

Matthew S. Warner
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May 22, 2014

SENT VIA EMAIL

Jane.murray@des.nh.gov
and REGULAR US MAIL

New Hampshire Department of
Environmental Services
Attention: Jane Murray
29 Hazen Drive
P. O. Box 95
Concord, NH 03302-0095

RE: Granite Reliable Power, LLC – SEC Docket No. 2014-03

Dear Jane:

I am enclosing the following pre-file testimony:

- (1) Testimony of John R. Cyr;
- (2) Testimony of Kenneth D. Kimball; and
- (3) Testimony of Tyler B. Phillips

I have sent two hard copies of this testimony by mail today and will provide the originals, under separate cover next week.

Please do not hesitate to contact me with any questions.

Sincerely,



Matthew S. Warner

MSW:smw

Attachments

STATE OF NEW HAMPSHIRE
BEFORE THE ENERGY FACILITY SITE EVALUATION COMMITTEE

Docket No. SEC 2014-03

Motion of Granite Reliable Power, LLC (“GRP”)
to Amend the Certificate of Site and Facility

TESTIMONY OF JOHN R. CYR ON
BEHALF OF GRANITE RELIABLE POWER, LLC.

1 **Q. Please state your name, title and business address for the record.**

2 **A.** John Richard Cyr, Operations and Maintenance Supervisor for the Granite Reliable
3 Power Windpark. My business address is 972 Main Street, Berlin, New Hampshire.

4 **Q. In what capacity are you testifying?**

5 **A.** I am here to represent Granite Reliable Power, LLC in support of its motion to narrowly
6 amend its Certificate of Site and Facility. After several years operating the Windpark, it has
7 become apparent that the Project's wind turbines require more frequent maintenance than
8 originally anticipated. Turbine maintenance often requires use of large cranes that require tractor
9 trailer support. Under the current Certificate authorizing 12 foot wide roadways on Mt. Kelsey,
10 the roadways must be widened each time a tractor trailer, large crane, or boom truck must ascend
11 to the turbines, and then re-vegetated when maintenance is complete. The Windpark does not
12 require any immediate maintenance, and no maintenance using heavy equipment is currently
13 scheduled. However, by widening the roadways and proactively vegetating instead in adjacent
14 high elevation areas, Granite will enable the performance of the periodic turbine maintenance
15 which will likely be required, while minimizing disruption to vegetation.

16 **Q. Briefly summarize your background and qualifications.**

17 **A.** I have worked as Operations and Maintenance Supervisor at the Windpark since
18 September 2011. In this role, I personally oversee the Windpark's day-to-day operations.
19 Regarding maintenance issues, I oversee repair and replacement efforts from start to finish,
20 which include working closely with turbine mechanics and the contractors hired to transport
21 necessary maintenance equipment to and from the turbines. Before working at the Windpark, I
22 worked as a maintenance supervisor for 21 years, first at Great Northern Paper and then at Sappi
23 Fine Paper in Maine. My resume is attached as **Exhibit A**.

1 **Q. How did you become involved with Granite's efforts to widen the roads on Mt.**
2 **Kelsey?**

3 **A.** In 2012, Vestas, the manufacturer of the Windpark's 33 turbines, informed us that it
4 would need to replace the bearing inside the gearboxes in the nacelles atop six of the turbines'
5 towers. One of these turbines is located on Mt. Kelsey. To replace those bearings, Vestas
6 needed to bring the 26-ton gearbox to the ground. This required a large crane. At the time, I
7 notified Will Staats of New Hampshire Fish and Game (or "Fish and Game"), as well as officials
8 at other relevant agencies, that Vestas planned to transport this large crane to the base of the
9 affected turbine via tractor trailer. To permit tractor trailer access, with the consent of Fish and
10 Game and New Hampshire's Department of Environmental Services, the topsoil was rolled back
11 and the road was widened only to the extent necessary.

12 During the gearbox replacement, Mr. Staats, Tyler Phillips of Horizons Engineering,
13 and I discussed whether a way existed to widen the roadway without disturbing the roadside
14 vegetation each time heavy equipment had to be brought to the site. Although the engineers who
15 testified in the 2009 SEC hearing regarding the current Certificate contemplated exactly this
16 practice, the SEC did not specifically address the issue at that time. Accordingly, Mr. Staats and
17 I discussed several times the benefits of permanently widening the road to provide access for
18 necessary maintenance equipment, and relocating any displaced topsoil and vegetation to
19 alternate locations where Granite would also plant a number of trees greater than or equal to
20 those displaced. After these conversations, Mr. Staats selected the locations where, he said,
21 planting those trees would have the most benefit.

22 The wisdom of these discussions has been evident in several subsequent events at the
23 Project. For example, removing and repairing a turbine blade damaged in a lightning strike

1 during the Fall of 2013 involved transporting another large crane up Mt. Kelsey. Practical
2 experience has shown that large cranes are needed to repair turbines, generators, blades, and
3 other project equipment more frequently than originally anticipated. Rather than widening and
4 then re-vegetating the roads each time a large crane is needed, Granite, in conjunction with Fish
5 and Game and the Appalachian Mountain Club, is proposing a solution that will allow vegetation
6 to flourish uninterrupted and therefore more robustly.

7 **Q. Do you expect the Mt. Kelsey turbines to require further maintenance in the future?**

8 **A.** Yes. While it is impossible to know exactly what turbine maintenance issues might arise,
9 experience has made me reasonably certain that periodic maintenance will be required.
10 Maintenance can be necessitated by everything from lightning strikes requiring blade repair or
11 replacement, to ice throws damaging turbine blades, to further issues with the turbine gearboxes
12 or equipment inside the nacelles atop the turbine towers. As with any other large energy project,
13 especially one located in a beautiful, but sometimes harsh natural environment such as Mt.
14 Kelsey, the occasional need for maintenance and repairs is inevitable. What is more, the timely
15 and efficient performance of such maintenance and repairs is important for the Project's
16 continued value as an alternative energy source for the region.

17 While each and every instance of project maintenance may not involve large cranes or
18 other heavy equipment, such cranes and equipment will be needed for any issues with turbine
19 blades (weighing 7 tons), gearboxes (weighing 26 tons), or other equipment that is heavy or
20 located atop the turbine towers . Furthermore, while all turbine generators at the Windpark
21 currently are operational, turbine generators inevitably require periodic repair and/or
22 replacement, which requires transport by boom trucks and tractor trailers incapable of navigating
23 a roadway that is only 12 feet wide. In short, I am confident that Granite will periodically need

1 to haul large cranes and other heavy equipment up to the Mt. Kelsey turbines by tractor trailer,
2 thus requiring wider access roads.

3 **Q. What alterations to the Windpark are needed to accommodate future maintenance**
4 **and repairs?**

5 **A.** The proposed Revised High Elevation Restoration Plan, incorporated into the
6 Amendment to the High Elevation Mitigation Settlement Agreement, establishes road widths of
7 16 feet with widths of 18 to 26 feet at six corners. These widths are the minimum possible to
8 accommodate the tractor trailers needed to carry large cranes and other heavy equipment up Mt.
9 Kelsey. In addition, the Restoration Plan allows for erection of lattice cranes in designated areas
10 of Mt. Kelsey, once the components are trucked to the ridgeline, depending on which turbine is
11 being serviced. The Restoration Plan also allows for walking these erected cranes from turbine
12 to turbine, if needed. Because cranes can be assembled in only four areas on the ridgeline,
13 moving the assembled crane to a turbine requiring maintenance may require temporarily
14 expanding the roadway in that area to 34 feet. These crane erection and walk-through areas have
15 been selected to service nearby turbine pads, thereby minimizing potentially hazardous crane
16 walk distances and overall impact on vegetation. While it is highly unlikely that every turbine
17 will need to be serviced by large cranes requiring use of these areas over the life of the Project,
18 the Amendment also provides that these areas, once used, will be stabilized with straw mulch
19 that will support natural vegetation. And instead of replanting trees in these crane areas at the
20 time they are impacted, Granite will proactively plant a number of trees greater than or equal to
21 those in the designated crane erection and walk-through areas, regardless of whether those areas
22 are ever used or their vegetation ever disrupted. This proactive planting will allow the trees to
23 begin to mature much sooner than they otherwise would.

1 **Q. How did you determine the revised road widths established by the proposed**
2 **Amendment?**

3 **A.** Cianbro Corporation has performed necessary repairs for Granite, and has transported
4 large cranes and other heavy equipment up to the turbines as needed. In collaboration with
5 Granite, Cianbro has determined the minimum road width necessary to accommodate tractor
6 trailers and other vehicles needed for turbine repair. These are the widths reflected in the Revised
7 High Elevation Restoration Plan incorporated into the proposed Amendment to the High
8 Elevation Mitigation Agreement.

9 Furthermore, Granite consulted closely with Cianbro to identify optimal crane assembly
10 areas for every Mt. Kelsey turbine, as well as the pathways needed to allow cranes to walk
11 between turbines, if necessary.

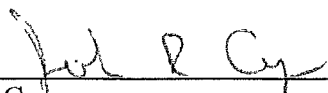
12 The proposed widths of the Mt. Kelsey roadways, the crane assembly areas, and the crane
13 walk-throughs are, quite literally, the minimum width needed for project maintenance. They
14 have been carefully determined, and are informed by the Project maintenance performed to date.

15 **Q. Does this conclude your pre-filed testimony?**

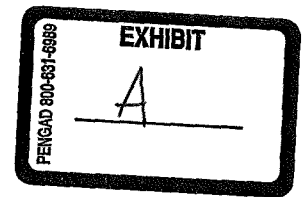
16 **A.** Yes, but I would be happy to answer questions from members of the Committee,
17 Committee Counsel, interveners, or members of the public.

18

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23



John Cyl
Operations and Maintenance Supervisor,
Granite Reliable Power Windpark



John R. Cyr

10 Shary Lane, Milan NH, 03588

jcyrmill78@gmail.com

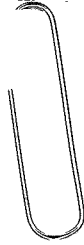
Phone 1-207-680-0286

Objective:

Operations & Maintenance Supervisory position

Experience:

- 33 years of heavy industrial maintenance experience within the Pulp, Paper & Power industries, with the past 3 years as a Supervisor of Operations & Maintenance of a 99MW Wind Farm in Northern New Hampshire.
- For 23 of my 33 years I have been employed as a Supervisor/Planner for Brookfield Renewable Power, Sappi Fine Paper and Great Northern Paper.
- Responsible for the planning, direction and supervision of maintenance activities involving numerous groups of employees engaged in the maintenance and repair of facility equipment, ensuring continuity and reliability of equipment operation.
- Safety driven through extensive experience, planning, job safety analysis, risk assessments and one-on-one mentoring with employees.
- Constantly seeking and sharing ideas to improve safety for all craftsmen from personal experiences, Safe work observation techniques and supervisory training acquired throughout my career.
- Supervision, Planning and execution of mechanical and electrical maintenance activities of union/non union maintenance craftsmen, and contractors.
- Development, scheduling and management of major maintenance projects.
- Scoping, estimating and tracking of project costs, while working closely with consultants, general contractors, equipment suppliers and fabricators.
- Creation and management of work orders, purchase requisitions and change orders.
- Having worked with predictive/preventive maintenance based reliability programs, continuous improvement programs and understanding the impact they have with regards to the facility's production goals, and the reduction of overall maintenance costs.
- Possess excellent mechanical troubleshooting skills, combined with heavy industrial related organizational, and administrative skills, proficient in the use of personal computers, MS Office Suite, MS Project and CMMS programs Empac SAP and IFS.



Professional Experience:

Brookfield Renewable Power

Berlin, New Hampshire

Superintendent of Operations & Maintenance Granite Reliable Wind

33 Vestas V90 3MW Turbines

2011 to Present

Sappi Fine Paper

Skowhegan, Maine

Maintenance Supervisor/Planner

#2 Paper Machine and Finishing/Shipping

2008 to 2011

Utilities/Recovery

2006 to 2008

#1 Paper Machine

2003 to 2006

Great Northern Paper

East Millinocket, Maine

Maintenance Supervisor/Planner

Utilities/Hydroelectric Dams

2002 to 2003

Recycle Fiber & Waste Water Treatment Plants

1998 to 2002

Screen Room, Grinder Room & Recycle Fiber Plants

1996 to 1998

Night Maintenance Supervisor Mill-wide

1995 to 1996

Wood yard & Waste Water Treatment Plant

1990 to 1995

Great Northern Paper - Craftsmen 3 MW/PF/MT (Union)

1987 to 1990

Wade & Searway - Construction Millwright (Union)

1986 to 1987

Great Northern Paper - Journeyman Millwright (Union)

1983 to 1986

Cianbro Corporation - Construction (Non-Union)

1980 to 1983

Education:

Eastern Maine Vocational Technical Institute

Bangor, Maine

Associate's Degree in Heavy Equipment Mechanics

1978 to 1980

Stearns High School

Millinocket, Maine

Diploma in Vocational Technology

1974 to 1978

Professional work experience references provided on request

STATE OF NEW HAMPSHIRE
BEFORE THE ENERGY FACILITY SITE EVALUATION COMMITTEE

Docket No. SEC 2014-03

Motion of Granite Reliable Power, LLC (“GRP”)
to Amend the Certificate of Site and Facility

TESTIMONY OF KENNETH D. KIMBALL ON
BEHALF OF APPALACHIAN MOUNTAIN CLUB

1 **Q. Please state your name, title and business address for the record.**

2 **A.** Kenneth D. Kimball. I am the Director of Research of the Appalachian Mountain Club.
3 My business address is 361 Route 16, Pinkham Notch, Gorham, New Hampshire.

4 **Q. Are you familiar with the Amendment to the High Elevation Mitigation Settlement**
5 **Agreement (the “Amendment”)?**

6 **A.** Yes.

7 **Q. Are you familiar with the Revised High Elevation Restoration Plan (the “HER**
8 **Plan”) incorporated into the Amendment?**

9 **A.** Yes.

10 **Q. Were you involved in the crafting of the Revised HER Plan?**

11 **A.** Yes. Staff of Brookfield Renewable Energy Group first sent Dr. David Publicover of the
12 Appalachian Mountain Club and I a draft of the HER Plan in January 2014. In February and
13 March 2014 we communicated with Brookfield staff and with staff from the New Hampshire
14 Department of Fish and Game regarding ways to improve the HER Plan. In particular, AMC had
15 concerns that the continued management of a linear, unnatural grassy environment along the road
16 corridor above 2700 feet on Mt. Kelsey could contribute to additional and unnatural predator
17 attraction to the area with a corresponding adverse effect on the pine martin population. AMC
18 requested that the HER Plan eliminate the use of further grass seeding, and that, instead, straw
19 mulch be applied where new organic material is placed or disturbed and that natural tree
20 reseedling be allowed to occur, even if these trees development is arrested periodically due to
21 road clearance needs. This is reflected in the HER Plan, Section 3(d) “Mulch for Moisture
22 Retention and Stabilization.”

23 **Q. Were you involved in the crafting of the Amendment to the 2009 Agreement?**

1 A. Yes. Aside from helping craft the HER Plan incorporated into the Amendment, I revised
2 the Amendment itself. I noted in an e-mail to Granite personnel on March 10, 2014 that in the
3 Amendment there is a 'whereas' clause which appropriately references the post-construction
4 lesson learned to date that turbine and therefore road maintenance is needed more frequently than
5 originally anticipated. However, I also noted the need for an additional 'whereas' clause stating
6 that the road has likely increased the amount of high elevation canine predation based on the
7 post-construction pine martin study. As a result, the Amendment includes the following:
8 "WHEREAS based on the post construction pine martin study there is evidence of winter
9 mortality by canine predators that are gaining access by way of the road, predation that
10 potentially could be enhanced due to high elevation roadside grass seeding and resultant creation
11 of attractant prey population habitat."

12 **Q. Did the Appalachian Mountain Club execute the Amendment?**

13 A. Yes. Our CEO and President John Judge executed the Amendment in March 2014.

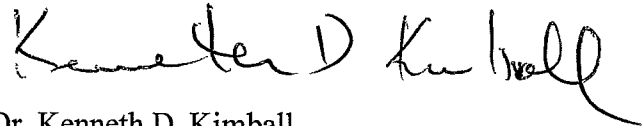
14 **Q. Do you have any other comments on the Amendment?**

15 A. Ideally, AMC would prefer that the roads remain at twelve foot width with the least
16 amount of forest cut back. But I understand that in the original 2009 SEC hearings, Granite
17 Reliable Power proposed that each time maintenance is required the roads will need to be
18 widened and then re-vegetated. What is more, AMC expressed concerns during the 2009 SEC
19 hearings that the proposed projects habitat fragmentation could possibly increase predation on
20 sensitive species in this intact old growth sub-alpine forest. As the Windpark currently stands
21 and operates this Amendment and it's HER Plan possibly may better ameliorate to some degree
22 threats to the pine martin population. It is my professional judgment based on consultation with
23 Dr. Publicover and NH Fish and Game Department that this may be preferable to repeatedly

1 disrupting roadside vegetation and reseeding with erosion control grass to form linear prey
2 rodent habitat corridors, which in return could attract additional predators into this once intact
3 old growth sub-alpine forest ecosystem on Mt. Kelsey.

4 **Q. Does this conclude your pre-field testimony?**

5 **A. Yes.**

6 

7
8 Dr. Kenneth D. Kimball
9 Director of Research
10 Appalachian Mountain Club

11
12 May 14, 2014

STATE OF NEW HAMPSHIRE
BEFORE THE ENERGY FACILITY SITE EVALUATION COMMITTEE

Docket No. SEC 2014-03

Motion of Granite Reliable Power, LLC (“GRP”)
to Amend the Certificate of Site and Facility

TESTIMONY OF TYLER B. PHILLIPS ON
BEHALF OF GRANITE RELIABLE POWER, LLC.

1 **Q. Please state your name, title and business address for the record.**

2 A. My name is Tyler B. Phillips, Jr. I am the Senior Project Manager at Horizons
3 Engineering, Inc. My business address is 34 School Street, Littleton, New Hampshire.

4 **Q. What is the purpose of your testimony?**

5 A. I represent Granite Reliable Power, LLC (“Granite”). I have been involved, through my
6 firm Horizons Engineering, as the Environmental Monitor for Granite Reliable Power Windpark
7 (or the “Windpark”) and have been involved with various permitting and design elements since
8 the project’s inception. Today I am here to support the proposed Amendment to Granite’s
9 Certificate of Site and Facility (or the “Certificate”). After several years of operations, it is now
10 apparent that the Mt. Kelsey roadways must be permanently widened and horizontally realigned
11 to accommodate vehicles required for certain necessary future maintenance and to better
12 accomplish the objectives of high elevation habitat restoration(for example, by planting tree
13 seedlings in adjacent high elevation areas where they will have the most benefit). I am here to
14 explain the terms and associated benefits of the proposed Amendment and to explain how these
15 terms comport with operational realities and habitat objectives.

16 **Q. Please briefly summarize your educational and professional background and your
17 experience with the Granite Windpark in particular.**

18 A. I hold a Bachelor of Science from the University of New Hampshire in Land Use
19 Sciences. For over 15 years I have worked on project design, permitting, and monitoring for
20 hundreds of clients. Much of my work has involved assessing a project’s effects on water
21 quality and habitat, and this assessment experience has led to the design and incorporation of
22 various project features aimed at conserving or improving these natural resources. Additional
23 pertinent experience includes working with numerous clients to design, permit and monitor

1 erosion control and stabilization measures at high elevations. My resume is attached as **Exhibit**
2 **A.**

3 For the Granite Windpark, I worked closely with the NH Department of Environmental
4 Services (“DES”) to help Granite secure its 401 Water Quality Certification and contributed to
5 our firm’s work in preparing the Alteration of Terrain Permit for the project. Since the SEC
6 issued the Certificate, I have been responsible for environmental monitoring of the Windpark
7 prior to, during, and post-construction.

8 **Q. Are you familiar with Granite’s proposed Amendment to its Certificate?**

9 **A.** Yes. In coordination with New Hampshire Department of Fish and Game (or “Fish and
10 Game”), New Hampshire Department of Environmental Services (or “DES”), and the
11 Appalachian Mountain Club (or “AMC”), I drafted the Revised High Elevation Restoration Plan
12 (or the “Restoration Plan”), which the Amendment incorporates into the High Elevation
13 Mitigation Settlement Agreement. The Restoration Plan is attached as **Exhibit B.**

14 **Q. Could you briefly summarize the substance of the proposed Amendment?**

15 **A.** The Amendment proposes to modify the High Elevation Mitigation Settlement
16 Agreement executed by Granite, Fish and Game, and AMC, in three basic ways:

17 (1) Wider Roads and Restoration Areas: The Amendment would permanently widen the
18 Mt. Kelsey roadways from 12 feet to 16 feet, with wider areas around select corners, so that
19 tractor trailers required to provide future maintenance can access the Windpark’s existing wind
20 turbines. To widen the road, Granite would relocate organic material, including topsoil, from the
21 roadbeds in the areas where the road is to be permanently widened to select locations on the
22 turbine pads. Granite would also import additional topsoil to cover the portions of the pads
23 shown on the proposed plans. This work will allow vegetation, including trees, to grow on the
24 pads, and will decrease the overall expanse of gravel within the Project. Fish and Game
25 determined that the pads are the highest priority planting location (designated as Tier I locations
26 on the plans), and so a portion of the seedlings that are displaced by the roadway widening will

1 be planted in the organic material placed on the pads. Per Fish and Game's advice, areas where
2 no natural or planted seedlings currently exist (Tier II areas) and where there is natural growth,
3 but are no planted seedlings to date (Tier III areas), were also designated for planting. The same
4 or greater number of trees equal to that removed from the roadbeds will be planted in these
5 restoration areas.

6
7 (2) Crane Erection Areas and Pathways: Heavy cranes are necessary to repair particularly
8 heavy components and/or components located near the tops of the turbines. The Amendment
9 would allow Granite to use such cranes in the future, if needed, without replanting tree seedlings
10 in the crane erection areas or in those pathways between turbines where an erected crane might
11 travel. With the help of Cianbro Company, the contractor responsible for equipment repairs at
12 the Windpark, Granite staff identified the optimal crane assembly areas that could service groups
13 of turbine pads and minimize impacts associated with walking cranes across long stretches of
14 ridgeline from a single designated assembly area. If repairs require that vegetation be cleared
15 from these assembly areas and walk-throughs, Granite will replace the topsoil, will cover the
16 area with straw mulch, and will allow natural re-vegetation to take place upon completion of
17 crane work. To minimize the impact on any crane assembly areas, however, Granite would plant
18 immediately, in designated Tier I-III Restoration Areas, the same amount of trees that would
19 need to be moved if a crane is used in the future. These restoration areas are equal in size to the
20 crane assembly and walk-through areas. This will allow these trees to mature and to serve their
21 habitat function sooner than if Granite waited and replanted trees only if and when the assembly
22 and walk-through areas are used in the future.

23
24 (3) Adjust Stabilization Material to Deter Predators. At AMC's request, the Amendment
25 would change the material used to stabilize the Project in order to better deter predators.
26 Previously, Granite used certain higher elevation grasses to stabilize the organic material into
27 which the trees have been planted, and used hay mulch to temporarily stabilize the seeded soil
28 until the grass could stabilize the seeded soil. AMC requested that Granite change the material
29 used to stabilize the Project, however, to mitigate against the possibility that planting grass
30 within the high elevation restoration (HER) area might harm area pine marten by serving as a
31 suitable habitat for small rodents (e.g., mice, voles) that could attract pine marten-preying

1 predators (e.g., coyotes, foxes). Additionally, the hay mulch currently used to temporarily
2 stabilize organic material surfaces contains incidental grass seed which, upon germination, could
3 also expand the extent of grass and further attract predators of pine martens to the area. The
4 Amendment proposes no further grass seeding and proposes the use of straw mulch, which does
5 not contain grass seed, instead of hay mulch. Given the relative stability of the organic material
6 to date, and given that all future placement of such material will occur on either the relatively flat
7 grades of the turbine pads or in the areas of turbine erection/walking where relatively short
8 runoff flow paths exist, a heavy application of straw mulch will temporarily stabilize disturbed
9 areas and will provide a reasonable bridge to the longer-term stabilization afforded by planted
10 and natural recruitment of seedlings. DES has been consulted and consents to this change in
11 stabilization material.

12

13 **Q. How were the terms of the proposed Amendment, including the Revised High**
14 **Elevation Mitigation Plan, crafted?**

15 After widening the Mt. Kelsey roadways in 2012 to allow for maintenance vehicle
16 access, John Cyr, the Windpark's Operations and Maintenance Supervisor, and I met with Will
17 Staats of Fish and Game. We discussed re-planting trees elsewhere to avoid repeatedly tearing
18 up vegetation in the roadbeds. Over the next year and a half, through numerous site walks and
19 meetings, I worked with Mr. Staats to identify the most desirable project locations for such re-
20 vegetation. Ultimately, we created the re-vegetation plan illustrated in the Restoration Plan. See
21 Exhibit B, § 3 and Attachments.

22 The Amendment also incorporates AMC's suggestion to not plant grass and to use straw
23 mulch in lieu of hay mulch to temporarily stabilize project surfaces, so as to better protect pine
24 martens. And since mid-2013, I have worked with various state and federal agencies to ensure
25 that the Amendment and Restoration Plan address the concerns and meet the objectives of all
26 signatories, as well as the DES.

1 The proposed Amendment is the result of a lengthy collaborative process. Mr. Cyr and I
2 created the Mitigation Plan in close collaboration with Mr. Staats, Ken Kimball of AMC, and
3 officials at the DES, the U.S. Environmental Protection Agency, and the Army Corps of
4 Engineers.

5 **Q. Will this Amendment affect the Project's water quality?**

6 **A.** No. The Amendment limits its scope to previously disturbed and now stabilized surfaces.
7 Mt. Kelsey roads were initially constructed to 34 feet and were surfaced with gravel to allow for
8 project construction before they were narrowed back to 12 feet by covering a portion of the
9 gravel road width with organic material. This portion of the Project's drainage design was
10 similar to other ridgeline portions of the Project and assumed that the full 34 foot width of gravel
11 roadway would be exposed to precipitation. The widening of roadways now from 12 feet to 16
12 feet wide, or wider at some corners, will not affect the findings of these studies based upon much
13 wider roads: that no increase in runoff flow rates will be experienced at the analysis points above
14 that which existed in a pre-development condition. Furthermore, the culverts and rock
15 sandwiches currently installed on site are large enough to handle the increased road width. No
16 wetland areas are associated with the activities proposed in the Amendment.

17 The Amendment also proposes to transfer organic material from one gravel surface to
18 another. Moving topsoil from roadbeds to turbine pads will not affect erosion or run-off impacts
19 at the Project. Through post-construction monitoring, no significant erosion of the Project's
20 organic material surfaces has been observed to date. And the turbine pads' grades are, by design,
21 flat surfaces with little potential for such erosion.

22 Again, DES has reviewed and consents to the Amendment.

23 **Q. Will this Amendment affect the Project's natural environment?**

1 A. Not adversely. As noted earlier, upon AMC's request, this Amendment changes the
2 material used for stabilization so as to minimize causal factors that might encourage predation on
3 pine marten. Because of input from DES and Fish and Game, and due to coordination with and
4 requests of AMC, this Amendment is an opportunity to improve upon key elements of the Plan,
5 and, in doing so, is more protective of the natural environment than the Certificate as currently
6 approved.

7 **Q. Do you have any additional comments on the Amendment?**

8 A. Yes. Large projects such as the Windpark can inevitably be improved after several years
9 of operations. Operational experience provides insight into certain site specific needs, the
10 shortcomings of a project as-approved, and the best remedies for these shortcomings.

11 Granite complied with all requirements of its Certificate, including narrowing all high
12 elevation roads to 12 feet upon completing construction and planting all trees and grass as
13 required by the Certificate. After several years, it is clear that the vegetation planted along the
14 roadbeds is very unlikely to reach maturity if periodically disrupted by maintenance vehicles.
15 Furthermore, if maintenance requires erecting large cranes and walking them to turbines, this
16 will further hamper efforts to restore the Project's high elevation forests. The best way to keep
17 the Project in good working order and to foster meaningful growth of re-planted vegetation is to
18 permanently widen the roads, and to re-vegetate in other areas of need within the high elevation
19 restoration area.

20 The Restoration Plan requires Granite to plant more trees than it is likely to ever remove
21 from roadsides or crane erection and walk-through areas. But this Amendment will also make it
22 easier to perform necessary maintenance on project turbines, and will greatly improve the
23 efficacy of the Project's re-vegetation and restoration efforts. And Granite will pay for the entire

1 cost of the Amendment and the Amendment's restoration plans. After several years of Windpark
2 operations and monitoring, this Amendment clearly is a decided improvement to the Project and
3 will benefit the environment.

4 **Q. Does this conclude your pre-filed testimony?**

5 **A.** Yes, but I would be happy to answer questions from members of the Committee,
6 Committee Counsel, interveners, or members of the public.

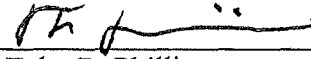
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Tyler B. Phillips
Senior Project Manager
Horizon Engineering, Inc.



TYLER PHILLIPS, CPESC
Senior Project Manager

EXPERIENCE

With extensive design and permitting experience, Tyler has helped clients all over New England find successful and often innovative solutions to their problems. With a focus on water resources, public and private clients have found Tyler's insights to be valuable in avoiding costly and time consuming permitting delays by anticipating project challenges and working with clients and agencies to achieve project goals in a timely and cost-effective manner that is protective of the environment.

With his currency in the field of stormwater management he has been appointed to a number of state panels and commissions and is a lecturer at workshops for engineers, scientists, regulators and contractors on the subject, providing them with Continuing Education Credits and recommendations on how to comply with local, NH, VT, MA, ME and EPA regulations related to stormwater and erosion control. Tyler has completed over 100 Storm Water Pollution Prevention Plans for construction sites and has performed thousands of hours of erosion control inspections.

Some of Tyler's recent work has involved:

- Preparation of 401 Water Quality Certification, and ACOE/NH DES permitting compliance for construction of 12 miles of new high elevation roadway ((up to 3,400' elev.), and upgrades to 20 miles of existing roadway involving 13.5 acres of wetland impact and over 200 acres of earth moving for a wind farm in Coos County. Aided contractor in meeting environmental obligations enabling project to be constructed and operational in less than one year. (*Dummer, NH*)
- Stormwater treatment designs, permitting, and monitoring at various high elevation (between 1,500 and 4,000' elev.) projects. (*Lincoln, Livermore, Carroll, Crawford's Purchase, Harts Location, Bethlehem, Franconia, Waterville Valley, Jackson, NH and Burke , VT*)
- Directing a fish passage study evaluating over 100 potential barriers (bridges and culverts) along the Ammonoosuc River, and development of NH's first Eastern Brook Trout fish passage assessment protocol. (*Woodsville-Carroll, NH*)
- Developing sampling designs, bio-monitoring plans, pollutant and sediment transport studies, and providing environmental monitoring services for various private companies, NGO's, Town, and State (NH DES, NH DOT) agencies. (*Statewide*)

TYLER PHILLIPS, CPESC

Page 2 of 2

- NPDES permitting and blast monitoring plans for construction and industrial sand and gravel facilities and quarries. (*Statewide*)
- Monitoring the creation of a 13 acre ACOE wetland mitigation site for NH DOT. (*Albany, NH*)
- Preparation of various construction dewatering and wetland restoration plans including EPA required mitigation/restoration of ephemeral and perennial stream channel (*Woodstock, Carroll, Londonderry, NH*)
- HEC RAS modeling, and federal, state and local permitting, construction stakeout and construction oversight for channel modifications involving 36 acres of wetland disturbance to a large high-gradient river and NH's largest river restoration project using natural channel design principles (*Pemigewasset River -Woodstock, NH*)

PROFESSIONAL ASSOCIATIONS

Certified Professional in Erosion and Sediment Control
NH Licensed Subsurface Designer

EDUCATION

Bachelor of Science in Land Use Sciences, University of New Hampshire, 1995
Wastewater Treatment Plant Operation I- California State Univ., Sacramento, CA, 1996
Wastewater Treatment Plant Operation II- California State Univ., Sacramento, CA 1998
Advanced Turbidity Control, NC State Chappell Hill, NC 2010

PATENTS

A limnetic device for the efficient removal of soluble phosphorus from surface waters -
Pending

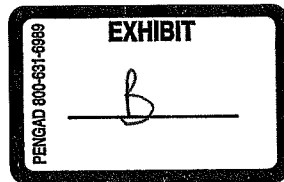
OTHER

Chairman- Thornton NH Planning Board
NH DES Ad Hoc Engineers Panel - Regulatory review

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Granite Reliable Power LLC

Revised High Elevation Restoration Plan

Coos County, New Hampshire

March 3, 2014

Brookfield

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INTRODUCTION

This Granite Reliable Power Revised High Elevation Restoration (HER) Plan presents a comprehensive approach to restoration and re-vegetation of disturbed areas associated with the construction of the Granite Reliable Power (Granite) windpark. The Plan benefits from post-construction operational and maintenance experience and supersedes the previously approved HER Plan prepared by RMT. The Plan provides equivalent or greater environmental restoration than originally required. The Plan is meant to be incorporated into an amendment to the High Elevation Mitigation Settlement Agreement, which will be submitted to the New Hampshire Site Evaluation Committee for approval. The road access provisions of this Plan are meant to supersede, once approved, the road width limitations in the High Elevation Mitigation Settlement Agreement and the same road width limitations referenced in the Decision and Order Granting Certificate of Site and Facility (July 15, 2009).

This Plan was presented to and incorporates comments received from NH Fish and Game (NHF&G), the NH Department of Environmental Services (NHDES), the Army Corps of Engineers, the Appalachian Mountain Club (AMC), and the New Hampshire Natural Heritage Bureau (NHB).

This plan applies specifically to construction on Mt. Kelsey within the Retained Lands of the High Elevation Mitigation area with an elevation of 2,700 feet or higher. Therefore, the restoration methods described herein will be employed in those areas on Mt. Kelsey above 2,700 feet in elevation.

The Plan consists of five components:

1. Minimization of temporary and permanent disturbances
2. Restricted access
3. Stabilization & Revegetation
 - a. Grading
 - b. Soil preparation
 - c. Tree seedlings for restoration
 - d. Mulch for moisture retention and soil stabilization
4. Monitoring
5. Maintenance

Each of these components is detailed below.

1. Minimization of Temporary and Permanent Disturbances

The limits of tree clearing have been reduced from the permitted locations, as shown on RMT's construction drawings (submitted previously), to match the approximate extent of grading. Grading of roads, turbine assembly areas, truck turnarounds, and crane pads will be designed for the minimum disturbance necessary to complete construction.

Permanent disturbance will be minimized by reducing the constructed access road widths generally to 16 feet (previously 12 feet, see explanation in "Stabilization and Re-vegetation"), and by establishing other widths on certain roadway corners (see drawings in Attachment 2). The

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surficial extent of wind turbine pad gravel surfacing will also be reduced, were feasible. These reductions in permanent gravel surfacing are accomplished by applying a minimum 4" thickness of organic material to such surfaces to support revegetation per this plan.

2. Restricted Access

Identification of the high elevation conservation areas will be included in construction crew training. Access to high elevation conservation areas will be restricted throughout construction.

Three permanent access gates will be installed on standard width access roads. Therefore, access to each turbine string will be restricted with a permanent gate as follows:

- Dixville Peak and Fishbrook will have one gate each
- A single gate on the common access road will control access to Owlhead and Mt. Kelsey

Gates were installed during initial road construction and remain in place after turbine erection. The gates have been posted with signs indicating, "Boundary- State Wildlife Management Area Beyond this Sign."

3. Stabilization and Re-vegetation

Stabilization and re-vegetation require grading, soil preparation, seedlings for restoration, and (typically) grass seeding and mulch for stabilization. The re-vegetation methods specified in this plan have been refined through various agency and stakeholder coordination efforts to minimize spruce/fir forest habitat fragmentation and lessen opportunities for habitation by mice and associated predators.

There are two general components to this revegetation plan: (A) the narrowing of roadway gravel surfaces by applying organic material to reduce exposed gravel surfaces, yet still allow for future wind turbine maintenance; and (B) planting of endemic tree seedlings to increase forest habitat connectivity. A third component of the original plan that included stabilization of the organic material with high elevation grasses has been eliminated due to concerns that the grass may provide habitat for mice and associated undesirable predators as described in greater detail below. This revegetation plan is intended to augment revegetation efforts that have already been instituted project-wide on areas above 2,700 feet in elevation.

While not part of the original HER Plan, input from the Army Corps of Engineers, NHF&G and NHDES in 2012-13 led to the revision of the plan to increase forest cover on wind turbine pad areas while considering the needs for crane access during future wind turbine maintenance. To accomplish these objectives, Granite to the following measures will be taken:

1. Surface a narrower portion of the 34-foot roadway with organic material consisting of forest duff, soil, and stump grindings and re-vegetate with planted seedlings. Generally, this will result in a 16-foot wide roadway surface with planted trees. However, at certain corners, roadway surfaces will be wider to accommodate the turning movements of larger vehicles needed for wind turbine maintenance. This vegetative treatment can be seen on the drawings (R299, R300, R301, R302, R303 and R304) in Attachment 2. No trees will be planted within adjacent ditches.

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2. To offset the reduction in revegetation area on the roadways, Granite will replant the number of trees corresponding to the reduced area, but do so in other adjacent beneficial areas such that the same or greater total number of tree seedlings specified in the approved December 2010 HER plan are planted. These reallocated trees will be planted:

- on portions of the turbine pads (referred to as Tier 1 to acknowledge a higher priority by NHF&G),
- in areas where there are no natural or planted seedlings present (referred to as Tier 2); and
- in areas where natural seedlings may exist (Tier 3 areas).

The estimated numbers of tree seedlings that can be planted in Tier 1, Tier 2 and Tier 3 are summarized below. Additional tables and drawings are in Attachments 1, 2 and 3.

Tree Planting Summary Provided by Horizons Engineering			
Description	December 2010 Number of Trees	Proposed Number of Trees	Tree Seedlings Locations
Seedlings to be planted per December 2010 approved HER plan	5,605		See Table 1
		1,576	Previously planted areas; trees to remain on restored roadway at 7' o.c. spacing (see Table 1.a)
		1,323	Tier 1 - Turbine pads (see Table 2)
		894	Tier 2 - Areas where no seedlings are present (Table 3)
		1,814	Tier 3 - Areas where natural seedlings may exist (see Table 4)
TOTAL	5,605	5,606	

Seedlings will not be planted in water control structures (such as rock-lined ditches), and above the underground collection lines. The drawings showing the proposed planting areas are contained in Attachment 2 (R299, R300, R301, R302, R303, and R304).

Details of grading, soil preparation, tree seedlings and grass seeding follow

- a. **Grading** - The original permit drawing entitled *High Elevation Access (>2,700 feet) Road Restoration Details* (RMT Sheet No. C599) has been modified to reflect NHF&G's and Granite's proposed changes described above. The revised plan (R599 contained in Attachment 3) shows a cross-sectional view of a typical access road during the construction phase and as restored following construction. Forest duff, soil, and ground-up stumps removed for the construction phase will be stockpiled, to the

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extent possible, and replaced over gravel surfaces at a minimum depth of four inches where re-vegetation will occur. Supplemental native soils will be procured from local construction projects or suppliers, if needed.

- b. **Soil Preparation** - Soil tests will be performed to support fertilizer specifications if fertilizer is to be used. The minimum appropriate soil amendments to establish seedlings will be used in order to address stormwater contamination concerns. The soil test results; the name, brand, and nutrient content (e.g., nitrogen, phosphorous, and potassium) of the specified fertilizer; and the application rates for lime and fertilizer, will be provided to NHDES within 30 days of receiving their request.
- c. **Tree Seedlings for Restoration** - The updated drawing, High Elevation Access (>2,700 feet) Road Restoration Details (R599 contained in Attachment 3), provides specifications for establishing tree seedlings within the High Elevation Restoration Area. In general, the following seedling species (3 to 4 year maturity, depending on availability) will be planted within the areas shown in drawings R299, R300, R301, R302, R303, and R304, at a spacing of approximately seven feet on center (7' o.c.):
 - Balsam fir
 - Red spruce
- d. **Mulch for Moisture Retention and Stabilization** - Grass seeding requirements and specifications were discussed in the April 27, 2009 NHDES response to public comments regarding Granite's Section 401 Water Quality Certification (WQC# 2008-004). Replying to Comment A1, which discussed restoration at high elevations (>2,700 feet), the NHDES stated that the Applicant had consulted with NHDES's Alteration of Terrain Bureau, the NH Department of Resources and Economic Development, Natural Heritage Bureau regarding appropriate soil stabilization techniques that would not inhibit natural regeneration in the high elevation ecosystems. A high elevation grass seed mix was selected to provide a means of rapidly stabilizing all project disturbed soils above 2,700 feet in elevation, but not restrict the recruitment of tree seedlings.

In recent discussions with NHDES and on January 29, 2014 and February 10, 2014 with AMC regarding the organic material placed over the roadway within the High Elevation Mitigation area the Environmental Monitor indicated that the original objective of stabilization to prevent organic material erosion has largely been met on the surfaces where organic material was previously applied. This combined with AMC's concern that the introduction of grasses could change the ecology of these high elevation areas (by providing habitat for mice that may encourage coyotes and other predators that could in turn prey upon pine marten) has led to the conclusion that further grass seeding or establishment is undesirable. As an alternative, straw mulch will be applied where new organic material is placed or disturbed and will have the additional benefit of lowering the albedo and retaining moisture of the organic material. Therefore, this HER plan proposes that stabilization of this organic material be accomplished by natural seedlings with straw mulch applied to disturbed organic material surfaces to provide near-term stabilization in a manner that does not impede seedling germination and maturation.

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4. Monitoring

During construction, the Environmental Monitor will include qualitative checks on planted areas during inspections and determine the need for replanting. Following construction, Granite will provide annual monitoring of seedling survival for two years. Successful tree establishment will be a 75% survival rate.

5. Maintenance

It is understood that future wind turbine or related project maintenance needs will arise and may result in impacts to planted and natural trees. Where such maintenance can occur through the use of the gravel roadway surface, any tree trimming that needs to be done should involve reasonable attempts to leave the bottom 1-3' of the tree intact. In other cases it may be necessary to temporarily roll back the organics that overlie the original roadway to facilitate assembly and walking of cranes needed to perform maintenance on the wind turbines. Upon completion of any such maintenance within the crane assembly and walking areas organic material and straw mulch will be spread back across the roadway surface to the widths and depths specified in this plan.

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Attachments

Provided by Horizons Engineering

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Attachment 1 – Detailed Tree Allocation Tables (Table 1, 1a, 2, 3 & 4)

Total Number of Trees

TABLE 1: HER Plan Approved Tree Planting Obligation				
Description	Beginning Station	Ending Station	Surface area (sf)	Trees (7' o.c. spacing)
Beginning to T-15	7950	12400	97,900	1,998
T-15 Spur	0	254	5,588	114
Road between T-15 and T-14	12400	13050	14,300	292
T-14 Spur	0	600	13,200	269
Road between T-14 and t-13	13050	13800	16,500	337
Road between T-13 and T-12	13800	15000	26,400	539
T-12 Spur	0	280	6,160	126
Road between T-12 and T-11	15000	15800	17,600	359
Road between T-11 and T-10	15800	16350	12,100	247
T-10 Spur	0	100	2,200	45
Road between T-10 and T-9	16350	17600	27,500	561
Road between T-9 and T-8	17600	19200	35,200	718
TOTALS			274,648	5,605

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Total Number of Trees (continued)

TABLE 1a: Trees to Remain on Restored Roadway *				
Description	Beginning Station	Ending Station	Surface area (sf)	Trees (7' o.c. spacing)
Beginning to corner at station 91+50	7950	9150	21,600	441
No trees- corner between 91+50 and 94+00	9150	9400		
Road between 94+00 and 99+50	9400	9950	9,900	202
No trees- corner between 99+50 and 103+50	9950	10350		
Road between 103+50 and 107+00	10350	10700	6,300	129
No trees - corner between 107+00 and 110+00	10700	11000		
Road between 110+00 and 120+00	11000	12000	18,000	367
No trees - road between 120+00 and 142+00	12000	14200		
No trees - T-15 Spur	0	254		
No trees - T-14 Spur	0	600		
Road between 142+00 and 145+00	14200	14500	5,400	110
Road between 145+00 and 146+00	14500	14600	1,600	33
No trees - road between 146+00 and 178+00	14600	17800		
No trees - T-12 Spur	0	280		
No trees - T-10 Spur	0	100		
Road between 178+00 and 182+00	17800	18200	7,200	147
No trees - corner between 182+00 and 186+50	18200	18650		
Road between 186+50 and 190+50	18650	19050	7,200	147
No trees-road between 190+50 and 192+00	19050	19200		
TOTALS			77,200	1,576

* The number of trees is estimated based on the area of topsoil to remain. The exact number of trees within these areas has not been counted, but trees will be spaced at 7' o.c., so the total will equal or exceed the 1,576 indicated.

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Tier 1

Pad #	Planting area (sf)	# of Trees
15	5,147	105
14	10,255	209
13	9,839	201
12	8,820	180
11	10,687	218
10	3,717	76
9	7,609	155
8	8,753	179
TOTALS	64,827	1,323

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Tier 2

TABLE 3: Tier 2 Tree Planting Areas Without Natural or Planted Seedlings						
Location (approx. roadway station)	Side of Road	Surface	Width	Length (along roadway)	Area (sf)	# of Trees
94+00	L	Stump grindings	10	50	500	10
95+00	L	Grass	20	70	1,400	29
95+50	L	Grass	30	40	1,200	24
101	L	Grass	20	70	1,400	29
107	R	Stump grindings	18	80	1,440	29
109	L	Grass	50	200	10,000	204
111	R	Stump grindings	30	60	1,800	37
113+50	R	Stump grindings	20	30	600	12
116	R	Stump grindings	20	40	800	16
116	L	Stump grindings	30	50	1,500	31
120	R	Stump grindings	25	100	2,500	51
122	R	Grass	18	300	5,400	110
132	R	Stump grindings	25	70	1,750	36
133	L	Stump grindings	50	80	4,000	82
135+50	R	Stump grindings	20	40	800	16
T-12 North	R	Stump grindings	20	50	1,000	20
158	R	Stump grindings	30	70	2,100	43
T-11 North	L	Stump grindings	20	30	600	12
160+50	R	Stump grindings	15	40	600	12
T-8 Southwest	L	Stump grindings	40	40	1,600	33
T-8 East	R	Grass	20	100	2,000	41
T-8 Southeast	R	Grass	20	40	800	16
TOTALS					43,790	894

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Tier 3

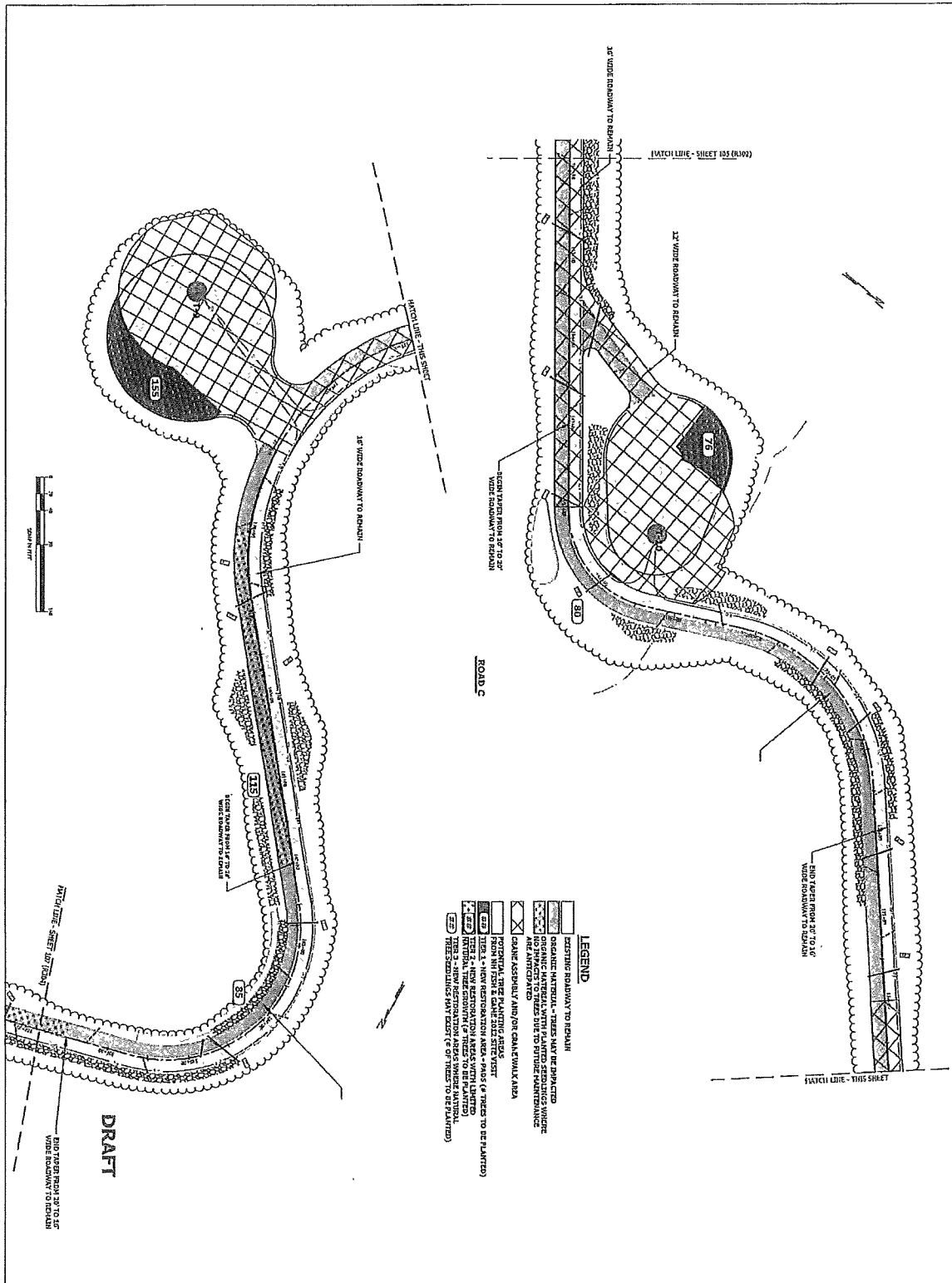
Location (approx. roadway station)	Side of Road	# of Trees
T-16 S-E-N Perimeter	L&R	160
76+50	R	295
91+50	L	42
99+00	L	42
102+50	L	50
105+00	R	300
118+50	R	100
125+00	R	80
129+50	L	105
130+50	R	25
T-14 Spur 5+00	R	40
T-14 East	L	30
142+00	L	25
153+50	L	50
154+00	R	30
161+00	L	60
167+00	R	80
181+00	R	115
184+00	R	85
189+50	L	100
TOTAL		1,814

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**Attachment 2 – Restoration Drawing No.'s R299, R300, R301, R302, R303
and R304**



HIGH ELEVATION RESTORATION PLANS
AMMENDMENT PLAN SHEETS

NO.	DATE	REVISION
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

RMT
 RAINIER METEOROLOGICAL & TERRAIN CONSULTANTS
 1000 15th Avenue, Suite 100
 Seattle, WA 98101
 TEL: 206.461.1111
 FAX: 206.461.1112
 WWW: www.rmt.com

CLIENT: DUNLAP POWER & PAPER CO. COGS COFFIN, EAST/WEST, INC. 14
PROPOSED ROAD GRADING, DRAINAGE, AND EROSION CONTROL SITE PLAN
 DATE: 03/20/04 10:00 AM
 PROJECT NO: 04-001
 SHEET NO: 001

DRAFT

- LEGEND**
- [Symbol] RESTORATION TO REMAIN
 - [Symbol] RESTORE IN NATURAL - TREES MAY BE SPARINGLY REMOVED TO IMPROVE TO TREES DUE TO STURDIER MAINTENANCE AND ANCHORING
 - [Symbol] SOILS ASSAILANT AND/OR CALAMITOUS AREA
 - [Symbol] E15 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT
 - [Symbol] E16 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT
 - [Symbol] E17 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT
 - [Symbol] E18 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT
 - [Symbol] E19 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT
 - [Symbol] E20 - NEW RESTORATION AREA - TREES TO BE PLANTED FROM IN PLACE & CAME THE SITE VISIT

Attachment 3- RMT Sheet No.C599 (amended and renamed R599)

SEEDING RECOMMENDATIONS

1. GRADING AND SHAPING

A. SLOPES SHALL NOT BE STEEPER THAN 2:1 UNLESS IN ROCK CUTS. 3:1 SLOPES OR FLATTER ARE PREFERRED. WHERE POWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.

2. SEEDBED PREPARATION

A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.

B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH VEGETATION ESTABLISHMENT AND FUTURE MAINTENANCE OF THE AREA.

C. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF PLANTING AND INCORPORATED INTO THE SOIL. KINDS AND AMOUNTS OF LIME AND FERTILIZERS MUST BE BASED ON AN EVALUATION OF SOIL TESTS. APPLICATION OF FERTILIZER SHOULD ACCOUNT FOR STORM WATER CONTAMINATION CONCERNS AND THE STORM WATER POLLUTION PREVENTION PLAN.

3. ESTABLISHING TREE SEEDLINGS FOR RESTORATION

A. THE FOLLOWING SEEDLING SPECIES SHOULD BE HULDED IN WITHIN THE SEEDLING ZONE (SEE RESTORATION DETAIL)

SPECIES	SIZE	MATURITY
BALSAM FIR	50	3-4 YEARS
RED SPRUCE	50	3-4 YEARS

B. SEEDLINGS SHOULD BE PLANTED AT A SPACING OF APPROXIMATELY 7-FT ON CENTER IN LOCATIONS SHOWN ON PLAN SHEETS K039-4304.

C. SEEDLING SURVIVAL SHALL BE A MINIMUM OF 75%, MEASURED ONE YEAR AFTER PLANTING. INSPECTIONS SHALL BE COMPLETED ONCE PER YEAR FOLLOWING TERMINATION OF CONSTRUCTION. MONITORING WILL EXTEND NO MORE THAN 2-YEARS AFTER PLANTING.

4. MULCH

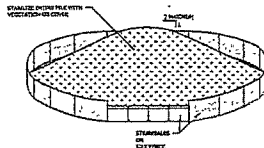
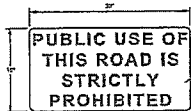
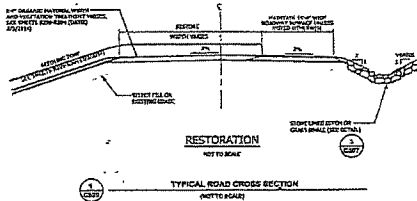
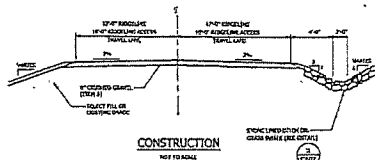
A. STRAW MULCH SHOULD BE APPLIED AT 3000 LBS/ACRE IMMEDIATELY AFTER PLACEMENT OR RE-ESTABLISHMENT OF ORGANIC MATERIAL THAT COVERS GRAVEL SURFACES.

B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING, IF NEEDED.

5. MAINTENANCE TO ESTABLISH A STAND

A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE AND TRAFFIC.

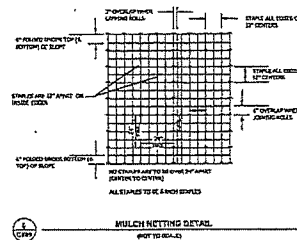
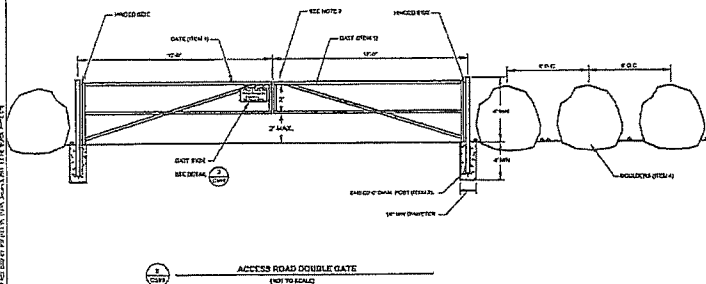
B. IN WATERWAYS, CHANNELS OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, OCCASIONAL POWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.



INSTALLATION NOTES:

1. ALL STOCKPILES MUST BE COVERED WITH VEGETATION OR GRAVEL.
2. STOCKPILES MUST BE COVERED WITH VEGETATION OR GRAVEL IMMEDIATELY AFTER PLACEMENT.
3. STOCKPILES MUST BE COVERED WITH VEGETATION OR GRAVEL IMMEDIATELY AFTER PLACEMENT.

SOIL STOCKPILING DETAIL (NOT TO SCALE)



MATERIALS LIST	
QTY	DESCRIPTION
1	GATE: 1" TOP 12" DIA. GALVANIZED STEEL, 12" X 12" ON CENTER APPROVED EQUIVALENT.
2	SUPPORT POST: 12" DIA. 304 SS, GALVANIZED STEEL POST OR ENGINEER APPROVED EQUIVALENT.
3	GRAVEL: BRANCO OR PROFORMER APPROVED EQUIVALENT (FROM 3043).
4	SOIL STOCKPILING: 6" DIA. CONCRETE

NOTES	
ACCESS ROAD GATE:	
1.	GATE REQUIRED PRIOR TO HIGH ELEVATION AREAS AND THROUGH E.C.E. PLACES FOR LOCAL DRAINAGE. SPACING SHALL BE DETERMINED BY THE FIELD BY PMT AND OWNER.
2.	PROFORMER LOGS AND LOGS AS ACCEPTABLE BY OWNER.
3.	PLACE GATE SIGN ON GATE.
4.	PLACE BOLLARDS 5 FEET ON CENTER SPACING AT GATE POST AND EXTENDING APPROXIMATELY 25 FEET FROM THE GATE POST NEEDED TO PROTECT PUBLIC ACCESS TO THE ACCESS ROAD.

REVISIONS	
1.	MODIFIED ROADWAY WIDTH ON TYPICAL ROAD CROSS SECTION - RESTORATION.
2.	ADDED GATE SIGN DETAIL ON TYPICAL ROAD CROSS SECTION - RESTORATION.
3.	REVISED DIMENSIONS TO HIGH ELEVATION CROSS SECTIONS AND PMT PLAN.

R 555
3/3/2014

HIGH ELEVATION RESTORATION PLANS
AMENDMENT PLAN SHEETS