STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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March 6, 2020

Lee D. Hoffman, Esq.
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90 State House Square
Hartford, CT 06103-3702

RE: **PETITION NO. 983** - BNE Energy, Inc. Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of a 4.8 MW Wind Renewable Generating facility located on Flagg Hill Road, Colebrook, Connecticut. **D&M Plan Modification.**

Dear Attorney Hoffman:

The Connecticut Siting Council (Council) is in receipt of your correspondence dated January 9, 2020 regarding a modification to the Development and Management (D&M) Plan for the above-referenced Wind Colebrook South site that was approved by the Council on November 22, 2011.

Pursuant to Regulations of Connecticut State Agencies §16-50j-62(b), the Council's June 2, 2011 Declaratory Ruling and the Council's October 21, 2011, November 22, 2011, February 7, 2013 and December 17, 2013 D&M Plan and D&M Plan modification approvals, the request to relocate Turbine 3 (T3) and to construct, maintain and operate an Enercon 4.2-138 MW wind turbine at Wind Colebrook South is hereby approved with the following conditions:

1. Submission of a final site plan that includes, but is not limited to, details for crossing Wetland 1, extent of vegetative clearing, grading, wetland buffers, access roads, turbine foundation, equipment and material laydown and staging area, electrical interconnection, fencing, equipment pad, and post-construction stormwater controls, as designed in the DEEP-approved Stormwater Pollution Control Plan (SWPCP);
2. Submission of a copy of the DEEP General Permit and DEEP-approved SWPCP prior to commencement of construction;
3. Retention of a third party monitor to ensure establishment of appropriate environmental safeguards protective of amphibian and reptile species during construction consistent with Note 5 under "WCS Third Party Environmental Inspections" on Sheet C600 of the D&M Plan Modification;
4. Submission of the final FAA determination(s);
5. Written notice of commencement of site clearing, foundation construction, T3 installation, completion of remediation, and commencement of T3 operation;
6. Performance of a post-construction noise monitoring protocol consistent with the existing WCS protocol describing locations, frequency and methods to be employed for a post-construction noise study of all three turbines. Upon review of the subsequent noise study, the Council will evaluate and determine if any mitigation measures should be employed, including turbine operations management;

7. Performance of post-construction monitoring of bats and birds consistent with the existing WCS protocol to document any mortality from T3 operations. An annual summary of the study results shall be submitted to the Council for a period of three years with the first report due one year after commencement of T3 operation. At the end of the three-year study period, the Council will evaluate and determine if any mitigation measures should be employed to reduce bat and/or bird mortality; and
8. Submission of a first year operating report within three months after the conclusion of the first year of operation that includes a discussion of the number of hours of operation, wind speeds, and the amount of generation produced by T3.

This approval applies only to the D&M Plan modification dated January 9, 2020 and supplemental information submitted on February 21, 2020, February 26, 2020, March 2, 2020 and March 5, 2020.

Any significant changes to the D&M Plan require advance Council notification and approval.

Enclosed is a copy of the staff report on this D&M Plan modification, dated March 6, 2020.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MB/MP/laf

c: Council Members

Enclosure: Staff Report, dated March 6, 2020

Petition No. 983
BNE Energy, Inc. – Wind Colebrook South
Development & Management Plan Modification
Staff Report
March 6, 2020

Introduction

On June 2, 2011, the Connecticut Siting Council (Council) issued a Declaratory Ruling to BNE Energy, Inc. (BNE) in Petition 983, pursuant to Connecticut General Statutes (CGS) §4-176 and §16-50k, for the construction, maintenance, and operation of a 4.8 megawatt (MW) wind electric generating facility located on Flagg Hill Road in Colebrook, Connecticut, known as Wind Colebrook South (WCS).[1] WCS is the only utility-scale wind electric generating facility in the state.

The parties and intervenors to Petition 983 were: Robin Hirtle, Stella and Michael Somers, FairwindCT, Inc. (Fairwind), David Lawrence and Jeannie Lemelin, the Town of Colebrook (Town), Benjamin and Kristin Mow, Walter Zima, Brandy Grant, Eva Villanova and Susan Wagner (Parties and Intervenors).

BNE initially proposed the construction, maintenance and operation of three GE 1.6-82.5 MW (GE-1.6) turbines with hub heights of 100 meters (m) and rotor diameters of 82.5m (tip height of 463 feet), but also requested allowance for a 100m rotor diameter if it became commercially available in 2012. In its Declaratory Ruling, the Council found the visual impact among the two rotor diameters not significantly different and approved three GE-1.6 turbines with hub heights of 100m and rotor diameters of 100m (tip height of 492 feet) at WCS.

Wind Regulations

Public Act (PA) 11-245 required the Council to adopt regulations concerning the siting of wind turbines and imposed a moratorium on any application or petition for siting of a wind turbine until after the adoption of the regulations. The regulations include, but are not limited to, consideration of setbacks, shadow flicker, ice throw, noise, decommissioning and natural resources. PA 11-245 took effect on July 1, 2011. The Council issued its Declaratory Ruling for WCS on June 2, 2011. PA 11-245 did not apply to WCS. Wind regulations were adopted on May 9, 2014. They do not apply to WCS.[2]

Judicial Appeal

Fairwind appealed the Council's Declaratory Ruling. The Superior Court dismissed Fairwind's appeal on October 1, 2012. Fairwind appealed to the Supreme Court. On September 23, 2014, the Supreme Court affirmed the Superior Court's dismissal of Fairwind's appeal. It held, in relevant part:

1. The wind regulations are not retroactive;
2. The Council is not bound by Department of Environmental Protection Noise Control regulations;

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[1] BNE purchased the site in November 2007. It submitted a proposal into the Connecticut Clean Energy Fund's (CCEF) Call for Applications for Renewable Energy Projects in Pre-Development, an initiative in support of the state Renewable Portfolio Standard requiring the distribution companies to enter into minimum 10-year contracts for at least 100 MW of Class I renewable capacity. CCEF selected BNE's proposal in July 2008.
[2] *FairwindCT, Inc. v. Conn. Siting Council,* 313 Conn. 669 (2014).

3. The Council is authorized to condition a Declaratory Ruling with a Development and Management (D&M) Plan;
4. Substantial evidence in the record supports the Declaratory Ruling; and
5. Sufficient notice of plan changes and relocation of the turbines was provided.

The Supreme Court concluded that the plans submitted with the petition had to be revised after approval to address unforeseen site conditions.[3] This is the purpose of a D&M Plan.

WCS D&M Plan

Condition 2 of the Declaratory Ruling states: "The Petitioner shall not commence construction activities until securing Council approval of a D&M Plan. The D&M Plan shall be served on all parties and intervenors as listed in the service list for comment, and submitted to and approved by the Council in one or more sections prior to the commencement of facility construction …"

Regulations of Connecticut State Agencies (RCSA) §16-50j-60 requires each section of a D&M Plan to be approved, modified or disapproved within 60 days of receipt. The regulations allow for changes to a D&M Plan while it is under review, at any time during or after preparation of the plan, and at any time after the plan has been approved. RCSA §16-50j-62 requires advance written notice whenever a significant change to an approved D&M Plan is necessary and for significant changes to be approved, modified or disapproved by Council staff in accordance with RCSA §16-50j-60. Significant changes to an approved D&M Plan include, but are not limited to, "a change in structure type or location."

On September 16, 2011, BNE submitted its D&M Plan. It included all of the sections required under Condition 2 of the Council's Declaratory Ruling. Copies of the D&M Plan were served on all Parties and Intervenors. The Town submitted comments related to the Host Community Agreement, conservation easement, infrastructure protection, noise monitoring, environmental monitoring and Decommissioning Plan.[4] Fairwind submitted comments claiming the D&M Plan did not satisfy the Council's orders in the Declaratory Ruling. The Council approved the site clearing and environmental monitor sections of the D&M Plan on October 21, 2011.

October 28, 2011 D&M Plan Modification

On October 28, 2011, BNE submitted a modification to the pending D&M Plan to relocate the temporary construction access road. This relocation avoided use of the driveway and utility easement in favor of the WCS property over abutting property to the east owned by Hirtle located at 29A Flagg Hill Road. Copies of the D&M Plan Modification were served on all Parties and Intervenors. No comments were received.[5] The Council approved all of the remaining sections of the D&M Plan, including relocation of the temporary construction access road requested in the D&M Plan Modification, on November 22, 2011.

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[3] *Id*., A D&M Plan is not the subject of a proceeding. It is a condition of a final decision in a proceeding that must be met in order to commence facility construction. A D&M Plan functions to "fill up the details" and constitutes the "nuts and bolts" of the facility approved by the Council. *Town of Westport v. Connecticut Siting Council*, 260 Conn. 266 (2002); *Town of Middlebury v. Conn. Siting Council*, 2002 Conn. Super. LEXIS 610 (Conn. Super. 2002).
[4] Pursuant to Conditions 2(c) and 3 of the Declaratory Ruling, in its D&M Plan, BNE submitted details for the protection of town infrastructure and for the Host Community Agreement with the Town.
[5] On January 10, 2012, counsel for Hirtle submitted concerns regarding the relocation of the temporary access road.

November 2, 2012 D&M Plan Modification

On November 2, 2012, BNE submitted a modification to the approved D&M Plan to further modify the construction access road and to relocate Turbines 1 and 2 (T1 and T2). For the relocation of T1 and T2, BNE purchased the 5-acre abutting parcel to the east at 29A Flagg Hill Road to utilize the existing residential driveway for the access road. Copies of the D&M Plan Modification were served on all Parties and Intervenors. No comments were received. T1 was relocated approximately 135 feet to the east farther from Wetland 1 resulting in 6,100 square feet less tree clearing within 100 feet of Wetland 1 and an increase in ground elevation of 16 feet. T2 was relocated approximately 167 feet to the southwest further into the interior of the site property resulting in 12,550 cubic yards less fill and an increase in ground elevation of 22 feet. The Council approved the D&M Plan Modification on February 7, 2013.

November 5, 2013 D&M Plan Modification

On November 5, 2013, BNE submitted a modification to the approved D&M Plan to construct, maintain and operate three GE 2.85-103 MW (GE-2.85) turbines with 98.3m hub heights and 103m rotor diameters (tip height of 491 feet) due to changes in GE's product line that rendered the three Council-approved GE-1.6 turbines no longer available. Copies of the D&M Plan Modification were served on all Parties and Intervenors. Fairwind objected claiming no statute or regulation allows for project modifications in the D&M Plan process, the modification is prohibited by the PA 11-245 moratorium, the GE-1.6 turbines are available, the GE-2.85 turbines would produce the same electrical output as the GE-1.6 turbines and BNE failed to submit updated, engineer-certified plans. The Council overruled Fairwind's objection and approved the D&M Plan Modification on December 17, 2013.

Construction and Operation of T1 and T2

Site clearing and construction at WCS commenced on December 5, 2011. In compliance with the Council's Declaratory Ruling and the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (General Permit) issued by the Department of Energy and Environmental Protection (DEEP), BNE submitted 104 bi-weekly environmental monitoring reports, 20 stormwater monitoring reports, 14 erosion and sedimentation control reports, 2 post-construction amphibian monitoring reports,[6] 3 post-construction bird and bat monitoring reports,[7] and 3 post-construction noise monitoring reports, including a final noise compliance measurement study.[8]

BNE achieved commercial operation of T1 and T2 on November 4, 2015 and completed first year operations at the end of 2016 at an annual average wind speed of 15.44 miles per hour, a capacity factor of 29.1%, generation of 12,741,917 kilowatt hours of electricity, and production of 12,741 renewable energy credits. The number of hours of operation was 8,330 out of 8,760, resulting in an average availability for T1 and T2 of 95.09%. BNE did not submit notification of completion of construction and site rehabilitation pursuant to RCSA §16-50j-62 because the Council's Declaratory Ruling approved the construction of three wind turbines at WCS and Turbine 3 (T3) has not yet been constructed.

[6] The reports concluded the spotted salamander population is stable and the wood frog population is increasing.
[7] The reports concluded the mortality results are significantly below the WCS predicted average mortality rates.
[8] The reports and study conclude T1 and T2 operate at cumulative noise levels no greater than 49 dBA.

Extension for Construction of T3

Condition 7 of the Declaratory Ruling required completion of construction at WCS within four years of the date of the Declaratory Ruling or within four years after all appeals of the Declaratory Ruling have been resolved. The Supreme Court dismissed Fairwind's appeal of the Declaratory Ruling on September 23, 2014 rendering the deadline for completion of construction as September 23, 2018. On July 17, 2018, in compliance with Condition 7 of the Declaratory Ruling, BNE requested a three-year extension of the construction completion deadline to September 23, 2021. In its request, BNE stated that it had entered into additional power purchase agreements (PPAs) with Eversource and United Illuminating (UI) for T3 on June 20, 2017. The Council granted BNE's request for a three-year extension of the construction completion deadline for T3 on August 31, 2018.

January 9, 2020 D&M Plan Modification

On January 9, 2020, BNE submitted a modification to the approved D&M Plan to relocate T3 1,715 feet south of the initial T3 location and to construct, maintain and operate an Enercon 4.2-138 MW (E-4.2) turbine with a 128m hub height and 138m rotor diameter (tip height of 646 feet) due to changes in GE's product line that rendered the Council-approved GE-2.85 turbine no longer available. For the relocation of T3, BNE entered into two option agreements to purchase approximately 36 additional acres to the south of the existing site.[9] Copies of the D&M Plan Modification were served on all Parties and Intervenors. On March 4, 2020, 55 days after receiving notice of the D&M Plan Modification, Fairwind objected claiming no statute or regulation allows for project modifications in the D&M Plan process and the wind regulations apply to WCS. The same Fairwind objection to BNE's November 5, 2013 D&M Plan Modification was overruled on December 17, 2013.[10]

BNE provided notice to the abutting properties to the south, east and west of the 53 Flagg Hill Road, Colebrook parcel on January 31, 2020. Comments were received from three abutters and three neighbors relative to the applicability of the wind regulations and concerns about Beckley Bog, vernal pools, setbacks, noise, visibility, water quality and lighting.[11] Each concern is addressed below.

On January 24, 2020, the Council issued interrogatories to BNE. BNE submitted responses to the interrogatories on February 21, 2020 and February 25, 2020. The Council issued a second set of interrogatories to BNE on February 25, 2020. BNE submitted responses to the second set of interrogatories on March 2, 2020 and March 5, 2020.

T3 Power Purchase Agreements

T3 was selected through a DEEP Request for Proposals for Class I renewable energy sources with a nameplate capacity rating of more than 2 MW and less than 20 MW to enter into long-term PPAs with the

[9] BNE has options to purchase 27.21 acres at 53 Flagg Hill Road and 9.27 acres at 45 Flagg Hill Road in Colebrook.
[10] Fairwind omits any reference to its same objection regarding the November 5, 2013 D&M Plan Modification being overruled and omits any reference to the November 2, 2012 D&M Plan Modification when BNE purchased additional acreage on Flagg Hill Road that resulted in new abutters and relocation of the access road and turbines.
[11] The three abutters that submitted comments are the owners of 319 Beckley Road in Norfolk and a parcel on Skinner Road in Winchester; the owners of 246 Danbury Quarter Road in Winchester; and the Nature Conservancy. The three neighbors that submitted comments are the owners of 10 Schoolhouse Road in Norfolk; the owners of 324 Beckley Road in Norfolk; and the owners of 289 Grantville Road in Norfolk.

electric distribution companies. Per BNE's PPAs, approximately 80 percent of the electricity and renewable energy certificates will be sold to Eversource and 20 percent will be sold to UI. The PPAs total 3.83 MW maximum capacity output. The Public Utilities Regulatory Authority approved BNE's PPAs on September 7, 2017. The PPAs have a 20-year term, and there is no option for any renewal. At the end of the PPA terms, BNE will seek other revenue mechanisms to maximize the useful life of T3.

Interconnection

BNE is currently working with Eversource to conduct the interconnection studies needed to accommodate T3. Upon completion of the interconnection studies, BNE expects to enter into an Interconnection Agreement with Eversource for T3. An ISO-NE transmission study is also required.

The existing electrical connection for WCS to the distribution system on Flagg Hill Road is 23 kilovolts (kV). To accommodate T3, approximately 5.5 miles of three-phase 23-kV distribution would be upgraded, resulting in a 27-kV connection to the existing Riverton Substation. Eversource would be responsible for the required distribution upgrades.

The electrical output of T3 would be three-phase 27-kV. The on-site underground electrical interconnection would require two 5-inch polyvinyl chloride (PVC) conduits (one for the 27-kV generator line itself and one for a spare) and one 3-inch PVC conduit (for fiber optics and controls) to be located within a concrete duct bank. The duct bank will be installed within the arch bridge to cross the on-site watercourse/wetland area. The electrical interconnection route would run underground roughly parallel to the access drive to T3. In the vicinity of the existing access route for T1 and T2, the interconnection route would then turn northwest and run east of the existing access to T2 before finally turning to the northeast to reach an existing utility equipment pad area directly off of Flagg Hill Road and connect to electric distribution on Flagg Hill Road. No new transformers would need to be installed because the output line voltage from T3 would match the (upgraded) line voltage of 27-kV.

Output

The E-4.2 output would be limited to 3.83 MW (at the point of interconnection) to comply with the terms of the PPAs. Thus, BNE would limit the maximum capacity of T3 by 8.8%, but the power curve of the E-4.2 would remain the same up to the 3.83 MW PPA limit. BNE projects an annual capacity factor of approximately 37.6 percent, resulting in a projected annual electricity production of 13,845 MWh. While the projected capacity factor for T3 was slightly reduced due to the capacity limit of 3.83 MW, T3 is still projected to generate more Class I renewable energy on an annual basis than the pair of existing GE 2.85s. This is due to the E-4.2's higher capacity factor (i.e. 37.6 percent vs roughly 29.1 percent) than the GE-2.85 and the E-4.2's greater capacity than the GE-2.85.

The E-4.2 has a blade heating system that improves T3's energy production (and effectively, its capacity factor) because it would minimize icing, and during an ice shutdown, the heaters would speed the thawing process and thus shorten the duration of such ice-related shutdown. Since the noise reduction mode would result in a capacity limit of 3.5 MW and thus a lower capacity factor, BNE does not expect to utilize the noise reduction mode in order to comply with DEEP Noise Control Standards at the nearest residential receptors.

A battery storage component could be incorporated in the future for the electrical output from WCS.

T3 Model Selection

Based on wind speed, extreme gusts and turbulence, the International Electrotechnical Commission establishes standard wind classes. Wind class determines what turbine model is suitable for the normal wind conditions of a particular site. For example, a turbine installed at a Class III (low wind) site will need a larger rotor to capture the same amount of energy as a similar turbine installed at a Class II (medium wind) site. WCS is a Class IIIA site. It has low wind speed and high turbulence intensity.

The turbulence intensity and size of the WCS site are limiting factors in turbine model selection. Turbine manufacturers determine the suitability of a model for a site with high turbulence intensity. Some turbine manufacturers, such as Siemens and Vestas, have minimum project size requirements. BNE initially considered the GE 5.3-158 MW (GE-5.3) turbine, but it was rejected due to site suitability and size. The GE-5.3 is available with hub heights of 101m - 161m and a rotor diameter of 158m. It is considerably larger than the E-4.2. Specifically, the GE-5.3's 158m rotor would sweep out an area of about 19,600 square meters, or about 31 percent more than the E-4.2's 138m rotor that would sweep out an area of about 15,000 square meters. Furthermore, the GE-5.3 would require a hub height of 151m at WCS, resulting in a tip height of 755 feet, which is 17 percent greater than the tip height of the E-4.2.

BNE also considered the E-4.2 and the Enercon 3.5-138 MW (E-3.5) turbine models. The E-4.2 and E-3.5 are available with hub heights of 80m - 160m and a rotor diameter of 138m. Like the E-4.2, the E-3.5 is suitable for the WCS site, but it is the same size as the E-4.2 and produces less energy due to its capacity being 0.7 MW less than the E-4.2. Taking into account all of the foregoing factors, BNE selected the E-4.2 for the T3 model.

Public Safety

Operations Management

T3 has a projected operational life of 25 years. Like T1 and T2, it would have emergency stop buttons located within the tower base and within the nacelle to stop T3 in the event of an emergency. T3 would also have an automatic fire suppression system and handheld fire extinguishers, as well as the ability to be shut-down and de-energized in the event of a fire. When T1 and T2 were constructed, BNE hosted a tour with local emergency responders. When T3 is constructed, BNE will also host a tour with local emergency responders.

Access to T3, including the bridge crossing, is able to accommodate construction vehicles and emergency responders. Construction of T3 would comply with the National Electric Code, the National Electrical Safety Code and all applicable National Fire Protection Association codes and standards. Like T1 and T2, T3 will be self-contained and locked on the restricted access WCS site, as well as monitored by security cameras. Also like T1 and T2, mechanical and electrical maintenance of T3 would generally be scheduled every six months for approximately one and a half days.

Aviation Safety

BNE notified the Federal Aviation Administration (FAA) of T3 and associated temporary construction structures. It expects a FAA determination within the next few months.

Per FAA requirements, T1 and T2 have one flashing red light on their nacelles that is illuminated at night and flashes simultaneously. T3 requires a FAA lighting scheme with two flashing red lights on opposite sides of its nacelle. T3's FAA lighting scheme will be configured to flash simultaneously with T1 and T2. The FAA determined that wind turbines painted white demonstrate the most effective method for providing daytime conspicuity and red flashing, strobe or pulsed obstruction lights installed as high as possible on the nacelle demonstrate the most effective method for providing nighttime conspicuity.

Setbacks

Pursuant to Condition 2(a) of the Declaratory Ruling, BNE submitted a detailed site plan demonstrating the location and rotor diameter of T1 ensures the rotating blades are confined to the host property that was approved by the Council on November 22, 2011. In its D&M Plan Modification, BNE submitted a detailed site plan demonstrating the location and rotor diameter of T3 ensures the rotating blades are confined to the host property by a distance of 1.1 times the length of the blade from the property lines. See Attachment A. The distance from the initial T3 location to the Nature Conservancy (TNC) property line is 235 feet to the west. The distance from relocated T3 to TNC's property line is 324 feet to the west.

Industry setback standard considerations include adjoining population density, usage frequency of adjoining roads, land availability and proximity to publicly accessed areas and buildings. Objects of concern within the setback distance are public use areas, residences, office buildings, public buildings, parking lots, public and private roads, railroads and sensitive above ground services, such as pipelines and electric transmission lines. The GE setback distance for blade failure, ice throw, tower collapse, rotor sweep and falling objects is 1.1 times the blade tip height from objects of concern within the setback distance. The setback distance is calculated from the center of the tower. T1 and T2 comply with this setback distance.

The wind regulations allow for a setback of no less than 1.5 times the wind turbine height to a residence.[12] Under RCSA §16-50j-2a, "wind turbine height" means the measurement from ground level to the tip of the blade of a wind turbine in the vertical position, also referred to as "tip height." The nearest residence to T3 is located at 319 Beckley Road in Norfolk approximately 1,027 feet to the southwest. For the E-4.2, this gives an effective setback of about 1.6 times the wind turbine height to the residence, which conservatively exceeds industry setback standards. The second nearest residence to T3 is located at 324 Beckley Road in Norfolk approximately 1,600 feet to the southwest. For the E-4.2, this gives an effective setback of about 2.5 times the wind turbine height to the residence. All other residences are greater than 2,050 feet from T3.

Shadow Flicker

"Shadow flicker" describes the alternating pattern of light and dark that occurs when wind turbine blades sweep through the path of sunlight low in the sky. It is measurable to a high degree of predictability. In its Declaratory Ruling, the Council found that shadow flicker is a potential annoyance rather than a health threat and committed to work with property owners and BNE to determine reasonable mitigations on a case-by-case basis.

[12] Regulations of Connecticut State Agencies §16-50j-95(a) (2014).

The wind regulations require submission of an evaluation of shadow flicker and allow for shadow flicker to occur more than 30 total annual hours at any off-site occupied residential structure.[13] In its D&M Plan Modification, BNE submitted an evaluation of shadow flicker.

The Petition 983 shadow flicker evaluation determined 7 residential structures would experience some shadow flicker ranging from 10 to 48 hours per year. See Attachment B. The shadow flicker evaluation for T3 confirmed that shadow flicker beyond approximately 1.25 miles from T3 would be negligible as shadow flicker diminishes with distance. Taking into account the direction of the sun, shadow flicker is expected at the following residential structures: 31 total annual hours at 29A Flagg Hill Road in Colebrook; 30.5 total annual hours at 8 Flagg Hill Road in Colebrook; and 6 total annual hours at 129 Grantville Road in Norfolk. The two closest residences at 319 and 324 Beckley Road in Norfolk will not receive any shadow flicker due to their location southwest of T3.[14]

Ice Throw

Pursuant to Condition 2(i) of the Declaratory Ruling, BNE submitted an Ice Safety Management Plan (ISMP) that was approved by the Council on November 22, 2011. The wind regulations require the submission of an evaluation of ice throw and the turbine manufacturer's technical documentation relating to recommended ice throw setback distances and installed ice monitoring devices and sensors.[15] In its D&M Plan Modification, BNE submitted an evaluation of ice throw, technical documentation relating to recommended ice throw setback distances and installed ice monitoring devices and sensors, and a modified ISMP. See Attachment C.

The E-4.2 has an ice detection system and a blade heating system to melt ice. Enercon conducted a site-specific ice risk assessment for T3. It concluded that with employment of the ice detection system and blade heating system, the ice throw probability from T3 to the nearest residence is null and ice drop will not extend beyond the length of the blades. This is consistent with turbine manufacturers' technical documentation relating to recommended ice throw setback distances, including GE's ice throw setback of 711 feet from the nearest residence. The nearest residence to T3 is 1,027 feet. Under the modified ISMP, the blade heating system will operate when temperature and relative humidity are within defined thresholds for icing. If icing is detected, T3 will automatically shutdown until all of the ice is melted and T3 can be safely restarted.

The combination of compliance with manufacturers' recommended ice throw setback distances, employment of the E-4.2 ice detection system and blade heating system, and implementation of the modified ISMP mitigates ice throw probability from T3.

Noise

Pursuant to Condition 2(j) of the Declaratory Ruling, BNE established a post-construction noise monitoring protocol that was approved by the Council on November 22, 2011. The wind regulations

[13] Regulations of Connecticut State Agencies §16-50j-95(c) (2014).
[14] Identified as X and Y, respectively, on Attachment B, Petition 983 Probable Case Shadow Flicker Analysis.
[15] Regulations of Connecticut State Agencies §16-50j-94(e) (2014).

require an evaluation of noise.[16] In its D&M Plan Modification, BNE submitted an evaluation of noise from all three WCS turbines. Like shadow flicker, noise diminishes with distance.

The Petition 983 noise evaluation predicted cumulative noise levels from all 3 turbines would range from 32-49 dBA. The residence located at 319 Beckley Road in Norfolk is identified as Receptor Location 7 (R7) in the Petition 983 noise evaluation. See Attachment D. Cumulative noise levels at this location from all 3 turbines were predicted to be a maximum of 39 dBA.[17] This level is below the DEEP standard of 51 dBA. Short-term and long-term post-construction noise monitoring studies of WCS were performed for a period of one year. Monitoring Location 3 (M3) in the post-construction noise monitoring studies conducted during the first year of WCS operation is located between the turbines and the property line of 319 Beckley Road in Norfolk. Noise levels from T1 and T2 at M3 varied from approximately 36 dBA to 46 dBA. This range is below the DEEP standard of 51 dBA. The final noise measurement study concluded that compliance verified at the M3 location proves compliance at R7 as it is approximately 1,265 feet further away from the turbines than the M3 monitoring location.

The T3 noise evaluation predicts cumulative noise levels from all 3 turbines would range from 39-48 dBA. Cumulative noise levels from all 3 turbines at 319 Beckley Road in Norfolk are predicted to be a maximum of 45.4 dBA. Cumulative noise levels from all 3 turbines at 324 Beckley Road in Norfolk are predicted to be a maximum of 38.8 dBA. These levels are below the DEEP standard of 51 dBA.

The T3 noise evaluation concludes that cumulative noise levels from all 3 turbines without the utilization of noise reduction mode will comply with the DEEP Noise Control Standards at the nearest residential receptors. The E-4.2 is comparable in noise characteristics to the GE-1.6 turbines originally modeled and approved by the Council. Its maximum worst-case noise level is 106 dBA at a hub height of 128m and at an operational wind speed of 12m per second. Like T1 and T2, the E-4.2 utilizes serrated blades that enable improved turbine acoustics. The E-4.2 also has the capability to operate in a noise reduction mode at a reduced power output of 3.5 MW.

In compliance with the Declaratory Ruling, with the addition of T3 equipped with serrated blades and the capability to operate at reduced sound outputs, if necessary, cumulative noise levels of all 3 turbines at WCS are expected to comply with the DEEP Noise Control Standards at the nearest residential receptors.

Decommissioning

Pursuant to Condition 2(*l*) of the Declaratory Ruling, BNE submitted a Decommissioning Plan that was approved by the Council on November 22, 2011. The wind regulations require submission of a Decommissioning Plan.[18] T3 does not require any revisions to the approved Decommissioning Plan.

[16] Regulations of Connecticut State Agencies §16-50j-94(d) (2014).
[17] Near 324 Beckley Road in Norfolk is identified as Monitoring Location 2 in the Petition 983 noise evaluation. Cumulative noise levels at this location from all 3 turbines were predicted to be a maximum of 37 dBA.
[18] Regulations of Connecticut State Agencies §16-50j-94(i) (2014).

Environment and Natural Resources

Air and Water Quality Standards

T3 would comply with DEEP air quality standards as it would produce no emissions during operation.

Pursuant to Conditions 2(d) - (g) of the Declaratory Ruling, BNE submitted an Erosion and Sedimentation Control Plan, a Stormwater Management Plan, Drainage Calculations and provisions for crossing Wetland 1 that were approved by the Council on November 22, 2011. With its D&M Plan Modification, BNE submitted an Erosion Control Plan, Stormwater Management Plan, Stormwater Pollution Prevention Plan, Drainage Calculations and provisions for crossing Wetland 1.

Pursuant to CGS §22a-430b, DEEP has exclusive jurisdiction over stormwater management. Construction of T3 requires a General Permit. On December 31, 2019, DEEP published notice of intent to reissue the General Permit that will become effective on September 30, 2020. Construction of T3 will comply with the proposed reissued General Permit. BNE held a conference call with the DEEP Stormwater Division on February 7, 2020 and a meeting on March 4, 2020. DEEP staff is currently reviewing BNE's General Permit registration.

The DEEP General Permit will ensure there are no construction-related impacts to on-site and off-site water quality. All aspects of construction phasing, erosion and sedimentation control methods, temporary and permanent stormwater control features, and on-site monitoring and reporting requirements are reviewed and approved by DEEP as part of the General Permit registration. No site construction activities can occur until the General Permit is issued.

As part of the DEEP General Permit and Condition 2(k) of the Council's Declaratory Ruling, BNE is required to retain an independent third party inspector to monitor on-site erosion and sedimentation controls and report to DEEP during construction.

Wetlands and Wildlife

Pursuant to Conditions 2(b) and (h) of the Declaratory Ruling, BNE submitted a conservation easement and Wetland and Wildlife Restoration Plan (WWRP) that were approved by the Council on November 22, 2011. The wind regulations require the submission of a natural resources evaluation report.[19] The 26.58-acre conservation easement protects the site's natural resources for the life of WCS. The WWRP provides for restoration of disturbed areas with a native seed mix for erosion control and wildlife habitat value and maintains portions of the restored areas as permanent meadow. The final bi-weekly environmental monitoring report concluded construction of T1 and T2 was completed in conformity with the WWRP. Construction of T3 does not require any revisions to the approved conservation easement or WWRP.

T3 is not within a DEEP Natural Diversity Database (NDDB) area nor is it within ¼ mile of a DEEP NDDB area.[20] Beckley Bog is a National Natural Landmark located in the Town of Norfolk. It is approximately 2,900 feet to the west of the initial location of T3 and approximately 3,100 feet west of

[19] Regulations of Connecticut State Agencies §16-50j-94(h) (2014).
[20] BNE completed ongoing comprehensive wildlife surveys of the WCS site. In 2010, DEEP NDDB identified Great St. John's-wort, a state special concern plant, growing in an off-site wetland east of the WCS site. DEEP recommended utilization of erosion and siltation control mechanisms to prevent negative impacts to the habitat.

relocated T3. Similar to the construction of T1 and T2, there will be no impacts to this natural resource from construction of T3.

Access to the initial T3 location required approximately 4,250 square feet of disturbance within the Wetland 1 boundary. Access to relocated T3 would require approximately 2,320 square feet of disturbance within the Wetland 1 boundary. This is a 45% reduction in wetland disturbance. The initial approved wetland crossing location for T3 was approximately 500 feet from the nearest vernal pool and within the 750 foot Critical Terrestrial Habitat (CTH). The relocated wetland crossing location for T3 is approximately 930 feet from the nearest vernal pool and completely outside of the CTH. In compliance with the 2015 U.S. Army Corps of Engineers (ACOE) Best Management Practices (BMPs) for Vernal Pools, maintenance of an uninterrupted directional corridor and use of a bridge for the wetland crossing maintains connectivity between the vernal pools and upland areas. BNE will retain a third party environmental monitor to ensure establishment of appropriate environmental safeguards protective of amphibian and reptile species during construction activities.

In compliance with Condition 4 of the Declaratory Ruling, BNE submitted bird and bat fatality monitoring reports for a period of three years after commencement of operation of T1 and T2. The studies concluded the average annual mortality results of 6 birds and 4 bats over the three year study period are significantly below the WCS predicted average annual mortality rates of 40 birds and 113 bats. Based on the results of the studies and consistent with Condition 4 of the Declaratory Ruling, on November 22, 2019, the Council determined that mitigation measures to reduce bird and/or bat mortality at T1 and T2 are unnecessary. The E-4.2 also offers a bat protection feature that can be installed post-construction.

With the employment of the established post-construction bird and bat fatality monitoring protocol for T3 and subsequent mitigation measures, including, but not limited to, the bat protection feature, if necessary, bird and bat mortality results are expected to be below the WCS predicted average annual mortality rates.

Visibility

The wind regulations require an evaluation of visibility.[21] In Petition 983, BNE performed a viewshed analysis of WCS using a 5 mile radius. The initial analysis determined the three approved turbines would be at least partially visible year-round from approximately 457 acres and seasonally visible (leaf-off) from approximately 1,327 acres. See Attachment E.

In its D&M Plan Modification, BNE performed a viewshed analysis of T3 using a 5 mile radius. The analysis determined that T3 would be at least partially visible year-round from approximately 541 acres and seasonally visible (leaf-off) from approximately 1,339 acres. Most of the year-round visibility of T3 would occur along portions of Route 44, over open water and open fields. Seasonal visibility of T3 would occur mostly on the existing WCS property and extend onto surrounding properties. See Attachment E.

For areas within a one mile radius, viewshed mapping indicates T3 would be visible year-round from areas that were previously determined to have visibility of the three initial turbine locations, including areas along Route 44, Flagg Hill Road, Beckley Road, open areas and waterbodies. New areas of visibility within a one-mile radius of T3 include, but are not limited to, areas along Route 44 near

[21] Regulations of Connecticut State Agencies §16-50j-94(c) (2014).

Greenwoods Turnpike, the area adjacent to T3, Beckley Pond and Beckley Bog, and open field areas along Beckley Road in Norfolk and at the end of Marchone Road in Winchester.

The closest residence to T3, 319 Beckley Road in Norfolk, is expected to have year-round views of T3 across an open field area with the hub visible from most of the property. Seasonal views of T3 would also occur from wooded areas on the property. The property at 324 Beckley Road in Norfolk is expected to have a mix of year-round and seasonal views of the T3 hub from the eastern portion of the property and mostly seasonal views from the western portion of the property. The residence on this property appears to face T3 and would be expected to have seasonal views.

The State Historic Preservation Office determined that WCS would have no adverse effects upon any historic or cultural resources, including the Rock Hall property in Colebrook, a property listed on the National Register of Historic Places. The D&M Plan Modification viewshed analysis indicates T3 would not be visible from the Rock Hall property.

T3 Construction

T3 is located on a small hill in the southwest corner of the 53 Flagg Hill Road parcel. Access to T3 will be from a new 20 to 30-foot wide gravel access drive extending approximately 2,650 feet from the existing T1 and T2 access drive. The new access drive will extend southwest from the existing drive, crossing through the 45 Flagg Hill Road parcel and into the 53 Flagg Hill Road parcel, ascending the southeast side of the hill to the T3 site. Due to hilly terrain, the access drive will be constructed with 2:1 side slopes and grades of up to 10 percent.

Runoff along the access road will be directed into riprap lined swales with underlying infiltration trenches or grass lined swales when slope conditions permit. Two storm water detention basins and level spreaders will be installed along the access drive to control runoff discharge.

A span arch bridge will be installed in the middle section of the access drive to facilitate the crossing of a watercourse. The watercourse, with bordering wetlands, extends from the southern end of Wetland 1 located on the 45 Flagg Hill Road parcel to another, wider wetland area located in the central portion of the 53 Flagg Hill Road parcel. The bridge will have a span of 30 feet and is located at the narrowest point of the watercourse/wetland area. The bridge design conforms to ACOE Stream Crossing BMPs that recommend span crossings to minimize disruption to watercourses by eliminating the need for culverts that have the potential to impound water and concentrate flows. The ACOE guidelines are consistent with DEEP BMPs and guidelines. In addition to maintaining natural watercourse flow, the bridge will allow wildlife to follow the watercourse unimpeded. The arch bridge, as recommended by the ACOE, will have a span that is 1.2 times wider than the full stream width, allowing for uninterrupted flow of a 50-year frequency storm.

The T3 location will be graded to create a level ground elevation of approximately 1,492 feet above mean sea level. An approximate 200-foot by 232-foot gravel pad will be established for construction equipment and a turbine assembly area. The gravel pad will have a slight pitch to direct runoff southwest to a stormwater detention basin.

Site construction will disturb an 8.45 acre area and will require 13,780 cubic yards of cut and 13,200 cubic yards of fill. Approximately 7.20 acres of forest will be cleared and grubbed for construction.

Stumps will be removed from the site. Approximately 2,320 square feet of wetlands will be impacted by construction, mostly in the area of the watercourse/wetland crossing.

Construction sequencing includes the clearing, grubbing and construction of the new access road to the bridge site, followed by bridge construction. Once the bridge is completed, the remaining access road and turbine pad area will be constructed. Construction activities will comply with the *2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control.* Provisions have been made for soil stockpiles, temporary sediment traps and a temporary mat crossing of the watercourse/wetland area to facilitate bridge construction.

Consistent with the existing WWRP, once site work is completed, disturbed upland areas will be restored with a New England Conservation/Wildlife Mix, a native herbaceous seed mixture that will facilitate growth of a permanent cover of grasses, forbs, wildflowers and legumes. This seed mixture will provide erosion control and wildlife habitat value. Portions of the restoration area will be maintained as a permanent meadow.

BNE expects to complete construction by the end of 2020. Typical construction hours and days of the week will be 7:30 AM to 4:00 PM, Monday through Friday.

Conclusion

WCS is an existing distributed energy resource facility as defined in CGS §16-1(a)(49). CGS §16a-35k establishes the state's energy policy, including the goal to "develop and utilize renewable energy resources, such as solar and wind energy, to the maximum practicable extent." The 2018 Comprehensive Energy Strategy identifies Strategy No. 3 as, "Grow and sustain renewable and zero-carbon generation in the state and region." Governor Lamont's 2019 Executive Order 3 declares the state's goal to reach 100% carbon free electricity by 2040. WCS contributes to fulfilling the state's clean energy goals as a zero emission Class I renewable energy source. Additionally, WCS has the capability to incorporate battery storage in the future, which would maximize Class I renewable source electricity production.

In its Declaratory Ruling, the Council did not restrict the height, type or location of the three approved turbines on the WCS site. Inclusive of BNE's November 2, 2012 and November 5, 2013 D&M Plan modifications referenced herein, established Council precedent exists for approving the use of different turbine models and relocation of approved turbines through a D&M Plan modification. In 2000, the Council approved a D&M Plan modification to relocate an approved electric generating facility by 500 feet. This modification was upheld on appeal.[22] In 2001, the Council approved a D&M Plan modification to change approved turbine models and relocate an approved electric generating facility. This modification required all of the buildings to be rotated 90 degrees counterclockwise and construction of two taller buildings as opposed to one shorter building.[23] In 2017, the Council approved a D&M Plan modification to make layout changes to a section of approved solar arrays and increase clearing limits to minimize shading effects.[24] In 2018, the Council approved a D&M Plan modification to make layout changes to two sections of approved solar arrays.[25] In 2019, the Council approved a D&M Plan

[22] Council Docket 192, Towantic Energy Center, Oxford; *Town of Middlebury v. Conn. Siting Council*, *supra* note 3.
[23] Council Docket 190, Meriden Gas Turbines, LLC, Meriden.
[24] Council Petition 1234, DG Connecticut Solar, LLC, North Canaan.
[25] Council Petition 1247, C-TEC Solar, Thompson.

modification to change the solar inverter model, adjust fence locations and install additional higher wattage solar panels in different locations than the locations identified in the Declaratory Ruling.[26]

The January 9, 2020 D&M Plan Modification, and supporting materials dated February 21, 2020, February 26, 2020, March 2, 2020 and March 5, 2020, are consistent with the Council's June 2, 2011 Declaratory Ruling and the Council's October 21, 2011, November 22, 2011, February 7, 2013 and December 17, 2013 D&M Plan and D&M Plan modification approvals.

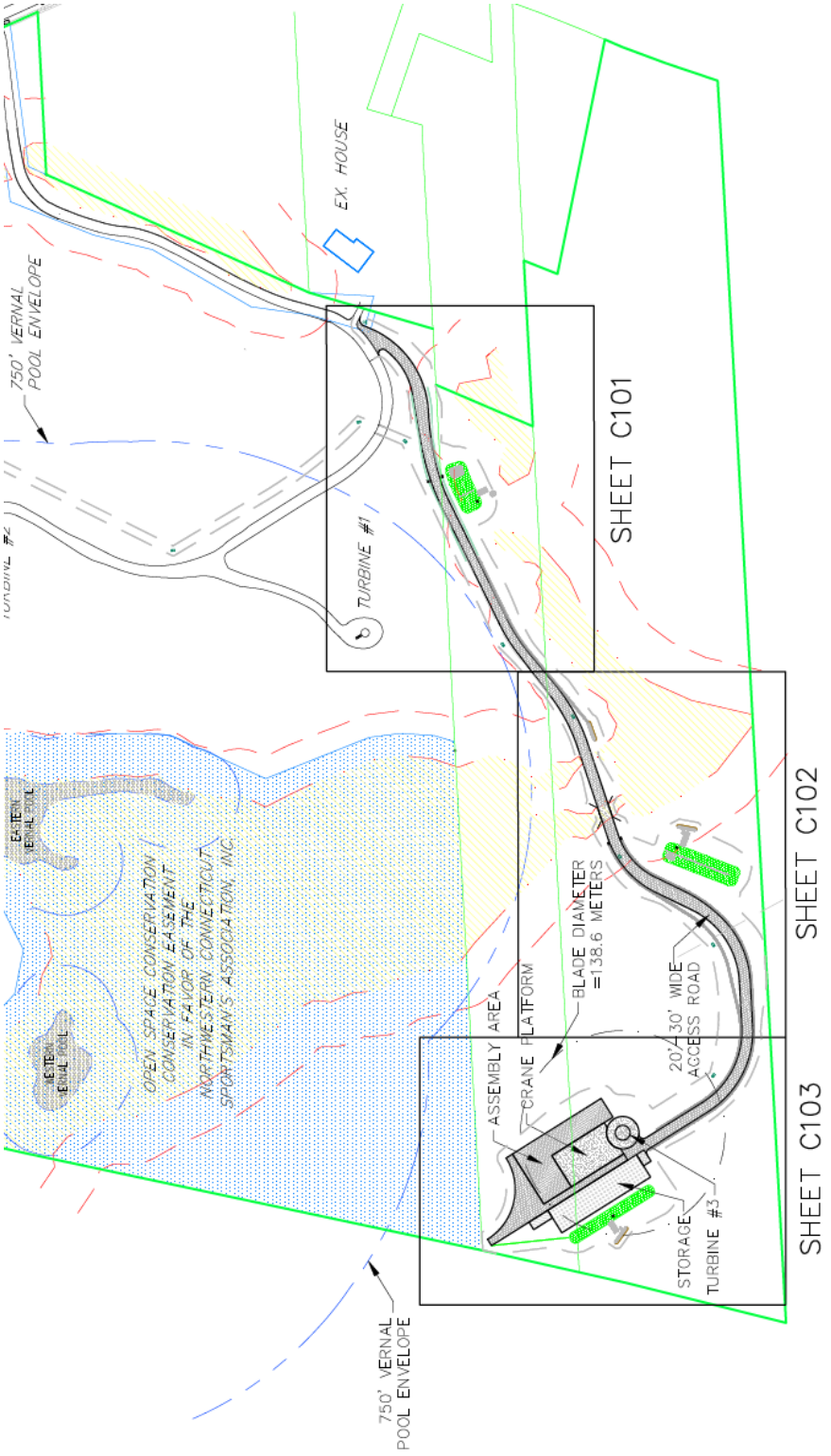
Pursuant to Regulations of Connecticut State Agencies §16-50j-62(b), the Council's June 2, 2011 Declaratory Ruling and the Council's October 21, 2011, November 22, 2011, February 7, 2013 and December 17, 2013 D&M Plan and D&M Plan modification approvals, the request to relocate Turbine 3 (T3) and to construct, maintain and operate an Enercon 4.2-138 MW wind turbine at Wind Colebrook South is hereby approved with the following conditions:

1. Submission of a final site plan that includes, but is not limited to, details for crossing Wetland 1, extent of vegetative clearing, grading, wetland buffers, access roads, turbine foundation, equipment and material laydown and staging area, electrical interconnection, fencing, equipment pad, and post-construction stormwater controls, as designed in the DEEP-approved Stormwater Pollution Control Plan (SWPCP);
2. Submission of a copy of the DEEP General Permit and DEEP-approved SWPCP prior to commencement of construction;
3. Retention of a third party monitor to ensure establishment of appropriate environmental safeguards protective of amphibian and reptile species during construction consistent with Note 5 under "WCS Third Party Environmental Inspections" on Sheet C600 of the D&M Plan Modification;
4. Submission of the final FAA determination(s);
5. Written notice of commencement of site clearing, foundation construction, T3 installation, completion of remediation, and commencement of T3 operation;
6. Performance of a post-construction noise monitoring protocol consistent with the existing WCS protocol describing locations, frequency and methods to be employed for a post-construction noise study of all three turbines. Upon review of the subsequent noise study, the Council will evaluate and determine if any mitigation measures should be employed, including turbine operations management;
7. Performance of post-construction monitoring of bats and birds consistent with the existing WCS protocol to document any mortality from T3 operations. An annual summary of the study results shall be submitted to the Council for a period of three years with the first report due one year after commencement of T3 operation. At the end of the three-year study period, the Council will evaluate and determine if any mitigation measures should be employed to reduce bat and/or bird mortality; and
8. Submission of a first year operating report within three months after the conclusion of the first year of operation that includes a discussion of the number of hours of operation, wind speeds, and the amount of generation produced by T3.

[26] Council Petition 1234, DG Connecticut Solar, LLC, North Canaan.

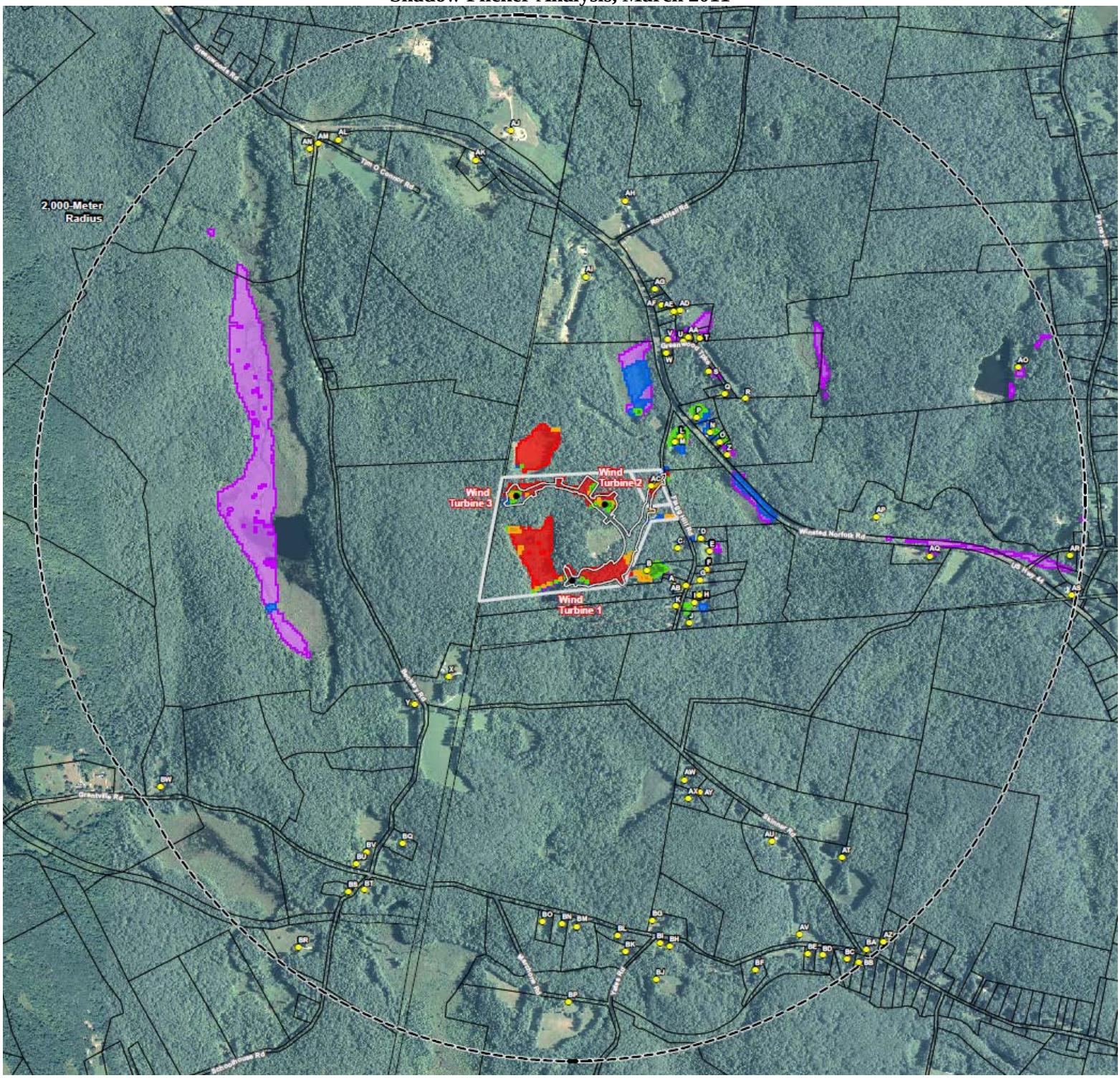
Attachment A

Site Plan



Attachment B

Shadow Flicker Analysis, March 2011



Legend

- Receptor
- Proposed Wind Turbine Location
- Proposed Clearing Limits & Access Road
- 2,000-Meter (1.24 - Miles) Radius
- Approximate Project Site Boundary
- Approximate Assessor Parcel Boundary

Probable Case Shadow Flicker

Hours Per Year

- < 10
- 10 - 20
- 20 - 30
- 30 - 40
- > 40

Base Map Source: 2010 aerial photography with 1-meter resolution.

Attachment C

Modified Ice Safety Management Plan, February 2020

ICE SAFETY MANAGEMENT PLAN
WIND COLEBROOK SOUTH TURBINE 3

BNE will implement best practices and utilize the advanced capabilities of the Enercon 4.2 to enhance safety and minimize the potential for ice throw. Below are the step-by-step procedures that BNE would follow for Turbine 3 in the event of potential turbine blade icing, and the techniques that would be employed prior to restart:

- Wind Colebrook South will be monitored 24 hours per day, 7 days per week. The turbines are expected to be monitored remotely by Enercon and by onsite personnel during regular business hours and icing events.

- During winter months when there is a potential for an icing event, BNE will restrict access to the site and place fences and warning signs as appropriate for the protection of site personnel and the public.

- BNE and Enercon will be continuously monitoring weather forecasts for conditions which are favorable to producing icing events.

- The Enercon 4.2 is equipped with an ice detection system, which is based on a specially developed and patented characteristic curve analysis method. During operation, the ice detection system compares current operating data such as wind, power and blade angle with the recorded long-term mean values to determine if ice build-up on the wind turbine has changed the aerodynamic properties.

- If ice build-up is detected, the wind turbine will automatically shut down to reduce icing and prevent ice throw. The turbine can also be shut down remotely and manually on-site.

- BNE will also employ the optional blade heating system to reduce icing, prevent ice throw and enhance safety. The blade heating system will only operate after icing is detected and the wind turbine is automatically shut down. The blade heating system will automatically switch on until the ice is melted.

- The turbine can be restarted when the ice is melted in accordance the re-start procedure.

Re-start procedure:

- If the turbine is shut down due to icing, BNE will be responsible for monitoring the turbine to ensure the blade heating system has melted all ice from the blades before the turbine can resume normal operating conditions.

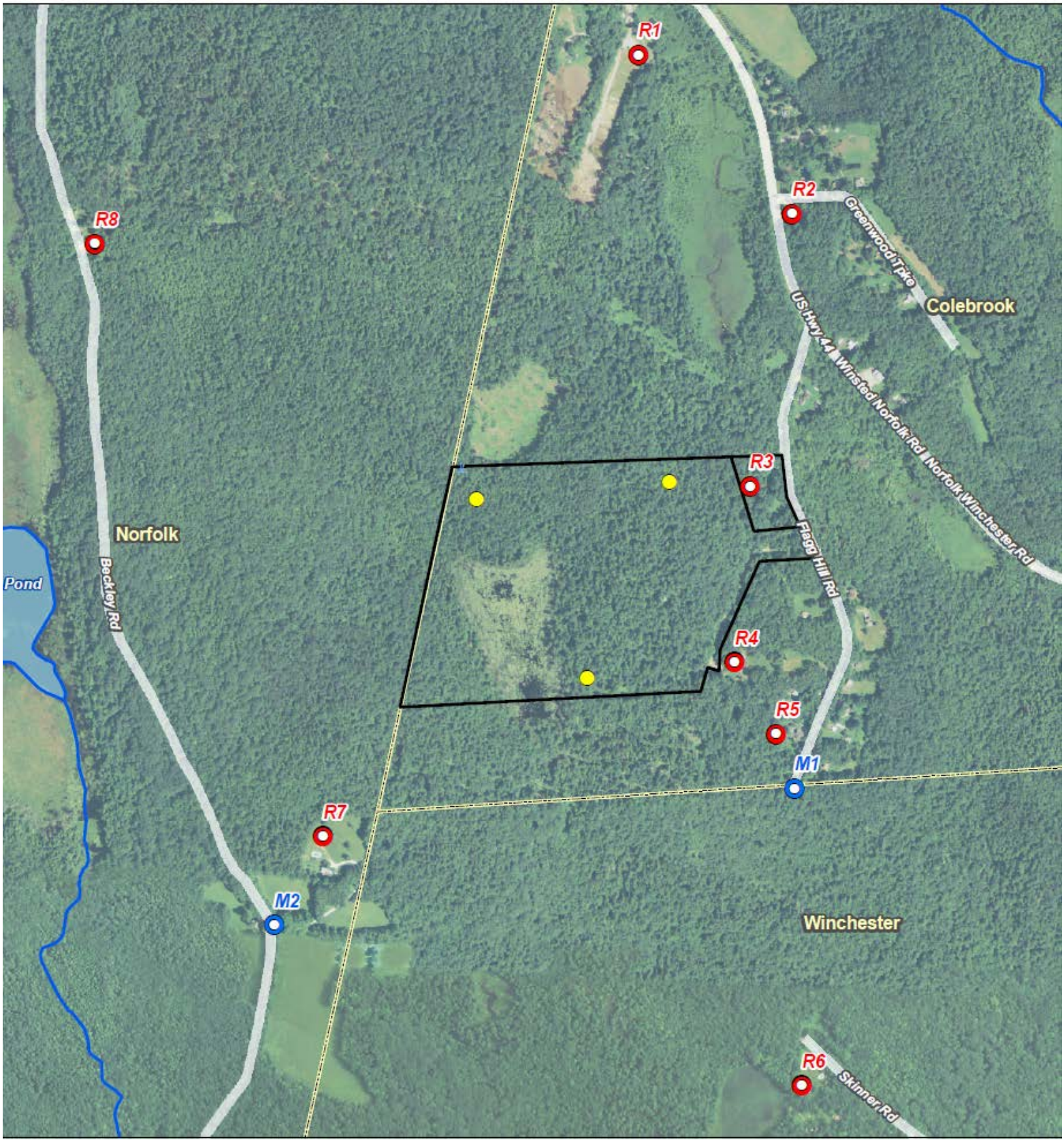
- BNE will thoroughly inspect the turbine to ensure that there is no remaining ice on the blades prior to restart.

- The turbine will remain shut-down until BNE can assess the operating conditions of the turbine. At that time, BNE may restart the turbine provided that the area affected by possible ice falling is appropriately monitored to prevent injury to people in the area or damage to property. A designated technician will be present at the turbine site before and after the iced turbine is started up. This individual will assess the suitability of restarting the iced turbine for any potential impact to adjacent individuals or property.

- In extreme conditions, BNE will curtail or shut down the turbine in advance of subjecting the turbine to ice build-up on the turbine blades and risk of ice throw. Depending on the wind direction and conditions of the icing event, the turbine may be manually positioned (by yawing) out of the upwind position to reduce direct ice build-up on the turbine and blades. The turbine will remain shut-down until weather conditions improve. BNE will thoroughly inspect and validate the turbine to ensure that there is no remaining ice on the blades prior to restart. A designated technician will be present at the turbine site before and after the turbine is started up to ensure safe operations.

Attachment D

Noise Monitoring and Receptor Locations, November 2010



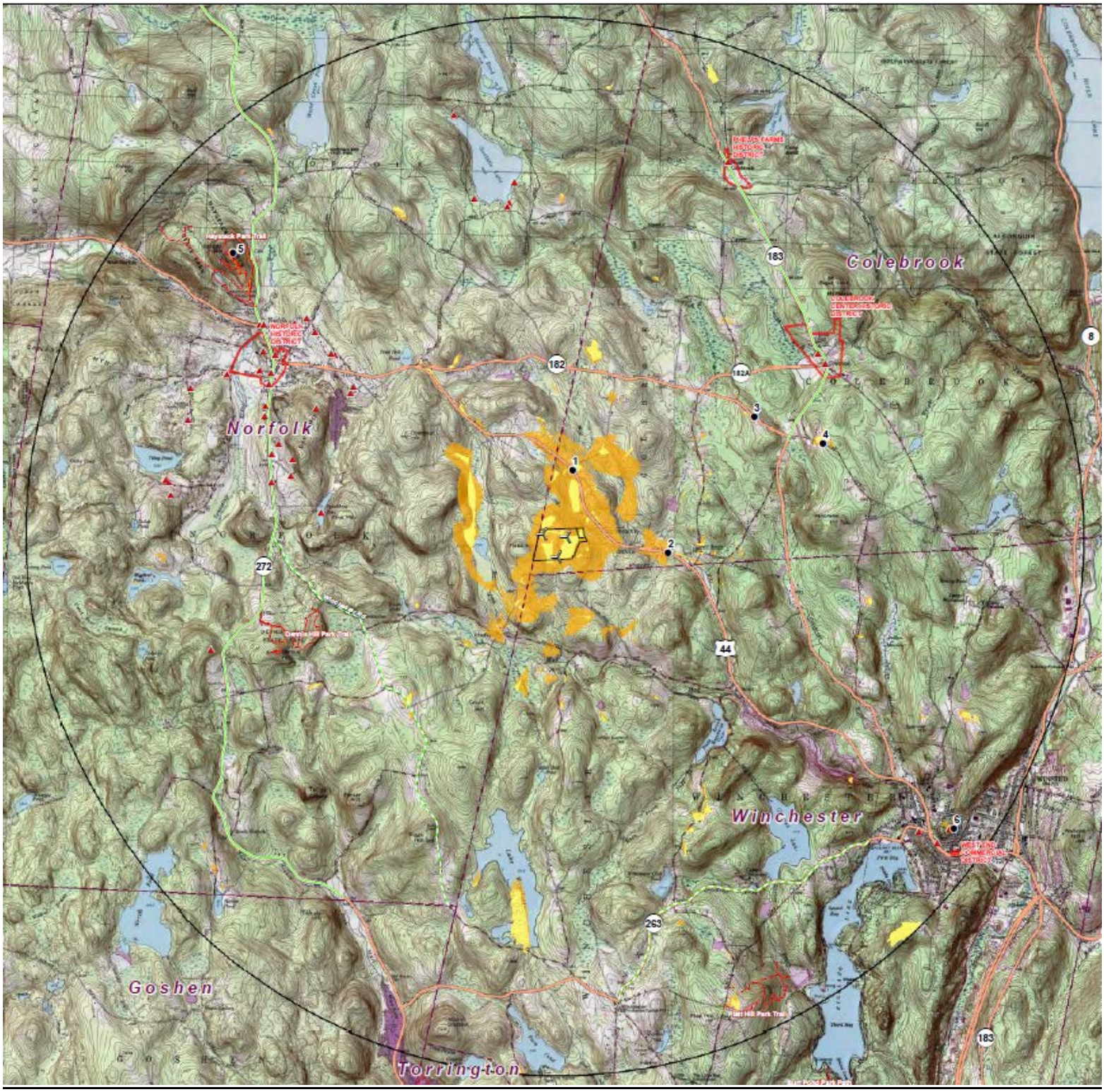
Legend

- Receptor Location
- Monitoring Location
- Proposed 1.6MW Wind Turbine Location
- Property Boundary
- Town Boundary

Base Map Source: 2008 aerial photograph with 1-meter resolution.

Attachment E

Viewshed analysis of WCS facility within a 5 mile radius compiled in March 2011

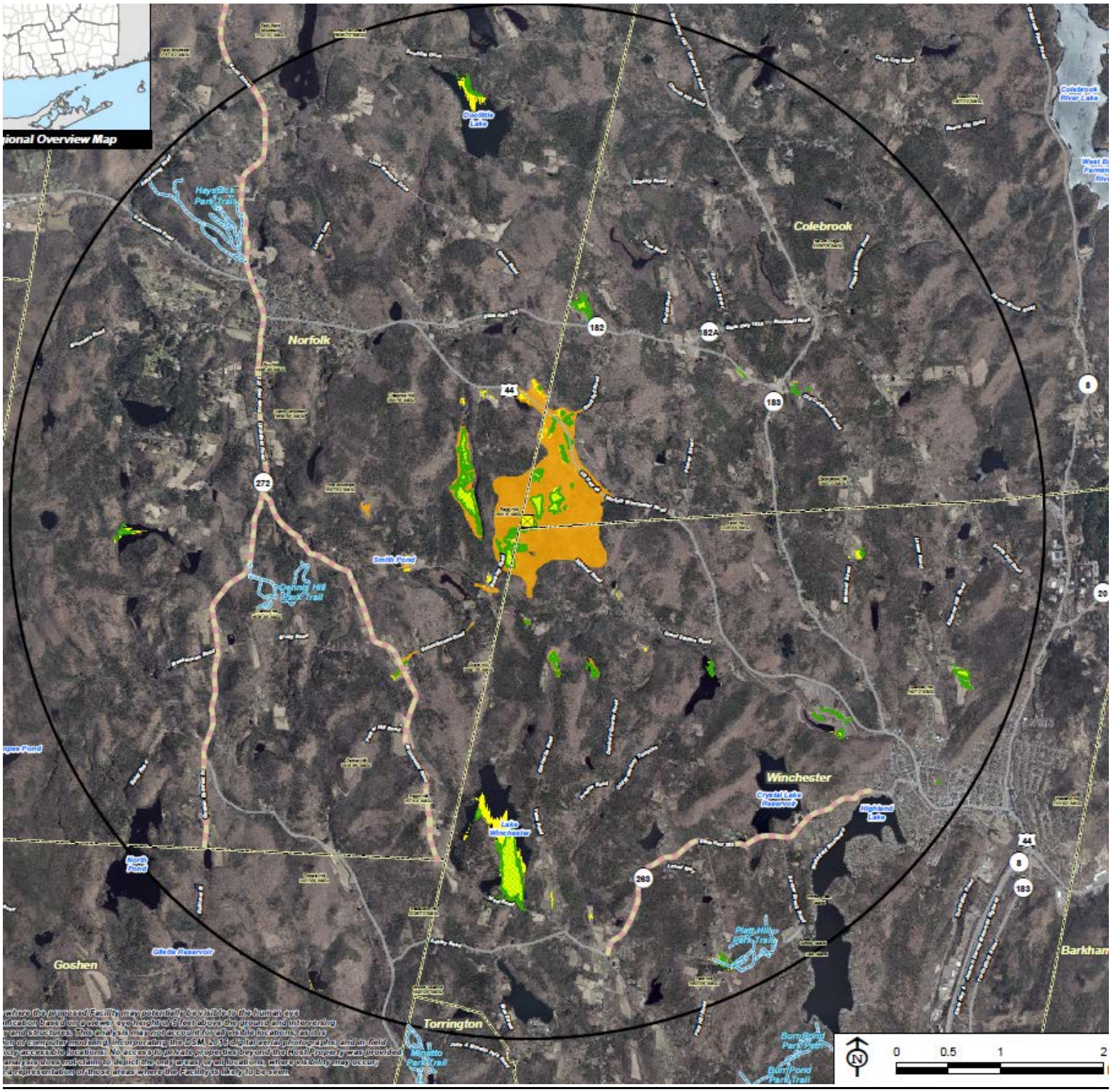


Legend

- Proposed Wind Turbine Location
- Photo Locations
- 5-Mile Study Area
- Site Property Boundary
- National Register Listed Historic Site
- National Register Listed Historic District
- Wind Turbine 100 Meter Hub Height Year-Round Visibility (+/- 254 acres)
- Wind Turbine 100 Meter Hub Height Seasonal Visibility (+/- 1,327 acres)
- Scenic Highway
- Scenic Local Road
- Trails
- Town Line

N

Viewshed analysis of T3 within a 5-mile radius compiled in February 2020



Legend

- Proposed Wind Turbine Location
- Study Area (5-Mile Radius)
- Predicted Year-Round Visibility - 128 Meter Wind Turbine Hub Height (204 Acres)
- Predicted Year-Round Visibility - 138 Meter Diameter Wind Turbine Blade Height Above Proposed Hub (337 Acres)
- Predicted Seasonal Views - Wind Turbine Hub and Blad (798 acres)
- Municipal Boundary
- Trail
- Scenic Highway