Highland Wind Project
LURC Development Permit DP 4862
Compiled Agency Review Comments, Part 1
April 13, 2011

This document contains the agency review comments submitted by the Maine Department of Inland Fisheries and Wildlife, the State Soil Scientist, the Maine Natural Areas Program, and the Maine Dept. of Health and Human Services' Division of Environmental Health.

Maine Department of Inland Fisheries and Wildlife
Wildlife Division Review Comments
for
LURC DP-4862: Highland Wind Power Project, Highland Plantation
April 13, 2011

MDIFW has reviewed the application for development of the Highland Wind Power Project, in Highland Plantation. Use of preconstruction studies is critical to our evaluation of potential impact to sensitive wildlife resources. Avoidance of sites with high risk remains the primary focus for site-specific guidance on wind energy development. Based on pre-construction surveys, existing scientific studies, and internal review among several staff species specialists we have strong concerns about potential wildlife impacts resulting from this proposed project. Furthermore, we believe that the substantial collective risk to wildlife resources indicates that the proposed site locality is not appropriate for intensive wind power development. Specifically, the Highland Wind Power project is likely to have negative impacts on two State Endangered and Threatened species, one state Special Concern species, three Significant Wildlife Habitats, and potential direct mortality to as many as eight state Special Concern species of bats. As such, we conclude that this project, as currently proposed, will likely have undue adverse impacts to multiple high value wildlife resources. Specific impacts are as follows:

Northern Bog Lemming: The applicant identified six wetlands having habitat characteristics suitable for the State-listed Threatened Northern Bog Lemming. The Department has not previously reviewed a proposed Wind Power development with this much occupied and potentially occupied habitat for this species. Cursory surveys to determine presence of this species indicated that three of the wetlands (W134, W068, and W011) are currently occupied by Bog Lemmings (undetermined species). In lieu of trapping (likely causing mortality to the species) or expensive genetic analysis, MDIFW and the applicant agreed to treat all wetlands with documented presence of Bog Lemmings as occupied by the Northern Bog Lemming species. Additionally, we believe that W068 is part of a wetland complex containing wetlands W072, W073 (identified as suitable habitat), W066, and W069, which likely provides habitat for dispersing lemmings and could become occupied through natural colonization processes. In these higher-elevation sites, MDIFW assumes that these wetlands support a metapopulation

allowing for immigration, emigration and the dynamics of gene flow in the Northern Bog Lemming. We have significant concerns that the proposed development will have undue adverse impacts to this series of wetlands along Witham Mountain and believe that maintaining the integrity of this complex is critical to the local population of this Threatened species.

Roaring Brook Mayfly and Spring Salamander: The applicant conducted limited surveys to determine the presence/absence of both the Roaring Brook Mayfly (State-Endangered) and Spring Salamander (State Special Concern) within the project area. Despite this limited effort, both species were documented in the Stoney Brook watershed. In lieu of conducting additional surveys, the applicant agreed to consider all potentially suitable streams within the project area as occupied by Roaring Brook Mayfly and Spring Salamander and adhere to MDIFW's guidelines for avoiding and minimizing impact to these two rare species and their habitat. There are 44 perennial streams within the project area, of which 20 are associated with the transmission line and 24 with turbines and/or access roads. The applicant identified five of these streams, all within Stoney Brook watershed, as potentially suitable habitat. MDIFW subsequently requested and reviewed photo documentation of all perennial streams within 500 feet of a potential project impact. While the information provided was not sufficient to adequately assess all 44 streams, we believe a larger subset could meet suitable habitat standards and possibly include streams outside of the Stoney Brook watershed.

MDIFW reviews projects of this scale for endangered and threatened species concerns following Site Location Law standards of no adverse environmental effect or unreasonable disturbance to habitat. To avoid take and maintain integrity of streams occupied by the Roaring Brook Mayfly and Spring Salamander, we recommend that stream crossings be avoided to the greatest extent possible and a 250-foot forested riparian buffer be maintained on both sides of the stream. Within this buffer, 60-70% forest canopy should be maintained and permanent land use conversion should be prohibited. As currently proposed, this project includes new or upgraded crossings over occupied and potentially occupied streams which will require implementation of higher crossing standards to meet MDIFW's guidelines. It also includes a widening and upgrade of an existing haul road that runs parallel and immediately adjacent to Stony Brook and its major tributary for approximately 0.4 miles. Along this section of stream, which is where both Roaring Brook Mayfly and Spring Salamander were found, the amount of forest cover within the 250-foot riparian buffer would be further reduced by permanent conversion to impervious surface. The magnitude of project area within occupied stream habitat is of great concern and poses a high potential for undue impact to both species.

Bats: Results from the applicant's acoustic monitoring for bat activity within the project area show the highest recorded bat sequences for any previously proposed project in Maine. In fact, monitors located at tree height recorded 11,516 sequences during fall 2008 surveys. This is more than seven times higher (1,576 sequences) than tree height detectors at the permitted Record Hill facility in Roxbury. The detected sequences during the Highland Wind preconstruction surveys were distributed throughout the project area and not just restricted to individual detector sites. Likewise, all guilds of bats presented

in Maine have been documented at this site, representing eight bat species (all State Special Concern). Furthermore, bats are included in the high numbers of observed nocturnal migrants described below. MDIFW is greatly concerned that this proposed project poses a significant long-term mortality risk to both resident and migrant bats. Confounding these results are unknown effects that white nose syndrome (WNS) will have on the viability of regional bat populations. The majority of calls recorded during the Highland studies were identified to the genus Myotis. In Maine, little brown bats (*Myotis lucifugus*) and northern long-eared bats (*Myotis septentrionalis*) are the most abundant species in this genus. Little brown and northern long-eared bat populations are being severely impacted by WNS, and are currently under consideration for emergency listing by the U.S. Fish and Wildlife Service under the Endangered Species Act. Therefore, MDIFW believes that the currently proposed Highland Wind development poses an undue risk to bat populations.

Nocturnal Migrants and Diurnal Raptors: The passage rates of nocturnal migrants and diurnal raptors through the project area are among the highest reported for projects in Maine. Furthermore, a high proportion of nocturnal migrants and diurnal raptors pass the project area at altitudes equal to or less than the maximum turbine heights, greatly increasing the risk of collision. Observations revealed that over 80% of spring diurnal raptors (260) and nearly 50% of fall diurnal raptors (301) flew within the height of the proposed turbines, and approximately 60% of spring raptors and nearly 90% of fall raptors flew along or crossed the project ridgelines during passage. Both the potential for direct mortality with turbines and displacement from preferred flight corridors are concerns.

Similar concerns for nocturnal migrants exist at the proposed site. On average more than 23% of spring migrants passed through the rotor swept zone (RSZ) during the applicant's pre-construction surveys. Further, over 60% of the 21 nights surveyed showed a passage rate of at least 20% through the RSZ. On those nights, approximately 75% of the total documented nocturnal migrants (176,993) passed through the project area. These data are much higher than at the Saddleback Ridge project in nearby Carthage, which was also surveyed during the spring of 2009. An average of 16% of documented migrants passed through the RSZ at Saddleback Ridge, with only 29% (11/38) of the days surveyed having greater than 20% of passage through the RSZ. Furthermore, on those 11 days, only 15% of total documented nocturnal migrants passed (223,765) over the site. Similar results were documented at the Kibby Wind Power Expansion Project (Sisk Mountain) also conducted during spring 2009. Studies from Sisk Mountain showed that on average 18% of nocturnal migrants passed through the RSZ. On twelve of twenty days (60%) surveyed >20% of nocturnal migrants flew below RSZ, but those days accounted for less than half (48%) of total documented migrants (51,294).

The proposed Highland Wind Project has some of the highest recorded passage rates through the rotor-swept zone, and is among the highest passage rates (targets/km/hour) of any project reviewed by MDIFW. We acknowledge that no correlation between pre-construction counts and mortality caused by an operational facility has been demonstrated. However, results from the applicant's radar surveys suggest that the

proposed site poses a higher risk to nocturnal migrants, especially a single catastrophic mortality event, than of any project proposed in Maine to date. MDIFW's conclusion based on these combined observational data is that there is a relatively high risk of collision mortality to birds over the life of the project. Absent a commitment by the applicant for significant operational mitigations (e.g., seasonal curtailment of turbines during migration periods), there are no plausible strategies to mitigate risks to migrating birds at this time.

Vernal Pools: The applicant conducted vernal pool surveys within the project area and submitted datasheets to MDIFW for determination of significance. Currently, MDIFW recommends applying Natural Resources Protection Act - Significant Vernal Pool standards for evaluating impacts to vernal pools in both organized and unorganized townships. The NRPA rules only provide protection for vernal pools that are determined to be Significant Vernal Pools (SVP). While, NRPA rules are used to determine pool significance, the scale of the current project is consistent with that of a Site Location Law review, thus invoking higher performance standards for avoiding and minimizing impacts to Significant Wildlife Habitat. As such, MDIFW recommends a preferred strategy of avoidance of the SVP habitat, including the 250 ft life zone critical terrestrial habitat zone surrounding the pool depression. If, upon detailed alternative layout analysis by the applicant, complete avoidance of impacts to SVP habitat is not reasonable then MDIFW recommends that a 100 ft buffer be applied to the pool depression and not more than 25% conversion to the area from 100-250 ft from the pool edge.

The applicant identified 46 vernal pools in the project area, of which three were determined to be SVPs. The applicant proposes approximately 9% impact to the 250-ft terrestrial habitat zone associated with SVP 04AA. However, as mitigation the applicant has proposed to discontinue the use of a portion (2%) of the original forest management road to permit natural revegetation. SVP 05ED has a proposed 10% impact to the terrestrial habitat zone from construction of an access road and Turbine 36E. Similarly, SVP 08ED would have approximately 5% impact to the terrestrial life zone as a result of constructing Turbine 39E and associated access road. MDIFW contends that the applicant has not yet provided enough information demonstrating that impacts to SVPs cannot be avoided entirely.

Conclusion: MDIFW has provided technical assistance and consultations to this project since 2007. Despite considerable discussions and previous project modifications, an array of concerns remain unresolved and are evident in the application now before LURC. As proposed, we feel the project in Highland Plantation is not an appropriate site for this development and consequently poses a significant adverse impact for wildlife resources. Piecemeal minimization and mitigation measures for some impacts are plausible, but are not consistent with the conditions of the Comprehensive Land Use Plan (no undue adverse effect) nor Maine's Site Location Law (no adverse environmental effect), those Laws which govern permitting standards for a project of similar scope throughout the state. We conclude that the collective wildlife concerns detailed above demonstrate that this is not an appropriate locality for an intensive wind energy installation such as that currently proposed by Highland Wind Power.

Sincerely,

cc: Tom Hodgman, Charlie Todd, Beth Swartz, John DePue, Dr.Phillip deMaynadier, Robert Cordes.

Comments - Environmental Project Review Maine Department of Inland Fisheries and Wildlife	
Fisheries Division Comments - Region D	
Applicant's Name: Highland Wind LLC	
Project #: DP4862	Regulatory Agency: LURC
Project Type: Wind Power Development	Project Manager: Marcia Spencer-Famous
Comments Due Date: 4/13/11	Date Comments Sent: 4/12/11
Project Location	
Town: Highland Plantation	County: Somerset
Waterbody: Sandy Stream, Michael Stream, Little Michael Stream, Stony Brook, Barker Brook, Churchill Brook, Houston Brook, Brittenell Brook, 34 unnamed perennial streams, 60 intermittent streams, Gilman Pond.	
Fisheries Biologist: Dave Boucher	

After review of the application and consideration of the proposal's probable effect on the environment, and on our agencies programs and responsibilities, we provide the following comments:

I. Resource Affected:

Most larger perennial streams in the project area were assessed during recent Eastern Brook Trout Joint Venture (EBTJV) surveys. Results of these surveys contradict the applicant's assessment of most streams in the project area, whereby they state (Appendix 14-2) ***"…five of the perennial streams, including Stony Brook, do not appear able to support fisheries for much of the year because flows are too rapid following spring snowmelt and are subsequently too shallow during the summer months. The presence of northern spring salamanders (Gyrinophilus porphyriticus), a species that typically occurs in streams without fish, further suggests that these streams are unable to support fisheries".*** In fact, all perennial streams surveyed by EBTJV and IFW staff, including Stony Brook, support robust fish assemblages that are characteristic of high elevation streams, consisting of brook trout, slimy sculpin, and blacknose dace. Fish assemblages in the unsurveyed perennial streams are probably very similar. Sandy Stream supports a more diverse suite of fishes that includes brook trout, slimy sculpin, ninespine stickleback, white sucker, and four native minnow species. Largemouth bass have recently colonized the lower reaches of Sandy Stream and Gilman Pond, but natural barriers prevent them from colonizing streams in the project area. Gilman Pond supports most species listed above, and chain pickerel, brown bullhead, and pumpkinseed sunfish. Fish populations in all project area waters are supported entirely by natural reproduction.

II. Major Concerns:

The potential for stream sedimentation is high because soils are moderately to highly erodible, and slopes are steep in many locations. Streams may be negatively impacted (flow volume and timing, temperatures) if vegetated buffers are inadequate and if natural hydrological processes are disturbed. Free passage of fish and other organisms through road culverts could be compromised. Water quality and fish habitat in Gilman Pond could be compromised if phosphorous loading exceeds limits established by MDEP.

III. Comments/Recommended Considerations or Conditions:

- 100-foot vegetated buffers should be maintained along each side of all perennial streams that cross the transmission line corridors, and vegetation within the buffers should be allowed to grow to 8-10 feet, or higher where pole structures are placed within the buffer and wire heights are greater. Both recommendations have been incorporated into the applicant's construction and maintenance plans.
- We support the applicant's proposals to reduce transmission line clearings to 40-50 feet wide within 100 feet of perennial streams, and to prohibit the use of herbicides within 250 and 25 feet of perennial and intermittent streams, respectively. Alternative setbacks for herbicide use may be considered upon further documentation of water quality protection and management effectiveness.
- Intermittent streams will be protected with 25-foot buffers "where practical", but no criteria for "practical" is provided. We prefer that all intermittent streams receive this minimal protection, and stress that channelization (road ditching in particular) of intermittent streams should be minimized or eliminated where feasible.
- We'll rely on the State's Soils Scientist for a thorough review of the applicant's stormwater management plan's effectiveness in maintaining water flows off the mountain remain as natural as possible. To assure underlying hydrology is properly identified and protected, we recommend a careful review of the applicant's provisional plans for winter construction.
- We'll rely on MDEP staff to assess phosphorous export to Gilman Pond.
- We support the applicant's proposal to construct bridges or open-arch culverts at all new crossings of perennial streams, and replace certain existing culverted crossings with bridges. We recommend, however, that bridges or arched culverts replace <u>all</u> existing crossings where upstream passage of fish is currently impeded by closed-bottom culverts. We would be happy to assist the applicant's consultants in identifying these sites.
- Where new culverts are proposed, they should be sized at least 1.2x the width of the stream crossing, and they should be embedded to facilitate passage of fish and other aquatic organisms, where downstream and upstream slopes don't naturally impede their free passage.
- The instream work window should be narrowed to July 15-September 15 to better reflect the sub-alpine conditions and earlier staging and spawning of brook trout.

MAINE DEPARTMENT OF AGRICULTURE
FOOD AND RURAL RESOURCES
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To: Marcia Spencer-Famous, Senior Planner, LURC
From: David P. Rocque, State Soil Scientist
Re: DP 4862, Proposed Highland and Pleasant Ridge Plt. Wind Farm
Date: April 6, 2011

After reviewing the subject application, I offer the following comments:

General – There are a couple of general comments I have to offer regarding the design of this proposed wind farm project. The first comment concerns proposed road building techniques. High elevation areas, even if they are not technically above the 2700' threshold for P-MA zones, have fragile soils and unique hydrology features. The higher in elevation you go the more fragile the soils are and the more likely you are to encounter unique hydrology features. The proper construction of roads in these areas require specialized road building techniques if impacts upon those soils and the natural hydrology are to be minimized. It is therefore, important to specify where or at least under what conditions certain road building techniques are to be employed. The project design appears to give the contractor the option to build roads using standard road building techniques with common borrow and gravel or more specialized techniques such as blast rock where ever and when ever they choose. I believe the design should be more specific and require the use of a blast rock road base, at a minimum, in sensitive areas such as on steep side slopes, along ridge tops and where road cuts are proposed to extend to or below the projected seasonal groundwater table. Blast rock roads on steep slopes reduce the downslope fill extension foot print thereby minimizing the extent of alteration required to build those roads. Blast rock roads, along with rock sandwiches, allow for pass through of intercepted groundwater thereby minimizing the alteration of the natural hydrology. I also believe that blast rock should be used for turbine pads. Doing so provides a sound base, allows for infiltration of stormwater and minimizes downslope fill extensions.

My second general comment concerns the use of rock sandwiches. The project design includes the note "potential rock sandwich" in most locations where rock sandwiches are depicted on the plans. I assume this note is designed to allow the contractor and/or on-site engineer to use his/her discretion as to whether or not a rock sandwich is needed and to what extent. What criteria will be used to make these determinations? If construction takes place in the dry time of year, it may not appear that a rock sandwich is needed whereas if the construction were to occur in the spring or fall it might become apparent that they are necessary. I believe it is possible to provide a more definitive design based on soils, depth of proposed cuts and size of watershed. Included should be areas noted by the project soil scientist where oxygenated groundwater occurs in the soils. Therefore, I recommend that the design be revised to indicate where rock sandwiches are to be installed, unless otherwise directed by the project engineer and third party inspector. The

extent of these rock sandwiches can be adjusted in the field based on site specific decisions by the project engineer, contractor and third party inspector. I offer my assistance in making those decisions and would be interested in accompanying the third party inspector periodically as I did on Kibby and the Stetsons.

Specific Comments:

1. **O & M Building** – The stormwater design for this component of the project includes 2 under drained soil filters. I believe under drained soil filters serve an important function in highly urbanized areas where there are limited treatment options but are generally not necessary in remote forested areas such as where this project is located. Under drained soil filters are man made features that require additional site alteration to construct, beyond what is needed for the O & M building, are difficult to construct properly and require continuing maintenance to function properly and require directing runoff to a single location. I believe it makes more sense to use a passive treatment system of shaping the lot so that runoff is shed in multiple directions to stone berm level spreaders, without the use of under drained soil filters. This would serve a number of purposes: (1) it would require a smaller foot print of area to be altered, (2) it spreads the runoff over a larger area with smaller amounts of water, (3) it is a passive system that would not require continual maintenance and is therefore less likely to fail. I therefore, recommend that the under drained soil filters be eliminated from the design and a passive system of shaping and stone level spreaders used instead.

2. **Access Road Station 0+00 to the O & M Building Site and Station 7+00** – This section of access road, which will have a deep cut, is shown as carrying runoff water for over 700 feet to the Long Falls Dam Road. Because of the deep cut, the ditches will also carry groundwater. My concern is with the amount of water that these ditches may carry to the Long Falls Dam Road. If possible, it would be helpful to put in a ditch turnout on either side of the road, about half way down to Long Falls Dam Road. I realize that would require a significant cut through the ditch bank to outlet which may not be practical. If ditch turnouts prove impractical due to the deep cuts, perhaps a cross culvert could be used to direct flow from the east side of the road to the west where the cut is less deep.

3. The design plans show a very steep side slope that must be crossed by **the access road from station 29+00 to station 32+50**. The only indication of what type of construction technique is to be used at this site is a note, just above the graphic scale, which reflects a recommendation I made during a site walk last year. I am concerned that the note is located so far away from the section of road requiring this special construction technique that it may not be seen by the contractor and/or engineer. I recommend that the note be moved closer to the specific area on the plan where it applies or an arrow be drawn from the note to the specific area on the road plan.

4. Proposed road ditch contours do not show **ditch turnouts or cross culverts** being used prior to ditches reaching all streams. It is important that road ditches have either turnouts to allow the filtering out of sediment or cross culverts to direct water within them away from streams. Therefore, I recommend that the plans be revised to include ditch turnouts prior to reaching any stream shown on the plans. Road ditch contours also need to be revised to show that ditches outlet to cross culverts shown in them provided that those culverts don't discharge directly into a stream. Ditch berms are the preferred technique to prevent water in ditches from by-passing culverts which could result in the water overwhelming the road ditch before it finally is discharged. It would be helpful to include a general construction note that says ditch turnouts or cross culverts will be used before ditches reach any stream channel. Since it is likely that there are at least a few small intermittent streams not shown on the plans, this note would assure no ditch would directly discharge to them.

5. **Stormwater Berms** – The design plans indicate occasional use of stormwater berms to direct runoff water to a specified location. In the case of a road ditch where water is to be directed to a ditch turnout, such berms are appropriate. I do not however, believe there is a need to concentrate runoff water for a longer time and distance to reach a specific buffer area if the area it is being directed away from is also suitable for infiltration. Such berms need to be maintained to work for the long term whereas allowing the runoff to discharge as sheet flow to a forested area where it naturally wants to do not require maintenance. I believe that dispersing smaller flows in multiple locations is preferable to dispersing larger flows in fewer locations. In rural areas, where there is plenty of space and undisturbed land area, passive systems are almost always a better choice than structural systems.

6. The legend sheet should include a **symbol for ditch turnouts**. Ditch turnouts are shown on the stormwater/erosion control plans but there is no symbol on the legend to indicate what they are.

7. The index sheet for **stormwater plans**, C-400, C-500 and C-600, state that those series are for stormwater but the sheets that follow indicate they are for sedimentation and erosion control. Both are closely related but the labeling should be the same to avoid confusion.

8. **Standard Details** –
    a. I would like to see a standard detail for a **blast rock road** since I believe they will be used in a number of locations. The standard detail of blast rock roads has a number of differences from the standard detail of roads built with common borrow and gravel. Blast rock in those details should be shown on the upslope cut face that is below the groundwater table. No soil or other material should be placed on the downslope fill extension since groundwater may need to discharge from the voids. Blast rock roads

should not have ditches that extend below the bottom of the blast rock to encourage as much pass through of water as is possible.

b. **Rip-rap outlet for culvert protection**. The detail for a rip-rap apron at the culvert outlet is appropriate for a culvert that discharges to a concentrated flow channel. If however, a culvert is to discharge road ditch water to an area without a concentrated flow channel, the rip-rap apron should include a stone berm level spreader in a semi-circle shape at the end of the apron. This will assure the discharge of ditch water as sheet flow and prevent the scouring of a channel.
c. **Typical Level Spreader** – The standard details sheet indicates that "all level spreaders shall be constructed in cut sections". That may be appropriate for ditch turnouts but I believe that stone level spreaders can be constructed for some areas without the need for an excavation or cut. Just place stone in a semi-circle shape on the undisturbed ground surface. Water will filter through the stone voids so that sheet flow is assured, even if the ground surface is a little irregular. I would like to see a detail for that type of application as well as the one with a cut.
d. **Stone Check Dam Detail** – This detail should include a size range for the stone to be used for the check dams (2"-3"). Blast rock is not appropriate for use in check dams as it usually has voids that are too large to be effective. This detail notes that "spacing of dams may be adjusted within rip-rap/blast rock armored ditches as approved by engineer". Why would stone check dams be needed for rip-rap or blast rock armored ditches?
e. **Stoned Bermed Level Lip Spreader Detail** – This detail should include a stone size for the level spreader (2"-3").
f. **Typical Stone Ditch Protection Detail** – This detail indicates that rip-rap will be used to line all ditches exceeding 8% slope, which is appropriate, though I believe 5% would be a better threshold. It is also appropriate to line ditches with rip-rap on lesser slopes if those ditches are to be constructed below the groundwater table, particularly if the length of slope is significant. This will typically occur when road cuts are made perpendicular to the slope. These ditches must carry water until they can outlet, which may be a considerable distance. They will be hard to vegetate due to prolonged wetness. The rip-rap protection should go up the cut face, at least to the height of the seasonal ground water table. No filter fabric should be used above the expected height of the flowing water in the ditch. There will not be any threat of scouring from flowing water in this area. The issue here is to allow the seeping water to enter the ditch through the voids in the stone while preventing the soils themselves from slumping into the ditch. A bedding layer of gravel or small stone can be used for bedding of the rip-rap stone.
g. **Typical Ditch Cross Section** – This detail states "provide loam, seed and mulch or erosion control mix (mulch) on all disturbed areas". It also states "Rip-rap to top of slope". If it is rip-rapped to the top of slope, there would be no need to loam, seed and mulch. Perhaps the detail should be revised to indicate that rip-rap should extend to the top of slope when used. Loam,

seed and mulch is appropriate for side slopes, above the seasonal groundwater table, on suitable slopes, and for the ditch bottom, provided that the loam and seed is covered with mulch that is tacked down or an erosion control blanket. Erosion control mulch is also appropriate for ditch side slopes above the expected height of flowing water but is not appropriate for ditch bottoms and side slopes below the expected height of flowing water. Concentrated flow there will likely wash the mulch away. Erosion control blankets over loam and seed should be used on ditch bottoms and should be required for long and/or steep slopes which are not to be rip-rapped.

h. **Typical Ditch Berm at Cross Culverts** – I would like to see a detail showing a berm in the ditch at cross culvert locations. This would assure that the ditch water enters the cross culvert and can not continue down the ditch. A note should indicate that ditch berms should be used at all cross culvert locations.

i. **Organic/Duff Waste Disposal Detail** – This detail indicates that all organic waste/duff will be disposed of along the downslope side of road fill extensions. That may be ok in some locations but may be a problem in others such as where a rock sandwich or blast rock is used and where significant amounts of runoff water will flow over the side of the road. I suggest the material simply be spread over the ground surface where it will decompose slowly. It can also be mixed with soil to form topsoil or it can be spread as is over blast rock surfaces on flat to gentle slopes to soften the appearance and/or narrow the road surface and provide a seed bed for native vegetation to become established (which is the best use).

j. **Typical Rock Sandwich Detail** – This detail needs to be revised as follows: The rock layer should extend upslope to at least cover all exposed soils that are below the seasonal groundwater table (even better is to the top of cut slope). Otherwise, these soils will seep and slump down over the sandwich material at the edge of the road and plug it up. No filter fabric should be used under the rock on the upslope side of the road. It is not needed because there will be no pressure forcing the stone into the underlying soil. Instead, a layer of coarse gravel that is permeable enough to allow the seeping water into the rock layer should be used. Filter fabric may not be permeable enough to accommodate the seeping water so it will be circumvented and become problematic. On the downslope side of the road, the rock sandwich should be placed on the ground surface so that it outlets on top of the ground surface at the toe of fill, not subsurface as the detail indicates. It is impossible to reconnect the subsurface layers as they were originally. Therefore, it is best to let the rock sandwich outlet onto the ground surface where it can eventually seep back into the ground.

k. **Rock Burrito** – I recommend including a standard detail for a rock burrito. A rock burrito is simply a trench that is filled with 3” – 6” stone and then wrapped in fabric (mini rock sandwich). Each end of the rock burrito is open to allow for the free passage of water, similar to a culvert. They do not crush, heave or rust and do not freeze when they carry

groundwater due to its latent heat. They can be used in some locations instead of a cross culvert and should be used beneath the proposed substation.

l. **Super-elevated Road Detail** – This detail is a bit confusing to me in that it shows an overflow culvert that is to be used with a rock sandwich. The rock sandwich detail however, does not show the use of an overflow culvert. It would make much more sense to me to remove the overflow culvert from this detail and place it in the rock sandwich detail where it belongs. The detail indicates that erosion control mulch is to be placed on the downslope fill extension of all super-elevated roads. Does this include all roads built of blast rock and rock sandwiches? It is unnecessary for stabilization purposes on blast rock roads and is problematic for road sections that include rock sandwiches. Why is an erosion control mulch berm shown with this detail? I do not see it as being necessary for accomplishing the super-elevation.

m. **Winter Construction Notes** – Note #7 indicates that mulch will be applied at double the rate between November 1 and April 15. I believe that the dates for this requirement should be October 1 to May 1, particularly for the higher elevation areas.

n. **Permanent Seeding Notes** – This note indicates that normal seeding can be done between the dates of April 15 and October 1. I believe those dates should be revised to be between the dates of May 1 and September 1, particularly for the higher elevation areas.

o. **Dormant Seeding Notes** – This note indicates that dormant seeding shall be done between the dates of October 1 and November 15. I believe it would be more appropriate for those dates to be revised to September 1 to November 1, particularly for the higher elevation areas.

9. There are a number of **landing yards/lay-down areas** depicted on the plans but there are no details about how those sites are to be prepared. If only trees are to be cut but no stumps removed or ground leveled, I see no issues provided that no heavy equipment drives over the area when the soil is saturated. If however, stumps are to be removed and the ground is to be leveled, there needs to be soil erosion/sediment control measures shown as well as stormwater measures. For stormwater, since these are fairly large areas, the land should be shaped to direct runoff to as many directions as possible. This will limit the length of slope over which runoff can travel, limiting its ability to cause erosion and sedimentation.

10. Some **fill extensions** depicted on the plans appear to be excessive, up to 220 feet in length. In talking with the project engineer, I understand that is being done to show a worse case scenario. I recommend, as stated above, the plans be revised to show blast rock roads in steeply sloping areas to reduce the fill extension foot print.

11. **Substation** - Sheet C-110 and C-405 show a feature cut into the slope and electrical wires entering but there is no labeling of what the feature is. In calling

the project engineer, I learned that this is the site of a proposed substation. He agreed that it should be so labeled. This site is located in a Colonel soil map unit. Colonel soils have a seasonal groundwater table at between 7" and 16" below the mineral soil surface. My concern with this site is the proposed deep cut which is well below the seasonal groundwater table. Intercepted groundwater will be an issue that should be addressed. The plans however, do not include any details for the construction of the site. I recommend that soil erosion and sediment control measures be included for the substation. One practice I would like to see included with those measures is one I recommended for the substation at Kibby. For Kibby, I recommended that several rock burritos be installed below the base of the substation that would outlet through rip-rap facing on the downslope fill extension. There should still be a rock lined ditch around the site but it would be constructed a few inches above the invert elevation of the rock burritos, to act more as an overflow mechanism. Rock burrito's would help to maintain the natural hydrology and would limit the amount of water in the overflow ditches.

12. **Turbine Pads** – I did not see any standard details for constructing the turbine pads. It appears from notes on the plans that they may be constructed of common borrow or blast rock or both (some show rip-rap on the downslope fill extension). I believe it is important to include standard details for the construction of turbine pads. If some are to be built with borrow, there will be compaction issues, hydrology (groundwater) issues, fill extension issues and stormwater runoff issues. If blast rock is used, none of the issues just listed will be a concern. Erosion control mulch can be placed on the blast rock surface to soften the appearance after construction and to allow for some natural re-vegetation.

13. **Ridge Line Crane Paths** – The proposed crane path along the ridge line crosses through a number of wet soils, some mapped with a soil series name and some indicated by shading as being oxygenated groundwater areas. None of the roads shown crossing these areas indicate that rock sandwiches will be used. If these ridge top roads are to be built with blast rock, as I believe they should, there is less of a need for rock sandwiches since blast rock is porous. If however, these roads are to be built out of common borrow and gravel, rock sandwiches will be needed.

14. **Connector Road** – Some of the connector road will be using existing road that is in need of upgrading. A number of sections cross over somewhat poorly drained soils and/or soils with an oxygenated groundwater table. Most notably is station 186+00 to 215+00. These sections will likely need additional cross drainage and/or rock sandwiches which should be determined on site by the project engineer and third party inspector. I would be interested in participating in those discussions and decisions.

15. **Transmission Line** – I did not find any narrative discussion about proposed construction techniques to be used in constructing the transmission line, in my packet of information regarding this aspect of the proposed project. After calling

the project electrical engineer, I learned that there was a narrative which mentioned that streams and wetlands would be crossed using temporary bridges and/or timber mats, as is appropriate (I have not received a copy of this narrative). I was also given a set of plans by the electrical engineer which showed these crossings. What I did not see however was any mention of crossing the areas indicated on the soils map as being somewhat poorly drained or with oxyaquic conditions. These areas have soils with a seasonal ground water table very near the soil surface in the spring, fall and after rainfall events. They are quite subject to rutting and subsequent alteration of the natural hydrology and therefore need to be crossed using construction techniques that take this into consideration. I suggest that the transmission line plans (E-700 Series) show the areas identified by the project soil scientist as being somewhat poorly drained and/or with oxyaquic conditions and then indicate that they will be crossed in one of three ways: (1) during the driest summer months of July, August or September when the soil is not saturated. Because Maine can sometimes have rainy summer months, dry soil conditions should be verified before crossing these areas. Conversely, it may be possible to work on them in another month if precipitation levels are below normal, (2) during the winter months when the soil is frozen and snow covered. This may require compacting the snow cover to make sure the soil below is sufficiently frozen to support the weight of construction vehicles, or (3) by the use of timber mats similar to crossing wetlands. With proper planning, the contractor can schedule work on the better drained soils in the wetter time of year, leaving the drier time of year and frozen ground conditions for the wetter soils. It is important however, for the contractor to avoid construction on any soils when they are saturated, including the better drained soils. The better drained soils drain faster after precipitation so they can be worked on sooner than the wetter soils.

16. **Transmission Line Access** – I did not find any discussion of how equipment will be accessing the transmission line but did note a number of existing roads, logging roads and skid trails intersect it. I assume that these existing accessways will be the primary means of reaching the transmission line with equipment. If the applicant should however, need to access the transmission line in another location where there is no existing road or skid trail that intersects it, that should be accomplished using the techniques discussed above (15) for work on the transmission line or by the road building standards listed for the access roads and crane paths. The application should be more specific on how this will be accomplished.

Maine Natural Areas Program

17 Elkins Lane

State House Station #93

Augusta, Maine 04333

Date: March 17, 2011

To: Marcia Spencer-Famous, Senior Planner, LURC

From: Don Cameron, Botanist/Ecologist

Re: Rare and exemplary botanical features, DP 4862, Highland Wind LLC, Grid Scale Wind Energy Development, Maine.

I have searched the Natural Areas Program's Biological and Conservation Data System files for rare or unique botanical features in the vicinity of the proposed site in response to your request of March 3, 2011 for our agency's comments on the project.

According to our current information, there is an exemplary natural community, a Spruce Talus Woodland that intersects in part with the project area on Bald Mountain in Highland Twp. The Spruce Talus Woodland natural community type is ranked S4 in Maine which means that it is apparently secure in the state. Only occurrences of S4 natural communities that are exemplary are tracked by the Natural Areas Program. An exemplary community is characterized as being one of the better examples of the type in the state based on a quality ranking system that considers three criteria; condition, size, and landscape context.

The Spruce Talus Woodland community at Bald Mountain in Highland Twp covers 53 acres and is considered a good quality example of the type with an element occurrence rank of B. The table below provides information on the natural community in terms of state rank and element occurrence rank (see attached explanation of ranks).

Scientific Name	Common Name	*State rank	*Element Occurrence Rank
Spruce Talus Woodland	Spruce Rocky Woodland	S4	B - Good

*An explanation of ranks is attached to the end of this memo.

The application indicates that the turbine and infrastructure proposed for Bald Mountain will impact 2.2 acres of the Spruce Talus Woodland. We assume that the 2.2 acre area is the actual footprint of the area of the site proposed to be excavated, filled, or otherwise developed, as no additional detail about the area of impact was provided in the application. In our evaluation, we have designated a 50 foot buffer from the outside edge of the proposed disturbance as also impacted area. The 50 foot buffer will likely be exposed to a number of potential impacts from its proximity to the construction zone. Likely impacts to the buffer area include changes in light and moisture regimes, increased exposure to wind and the potential for wind throw of trees, and possible vegetation decline or mortality due to changes in site hydrology from filling and

excavation. With the addition of the 50 foot buffer to the construction area, MNAP estimates that the total impact to Spruce Talus Woodland on Bald Mountain will be approximately 4 acres.

We recommend that the applicant add a map to the application that depicts the Spruce Talus Woodland and the proposed area of impact.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact our office if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

STATE RARITY RANKS

S1	Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2	Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3	Rare in Maine (20-100 occurrences).
S4	Apparently secure in Maine.
S5	Demonstrably secure in Maine.
SU	Under consideration for assigning rarity status; more information needed on threats or distribution.
S#?	Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Division of Environmental Health, Dept. of Health and Human Services

I have reviewed the HHE-200 Form dated 11/05/09 by Albert Frick, SE, for the proposed operations building for Highland Wind LLC. The design meets the requirements of the Subsurface Wastewater Disposal Rules. Permitting of the design is subject to timing provisions of Section 4.B.1 of the Rules, included below as an excerpt with added italicized emphasis.

> 4.B.1. Action on application for disposal system permit: The LPI shall examine, or cause to be examined, all applications for disposal system permits, and amendments thereto, *after a completed filing*. If the application for a disposal system permit does not conform to the requirements of these Rules (except as allowed by Section 2(F)), and all pertinent laws, ordinances and regulations, including those administered by public water systems, or if it is considered incomplete, such application for a disposal system permit must be rejected in writing within 14 days of a completed filing, stating the reasons therefore. If the LPI is satisfied that the proposed work conforms to the requirements of these Rules and all applicable laws, ordinances, and regulations, including those administered by public water supplies, a disposal system permit must be issued as soon as practicable. *For a period of 1 year from the effective date (01/18/11-jaj) of these Rules, the LPI may issue a permit based upon an HHE-200 Form dated no more than 1 year prior to the effective date of these Rules*, provided that the LPI has verified that site conditions have not changed in a manner that would require changes to the design to satisfy the Rules in place on the date the HHE-200 Form was completed and signed by the site evaluator.

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