unit is located on lands managed by the Department of Land and Natural Resources (DLNR). The sites are administered by the DLNR Division of Forestry and Wildlife (DOFAW) and the USDA Forest Service under a 35-year Cooperative Agreement establishing the Hawaii Experimental Tropical Forest. The Pu'uWa'awa'a Experimental Forest Unit incorporates a number of land designations spanning multiple agencies within DLNR. Approximately 31,475 acres (12,743 ha) are currently unencumbered State land that are in the process of being re-designated as Forest Reserve, and together with the 3,806 acre (1,542 ha) Forest Bird Sanctuary, are managed through DOFAW. The remaining 3,530 acres (1,430 ha) are managed by the DLNR Division of State Parks. In addition there are approximately 74 acres (30 ha) of private in holdings within the HETF boundaries.

Two NEON Relocatable Sites are proposed for deployment in the Pu'uWa'awa'a Experimental Forest. The relocatable sites are planned for a limited duration deployment of approximately 12 years. At the proposed Pu'uWa'awa'a sites, two towers will be utilized to mount NEON infrastructure. A small instrument hut will be built near each tower to house gas analyzer instruments and other equipment. Each instrument hut will also contain communications and control hardware that stores or transmits data back to the NEON central repository. There will be two temporary soil horizon test pits near each tower location for the collection of soil horizon and belowground biomass data and the proposed locations are depicted on the attached maps. NEON will also deploy terrestrial sampling near each tower site, and within the boundary depicted on the attached maps. The attached maps and three dimensional rendering show the proposed site locations and infrastructure in greater detail.

NEON is requesting a direct lease of two 5 acre areas for the construction and implementation of each tower and its related infrastructure for the 12 year duration of the project. The Pu'uWa'awa boundary depicted on the attached maps totals 1724.7 acres and would be utilized for terrestrial sampling activities. The larger boundary would be permitted through the special use permitting process for non-exclusive use.

NEON is requesting Approval in Concept for the NEON project at the proposed sites. This approval will allow NEON to commit the necessary resources to complete the HRS Chapter 343 process and develop a new board submittal for a Direct Lease. If you have any questions or concerns, please do not hesitate to contact me at 720-746-4897, or via email at lwright@neoninc.org. Thank you for your time in reviewing NEON's proposal and we look forward to discussing the NEON project in more detail.

Sincerely,
Liz Wright
Environmental Permitting Coordinator
National Ecological Observatory Network, Inc.

Cc: Elizabeth Blood, NSF NEON Program Officer
Krista Laursen, NEON Project Manager and Chief Operating Officer

Attachments:

Attachment A: Proposed Site Locations

Attachment B: Topographic Vicinity Map of the Upper Waiakea Forest Reserve Core Site

Attachment C : Tax Key Map of the Upper Waiakea Forest Reserve Core Site and Infrastructure

Attachment D: Topographic Vicinity Map of Pu'uWa'awa'a Relocatable Sites

Attachment E: Vicinity Map of Pu'u Wa'awa'a sites

Attachment F: Tax Key Map of Pu'u Wa'awa'a Grassland and Forest Relocatable Sites and Infrastructure

Attachment G: Rendering of Pu'u Wa'awa'a Relocatable Sites-Grassland Site

Attachment H: Rendering of Pu'u Wa'awa'a Relocatable Site-Forested Site

Attachment I: Pu'uWa'awa'a Boundary information

**Proposal for Approval in Concept
for
Upper Waiākea Reserve Core Site
and
Pu‘u Wa‘awa‘a Relocatable Sites
September 2014**



Abstract

National Ecological Observatory Network

NEON will create a new national observatory to collect ecological and climatic observations across the continental United States, including Alaska, Hawaii and Puerto Rico. NEON has partitioned the U.S. into 20 eco-climatic domains, each of which represents different regions of vegetation, landforms, climate, and ecosystem performance. Within these domains, NEON infrastructure and sensor systems will be used to collect site-based data about climate and atmosphere, soils, streams and ponds, and a variety of organisms. NEON will use distributed sensor networks, coordinated airborne observations and experiments—integrated by a communications, command, and control system—to collect ecological data across the continental United States, Alaska, Hawaii and Puerto Rico. Each domain will host a fully instrumented core site in a minimally managed “wildland” area to operate for the 30-year lifetime of NEON and two “relocatable” sites that will operate for a limited duration.

The goal of NEON is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental scale ecology by providing infrastructure to support research, education and environmental management in these areas. The NEON approach will standardize scientific ecological efforts and will enable integrated observatory operations at a continental scale. NEON is solely funded by the National Science Foundation (NSF).

The NEON project considered the perspectives proposed in the National Science Foundation’s Grand Challenge questions. As part of the NEON design, the site selection parameters in Hawai’i are fundamental in understanding the connectivity of the ecology among the NEON Domains--as well as the need to reveal immediate ecosystem responses to the stressors. Equally important will be NEON’s ability to provide key, basic data to support local land use, conservation, preservation and policymaking. The Pacific Tropical Domain is significant in helping to understand the interplay of human and natural systems.

Division of Forestry and Wildlife

The Forest Reserve System was created by the Territorial Government of Hawai’i through Act 44 on April 25, 1903. With Hawaii's increase in population, expanding ranching industry, and extensive agricultural production of sugarcane and later pineapple, early territorial foresters recognized the need to protect mauka (upland) forests to provide the necessary water requirements for the lowland agriculture demands and surrounding communities.

With its inception, the Forest Reserve System (FRS) represented a public-private partnership to protect and enhance important forested mauka lands for their abundance of public benefits and values. Though this original partnership has evolved over the decades, today the tradition is carried on by the Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) for public Forest Reserve lands. The Forest Reserve System is managed under the guidance of the Hawai’i State Constitution, Hawai’i Revised Statutes (Chapter 183) and associated Hawai’i Administrative Rules (Chapter 104). Through these directives DOFAW focuses its resources to protect, manage, restore, and monitor the natural resources of the FRS. Keeping with the original intention of the FRS, DOFAW provides recreational and hunting opportunities; aesthetical benefits; watershed restoration; native, threatened, and endangered species habitat protection and management; cultural resources; and fire protection among many other things.

NEON Project Locations

Core Site

Following the development of the Hilo Forest Reserve in 1904, and the addition of portions of the Upper Waiākea tract to the reserve system in 1905 and 1913, there was also set aside, the upland portions of Waiākea as a reserve. This established a contiguous line of forest across the Hilo District, and adjoining the Puna District.

In the Upper Waiākea Forest Reserve, NEON has identified a location to be used as the NEON Core site. At this proposed core site in the Upper Waiākea Forest Reserve a fully instrumented NEON tower is proposed which includes an instrument hut, five soil plots with instrumentation, pathways, and conduit for electrical and communications.

Relocatable Sites

The Pu‘u Wa‘awa‘a Experimental Forest Unit is located on lands managed by the Department of Land and Natural Resources (DLNR). The sites are administered by the DLNR Division of Forestry and Wildlife (DOFAW) and the USDA Forest Service under a 35-year Cooperative Agreement establishing the Hawaii Experimental Tropical Forest. The Pu‘u Wa‘awa‘a Experimental Forest Unit incorporates a number of land designations spanning multiple agencies within DLNR. Approximately 31,475 acres (12,743 ha) are currently unencumbered State land that are in the process of being re-designated as Forest Reserve, and together with the 3,806 acre (1,542 ha) Forest Bird Sanctuary, are managed through DOFAW. The remaining 3,530 acres (1,430 ha) are managed by the DLNR Division of State Parks. In addition there are approximately 74 acres (30 ha) of private in holdings within the HETF boundaries.

There are two NEON Relocatable Sites are proposed for deployment in the Pu‘u Wa‘awa‘a Experimental Forest. The relocatable sites are planned for limited duration deployment and instrumentation is limited. Each of the proposed sites is discussed in detail in the following proposal.

Research Design

Pre-Construction and Site Characterization Activities

Before construction commences at the site, NEON scientific and facilities construction teams will conduct preparatory work to collect information about the site's requirements, a process known as site characterization. They will interact with the Division of Forestry and Wildlife, DOFAW, and subject matter experts (in fauna, flora, soils, water, infrastructure, etc.) to gather information (wind, biota composition, biota distribution, digital datasets, etc.) that will be used in the planning and civil construction site design.

The Fundamental Instrument Unit (FIU) site characterization has been completed in May, 2011 at the proposed sites. This minimally invasive FIU characterization activity included:

- Identification of the ecosystem and site attributes of the tower site.
- Description of the preliminary site design and tower attributes.
- Detail of the soil array and soil pit information.
- Description of location of precipitation collection device(s)
- Completion of a site characterization report to inform the site design process

Once the site characterization activities are completed, NEON Facilities and Civil Construction (FCC) team, comprised of four to five persons comprising both NEON, Inc. personnel and its contractors, would visit the site for approximately two weeks to complete a professional land survey and geotechnical study.

- Detailed site survey to develop base plans used in civil construction design drawings.
- Identification of locations for boardwalks and paths, precipitation collection device, instrument hut, tower and the utility route. NEON does not plan to construct new roads.
- The survey activity will be coordinated with the DOFAW and routes of entry into the site will be determined prior to the work being performed.
- A geotechnical study would be performed at the core site only. NEON typically removes a soil core to a maximum depth of 25 ft. This would be used to design the tower foundation specific to the location. NEON has utilized alternative methods in the past if drilling a sampling is not an allowable activity.

Environmental Permitting

NEON will work directly with state and federal agencies to complete the required environmental compliance activities, including completion of the HRS Chapter 343 process. NEON will work with DOFAW to develop a scope of work for the environmental assessment including the designation of an Area of Potential Effect for each site. Once the environmental compliance process is complete NEON will develop a new board submittal for a Direct Lease of the property.

The site survey and site design process would begin following an approval in concept to generate site specific detail that will be critical to meeting all environmental compliance requirements. It is anticipated that this process would begin January 2015.

Construction Activities and Design Factors

Core Site

NEON FCC team of four to eight persons comprising both NEON, Inc. personnel and its contractors, would require access to the site for the duration of the construction period. NEON would employ a Construction Site Supervisor to oversee all contractor actions, implement health and safety protocols, and track daily activity at the site. The environment at every NEON site will be protected to the maximum extent possible during construction. Strict guidelines and considerations will apply to materials used in construction to minimize their impact on the environment NEON will employ best management practices (BMPs) in all construction design and activities. NEON will construct the site and will have three phases of instrumentation to be installed by a NEON Systems Integration and Verification team.

Site Infrastructure Overview

At the proposed core site, a lattice style galvanized steel tower will be utilized to mount NEON instrument as shown in Figure 1. An instrument hut will accompany the tower and would be built adjacent to the tower to house gas analyzer instruments and other equipment. The hut will also contain communications and control hardware that transmits data back to the NEON central repository. The individual components for the tower are further described below.



Figure 1: 26 ft. tower at the Santa Rita Experimental Range

Auxiliary Portal

The Auxiliary Portal (AP) will be located near power at the Core site along the Stainback Highway and will be used to supply tower for the project.

Boardwalks and Paths

Paths on the site will be designed to direct personnel along the preferred access routes and will measure

no wider than four feet. Boardwalks or improved paths are currently planned for access to and from the instrument hut, tower, and soil array. Unimproved, marked pathways can also be used for site access. By marking a specified pathway, this will help to reduce the site disturbance.

Fencing and Security

Security and protection from both humans and animals will be provided at all tower sites. As needed, the base of the tower will be enclosed by fencing to ensure the safety of large animals and protection of the instruments. The tower will have a locked gate at the base of the tower to restrict access from any non-NEON employees, and the instrument hut will have a locked door. The site will also display signage notifying the public of restricted access, requirement of hard hats and safety gear, and violations will be subject to federal law.

Instrument Hut

There will be an Instrument Hut (IH) near the base of the tower at the core site. The IH will house electronic instrumentation and other equipment associated with the tower, as well as inert gas bottles, tools, safety equipment, and other items for use during operations. The IH will be brought to the site by manpower or small vehicles such as ATVs using the existing road access. The design uses a base frame mounted, high performance, foam insulated, steel face panel modular structure that can be delivered in pieces and bolted together providing a tight assembly capable of withstanding the temperature, humidity, rain/snow and wind conditions. The outer façade of the IH can be seen in Figure 2.

Hut foundations will be site specific based on both the geotechnical characteristics of the site as well as the ecology of local plant and wildlife.



Figure 2: Instrument Hut at Blandy Experimental Farm

Power and Signal Distribution

Preliminary designs and estimates for power to the site would be generated with the local utility. NEON

would work with DOFAW to determine the appropriate power source. Where acceptable by local code and the owner, conduit may be placed on the surface of the ground and extend along the site boardwalk. Any underground utilities will be trenched and completed with a standard walk-behind trencher to minimize impacts. Extended overhead lines to the auxiliary portal would be kept clear of trees by hand clearing as necessary for the duration of the NEON project.

Precipitation collection

A Double Fence Intercomparison Reference (DFIR) is a primary standard precipitation collection system that will be deployed near the proposed core site tower location. This assembly contains a weighing-type precipitation collector, one metal altar shield and two double wooden octagonal fences following U.S. Climate Reference Network (USCRN) specifications, as shown in Figure 3 and 4. Deployment of wind shields and fences improves the ability to measure both liquid and solid precipitation without contamination from horizontal winds.



Figure 3: Side View DFIR



Figure 4: DFIR Precipitation Gauge

Site Access

General vehicular access to the Domain sites will be restricted during both construction and operations. A parking area for four vehicles will be designated at the point of closest existing road access. Beyond the

parking area, site access will be on foot. Where acceptable to DOWFAW, all-terrain vehicles may be used during operations to move gas canisters, sensors and miscellaneous equipment. At the proposed locations it is anticipated that NEON will develop a 40 m x 40 m staging and parking pad to be utilized during construction and operations of the sites.

Soil Array

There would be five soil array plots measuring ~82 sq. ft. each, which would array out from the tower typically in the direction of the prevailing wind. The individual plots would be located ~33 ft. from the path. There would be a soil array post adjacent to the path to delineate the location of the plots. The posts would measure 54 in. tall with two sign posts mounts extended to a maximum depth of 4 ft. below grade. The plots would each have a long (96") arbor and a short (60") arbor to be installed, and this would provide infrastructure to provide power and communications to the individual sensors in the plot.

Each plot would have several in ground and above ground sensors installed and each hole would be approximately 2.5 inches in diameter and would either be vertical or at a 45 degree angle, depending on the particular measurement to be collected and the depth is site specific with maximum depth of 7 ft. The soil array holes would be made using a portable Geoprobe machine. The individual boreholes for sensors would be placed to avoid any special status species, if necessary. The sensors would capture several soil, plant and air measurements including temperature, moisture content and CO2 levels.

Soil Horizon Pit

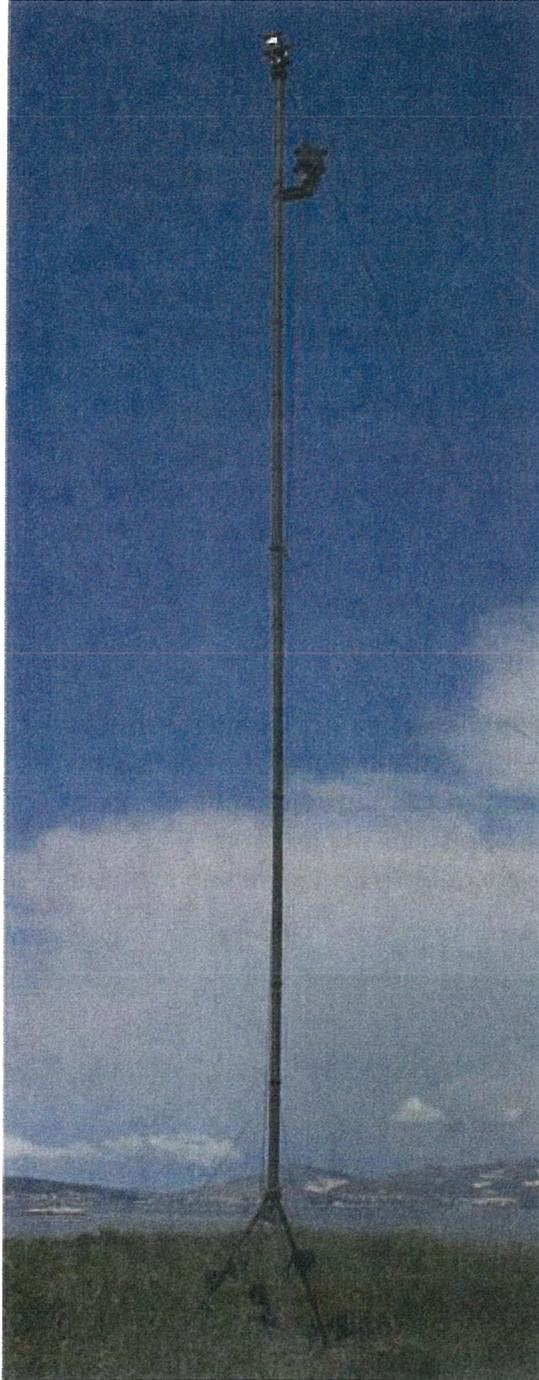
The soil horizon pit would be excavated, 5 ft. x 6 ft. and up to a maximum depth of 7 ft. The pit would be open for approximately one week for NEON scientists to collect soil samples and label the horizons, as shown in Figure 5. The pit would be covered with plywood when not in use and surrounded by a construction fence. NEON would utilize a temporary access path to the pit that will measure approximately 3 ft. wide. Upon completion of the science work, the pit would be backfilled and returned to its original condition.



Figure 5: NEON FIU scientists removing a sample from the soil horizon

Relocatable Sites Infrastructure

The NEON facilities construction team, numbering four to eight persons comprising both NEON, Inc.



personnel and its contractors, will require access to the site for the duration of the construction period. NEON will employ a Construction Site Supervisor to oversee all contractor actions, implement health and safety protocols, and track daily activity logs at the site. The environment at every NEON site will be protected to the maximum extent possible during construction. Strict guidelines and considerations will apply to materials used in construction to minimize their impact on the environment. NEON will employ best management practices (BMPs) in all construction design and activities.

Site Infrastructure Overview

At each of the proposed sites, a tower will be utilized to mount NEON infrastructure and will look markedly different than the tower at the core site, as seen in Figure 5. A small instrument hut will be built near each tower to house gas analyzer instruments and other equipment. The huts will also contain communications and control hardware that stores or transmits data back to the NEON central repository. The individual components for the two relocatable sites are further described below.

Boardwalks and Paths

Paths on the site will be designed to direct personnel along preferred access routes and will measure no wider than four feet. Boardwalks are currently not planned for access at the relocatable sites; however, improved or marked, unimproved paths may be utilized.

Fencing and Security

Security and protection from both humans and animals will be provided at all tower sites. Where needed to protect the site from intrusion or to ensure the safety of animals, the base of the tower and guy wires will be enclosed by fencing.

Figure 6: Prototype relocatable tower

Instrument Hut

There will be an Instrument Hut (IH) near the base of each relocatable tower. The IH will house electronic instrumentation and other equipment associated with the tower, as well as gas bottles, tools, safety equipment, and other items for use during operations. The IH will be brought to the site by manpower or small vehicles such as ATVs using the existing road access. The design envisions a small structure that can

be delivered to the site that would likely be kept on a trailer bed, reducing the foundation impact of the instrument hut.

Power and Signal Distribution

The preferable method of power for the relocatable towers would be to utilize a grid tied electrical line. This would require an auxiliary portal to be placed at the entrance to each site, similar to the core location. NEON would work with DOFAW to determine the appropriate power source and preliminary designs and estimates for power would be generated with the local utility. Where acceptable by local code and the landowner, on grade conduit may be placed on the ground and extend along the site pathways. Any underground utilities would be trenched and completed with a standard walk-behind trencher to minimize impacts.

If grid tied power is not an option, there are two alternatives that NEON could utilize. A solar array with storage batteries would be an option, but the required size of the array is unknown at this time and could require additional space. Also, a liquid propane generator would be another alternative power source which would be constantly running to provide power to the instruments and the hut.

Site Access

General vehicular access to the Domain sites will be restricted during both construction and operations. A parking area for four vehicles will be designated at the point of closest existing road access. Beyond the parking area, site access will be on foot. Where acceptable to the owner, all-terrain vehicles may be used during operations. At the proposed locations it is anticipated that NEON will develop parking areas.

Soil Horizon Pit

There would be a soil horizon pit that would be excavated at both relocatable locations. The pit would measure approximately 5 ft. x 6 ft. and up to a maximum depth of 7 ft. The pit would be open for one week to allow NEON scientists to collect soil samples and label the horizons. The pit would be covered with plywood when not in use and surrounded by a construction fence. NEON would utilize a temporary access path to the pit that will measure approximately 3 ft. wide. Upon completion of the science work, the pit would be backfilled and returned to its original condition.

Operations

The three NEON sites will be managed by a Field Operations Domain Manager, who will have a supporting staff of approximately five full-time-equivalent (FTE) field technicians. The Domain Manager will be the point of contact (POC) for the DOFAW once the sites transition to Operations. Typically, two field technicians will visit a site at any given time. The Domain Manager would operate out of a support facility located within the domain and within proximity of either the core or relocatable sites, and would be identified at a later time.

Airborne Observation Platform (AOP)

The NEON Airborne Observation Platform (AOP) is designed to measure the effects of land use change, and changes in vegetation state and ecosystem functioning including the presence and effects of invasive species through the use of airborne remote sensing technologies. Airborne spectroscopy and waveform LiDAR would quantify plant species type and function, and vegetation structure and heterogeneity at the scale of individual shrubs and larger plants. Panchromatic photography (30 cm resolution) would retrieve

fine-scale information on land use, roads, impervious surfaces, and built structures.

The AOP is aircraft-mounted and operated instrumentation and will not result in any ground impacts to the three sites. Flyovers would occur once a year. Flight paths have not been established, but would be coordinated with the Federal Aviation Administration and local air traffic control prior to any flights. NEON would have field staff perform minimal groundwork at selected plot locations, including setting up temporary equipment to link with the in-flight equipment.

During operations, NEON will survey each of the NEON sites on an annual basis. The flight season will generally extend from May till October or during the peak greenness period. The standard flight operations are divided into domains, with approximately one week being allocated for each domain. Flights are planned “campaign style” with domains being surveyed one week after another throughout the flight campaign.

Fundamental Instrument Unit (FIU)

Year round, at least two field technicians would spend time at each site every two weeks to perform sensor maintenance, process consumables, and collect site samples for off-site analyses. NEON would be present at all three sites throughout the operational phase of the project, the core site would be for a 30 year period.

Fundamental Sentinel Unit

Site Characterization Activities

NEON has selected specific groups of terrestrial organisms (referred to as sentinel taxa) and biogeochemistry of soil and plants to study as key indicators of environmental change. These organisms were selected to include varying lifespans and generation times, and wide geographic distributions to allow for standardized comparisons across the continent.

During the site characterization and construction period of the NEON Project they will develop standardized sampling designs and protocols with external review and input, and these protocols will continue to be reviewed and revised throughout the 30 year time span of the observatory. The terrestrial biological sampling will include bird diversity, small mammal diversity, population dynamics and diseases, tick-borne diseases, mosquito diversity, phenology and diseases, ground beetle diversity, plant phenology, diversity, biogeochemistry, productivity, and biomass(both above and below ground biomass), soil biogeochemistry, and soil microbial diversity and function. At each NEON site there are approximately 30 plots distributed throughout the site. In addition, there is one plant phenology transect and 5-20 vegetation and soil plots located within the tower air shed.

During the construction phase of the NEON project the Fundamental Sentinel Unit will begin their site characterization activities in anticipation of transitioning to field operations. These activities include:

- Desktop geo-spatial analyses of each site to determine potential plot locations based on vegetation type, topography, and site boundary information. During the desktop analysis, approximately 80 plot locations are identified with approximately half of those locations intended

as contingency plots. A contingency plot will be used if one of the first 40 potential plot locations is not suitable or if there is a future need to capture additional site variation. A minimum of 5 plots will be established in each major vegetation type.

- If needed, field validation of the potential plot locations is conducted to ensure that all locations are feasible from an on-the-ground perspective. This includes walking or hiking to each plot point and validating the location (using GPS), vegetation type, and assessing the logistical feasibility of each plot.
- There will also be limited insect sampling to test for species presence and to build baseline data for each site; limited plant sampling and vegetation surveys to collect data about plant species at each site; limited small mammal sampling and bird observations at each site; and limited soil sampling to gather site specific data.
- All plot locations and sampling activities are subject to review and approval by DOFAW and all required local, state and federal permits will be in place prior to starting any work.

Operations

During NEON operations the Domain Manager will be responsible for hiring and overseeing a crew of field technicians who will carry out terrestrial sampling in accordance with the protocols developed by the Fundamental Sentinel Unit.

Prior to the first sampling season in operations the FSU will determine preferred plot locations for the distributed plots (including co-located bird grids, small mammal grids/plots and tick drag plots), tower airshed plots, and plant phenology transect. Each location will be submitted to DOFAW for review and approval. Once the plot locations have been approved the field crews would begin the process of plot establishment which involves the placement of permanent and/or temporary plot markers, collecting GPS data on each location and assessing the logistical feasibility of each plot.

Terrestrial sampling is distributed throughout each site according to three different strategies:

Tower Plots are located within the tower airshed (located within the dominant site vegetation type) to optimize linkages with flux and phenocam data from tower infrastructure. Protocols associated with tower plots include:

- Plant productivity, below-ground biomass, above-ground biomass, litter, biogeochemistry, and large woody debris (5-20 plots)
- Soil microbes and biogeochemistry (soil cores and underground sensors in 5-20 plots)
- Plant phenology (one square 'loop' transect)

Distributed Plots are located throughout each site according to a stratified random sampling design to include 30 plots. Sampling would include the following:

- Breeding landbird point counts located in adjacent to plots (9 points in up to 10 plots);
- Small mammal trapping grids located near plots;
- Tick collections (drag cloth and CO₂ trap) located adjacent to up to 10 plots;
- Mosquito CO₂ light trap collections located in up to 10 plots;
- Beetle pitfall trap collections located in distributed plots at up to 10 locations;
- Plant biodiversity observations located in all distributed plots;
- Leaf area index located in all distributed plots;
- Above-ground biomass and plant productivity measurements located in all distributed plots

(woody stem mapping, sampling includes clip harvesting of herbaceous vegetation, leaf area index measurements);

- Coarse woody debris monitoring (and when necessary collection of small samples to determine biomass) at all distributed plots;
- Belowground biomass collection at all distributed plots;
- Litter collections using baskets and soil samples in all distributed plots;
- Plant biogeochemistry collections located in all distributed plots;
- Soil biogeochemistry collections located in all distributed plots; and
- Soil microbe collections located in all distributed plots

Gradient Plots would be established as needed along topographical and/or vegetation gradients in order to optimize biogeochemical sampling and validation of AOP data. Locations for these plots cannot be determined a priori; 1-3 years of data is necessary to determine if the Distributed Plots described above sufficiently capture gradients present at a site.

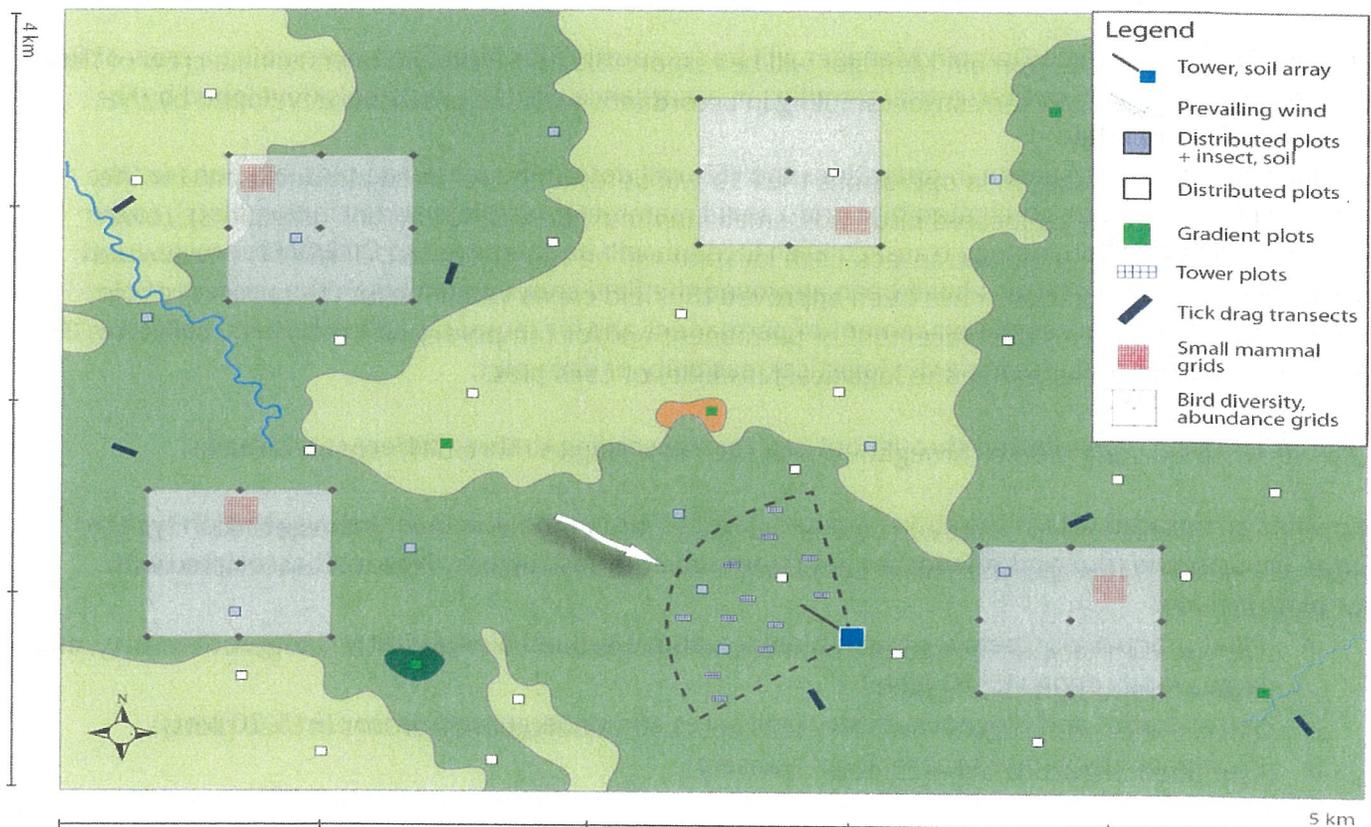


Figure 7: Terrestrial Observation System sampling design

Protocols that will be associated with the Distributed Plots include soil microbes; plant diversity; ground beetle diversity; mosquito diversity, phenology, and infectious disease; plant biogeochemistry; soil biogeochemical processes, small mammal diversity, demography, and disease, avian diversity, and tick-borne diseases. Soil microbe, plant diversity, plant biogeochemistry, and soil biogeochemical sampling will be collocated in 5 – 30 (depending on taxa) Distributed Plots.

Sampling for mosquitos, beetles, ticks, small mammals, birds will be collocated with these measurements in a subset of these plots. Within each of the Distributed Plots, sampling will be allocated to specific areas

in order to minimize disturbances that would affect the data. For example, plant diversity data will be collected from the center of most Distributed Plots in order to minimize the effects of trampling from more frequent sampling protocols (e.g. collection of soil samples). Additional restrictions to sampling at Distributed Plots include:

- Small mammal trapping grids will be placed at a subset of Distributed Plots with the added plot selection criterion that there are logistical constraints on the ability to transport bulky sampling equipment (maximum distance of 500 m from the nearest road) while maintaining the same proportional distribution by habitat as determined by the stratified random approach. Grids are located at a minimum of 30 meters from the edge of select Distributed Plots to avoid disturbance to other sampling efforts.
- Bird point count grids are centered just outside of a subset of Distributed Plots to avoid disturbance to other sampling efforts. Bird grids are situated so that they lie primarily within one habitat type and are proportionally distributed by habitat as determined using the stratified random approach.
- Ticks (to study tickborne disease) will be sampled in subplots just offset of the base Distributed Plots in order to minimize the impact of activity on tick-capture rates.

All plot locations and sampling activities are subject to review and approval by DOFAW and all required local, state and federal permits will be in place prior to starting any work.

Rehabilitation and Reclamation

After the life span of the site, NEON will return the site to existing conditions as per DOFAW's requirements. Any existing infrastructure would be disassembled and removed from the property. Any below grade infrastructure (concrete footings) would likely remain and be covered since the impact to remove the concrete would cause additional environmental impact.

Action Plan

The sites selected for consideration for Domain 20 are shown in the attached appendix. Due to the complex nature of these three sites, NEON will work to communicate with all involved parties during the agreement, construction, and operations phases.

- NEON understands that the DOFAW is responsible for any final Chapter 343 decisions regardless of who conducts the analyses.
- NEON will submit a statement of work for review and approval by DOFAW prior to beginning any required environmental assessment work.
- NEON will endeavor to communicate with all involved parties and will establish Diana Scott as the NEON permitting contact.

Timeline

NEON anticipates the following timeline for the NEON project:

2014

- September: NEON to submit formal proposal for review and approval in concept
- November/December: NEON to present proposal to DOFAW board for review
- December: DOFAW to respond to NEON proposal

2015

- January: NEON to scope and begin work on required NEPA process and begin planning site survey activities
- NEON to conduct site specific environmental surveys for all three sites
- Chapter 343 process ongoing
- Site Design submitted to DOFAW for review
- Public meetings conducted as needed

2016

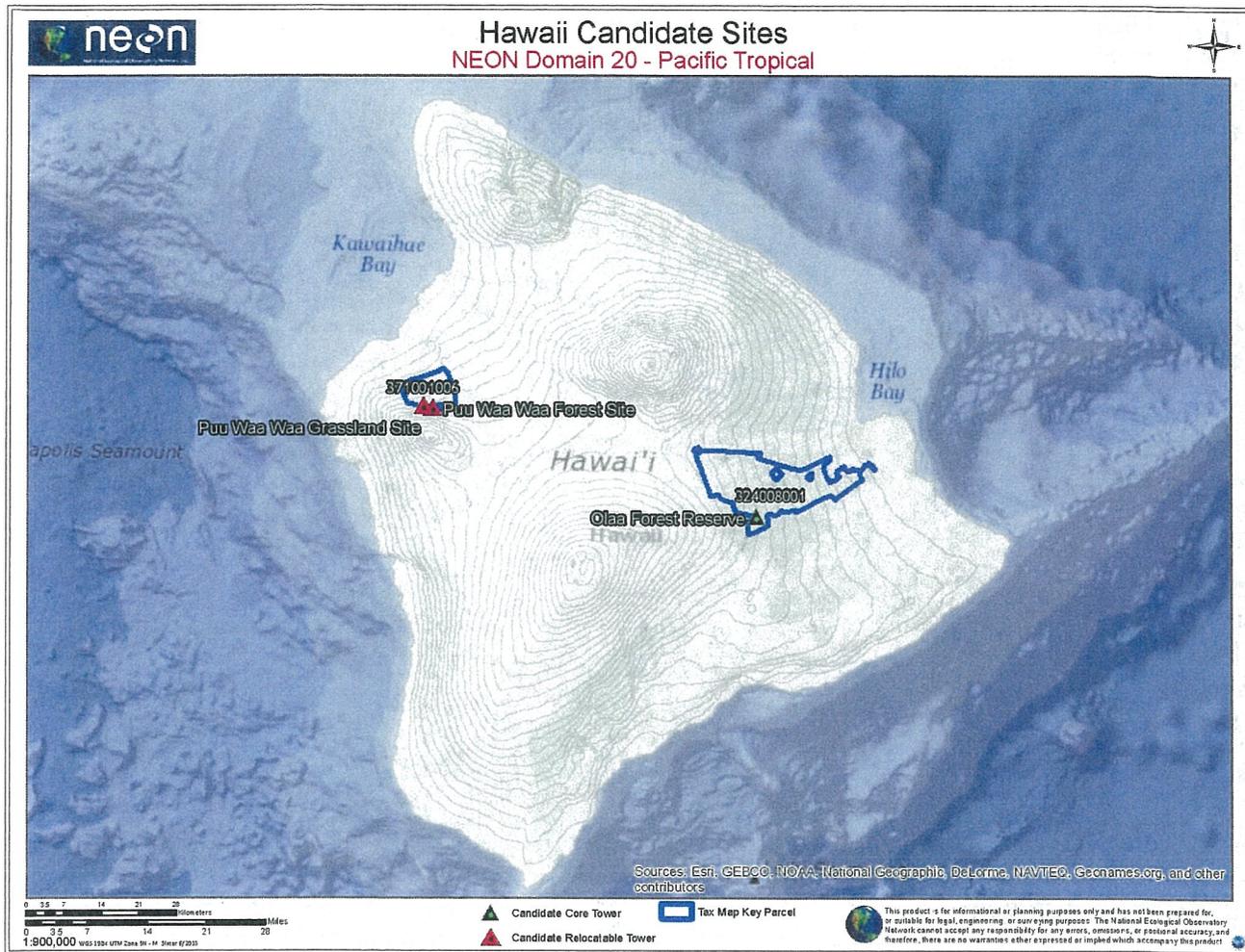
- Decision issued on NEON project HRS Chapter 343
- Public meetings to be conducted

2017

- Construction begins

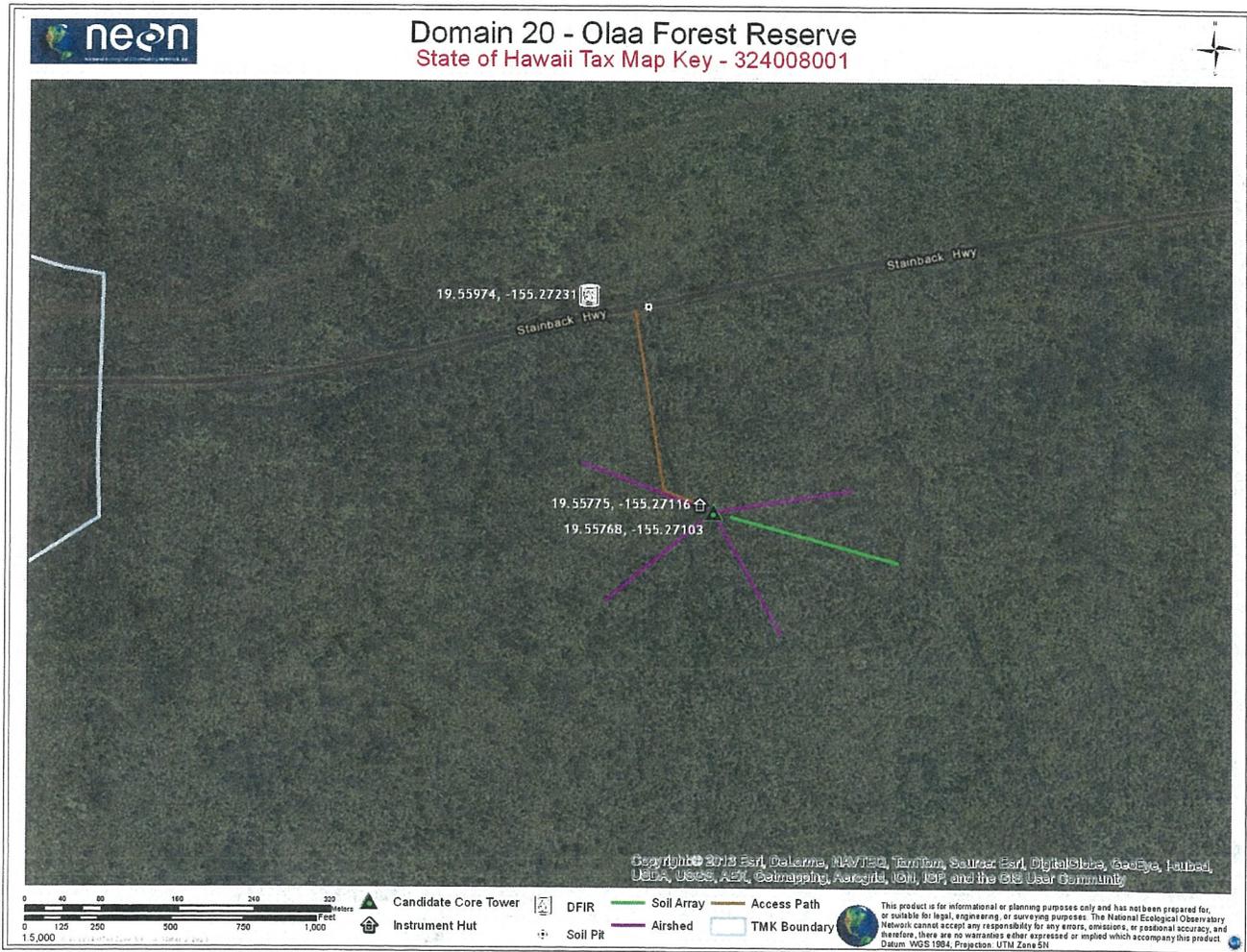
Attachment A

Proposed Site Locations



Attachment B

Ola'a Core Site Location



Attachment C

Pu'u Wa'awa'a Relocatable Sites

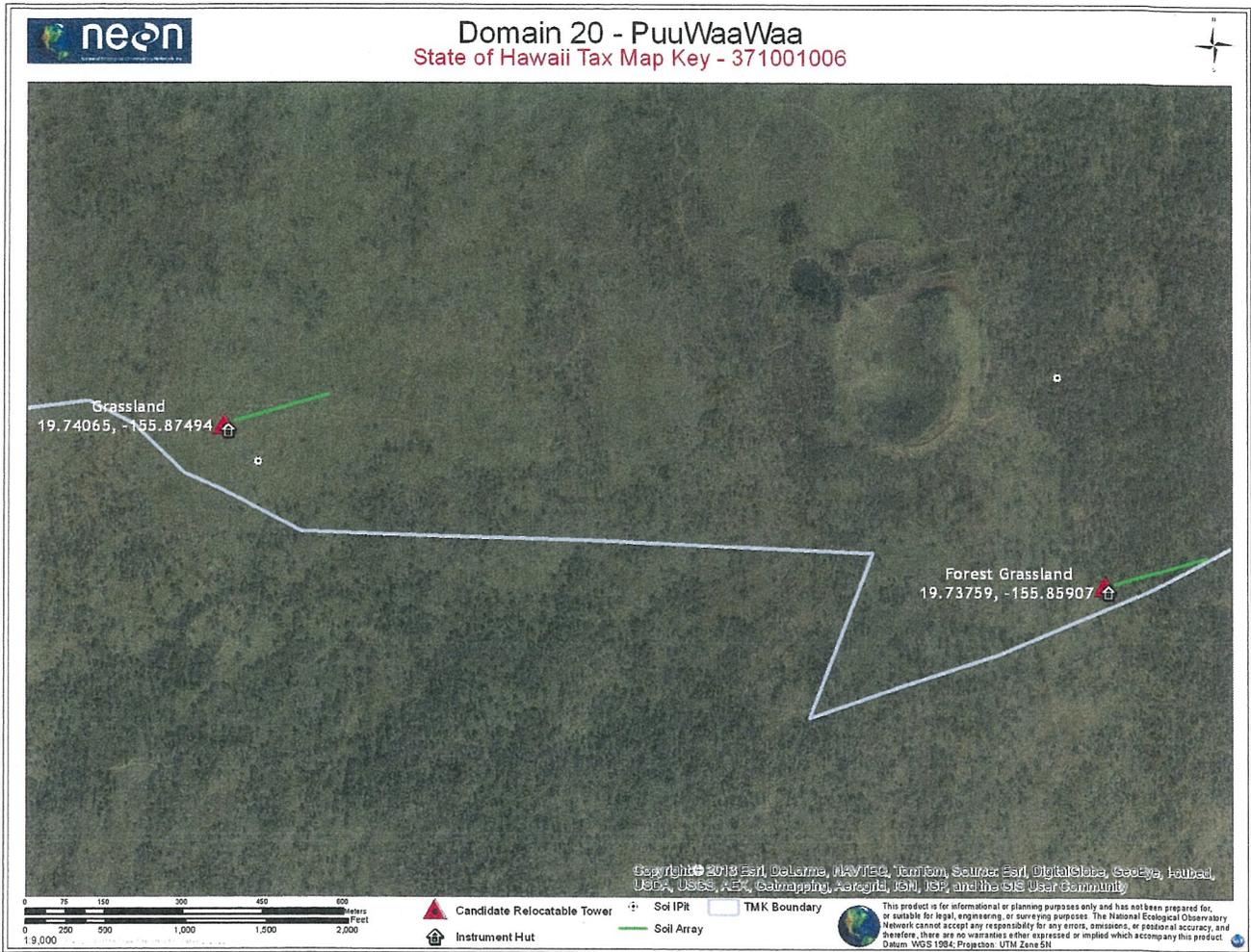
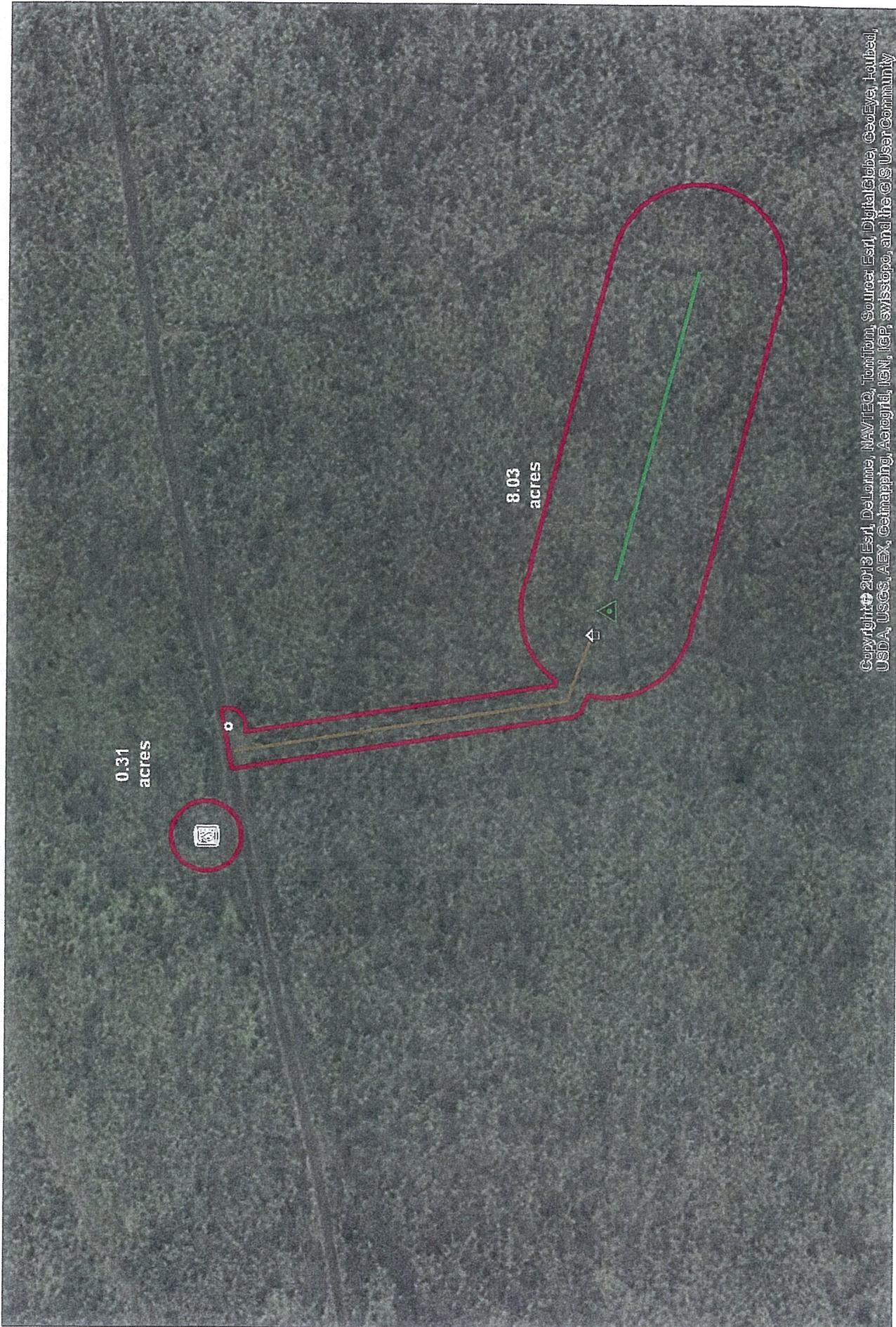




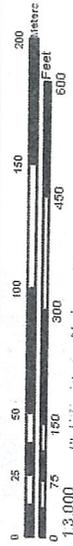
Exhibit A - Upper Waiakea Forest Reserve Core Tower

State of Hawaii Tax Map Key - 324008001



0.31 acres

8.03 acres



- NEON Core Tower
- Instrument Hut
- Access Path
- DFIR
- Soil Array
- Soil Pit
- Proposed Direct Lease Area - 8.34 Acres Total

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Datum: WGS 1984; Projection: UTM Zone 5N





Exhibit B - Upper Waiakea Forest Reserve Core Sampling Area

State of Hawaii Tax Map Key - 324008001



2594.15 acres

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0	150	300	600	900	1,200
0	500	1,000	2,000	3,000	4,000
1:25,000					

	NEON Core Tower		DFIR		Access Path
	Instrument Hut		Soil Pit		Soil Array
	Proposed Direct Lease Area - 8.34 Acres Total		Proposed Permit Area - 2594.15 Acres Total		State of Hawaii Tax Map Key - 324008001



Exhibit C - PuuWaaWaa Relocatable Towers

State of Hawaii Tax Map Key - 371001006



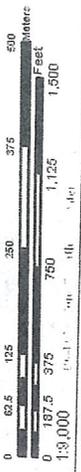
4.94 acres

Puu Waa Waa
Grassland
Site

0.08 acres

4.64 acres

Puu Waa Waa
Forest Site



- NEON Relocatable Towers
- Instrument Hut
- Soil IPit
- Access
- Soil Array

- Proposed Direct Lease Area - 9.66 Acres Total
- Proposed Permit Area - 2,150.86 Acres Total
- State of Hawaii Tax Map Key - 371001006



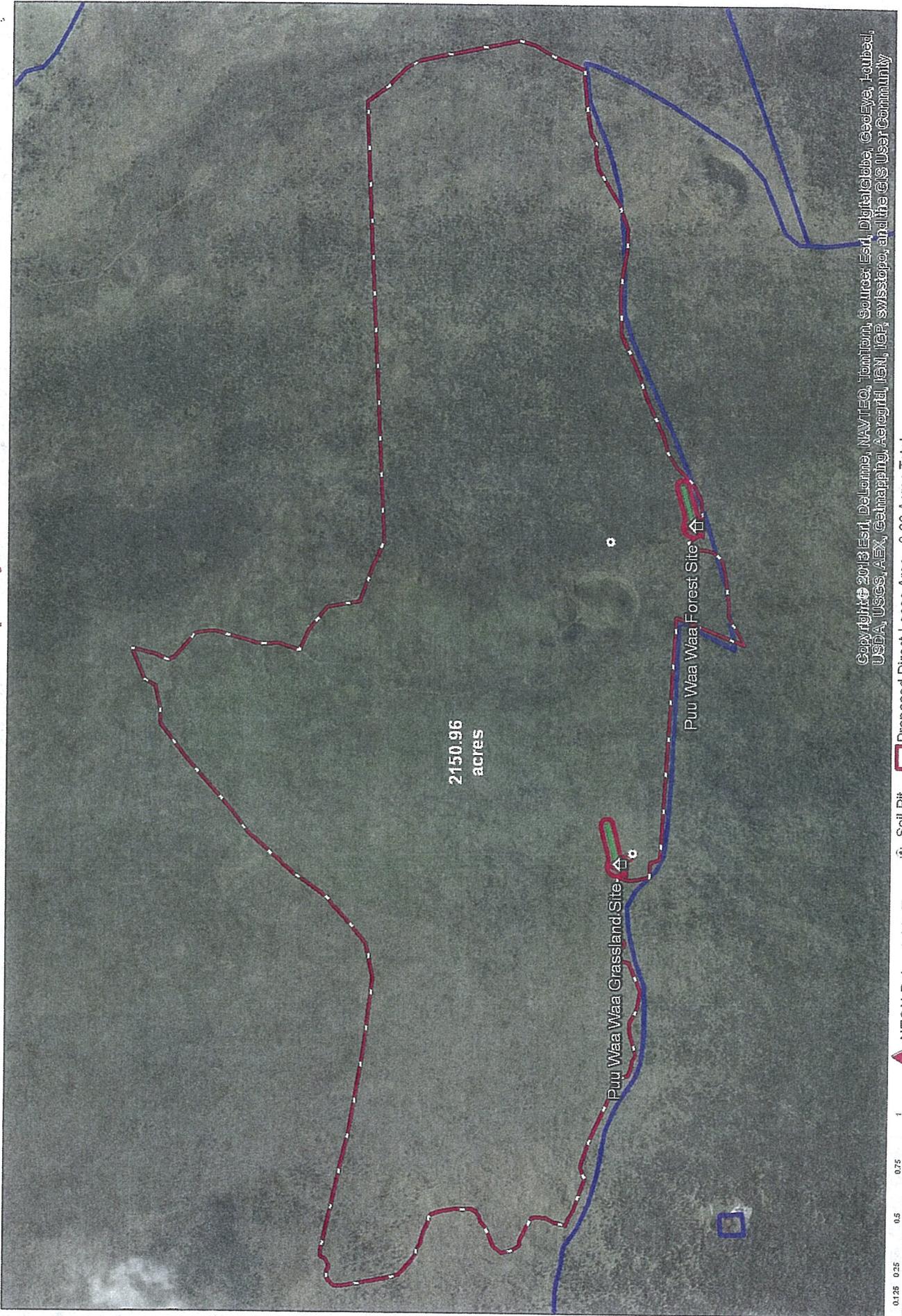
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Datum: WGS 1984, Projection: UTM Zone 60N



Exhibit D - PuuWaaWaa Relocatable Sampling Area State of Hawaii Tax Map Key - 371001006



0 0.125 0.25 0.5 0.75 1 Kilometers
0 375 750 1,500 2,250 3,000 Feet

NEON Relocatable Tower Soil Pit Proposed Direct Lease Area - 9.66 Acres Total
 Instrument Hut Soil Array Proposed Permit Area - 2150.96 Acres Total
 Access State of Hawaii Tax Map Key - 371001006

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Exhibit E.

NEON Site, Type, Duration, Activities, Acres Disturbed, Permit Type and Total Acres

Site	Type	Duration (Years)	Sample Activity or Infrastructure	Acres - Ground Disturbing	Acres - Exclusive Use	Acres - Terrestrial Sampling	Permit Type	Map Reference	Total Acres
Upper Waiakea	Core Tower	35	Tower, DFIR, Instrument Hut, Soil Array, Soil Pit	approx. 1 acre	8.34		Direct Lease	Exhibit A	2594.15
			Core Terrestrial Sampling (See Research Proposal)			2594.15	Cooperative Agreement and Permit to Use State Land	Exhibit B	
Puu Waa Waa Forest Site	Relocatable Tower 1	12	Tower, Instrument Hut, Soil Array, Soil Pit	approx. 1 acre	4.72		Direct Lease	Exhibit C	
Puu Waa Waa Grassland Site	Relocatable Tower 2	12	Tower, Instrument Hut, Soil Array, Soil Pit	approx. 1 acre	4.94		Direct Lease	Exhibit C	2150.96
			Relocatable Terrestrial Sampling (See Research Proposal)			2150.96	Cooperative Agreement and Permit to Use State Land	Exhibit D	



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Office of the Vice President for Research and Innovation

November 18, 2014

Dr. Russ Lea
CEO, NEON, Inc.
1685 38th St., Suite 100
Boulder, CO 80301

Dear Dr. Lea:

On behalf of the University of Hawai'i System, I wish to express our strong commitment to NEON Domain 20 (PACNEON) – Hawai'i and the Pacific.

The establishment of the PACNEON domain, with its core wildland and relocatable sites on Hawai'i Island, will provide unlimited educational and research value for University of Hawai'i at Hilo (UH Hilo) faculty and students. PACNEON will provide a game-changing boost to our research capacity and will complement our established national research programs on climate change, biogeochemical cycles, terrestrial ecosystems, invasive species, and the restoration and protection of natural resources. The infrastructure and added expertise provided by NEON will improve our ability to monitor global change impacts on climate and biodiversity.

It is anticipated that the PACNEON core wildland site is likely to become one of the most valuable within the NEON system, because of the active window it will provide into the functioning ecosystem of a tropical rainforest, a key biome due to its carbon storage potential and biodiversity. PACNEON will complement a well-established, high-quality cadre of researchers from academic, state, and federal offices on Hawai'i Island, who are in active pursuit of scientific knowledge on a wide range subjects.

It is also anticipated that PACNEON will provide vital education, training, and workforce development opportunities. This is of particular importance to UH Hilo and our Hawai'i Island community college campuses, where career development for underrepresented minorities in STEM fields is a high priority. It is our hope to partner with NEON on internships, collaborative research and community outreach in the near future.

2444 Dole Street, Bachman Hall
Honolulu, Hawai'i 96822

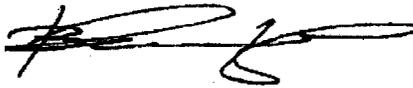
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Dr. Russ Lea
November 18, 2014
Page 2

The University of Hawai'i System wholeheartedly endorses and supports a partnership with NEON and the efforts to build and sustain the NEON Domain 20.

Sincerely,

A handwritten signature in black ink, appearing to read 'V. Syrmos', with a long horizontal flourish extending to the right.

Vassilis L. Syrmos
Vice President for Research and Innovation

c: Dr. James P. Collins, Chair, NEON, Inc. Board of Directions



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HILO

Office of the Chancellor

November 10, 2014

Dr. Russ Lea
CEO, NEON, Inc.
1685 38th St., Suite 100
Boulder CO 80301

Dear Dr. Lea,

This letter is to affirm the strong scientific and administrative support from the University of Hawai'i at Hilo (UH Hilo) for the NEON Domain 20 (Hawai'i and the Pacific; PACNEON).

UH Hilo is a comprehensive university of almost 4,000 students. We offer a wide range of liberal arts and professional programs, as well as a number of graduate and doctoral programs. UH Hilo is the most ethnically diverse university in the country, and this diversity in its student population, as well as the extraordinary diversity in the natural environment, has shaped the very mission of the institution. We strive to challenge students to reach their highest level of academic achievement by inspiring learning, discovery and creativity, employing applied learning that links theory with practice, connecting to the distinctive natural and cultural environments of Hawai'i, and promoting skilled participation in a global society.

The establishment of the core wildland and relocatable sites on Hawai'i Island is extraordinarily congruent with our educational goals. The island of Hawai'i has an experienced and well-established core of academic, state, and federal researchers, both on-island and from around the world, actively pursuing a wide range of scientific questions. Our UH Hilo faculty rank among the most active and distinguished of these researchers.

On the research front, NEON in Hawai'i will give the state the capacity to contribute to a national research program on climate change, and the local capacity to leverage NEON investments to address climate change and invasion across and within domains. NEON will greatly extend the ability to monitor global change impacts on climate and biodiversity, of vital importance because these form the legs of our natural capital on which the state's entire tourism industry stands. We foresee many research opportunities that will benefit UH Hilo faculty, staff, and students; field trips to the NEON sites, use of the online data, and the grant leverage possibilities are only a small sampling of the benefits.

On the education front, NEON will provide vital education, training, and workforce development opportunities for generations of our students, as well as providing the nation a window into tropical rainforest, the most carbon-rich and bio-diverse terrestrial ecosystem in the world. These types of educational experiences support our applied learning agenda, which benefits all students, but which has shown to be very effective the education and career development of underrepresented groups in STEM at all levels. Sixty percent percent (60%) of our student population are classified as under-represented minorities, and of those 26% as indicating Hawaiian ethnicity. The ability to partner with NEON on

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internships, collaborative research with our faculty, and community outreach are the kinds of practical experiences that make our graduates a cut above in a tight job market.

Importantly, UH Hilo has grown significantly in its research capabilities over the last dozen years as a result of infrastructure building activities and faculty hiring. Resources and faculty gained through Hawai'i EPSCoR and the development of the Tropical Conservation Biology and Environmental Science (TCBES) graduate program provide the base for an active research community on campus. EPSCoR's addition of core research facilities—the Spatial Data Analysis and Visualization Laboratory, the Genetics Core Facility, and Analytical Lab—have increased the research infrastructure available.

UH Hilo is one of the university hosts of the USGS Pacific Islands Climate Science Center, and the university lead for the USGS Fishery Cooperative Research Unit and Cooperative Ecosystems Studies Unit. The nearby USDA Forest Service Institute of Pacific Islands Forestry and the USGS Pacific Islands Ecosystem Research Center have established productive partnerships with faculty. Interaction and partnership with NEON also fits very well with many of our other large NSF-funded programs, including a Research Experiences for Undergraduates (REU) site grant, Louis Stokes Alliance for Minority Participation (LSAMP- UH Hilo serves as the lead organization for the Islands of Opportunity Alliance), and Centers for Research Excellence in Science and Technology (CREST). These on-campus alliances form a pipeline of opportunities for students, and create a synergy among STEM efforts on campus in recruitment, program coordination, and institutional strengthening. We also understand that the State Division of Forestry and Wildlife is working to include the NEON core site within parcels of land assigned to the Hawaii Experimental Tropical Forest (HETF); the relocatable site is already under this designation. We have long-standing research projects and partnerships within the HETF, and we feel that such a move will greatly facilitate the permitting and lease agreements and will be a strong asset towards moving to the construction phase for Domain 20.

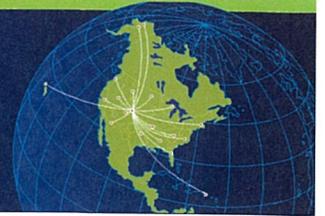
In summary, we are very excited to be active and willing partners with NEON Domain 20. NEON's placement on Hawai'i Island as the tropical forest domain is in full alignment with UH Hilo's unique educational and research niche linking science and society.

Sincerely,



Donald Straney
Chancellor

cc: Dr. James P. Collins; Chair- Board of Directors; NEON, Inc.



Measuring the causes and consequences of environmental change

Understanding the changing health of our ecosystems is a complex challenge. The National Ecological Observatory Network (NEON) is designed to collect and provide ecological data to enable the study and forecasting of ecological change over time at local, regional and continental scales in the U.S.

Free, open data and resources

NEON will collect a variety of atmospheric, soil, aquatic and organismal data for 30 years. The resulting research and education resources, specimens, and data will be freely available. NEON infrastructure can also be used for additional research activities. NEON will become fully operational in approximately 2017.

Visit www.neoninc.org to learn more about the National Ecological Observatory Network and its currently available programs and resources.



NEON at work

What is NEON?

NEON is a long-term, continental-scale science and education project sponsored by the National Science Foundation. NEON's distributed field sites (see map below) are strategically located in many different types of ecosystems across the U.S. At each site, a standardized and integrated suite of scientific data is collected to better understand how plants, animals, insects, and microorganisms influence and respond to their environments.



What happens at NEON sites?

A variety of methods are used to collect data at each site. Installed sensors collect atmospheric, soil, and aquatic data. Field scientists conduct field sampling of plants, animals, invertebrates, and microorganisms. Additional airborne mapping of each site collects data on changes in overall plant composition and structure over time. These integrated data will contribute to a better understanding of how and why U.S. ecosystems are changing.