EXHIBIT B.14 SOILS MAPPING, EROSION CONTROL AND STORMWATER MANAGEMENT

B.14.1 Soils Mapping

A site-specific soils survey was completed for the project area during the summer of 2009. Through consultation with David Rocque, Maine State Soil Scientist, it was determined that a Class L soil survey would be appropriate to characterize the soils found on the site for the proposed Kibby Expansion Project. Attachment B.14-1 is the Soil Survey Report, which includes a description of soil units, drainage classes, slopes, and an evaluation of soil suitability for the proposed project. Soils mapping is also included with the report.

B.14.2 Erosion Control

The erosion control plan is provided in Attachment B.14-2, which includes provisions for planning, temporary and permanent measure use, stockpile stabilization, seasonal work differences (winter construction), revegetation plans, and inspection and maintenance. This plan was developed in consultation with the State Soil Scientist and incorporates the "toolbox" approach to construction which allows for field judgment to choose the best practice to suit the circumstances. The plan is based on the plan approved in the Kibby Project, as updated based on construction of that project. Lessons learned through construction at the Kibby Project are also incorporated into plans and designs for the Kibby Expansion Project.

B.14.3 Stormwater Management

Per the LURC Chapter 10, Sub-chapter III Land Use Standards, the Project must meet the following stormwater management criteria: Surface Water Quality (for the new or improved access roads, crane (ridge) roads, wind turbine generator ("WTG") assembly pads, and substation), Phosphorous Control (for the portions of the Project that are located in the Chain of Ponds and Gold Brook/Flagstaff Lake watersheds), and Erosion and Sedimentation Control (for all temporary and permanent disturbed areas). Due to the size and distance of the Project from downstream properties, the watershed water quantity calculations consists of a curve number comparison for the pre- and post-development conditions for the contributing watershed.

The curve number comparison calculation utilizes the hydrologic soil information from the medium intensity soil survey of Somerset County, parts of Franklin, and Oxford Counties. Curve numbers based on the cover type and soil group are referenced in Table 2-2c of the USDA Urban Hydrology for Small Watersheds TR55 manual. A weighted curve number was generated by averaging the curve numbers associated with areas of the various cover types and their associated hydrologic soil group.

Phosphorous control is required for the portions of the wind farm located within the Chain of Ponds and Gold Brook/Flagstaff Lake watersheds. The Phosphorous calculations are based on the methodology used in Volume II of the Maine DEP Stormwater BMP Manual "Phosphorous Control in Lake Watersheds A Technical Guide to Evaluating New Development."

The Project will disturb more than one acre of land, therefore the standards of the Maine Construction General Permit must be met. During the construction process, erosion and sedimentation control measures will be implemented and maintained per the Maine Erosion and Sedimentation Control BMP's. Stabilization measures for the site include both temporary and permanent erosion and sedimentation controls; appropriate design of conveyance swales, culvert inlet and outlet protection, and channel protection (where applicable). Site stabilization includes evaluation of slope stability, erosion protection for earthen cut and fill slopes, stabilization of disturbed areas, and considers provision for future maintenance of the site. These treatment practices are used to reduce the impacts of site runoff on downstream water quality.

B.14.1.1 Existing Site Conditions

With the exception of the portions of the Project along the existing Mile 5 Road and short section of the Wahl Road, the existing Project site is undeveloped woodlands. The wooded areas are well vegetated with a mixed growth of small to large trees and good ground cover. Some portions of the site have been harvested for timber, but have reverted back to well-established small to medium sized trees and brush.

The topography and land surface within the Sisk range varies from steep in the higher elevations to moderately steep, to a milder slope as it approaches Kibby Stream and Clearwater Brook, to the east and west, respectively. Elevations range from 3,200 to 3,300-feet at the ridge tops to 2,200-feet at Kibby Stream. Slopes range from 25 percent ("%") to 30% along the ridge tops, with steeper slopes of 30% to 50% in the mid-level elevations and a gentler slope of 10% to 20% as one approaches Kibby Stream.

B.14.1.2 Proposed Development

The proposed Kibby Expansion Project includes 15 wind turbines located along the Sisk Mountain ridgeline, adjacent to and west of the current Kibby Project B Series. Associated elements of the Project include access to the turbines utilizing the existing roadway network to the greatest extent possible, some new access roads and ridgeline roads connecting the turbines, and 34.5 kilovolt ("kV") electrical interconnections (collector lines) from the turbines to a common, newly proposed Kibby Expansion Substation. A short 115 kV electric transmission tap line between the new Kibby Expansion Substation and the existing Kibby Project 115 kV electric transmission line is also proposed.

B.14.1.3 Stormwater Management Approach

The Plan and Profile sheets provided in the Permit Plan Set located in Attachment B.13-1 reflect specific stormwater design measures for each planned roadway. However, it is acknowledged that the final selection of appropriate design elements can only be made based on actual, in-field conditions and professional engineering judgment. Therefore, the plans also reflect a series of design measures, referred to as a "toolbox," that will be selected as appropriate to respond to a range of anticipated site conditions. These techniques have been developed and modified through a series of site visits, meetings, and discussions with regulatory agencies (including LURC, DEP, and the Maine State Soil Scientist), as well as experience gained on the Kibby Project.

Given the hydrology of the site, special design emphasis was placed on handling of surface runoff and subsurface drainage. In general, surface runoff is handled by maintaining overland flow where possible, and re-establishing overland flow (through the use of ditch turnouts and plunge pools), as needed, for distribution of concentrated surface runoff. For subsurface drainage, measures are proposed to maintain subsurface drainage across the roadway where cuts occur in areas of shallow groundwater. Maintenance of the subsurface flows is provided to reduce the potential for creating new seeps or springs. Such measures, outlined on the drawings on sheets C-16 through C-22 in Attachment B.13-1, include a "rock sandwich" drainage blanket (or rock mattress), as well as a series of drainage trenches. Typical roadway sections and drainage controls are also shown on sheets C-16 through C-22, as are erosion control measures.

Construction of the roads between the turbines along the ridgelines will likely occur in areas where deeper groundwater and drainage characteristics will not necessitate the use of conventional drainage conveyance measures. However, TransCanada will ensure oversight of the construction effort by an on-site engineer to allow for appropriate design adjustments to reflect observed field conditions. In this way, roadway construction can minimize its affect on hydrologic conditions at the site and ensure successful long-term stability and function.

During construction of the access roads, particularly at the lower elevations, excavations may expose springs or seeps. As indicated previously, permanent measures will be constructed (i.e., drainage blankets or mattresses) to manage this subsurface flow. To control seepage during construction, while cut and fill operations are still on-going, the contractor is required to use temporary flexible pipe to collect and convey the seeps through the construction site, discharging in a manner to avoid scour/erosion problems down slope. Temporary channels and/or berms and check dams are specified to be used to impound and direct seep drainage to the temporary flexible pipes.

B.14.1.4 Roadway Culverts

As discussed with David Rocque, Soil Scientist for the State of Maine, the use of concentrated treatment structures and ditching should be minimized, where possible, in the stormwater design. Where possible, structures that concentrate run-off have been eliminated. Roadway culverts have been placed where necessary to carryflow-through runoff from the mountainside beneath roads and then redistribute as sheet flow. Conveyance swales are used in conjunction with culverts where access roads parallel adjacent embankment slope. Inlet and outlet protection are used at culverts that convey existing channelized flow to dissipate energy and reduce the effects of concentrated flows. Rock sandwiches are used at wetland crossings without channelized flow and groundwater seeps to avoid the creation of channelized water. As mentioned above, it should be noted that the number of culverts shown on the Project drawings represents the expected worst case condition and therefore is considered a conservative approach. Rock sandwiches may be installed at some proposed culvert locations based on review of the actual field conditions at the time of construction (the "toolbox approach").

Access road culverts are designed to convey a 10-year 24-hour storm event. Culverts are specified to be placed with a minimum of 12" of cover over the pipe. Round corrugated plastic pipes ("CPP") with a smooth wall interior are proposed at all locations with the exception of the larger stream crossings at access road stations 35+85, 36+50, 45+20, and 56+50, which have the highest potential for fish passage. At these locations, corrugated metal pipe arch culverts are proposed to provide a wider and deeper flow at the bottom of the culvert to enhance fish passage. The minimum culvert size proposed at any location is 18-inches. Culvert sizing calculations did not take into account the passage of water through nearby rock sandwiches and therefore some culverts are upsized which, again, will enhance the potential for fish passage in smaller streams. Larger culverts also require less maintenance to function properly.

The modified portion of the Mile 5 Road will be widened from approximately 10-feet to 20-feet. Existing culverts will be replaced due to their poor condition and the expanded roadway width. (It should be noted that the existing bridge at the stream crossing at station 69+75 will remain in place.) The first 12 culverts on Mile 5 Road, directly down slope of Gold Brook Road, were sized neglecting the detention time created by the upslope roadway, thus providing an oversized culvert which again enhances fish passage. Culverts on the Gold Brook Road are evenly spaced along the road, mitigating the effects of the roadway functioning as a drainage divide.

The proposed section of new access road from the Mile 5 Road at station 115+00 to the ridge road will be constructed to a 20-foot width. Culvert installation has been minimized, and only used where there is existing channelized flow. Rock sandwich roadway sections are placed in areas of fill, at wetland crossings, and where groundwater seepage is present. The location of these roadway sections with rock sandwiches are identified on the Project plans, but are subject to minor relocation during construction based on field observations.

Along the ridge, the crane paths (ridge road) that connect the WTG locations will be 34-feet wide to accommodate the large crane needed to erect the turbines. Once the turbines are in place and all construction is complete, these ridge roads will be reduced to a 20-foot width. Large portions of the WTG assembly areas will also be reclaimed. This runoff "credit" was not taken into consideration when sizing the ridge top culverts. A gravel surface was used to model the crane paths, the crane assembly areas and the rip rapped side slopes. Run-off from crane paths is conveyed through erosion control devices such as culverts with inlet and outlet protection, swales, ditch turnouts and plunge pools, where necessary. As with the access road to the ridgeline, the number of the smaller diameter (18") culverts may be reduced (or their locations modified) and additional rock sandwiches installed, based on in-field conditions and professional engineering judgment during construction.

Design calculations used for the sizing of culverts are included in the Stormwater Calculation Package located in Attachment B.14-3.

B.14.1.5 Conveyance Swales

Two types of conveyance swales are used for this Project: a trapezoidal cross section and a triangular cross section. The trapezoidal section is used along the Mile 5 Road to about station 142+00. This conveyance swale is used mostly on the upslope side of the road. A triangular swale section is used from station 142+00 to the end of the ridge access road, where ledge is anticipated. The conveyance swales are designed so they will not extend below the seasonal groundwater table. The conveyance swales lead to ditch turnouts then to plunge pools. As with the access roadway and crane road on the ridge, rock sandwiches are placed in areas of fill, at wetland crossings, and where groundwater seepage is present.

Design calculations used for the sizing of conveyance swales are included in the Stormwater Calculation Package located in Attachment B-14-3.

B.14.1.6 Phosphorus Control Plan

Per LURC Chapter 10.25.L requirements, non-residential development that creates a disturbed area of one or more acres within the direct watershed of a body of standing water 10 acres or greater in size requires a phosphorous control plan. Portions of the Kibby Expansion Project (turbine sites 7, 10, 11, a portion of 12, 13 and 14, and associated crane roads) are located within the Chain of Ponds Lake watershed. Turbine #15 and associated crane road are located in the Gold Brook watershed which flows to the North Branch Dead River and Flagstaff Lake. Therefore, these Project components must meet the phosphorus standards.

Calculations were performed to determine the quantity of phosphorous exported from these portions of the Project. As previously stated, the phosphorous calculations were based on the methodology used in Volume II of the 2008 Maine DEP Stormwater BMP Manual "Phosphorous

Control in Lake Watersheds: A Technical Guide to Evaluating New Development". To derive a total phosphorus budget, an allocation for each lake watershed was provided by MDEP to determine the Project's allowable phosphorus export threshold.

The phosphorous evaluation for the portion of the Project within the Chain of Ponds watershed was based on a parcel bounded by the top of the Sisk Mountain ridge downslope in a generally westerly direction to a boundary defined by the 2,700-foot contour (the development parcel). Most of this area lies within the limits of the P-MA subdistrict, which is bounded by the 2,700-foot contour and above.

The phosphorous evaluation for the portion of the Project within the Gold Brook/Flagstaff Lake watershed was based on a parcel bounded by the top of the Sisk Mountain ridge downslope in a generally southeasterly direction to a boundary defined by the 2,800-foot contour (the development parcel). All of this area lies within the limits of the P-MA subdistrict. Impervious area associated with the new access roads and turbine sites are considered in the phosphorus calculations. All other areas disturbed during construction are stabilized with erosion control mix and allowed to revert to pre-development conditions following construction.

At each turbine site, the impervious areas included in the potential phosphorus export calculations after stabilization of the site consist of a 0.27 acre gravel surface. The impervious area associated with the potential phosphorus export from the ridge roads is the 20-foot wide road that will be permanently maintained after site stabilization. The total length of access road included in the phosphorus calculations is approximately 9,000 feet in the Chain of Ponds watershed and 1,550 feet in the Gold Brook/Flagstaff Lake watershed.

The phosphorus standards restrict the amount of phosphorus exported from a development parcel based primarily on the current water quality and projected growth in the watershed. The allowable per-acre phosphorus allocation for the Chain of Ponds watershed, as provided by the MDEP, is 0.062 pounds per acre per year ("lbs/ac/yr"). The total tributary acreage of the development parcel in this watershed is approximately399.0 acres. Per the criteria established by MDEP, the 399.0 acres of developable land within the Chain of Ponds watershed can export approximately 24.74 pounds of phosphorus per year ("lbs/yr") without providing any controls. This value is reduced to a total of 7.36 lbs/yr after reduction for undevelopable areas such as wetlands exceeding one acre, and areas that have steep slopes exceeding 25 %. The Project's Maximum Permitted Phosphorus Export ("PPE") in the Chain of Ponds watershed is therefore 7.36 lbs/yr. This compares to the Project's potential calculated phosphorous export, based on the area of new impervious surfaces, roads and turbine pads in the Chain of Ponds watershed, of 7.29 lbs/year which is less than the PPE.

The allowable per-acre phosphorus allocation for the Flagstaff Lake watershed within Kibby Township, as provided by the MDEP, is 0.045 lbs/ac/yr. The total tributary acreage of the development parcel in this watershed is approximately 116.2 acres. Per the criteria established

by MDEP, the 116.2 acres of developable land within the Flagstaff Lake watershed can export approximately 5.23 lbs/yr of phosphorus without providing any controls. This value is reduced to a total of 1.88 lbs/yr after reduction for undevelopable areas such as wetlands exceeding one acre, and areas that have steep slopes exceeding 25%. The Project's PPE in the Gold/Brook/ Flagstaff lake watershed is therefore 1.88 lbs/yr. This compares to the Project's calculated phosphorous export, based on the area of new impervious surfaces, roads and turbine pads in the Flagstaff Lake watershed within Kibby Township, of 1.30 lbs/year which is less than the PPE without controls.

Additional details regarding phosphorous calculations are provided in the Stormwater Calculation Package located in Attachment B.14-3.

B.14.1.7 Stormwater Maintenance

TransCanada is responsible for the ongoing maintenance of new Project roads. The landowners will continue to maintain the major access roads at the site, i.e., Gold Brook Road, Wahl Road and Mile 5 Road. Following construction, the landowner will continue to control access to the site. The condition and functioning of the stormwater management features will be monitored for two years following construction. Any problems or concerns that arise will be corrected and monitored until long-term functionality can be assured.

B.14.1.8 Summary

In summary, the stormwater management design and controls as described in this report meet the LURC Chapter 10 requirements with respect to stormwater quantity control, phosphorous control, and erosion and sedimentation control practices. The proposed development is not expected to increase runoff when compared to the pre-development conditions. The curve numbers for each watershed studied are as follows:

Kibby Stream Watershed

Pre-Development Weighted CN = 72
Post-Development Weighted CN = 72

Gold Brook Watershed

Pre-Development Weighted CN = 73
Post-Development Weighted CN = 73

Chain of Ponds Watershed

Pre-Development Weighted CN = 75
Post-Development Weighted CN = 75

Substation Watershed

Pre-Development Weighted CN = 71
Post-Development Weighted CN = 71

The stormwater runoff calculations (Attachment B.14-3) indicate that the change in cover types in the developed site (the new access roads, crane (ridge) roads, WTG assembly pads, and substation) have no impact on the overall curve number when compared to the Pre-developed site within the watershed. In general, a higher curve number in the developed condition will usually mean an increase in runoff from the watershed. In each case, the resultant weighted curve numbers for the post-development site in each watershed matches the pre-development weighted curve number; therefore, there is no increase in runoff.

The Project meets its phosphorus budget for the Chain of Ponds and Gold Brook/Flagstaff Lake watersheds.

The Project will be constructed, and stabilized using erosion and sedimentation (E&S) Best Management Practices (BMPs) and receive routine maintenance to ensure their continued function. The site will be maintained to prevent or correct erosion problems. Additional details about specific E&S measures and the minimum contractor E&S Plan requirements are provided on the Permit Plan Set in Attachment B.13-1 and in Attachment B.14-2, respectively. Design measures have been identified that will be used as Project refinements are made during the final design stage and through the construction effort in response to field conditions.

ATTACHMENT B.14-1

Class L Soil Survey

CLASS L SOIL SURVEY

KIBBY EXPANSION WIND PROJECT

Prepared for:

TRANSCANADA

Prepared by:

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November 4, 2009

Dana Valleau
TRC
249 Western Avenue
Augusta, ME
04330

Class L Soil Survey
Kibby Expansion Wind Project
Kibby & Chain of Ponds
Townships, ME

Dana,

We observed test pits in the areas for the proposed Access Roads, Collector Lines, Substation and Wind Turbine Locations for the proposed Kibby Expansion Wind Power Project intermittently throughout the summer and fall months of 2009 (*June through October 2009*). The test pits were observed in the field to prepare a Class "L" Soil Survey for the proposed fifteen wind turbines, access roads and adjacent collector lines, and the new substation. We understand the soils information will be used for engineering the route alignment in addition to augmenting the permit application for the Kibby Expansion Wind Project with the Land Use Regulation Commission (*LURC*).

The survey limits were established in the field using the plans and GIS background files provided by the TRC GIS department. We observed 110 test pits and 18 borings along the proposed roadways, collector line, substation and turbine string in addition to the soil data collected from the wetlands delineated at the site. We also observed soil profiles from "cuts" into the "banks" along the existing woods roads where present. We documented the soil's morphology from the hand dug test pits and borings within the approximate proposed access road corridor. The field data was referenced to the current Maine State Soil Catena and determined that for mapping purposes the following soils should react similarly to the Abram, Brayton, Colonel, Dixfield, Enchanted, Lyman, Mahoosuc, Monarda, Peacham, Ricker, Searsport, Saddleback, Surplus, Tunbridge soil series including Udorthents. It should be noted that the soil profiles were observed to depths of refusal by hand implements and the reported refusal depths may be greater with mechanized excavations. In most profiles it is not feasible to observe soil profiles to

depths greater than 60" without excavating equipment. The collected data determined the underlying soils limitations for this Class "L" Soil Survey.

The soils ranged from "very shallow" (<*10*"), "shallow" (*10" to* <*20*"), "moderately deep" (*20" to* <*40*") and "deep" (40" to <*60"*) depths over bedrock in the proposed project area. These soils also ranged in drainage classification from very poorly drained to excessively drained. Generally, the soils in the higher elevations were determined to have thixotropic and "cryic" soil conditions, whereas the soils in the lower elevations have frigid soil conditions without thixotropic characteristics. Many of the observed soils were shallow to assumed bedrock in the higher elevations with deeper soils in the lower elevations.

Typically, very shallow and shallow soils have many limiting factors for site development for projects with underground utilities, septic fields, lawns etc. However, shallow soils tend to provide suitable areas for wind power projects by impacting less soil in comparison to areas with deeper soils. The shallow soils underlying the proposed wind turbine sites will anchor the wind turbines to solid bedrock with less soil disturbance overall. Additionally, the shallower areas along the crest of the Sisk Mountain ridgelines will provide a natural solid road base with less soil disturbance. Any areas requiring blasting to alleviate slope gradients will produce materials that can be positioned in areas requiring fill materials for a desired local "cut and fill" balance. Less soil overburden should be more easily managed in comparison to deeper soils requiring more extensive soil excavations and overall soil impacts, drainage considerations and more topsoil storage space and management during project construction.

The proposed access road and much of the collector line will generally follow an existing woods road (*5 mile Road*) to elevation $\pm$ 2500 feet. The collector lines will extend from each turbine location along the ridgeline access roads to a common "homerun" line that generally follows existing or proposed roads to the new substation. The existing Mile 5 Road is a drivable gravel road that begins at Mile 5 on the Gold Brook Road. The improved road appears to have been the main "haul" route for tree harvesting the area. The road continues for approximately two miles with both ditching and underlying culverts in place helping with overall conditions of the frequently used roadway. It has a deep base of compacted native soils along with an intricate ditching network along the "uphill" side. The roadway and ditching have all the culverts installed to the stream where the current road is "blocked" by boulders. After this point the culverts have been removed and the low-lying areas of the former culvert locations are currently functioning as "slope breaks" in many instances.

Natural conditions exist above 2700′ in elevation and timber harvesting limits. A number of existing foot and moose trails continue up to the Sisk Mountain ridge tops at elevations up to $\pm$ 3400′. The trails follow the "flatter" with gradual grades up to the ridge tops. Some wetland areas and/or streams will need to be avoided or crossed to

reach the ridges using the proposed access route. Many of the wetlands have had previous alterations including grading, filling and ditching efforts below the 2700' elevation. These areas will require control structures under the proposed route for access and to "convey" water for continued flow. The proposed alignment appears to be located in a suitable area as studied, however limitations such as wetlands, streams and steep slopes will need to be considered for the project.

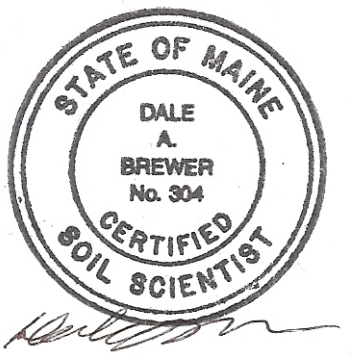
We visited the turbine sites and followed the proposed roadways and adjacent collector lines during this soil mapping effort. We located the existing roads, ditching, culvert locations, seeps, bedrock outcrops, slope breaks, wetland areas, borings and the soil test pit locations with Trimble® GEO-XH GPS units. Please see the following pages for more detailed soil information including the Soil Report, Soil Narratives, Soil Test Pit Logs and the attached Soil Map.

The Class L survey followed the proposed location of the remainder of the collector line, which is generally adjacent to the Gold Brook and Wahl Roads to the new substation. The proposed substation site is located off Wahl Road approximately 800 feet from the existing Kibby Substation.

Please feel free to contact us should questions arise or if further assistance is needed with the proposed Kibby Expansion Wind Project.

Respectfully submitted,

STATEWIDE SURVEYS, INC



_____Dale A. Brewer CSS #304

CLASS "L" SOIL NARRATIVE REPORT

KIBBY EXPANSION WIND PROJECT

Date: Test pits observed Summer/Fall 2009.

Base Map: TRC Topographical Maps
Two-foot contour intervals (*2′ CI*) (*Provided Survey Plan*).
Map Scale: 1 inch = 250 feet (1″=250′).

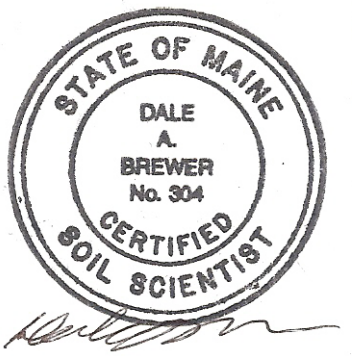
Ground Control: Test pits located by Trimble® GEO-XH GPS (*sub-foot to sub-meter*).

The Maine Association of Professional Soil Scientists (*MAPSS*) has adopted Standards for Class "L" Soil Surveys. This soil investigation has been prepared under remote and hand dug limitations as accepted for Class "L" Soil Surveys standards listed below.

Class L Soil Survey Minimum Standards

1. Map units are based on parent materials, slope, soil texture, soil depth to dense till or bedrock (*shallowest*) and soil wetness (*drainage class and/or oxyaquic conditions*) at the Class L High Intensity Map Unit size.
2. Scale of 1 inch = 100 feet (*1″=100′*) or larger. 1″=250′ for this project.
3. Ground Control and Test Pit locations accomplished using a Trimble GEO-XH GPS Unit, (*UTM 19 US Survey Feet*).
4. Base map with 2-foot contour intervals.

This Class L Soil Survey was prepared for the proposed Kibby Expansion Wind Project. The accompanying Soil Narratives (*Profile Descriptions*) and Soil Map were completed in general accordance with the standards adopted by the Maine Association of Soil Scientists and the Board of Certification of Geologists and Soil Scientists.



Dale A. Brewer, CSS #304 November 4, 2009

CLASS "L" SOIL CONDITIONS SUMMARY TABLE

KIBBY EXPANSION WIND PROJECT

 FORM E

SOIL CONDITIONS SUMMARY TABLE

For SUBSURFACE INVESTIGATIONS at DEP SITE LOCATION PROJECTS

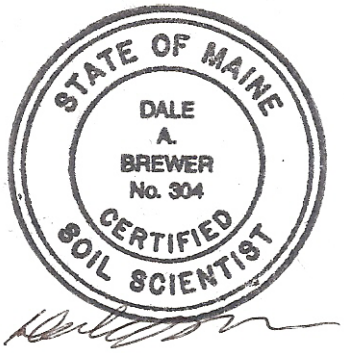
Project Name: **KIBBY EXPANSION WIND**	DEP Project #:
Applicant Name: **TRANSCANADA** **TRC ENVIRONMENTAL CORP**	Consultant Name: STATEWIDE SURVEYS, INC **DALE BREWER,** C.S.S. #304
Project Location *(municipality)*: **KIBBY/ CHAIN OF PONDS TOWNSHIPS**	**CLASS L LINEAR SOIL SURVEY** **FOR WIND TURBINE EXPANSION**

TEST PIT #	✓ or ✖ if at Field	● soil series name *(C.S.S.)* *(as appropriate to the investigation)*	Depths to *(check one)*: ✓ inches ☐ cm			Ground Surface (%)
			Mottling Or Oxyaquic	Bedrock Assumed	Restrictive Layer	
TP-1	x	COLONEL "LIKE"	9″	>60″	20″	5-10
TP-2	x	DIXFIELD "LIKE"	>18″		18″	5-10
TP-3	x	DIXFIELD "LIKE"	>18″		18″	20-30
TP-4	x	BRAYTON "LIKE"	12″		14″	0-5
TP-5A	x	TUNBRIDGE VARIANT		20″		10-20
TP-5B	x	TUNBRIDGE VARIANT	12″	20″		10-20
TP-6	x	PEACHAM VARIANT	0″	14″	12″	0-5
TP-7	x	ABRAM		3″		5-10
TP-8	x	TUNBRIDGE "LIKE"	16″	21″		5-10
TP-9	x	PEACHHAM VARIANT	0″	9″		5-10
TP-10	x	PEACHHAM VARIANT	0″	12″	0″	5-10
TP-11	x	LYMAN VARIANT	8″	17″	9″	0-5
TP-12	x	NASKEAG "LIKE"	2″	12″	″	0-5
TP-3	x	DIXFIELD "LIKE"	>18″		18″	20-30
TP-4	x	BRAYTON "LIKE"	12″		14″	0-5
TP-5A	x	TUNBRIDGE VARIANT		20″		10-20
TP-5B	x	TUNBRIDGE VARIANT	12″	20″		10-20
TP-6	x	PEACHAM VARIANT	0″	14″	12″	0-5
TP-7	x	ABRAM		3″		5-10
TP-8	x	TUNBRIDGE "LIKE"	16″	21″		5-10
TP-9	x	PEACHHAM VARIANT	0″	9″		5-10
TP-10	x	PEACHHAM VARIANT	0″	12″	0″	5-10
TP-11	x	LYMAN VARIANT	8″	17″	9″	0-5
TP-12	x	NASKEAG "LIKE"	2″	12″	″	0-5

TP-13	*x*	**DIXFIELD "LIKE"**	**>18″**		**18″**	**20-30**
TP-20	*x*	**SURPLUS**	**10″**			**15-30**
TP-21	*x*	**PEACHAM**	**0″**	**32″**		**0-15**
TP-22	*x*	**SADDLEBACK**		**21″**	**19″**	**0-15**
TP-23	*x*	**WONSQUEAK**	**5″**	**7″**		**0-15**
TP-24	*x*	**WASKISH**	**0″**			**0-15**
TP-25	*x*	**SURPLUS**	**16″**		**16″**	**15-30**
TP-26	*x*	**SURPLUS**	**12″**	**43″**	**14″**	**0-15**
TP-27	*x*	**SURPLUS**	**14″**		**10″**	**15-30**
TP-28	*x*	**SURPLUS**	**8″**		**24″**	**15-30**
TP-29	*x*	**SURPLUS**	**6″**	**12″**	**6″**	**0-15**
TP-30	*x*	**SADDLEBACK**	**12″**		**7″**	**15-30**
TP-31	*x*	**RICKER**	**8″**	**14″**	**8″**	**0-15**
TP-32	*x*	**ENCHANTED**		**18″**	**12″**	**15-30**
TP-33	*x*	**SADDLEBACK**		**19″**	**12″**	**0-15**
TP-34	*x*	**WONSQUEAK**	**0″**	**28″**		**0-15**
TP-35	*x*	**ABRAM**		**5″**		**0-15**
TP-36	*x*	**DIXFIELD**	**20″**		**20″**	**15-30**
TP-37	*x*	**COLONEL**	**15″**		**15″**	**15-30**
TP-38	*x*	**DIXFIELD**			**18″**	**0-15**
TP-39	*x*	**COLONEL**	**8″**		**9″**	**0-15**
TP-40	*x*	**SADDLEBACK**	**6″**	**16″**	**10″**	**0-15**
TP-41	*x*	**SADDLEBACK**	**12″**			**30-40**
TP-42	*x*	**RICKER**		**2″**	**0″**	**30-40**
TP-43	*x*	**WONSQUEAK**	**0″**	**12″**	**0″**	**0-15**
TP-44	*x*	**SADDLEBACK**		**14″**	**9″**	**30-40**
TP-45	*x*	**RICKER**		**5″**		**0-15**
TP-46	*x*	**RICKER**		**0″**		**0-15**
TP-47	*x*	**WONSQUEAK**	**2″**	**10″**	**0″**	**0-15**
TP-48	*x*	**RICKER**		**5″**	**3″**	**0-15**
TP-49	*x*	**SADDLEBACK**	**8″**	**10″**		**0-15**
TP-50	*x*	**WONSQUEAK**		**8″**	**2″**	**0-15**
TP-51	*x*	**RICKER**		**1″**		**15-30**
TP-52	*x*	**SADDLEBACK**	**10″**	**13″**	**7″**	**0-15**
TP-53	*x*	**SADDLEBACK**	**12″**	**24″**		**0-15**
TP-54	*x*	**SADDLEBACK**		**24″**		**0-15**
TP-55	*x*	**SADDLEBACK**		**5″**		**15-30**
TP-56	*x*	**COLONEL**	**14″**		**18″**	**0-15**
TP-57	*x*	**COLONEL**	**10″**	**22″**	**17″**	**15-30**
TP-58	*x*	**COLONEL**	**15″**		**15″**	**15-30**
TP-59	*x*	**PEACHAM**	**0″**	**12″**	**0″**	**0-15**
TP-60	*x*	**PEACHAM**	**3″**		**6″**	**0-15**
TP-61	*x*	**RICKER**		**4″**	**0″**	**15-30**
TP-62	*x*	**WETLAND**	**0″**			**0-15**

TP-63	*x*	**WASKISH**	**0″**	**24″**		**0-15**
TP-64	*x*	**SADDLEBACK**		**17″**	**15″**	**0-15**
TP-65	*x*	**SADDLEBACK**	**12″**	**18″**	**9″**	**0-15**
TP-66	*x*	**ENCHANTED**	**17″**	**22″**	**16″**	**0-15**
TP-67	*x*	**SURPLUS**	**15″**	**22″**	**15″**	**30-40**
TP-68	*x*	**SURPLUS**	**13″**	**28″**		**0-15**
TP-69	*x*	**SURPLUS**	**8″**		**8″**	**0-15**
TP-70	*x*	**SADDLEBACK**	**14″**	**22″**	**14″**	**0-15**
TP-71	*x*	**SURPLUS**	**7″**	**18″**		**15-30**
TP-72	*x*	**SADDLEBACK**		**10″**	**0″**	**15-30**
TP-73	*x*	**SADDLEBACK**	**22″**	**26″**		**15-30**
TP-74	*x*	**WASKISH**	**0″**	**30″**	**24″**	**0-15**
TP-75	*x*	**SISK**		**20″**		**0-15**
TP-76	*x*	**SADDLEBACK**	**16″**	**20″**	**12″**	**0-15**
TP-77	*x*	**ENCHANTED**	**22″**		**22″**	**0-15**
TP-78	*x*	**RICKER**		**5″**	**0″**	**0-15**
TP-79	*x*	**WONSQUEAK**	**9″**	**16″**		**0-15**
TP-80	*x*	**SADDLEBACK**		**5″**	**4″**	**0-15**
TP-81	*x*	**RICKER**		**1″**		**0-15**
TP-82	*x*	**WASKISH**	**0″**	**34″**		**0-15**
TP-83	*x*	**SADDLEBACK**		**10″**		**30-40**
TP-84	*x*	**SADDLEBACK**		**17″**		**30-40**
TP-85	*x*	**COLONEL**	**8″**		**6″**	**0-15**
TP-86	*x*	**DIXFIELD**	**18″**	**56″**	**24″**	**0-15**
TP-87	*x*	**UDORTHENTS**				**0-15**
TP-88	*x*	**UDORTHENTS**				**0-15**
TP-89	*x*	**DIXFIELD**	**18″**		**18″**	**0-15**
TP-90	*x*	**BRAYTON**	**8″**			**0-15**
TP-91	*x*	**DIXFIELD**	**20″**		**22″**	**0-15**
TP-92	*x*	**LYMAN**		**12″**		**0-15**
TP-93	*x*	**BRAYTON**	**10″**		**10″**	**0-15**
TP-94	*x*	**TUNBRIDGE**		**20″**	**17″**	**15-30**
TP-95	*x*	**BRAYTON**	**14″**		**16″**	**0-15**
TP-96	*x*	**BRAYTON**	**8″**		**30″**	**0-15**
TP-97	*x*	**TUNBRIDGE**		**18″**	**10″**	**15-30**
TP-98	*x*	**PEACHAM**	**0″**		**6″**	**0-15**
TP-99	*x*	**TUNBRIDGE**	**12″**	**20″**	**12″**	**15-30**
TP-100	*x*	**MARLOW**	**22″**		**22″**	**0-15**
TP-101	*x*	**MARLOW**			**14″**	**0-15**
TP-102	*x*	**SEARSPORT**	**0″**	**15″**		**0-15**
TP-103	*x*	**TUNBRIDGE**		**20″**		**0-15**
TP-104	*x*	**DIXFIELD**		**26″**	**16″**	**0-15**
TP-105	*x*	**BRAYTON**	**16″**		**8″**	**0-15**
TP-106	*x*	**BRAYTON**	**8″**		**28″**	**0-15**

TP-107	*x*	**BRAYTON**	**12″**			**15-30**
TP-108	*x*	**BRAYTON**	**16″**		**16″**	**15-30**
TP-109	*x*	**BRAYTON**	**8″**		**8″**	**15-30**
TP-110	*x*	**SADDLEBACK**		**<20″**		**30-40+**



Dale A. Brewer, C.S.S. #304 **November 4, 2009**

CLASS "L" SOIL LEGEND TABLE
KIBBY EXPANSION WIND PROJECT

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
AbA	ABRAM	SL[1]	0-15%	ED[2]	D
AbB	ABRAM	SL[1]	15-30%	ED[2]	D
AbC	ABRAM	SL[1]	30-40%	ED[2]	D
AbD	ABRAM	SL[1]	>40%	ED[2]	D
CoA	COLONEL	FSL	0-15%	SWPD	C
BeA	BEMIS	L[8]	0-15%	PD[5]	C
BeB	BEMIS	L[8]	15-30%	PD[5]	C
BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
BrC	BRAYTON	FSL[3]	30-40%	SWPD[4]/PD[5]	C
CoA	COLONEL	FSL	0-15%	SWPD	C
CoB	COLONEL	FSL	15-30%	SWPD	C
DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
DxB	DIXFIELD	FSL	15-30%	MWD[7]	C
DxC	DIXFIELD	FSL	30-40%	MWD[7]	C
EnB	ENCHANTED	FSL	0-15%	WD[9]	C/D
EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
MaC	MAHOOSUC	PEAT	30-40%	SWED[10]	A
PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
RiB	RICKER	PEAT	15-30%	SWED[10]	A
RiC	RICKER	PEAT	30-40%	SWED[10]	A
RiD	RICKER	PEAT	>40%	SWED[10]	A
SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaC	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaD	SADDLEBACK	FSL	>40%	WD[9]	C/D
SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C

TuD	TUNBRIDGE	FSL	>40%	WD	C
UdA	UDORTHENTS	VARIABLE	0-5%	VARIABLE	D
UdB	UDORTHENTS	VARIABLE	5-10%	VARIABLE	D

SL[1] is Sandy Loam.
ED[2] is Excessively Drained.
FSL[3] is Fine Sandy Loam.
SWPD[4] is Somewhat Poorly Drained.
PD[5] is Poorly Drained.
VPD[6] is Very poorly Drained.
MWD[7] is Moderately Well Drained.
L[8] is Loam.
WD[9] is Well Drained.
SWED[10] is Somewhat Excessively Drained.
SIL[11] is Silt Loam.

ABRAM
(*Frigid Lithic Udorthents*)

SETTING

Parent Material:	Thin mantle of glacial till
Landform:	Bedrock controlled ridges
Position in Landscape:	Mountaintops, ridge tops, side slopes, shoulders, miscellaneous areas
Slope Gradient Ranges:	0 to 80 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Excessively drained soils
Typical Profile Description:

Surface Layer: Thin organic mat
Subsurface Layer: Pinkish gray sandy loam, 1 inch thick
Subsoil Layer: Very dusky red and brown sandy loam, 3 inches thick
Substratum: Bedrock is at 4 inches

Hydrologic Group:	Group D
Surface Run Off:	Rapid
Permeability:	Moderately rapid
Depth to Bedrock:	Very Shallow, 4 inches
Hazard to Flooding:	None

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Saddleback
Contrasting:	Surplus, Histosols.

USE AND MANAGEMENT

Abram soils for Wind Power construction would likely need to "cut and fill" these areas to prepare the site for use. A limiting factor for building site development is the typical depth to bedrock (<*20 inches*) and slopes. However, shallow soils lend themselves to Wind Power projects with less soil impacts to access the underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients for site work and road alignments.

BEMIS

(*Aeric Cryaquepts*)

TYPICAL SETTING

Parent Material:	Dense glacial till
Landform:	Smooth, concave high elevation valleys
Position in Landscape:	Lower to intermediate positions
Slope Gradient Ranges:	0 to 15 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Poorly drained
Typical Profile Description:	
Surface Layer:	Highly decomposed organic materials, 0 to 5 inches
Subsoil Layer:	Mottled dark grayish brown gravelly fine sandy loam, 5 to 13 inches
Substratum:	Mottled olive and olive brown gravelly loam to 65 inches
Hydrologic Group:	Group C
Surface Run Off:	Slow
Permeability:	Moderately slow to moderately rapid in the organic and slow in the substratum.
Depth to Bedrock:	Very deep, greater than 60 inches
Hazard to Flooding:	May flood occasionally on lowest fringes during spring and periods of excessive precipitation.

INCLUSIONS

(*Within Mapping Unit*)

Potential inclusion intermixed with the Surplus and/or Mahoosuc soils.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. The limiting factor for building site development is wetness due to the presence of shallow water table throughout most of the year. The poorly drained Bemis soils frequently occur in wetland environments (*mapped*). Bemis soils were identified during this soil investigation, however they are expected in the concave sloping areas with the potential for seasonal wetness. Bemis soils may be deeper and underlying the Mahoosuc and/or the Surplus soils.

BRAYTON

(*Frigid Aeric Haplaquepts*)

TYPICAL SETTING

Parent Material:	Dense glacial till.
Landform:	Level or sloping lake plains.
Position in Landscape:	Lower to intermediate positions.
Slope Gradient Ranges:	0 to 25%

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat poorly and poorly drained soils.
Typical Profile:	Surface layer: Black organic matter, 0-4″ Subsurface layer: Gray fine sandy loam, 4-15″ Subsoil layer: Light olive brown sandy loam, 15 to 28″ Substratum: Olive sandy loam to 28-65″.
Hydrologic Group:	Group C
Surface Run Off:	Slow
Permeability:	Moderate or moderately slow in upper profile and very slow in dense substratum.
Depth to Bedrock:	Very deep, greater than 60″.
Hazard to Flooding:	May flood occasionally.

INCLUSIONS

(*Within Mapping Un*it)

Similar:	Colonel.
Contrasting:	Dixfield**,** Lyman, Tunbridge.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. A limiting factor for building site development is wetness due to the presence of a seasonal water table within 1.5 feet (*1.5'*) of the soil surface for a significant portion of the year. Brayton soils are "hydric" and usually found in wetland habitats and may be subject to environmental regulations and environmental permits could be required to impact these areas.

BURNHAM

(*Typic Haplaquepts*)

TYPICAL SETTING

Parent Material:	Glacial till
Landform:	Level flat areas
Position in Landscape:	Lower to intermediate positions
Slope Gradient Ranges:	0 to 3 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Very poorly drained soils

Typical Profile Description:

Surface Layer: Very dark brown muck, 0 to 6 inches
Subsurface Layer: Mottled gray loam 12 inches thick
Subsoil layer: Mottled gray gravelly loam, 12 to 20 inches
Substratum: Very firm olive gravelly loam to 20 to 60 inches

Hydrologic Group:	Group D
Surface Run Off:	Slow
Permeability:	Moderate or moderately slow in upper profile and very slow in dense substratum
Depth to Bedrock:	Very deep, greater than 60 inches
Hazard to Flooding:	Possible

INCLUSIONS

(*Within Mapping Unit*)

Similar: None

Contrasting: Brayton, Lyman, Monarda, Tunbridge

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. A limiting factor for building site development is wetness due to inundated or ponded areas on the surface for much of the year. Burnham soils are hydric and usually found in wetland environments and therefore may be subject to regulations. Wetland delineations are recommended prior to impacting these areas, as environmental permits could be required.

COLONEL
(*Frigid Aquic Haplorthods*)

TYPICAL SETTING

Parent Material:	Compact glacial till.
Landform:	Lower toe slopes, gently sloping crests of broad till ridges.
Position in Landscape:	Lower to intermediate positions.
Slope Gradient Ranges:	0 to 35%

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat poorly drained soils.
Typical Profile:	Surface layer: Very dark grayish brown fine sandy loam, 0-6″ Subsoil layer: Dark brown and mottled dark yellowish brown fine sandy loam in the upper part and mottled olive brown gravelly fine sandy loam in the lower part, 11″ thick. Substratum: Mottled olive gravelly fine sandy loam to 65″.
Hydrologic Group:	Group C
Surface Run Off:	Medium
Permeability:	Moderate in the solum and moderately slow or slow in substratum.
Depth to Bedrock:	Deep, greater than 60″.
Hazard to Flooding:	None

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Brayton.
Contrasting:	Dixfield, Lyman, Tunbridge.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. A limiting factor for building site development is wetness due to the presence of a water table within 1.5 feet (1.5′) of the soil surface for a significant portion of the year. Colonel soils generally require ditching to control hydrology once road cuts are made. Colonel soils were identified in the lower elevations in somewhat poorly drained landscapes.

DIXFIELD

(*Frigid Typic Haplorthods*)

TYPICAL SETTING

Parent Material:	Compact loamy glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Ridge tops and side slopes.
Slope Gradient Ranges:	0 to 50 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Moderately well drained.
Typical Profile Description:	Surface layer: Dark brown fine sandy loam, 0-6″ Subsoil layer: The subsoil 15″ thick is strong brown and dark yellowish brown fine sandy in the upper part and mottled light olive brown gravelly fine sandy loam in the lower part. Substratum: The substratum to 65″ is very firm and mottled light olive brown gravelly fine sandy loam.
Hydrologic Group:	Group C
Surface Run Off:	Medium
Permeability:	Moderate in the solum and moderately slow or slow in substratum.
Depth to Bedrock:	Deep, greater than 60″.
Hazard to Flooding:	None.

INCLUSIONS

(*Within Mapping Unit*)

Similar:	Marlow, Colonel.
Contrasting:	Lyman, Tunbridge.

USE AND MANAGEMENT

Wind Power construction is generally good with the Dixfield soils, however some areas may need control measures to handle the subsurface water movements. Seasonal high water tables and stoniness are principle limitations for Dixfield soils. Dixfield is a moderately well drained soil with dense basal till with variable depths to water moving across the dense firm restrictive subsoils.

ENCHANTED

(Mixed, Thixotropic over Loamy-Skeletal Humic Cryorthods)

TYPICAL SETTING

Parent Material:	Glacial till
Landform:	Mountains
Position in Landscape:	Mountainside slopes above 2,300 feet
Slope Gradient Ranges:	5 to 80 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Well drained soils

Typical Profile Description:

Surface Layer: Organic layer, 6 inches thick

Subsurface Layer: Pinkish gray very stony very fine sandy loam, 3 inches thick

Subsoil layer: Dark reddish brown and yellowish red channery fine sandy loam over mostly olive brown very gravelly sandy loam, 33 inches thick

Substratum: Dark grayish brown extremely cobbly loamy sand to 46 inches. Bedrock is at 46 inches.

Hydrologic Group:	Group B
Surface Run Off:	Dependent upon slope gradient
Permeability:	Moderate or moderately rapid in the solum and rapid or very rapid in the substratum
Depth to Bedrock:	$\pm$46 inches
Hazard to Flooding:	None

INCLUSIONS

(*Within Mapping Unit*)

Similar:	Surplus
Contrasting:	Saddleback

USE AND MANAGEMENT

Wind Power construction would likely need to "cut and fill" these areas to prepare the site for use. A limiting factor for building site development is the typical depth to bedrock (<*46 inches*) and slopes. Shallow soils lend themselves to Wind Power projects with less soil impacts to access the underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients, site work and road alignments.

LYMAN

(*Frigid Loamy Mixed Lithic Haplorthods*)

TYPICAL SETTING

Parent Material:	Glacial till.
Landform:	Rocky hills and high plateaus.
Position in Landscape:	Side-slopes, shoulders, crests of ridges, eroded areas and nearly all landscapes.
Slope Gradient Ranges:	3 to 80%.

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively drained (*SWED*).
Typical Profile Description:	Surface layer: Black loam, 0-2" Subsurface layer: Reddish gray fine sandy loam, 2 to 4" Subsoil layer: Very dusky red 4 to 6", from 6" to 10" is dark red loam, and from 10" to 17" is dark brown loam. Substratum: Bedrock is at 17".
Hydrologic Group:	Group C/D.
Surface Run Off:	Slow to rapid, depending upon slope and bedrock exposure.
Permeability:	Moderately rapid.
Depth to Bedrock:	Shallow 8 to 20".
Hazard to Flooding:	None.

INCLUSIONS

(*Within Mapping Unit*)

Similar:	Abram, Tunbridge.
Contrasting:	Brayton, Dixfield.

USE AND MANAGEMENT

Wind Power construction would likely need to "cut and fill" these areas to prepare the site for use. A limiting factor for building site development is the typical depth to bedrock (<*20 inches*) and slopes. Shallow soils lend themselves to Wind Power projects with less soil impacts to access underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients, site work and road alignments.

MAHOOSUC

(***Typic Borofolists, Dysic)***

TYPICAL SETTING

Parent Material: Organic deposits over dense compact glacial till
Landform: Mountain side slopes and valleys at the base of these areas
Position in Landscape: Variable
Slope Gradient Ranges: 8 to 80 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Somewhat excessively drained
Typical Profile Description:
Surface layer: Dusky red and black undecomposed and partially decomposed organic materials, 0 to 8 inches
Substratum: Gravel, cobbles, stones and boulders with little organic materials to 65 inches

Hydrologic Group: Group A
Surface Run Off: Slow
Permeability: Very rapid
Depth to Bedrock: Very deep, greater than 60 inches
Hazard to Flooding: None

INCLUSIONS

(Within Mapping Unit)

Similar: Rock outcrop
Contrasting: Saddleback

USE AND MANAGEMENT

Wind Power construction would likely need to blast these areas to prepare the site for use. Mahoosuc has limiting factors for building site development including steep slopes, large boulders, stones and seepage. Mahoosuc soils typically have an organic mat over loose boulders and stones. Wetter soils and/or "running" water may be underlying the boulders and stones.

MONARDA

(*Frigid Aeric Haplaquepts*)

TYPICAL SETTING

Parent Material:	Dense glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Nearly level to strongly sloping.
Slope Gradient Ranges:	0 to 15%.

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Poorly drained soils.
Typical Profile Description:	Surface layer: 4" organic mat Subsurface layer: Light brownish gray extremely gravelly silt loam 5" thick Subsoil layer: Mottled gray, gray and olive gravelly silt loam and very gravelly loam to 24" Substratum: The substratum to 65" is very dense mottled olive gravelly loam.
Hydrologic Group:	Group D
Surface Run Off:	Medium
Permeability:	Moderate to moderately rapid in the subsurface, moderate to moderately slow in the lower part of the subsoil and substratum.
Depth to Bedrock:	Deep, greater than 60".
Hazard to Flooding:	None

INCLUSIONS

(*Within Mapping Unit*)

Similar:	Brayton, Colonel
Contrasting:	Dixfield, Lyman, Tunbridge.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. A perched fluctuating water table is at or near the surface for 7 to 9 months of the year. Monarda soils have many limitations for site development. Monarda soils are "hydric" and typically found in wetland environments.

PEACHAM

(***Histic Humaquepts***)

SETTING

Parent Material:	Organic depositions underlain by compact loamy glacial till.
Landform:	Depressions and drainage ways on glaciated uplands.
Position in Landscape:	Lowest positions and depressions on landform.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class: Very poorly drained, with a perched water table within 0.5 feet of the soil surface from November through May.

Typical Profile Description:	Surface layer:	Black organic material, 0-7"
	Subsurface layer:	Olive gray loam, 7-10"
	Substratum:	Dark greenish gray loam, 10-65"

Hydrologic Group:	Group D
Surface Run Off:	Moderately rapid to rapid.
Permeability:	Moderate or moderately slow in upper layers, and slow or very slow in the dense substratum.
Depth to Bedrock:	Deep, greater than 40".
Hazard to Flooding:	None, although may be ponded during spring months time and periods of excessive precipitation.

INCLUSIONS

(*Within Mapping Unit*)

Similar: Brayton
Contrasting: Dixfield, Tunbridge.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. The limiting factor for building site development is wetness due to the presence of a shallow water table within 0.5 feet of the soil surface for a significant portion of the year. Peacham soils have severe limitations for construction due to wetness and thick organic cap. Peacham soil is usually classified as wetlands, based on the combined consideration of hydrology, hydric conditions, and vegetation.

RICKER

(***Lithic Borofolists, Dysic***)

TYPICAL SETTING

Parent Material: Organic deposits over bedrock
Landform: Mountains and hills
Position in Landscape: Variable
Slope Gradient Ranges: 3 to 80 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Well to excessively drained
Typical Profile Description:
Surface layer: Peat and Mucky peat organic materials, 0 to 4 inches
Subsoil: 3″ muck layer over a dark bluish gray channery silt loam 3″ to 5″
Bedrock is at 5″
Hydrologic Group: Group A
Surface Run Off: Dependent upon slope
Permeability: Very rapid
Depth to Bedrock: Very shallow, less than 10 inches
Hazard to Flooding: None

INCLUSIONS

(*Within Mapping Unit)*

Similar: Rock outcrop
Contrasting: Saddleback

USE AND MANAGEMENT

Ricker soils have limiting factors for building site development including steep slopes in places with a thin layer of organic materials over very shallow depths to bedrock. However, these shallow soils lend themselves to Wind Power projects with less soil disturbances/impacts when accessing the underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients and road alignments.

SADDLEBACK

(*Cryic Thixotropic Humic Lithic Cryorthods*)

TYPICAL SETTING

Parent Material: Thin veneer of glacial till
Landform: Glaciated uplands
Position in Landscape: Mountain ridges above 2,300 feet
Slope Gradient Ranges: 3 to 80 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Well drained soils
Typical Profile Description:

- Surface Layer: Organic mat, 0 to 5 inches
- Subsurface Layer: Dark grayish brown fine sandy loam, 1 inch
- Subsoil Layer: Very dusky red, dark reddish brown and reddish brown fine sandy loam
- Substratum: Bedrock is at 20 inches

Hydrologic Group: Group C/D
Surface Run Off: Dependent upon slope gradient
Permeability: Moderate
Depth to Bedrock: 20 inches
Hazard to Flooding: None

INCLUSIONS

(*Within Mapping Unit*)

Similar: Enchanted
Contrasting: Surplus, Rock outcrops

USE AND MANAGEMENT

Saddleback soils have limiting factors for building site development including steep slopes and shallow depths to bedrock. However these shallow soils are less limiting for Wind Power projects with less soil overburden to work with. Therefore, soil disturbances/impacts are less when accessing the shallow soils and underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients along the road alignments for a desired "cut and fill" balance.

SEARSPORT

(***Histic Humaquepts***)

SETTING

Parent Material:	Organic depositions underlain by compact loamy glacial till.
Landform:	Terraces and outwash plains.
Position in Landscape:	Lowest positions and depressions on landform.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class: Very poorly drained, with a perched water table within 0.5 feet of the soil surface from November through May.

Typical Profile Description:	Surface layer:	Dark gray mucky peat, 0-10"
	Subsurface layer:	Dark gray loamy fine sand, 10-15"
	Substratum:	Mottled dark gray loamy sand and gray sand, 15-65"

Hydrologic Group:	Group D
Surface Run Off:	Moderately rapid to rapid.
Permeability:	Moderate or moderately slow in upper layers, and slow or very slow in the dense substratum.
Depth to Bedrock:	Deep, greater than 40".
Hazard to Flooding:	None, although may be ponded during spring months time and periods of excessive precipitation.

INCLUSIONS

(*Within Mapping Unit*)

Similar: Brayton
Contrasting: Dixfield, Tunbridge.

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions. The limiting factor for building site development is wetness due to the presence of a shallow water table within 0.5 feet of the soil surface for a significant portion of the year. Searsport soils have severe limitations for construction due to wetness and thick organic cap. Searsport soil is usually classified as wetlands, based on the combined consideration of hydrology, hydric conditions, and vegetation.

SISK

(*Mixed Humic Cryorthods*)

TYPICAL SETTING

Parent Material: Dense glacial till
Landform: Glaciated uplands and mountain ridges
Position in Landscape: Mountain side slopes above 2,300 feet
Slope Gradient Ranges: 12 to 60 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Well drained soils
Typical Profile Description:

Surface Layer:	Organic mat, 0 to 2 inches
Subsurface Layer:	Weak red silt loam, 1 inch thick
Subsoil Layer:	Dusky red, reddish brown silt loam in the upper part and yellowish brown and light olive brown gravelly loam in the lower part, 19 inches thick
Substratum:	Firm, brown gravelly fine sandy loam to 65 inches

Hydrologic Group: Group C
Surface Run Off: Variable dependent upon slope gradient
Permeability: Moderate in the solum and moderately slow or very slow in the substratum
Depth to Bedrock: Very deep, greater than 60 inches
Hazard to Flooding: None

INCLUSIONS

(*Within Mapping Unit*)

Similar: Surplus, Chesuncook
Contrasting: Enchanted Saddleback

USE AND MANAGEMENT

Wind Power construction is generally good with the Sisk soils, however some areas may need control measures to handle the subsurface water movements. Seasonal high water tables and stoniness are principle limitations for Sisk soils. Sisk is a well drained soil with dense basal till with variable depths to water moving across the dense firm restrictive subsoils. Sisk soils have limiting factors for building site development including severe slopes, stoniness, frost action and slow percolation rates.

SURPLUS

(*Mixed Typic Cryorthods, Thixotropic*)

TYPICAL SETTING

Parent Material: Dense glacial till
Landform: Glaciated uplands
Position in Landscape: Mountainside slopes above 2,300 feet
Slope Gradient Ranges: 3 to 45 percent

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class: Moderately well and somewhat poorly drained soils
Typical Profile

Surface Layer: Organic mat, 0 to 7 inches
Subsurface Layer: Brown sandy loam, 7 to 11 inches
Subsoil Layer: Dark reddish brown fine sandy loam in the upper part and mottled yellowish red to brown gravelly fine sandy and sandy loam, 11 to 33 inches
Substratum: Firm, mottled light olive brown sandy loam, 33 to 60"

Hydrologic Group: Group C
Surface Run Off: Dependent upon slope gradient
Permeability: Moderate in the solum and moderately slow to very slow in the substratum
Depth to Bedrock: Greater than 60 inches
Hazard to Flooding: None

INCLUSIONS

(*Within Mapping Unit*)

Similar: Bemis
Contrasting: Enchanted, Saddleback, Rock Outcrop, Wonsqueak, Waskish

USE AND MANAGEMENT

Wind Power construction would likely need to mat these areas or complete the work during winter conditions**.** The Surplus Series limiting factor for building site development is the depth to seasonal perched water table (<24 inches), frost action and strong slopes. The hand dug Test Pits E and F represent surplus soils. The poorly drained Bemis may be underlying or intermixed within the Mahoosuc and/or the Surplus soils. Bemis soils were not identified however seasonally wetter soils are expected in the concave slopes.

TUNBRIDGE

(*Frigid Typic Haplorthods*)

TYPICAL SETTING

Parent Material:	Loamy glacial till.
Landform:	Glaciated uplands.
Position in Landscape:	Uppermost locations on landform, side slopes, shoulders, and crests of ridges.
Slope Gradient Ranges:	8-15%.

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Well drained soils.
Typical Profile Description:	Surface layer: Dark brown fine sandy loam, 0-2″ Subsurface layer: Grayish brown fine sandy loam, 1″ thick. Subsoil layer: Dark reddish brown in the upper part and yellowish brown silt loam in the lower part 11″ thick. Substratum: Dark grayish brown gravelly fine sandy loam, 14″thick.
Hydrologic Group:	Group C.
Surface Run Off:	Slow to rapid, depending upon slope gradient.
Permeability:	Moderate to moderately rapid.
Depth to Bedrock:	Moderately deep, 20 to 40″ to bedrock surface.
Hazard to Flooding:	None.

INCLUSIONS

(*Within Mapping Unit***)**

Similar:	Lyman.
Contrasting:	Abram, Dixfield.

USE AND MANAGEMENT

Tunbridge soils have limiting factors for building site development including steep slopes and shallow depths to bedrock (<*40″*). However these shallow soils are less limiting for Wind Power projects with less soil overburden to work with. Therefore, soil disturbances/impacts are less when accessing the shallow soils and underlying bedrock for use. Blasting or ripping of the underlying bedrock may be necessary to accommodate for slope gradients along the road alignments for a desired "cut and fill" balance.

ROCK OUTCROP
(*No Taxonomy*)

TYPICAL SETTING

Parent Material:	Weathered/Unweathered volcanic, metamorphic, sedimentary or conglomerate materials.
Landform:	Variable, bedrock controlled ridges.
Position in Landscape:	Miscellaneous areas.
Slope Gradient Ranges:	0-100%.

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Excessively drained.	
Typical Profile Description:	Surface layer:	Occasional thin organic mat.
	Subsurface layer:	None.
	Subsoil layer:	None.
	Substratum:	None.
Hydrologic Group:	Group D.	
Surface Run Off:	Very rapid.	
Permeability:	Moderately rapid.	
Depth to Bedrock:	Very Shallow, < 4".	
Hazard to Flooding:	None.	

INCLUSIONS
(*Within Mapping Unit*)

Similar:	Lyman.
Contrasting:	Tunbridge.

USE AND MANAGEMENT

Rock outcrops are limiting factors for building site development with steep slopes and shallow depth to bedrock (<4"). Blasting or ripping of the bedrock is necessary for deep excavation. Rock outcrops are shown as symbols on the soil map.

UDORTHENTS (UdA), (UdB), (UdD)

(*Variable composition, no taxonomy given*)

TYPICAL SETTING

Parent Material:	Variable, typically glacialfluvial sands and gravel.
Landform:	Variable, used in most landscapes.
Position in Landscape:	Variable.
Slope Gradient Ranges:	Variable.

COMPOSTION AND SOIL CHARACTERISTICS

Drainage Class:	Excessively drained to well drained soils.
Typical Profile:	Surface layer: Variable, usually sands, gravel and cobbles.
Hydrologic Group:	Variable, C/D with permeable underlying soils.
Surface Run Off:	Variable, dependent upon the fill composition and slope.
Permeability:	Variable, dependent upon the fill composition and slope.
Depth to Bedrock:	Variable.
Hazard to Flooding:	None.

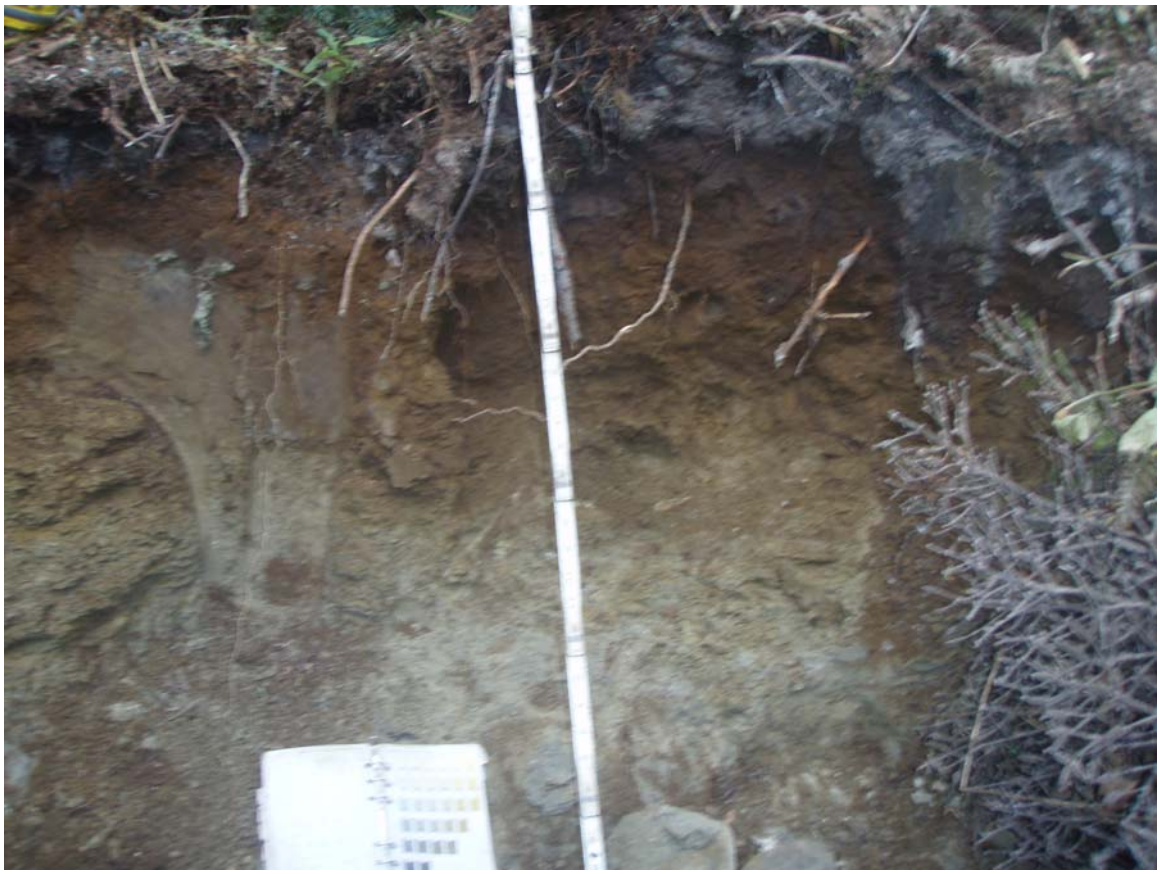
INCLUSIONS

(*Within Mapping Unit***)**

Similar:	None.
Contrasting:	Colonel, Lyman, Tunbridge.

USE AND MANAGEMENT

Environmental permits may be required to "fill" land areas. Udorthents are fill materials located within and around the existing Livermore Falls Substation perimeter. The fill materials observed consisted of compacted sands, gravels and crushed stone materials



Photograph One. TEST PIT 77 – Enchanted soils. Photograph taken 096/22/09.

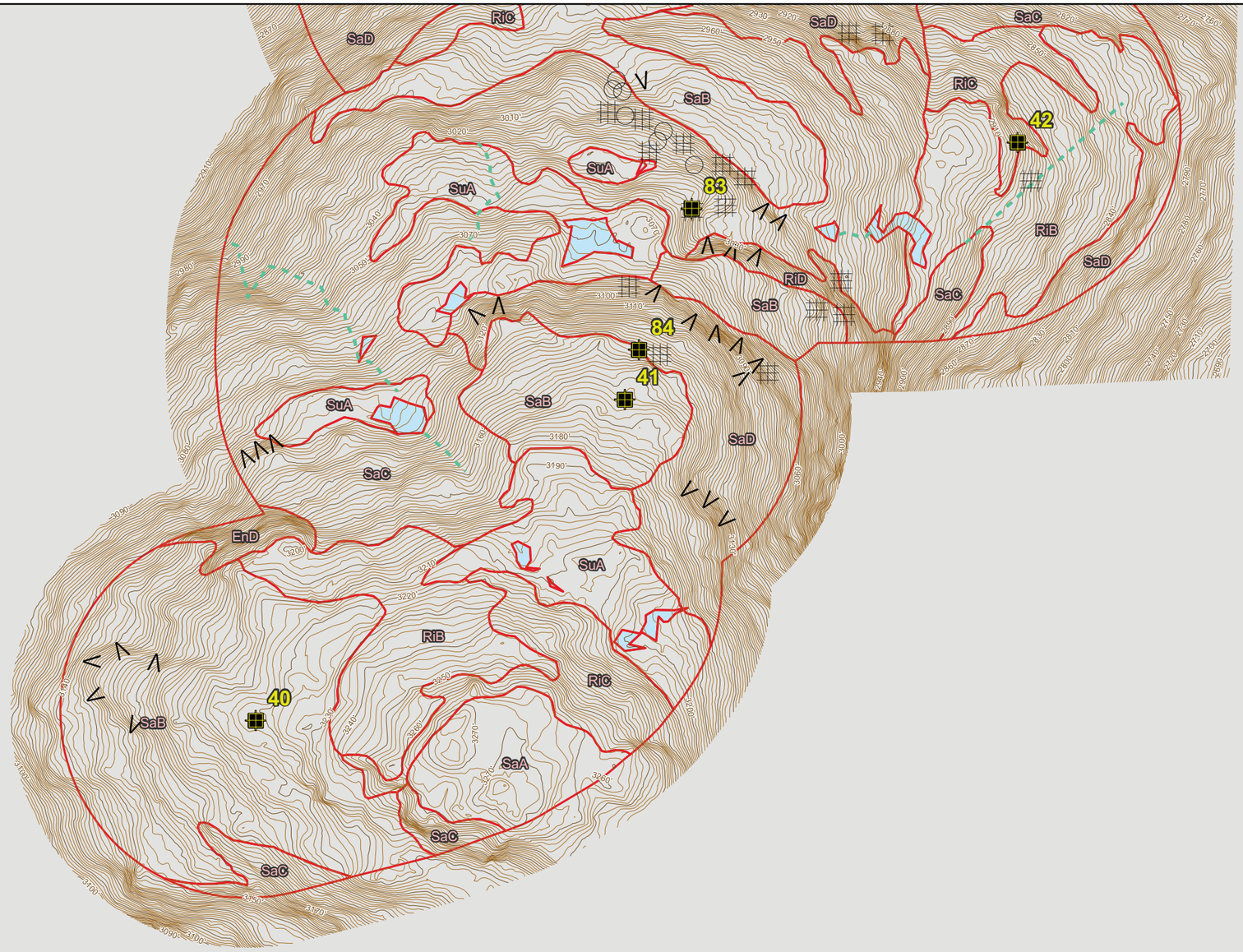
Photograph Two. View of the landscape with the existing Kibby Mountain Wind Project in the background. Taken from the cut-over area at the end of the 5 Mile Road. This area is has Surplus and Bemis soils. Photograph taken 08/11/09.

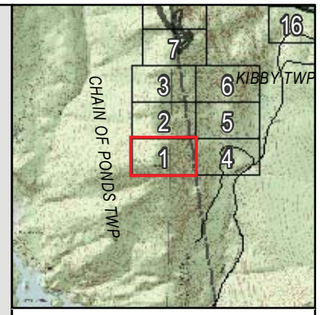
Photograph Three. View of the Sisk Mountain ridgeline looking southerly from near Test Pit 61. Photograph taken 09/02/2009.

Photograph Four. TEST PIT 80 – shallow Saddleback soils. Photograph taken on 09/22/2009.

Photograph Five. A photograph of a common bedrock exposure. Photograph taken 09/17/09.

Photograph Six. A close up of cryic soils with thixotropic conditions. These soils have a thick elluvial layer over spodic horizons with thixotropic properties over dense basal till and bedrock.





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STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

Sources: Maine OGIS, USGS and TRC

CLASS "L" SOIL LEGEND TABLE

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
AbA	ABRAM	SL[1]	0-15%	ED[2]	D
AbB	ABRAM	SL[1]	15-30%	ED[2]	D
AbC	ABRAM	SL[1]	30-40%	ED[2]	D
AbD	ABRAM	SL[1]	>40%	ED[2]	D
CoA	COLONEL	FSL	0-15%	SWPD	C
BeA	BEMIS	L[8]	0-15%	PD[5]	C
BeB	BEMIS	L[8]	15-30%	PD[5]	C
BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
BrC	BRAYTON	FSL[3]	30-40%	SWPD[4]/PD[5]	C
CoA	COLONEL	FSL	0-15%	SWPD	C
CoB	COLONEL	FSL	15-30%	SWPD	C
DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
DxB	DIXFIELD	FSL	15-30%	MWD[7]	C
DxC	DIXFIELD	FSL	30-40%	MWD[7]	C

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
EnB	ENCHANTED	FSL	0-15%	WD[9]	C/D
EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
MaC	MAHOOSUC	PEAT	30-40%	SWED[10]	A
PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
RiB	RICKER	PEAT	15-30%	SWED[10]	A
RiC	RICKER	PEAT	30-40%	SWED[10]	A
RiD	RICKER	PEAT	>40%	SWED[10]	A
SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaC	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaD	SADDLEBACK	FSL	>40%	WD[9]	C/D
SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C
TuD	TUNBRIDGE	FSL	>40%	WD	C
UdA	UDORTHENTS	VARIABLE	0-5%	VARIABLE	D
UdB	UDORTHENTS	VARIABLE	5-10%	VARIABLE	D

Class "L" Soil Survey Notes

1. This Class "L" Soil Survey was completed for a proposed wind turbine expansion along the ridgeline of Sisk Mountain. The soil survey was designed to provide the underlying soils limitations along the proposed access route and turbine locations.
2. The Class "L" Soil Survey is based on the standards for soil survey recently adopted by the Maine Association of Professional Soil Scientists (2009), excepting: the plan scale of 1" = 250'.
3. The map units shown are soil series that closely resemble the typical pedon description and may vary with more intensive surveys. The soil units were based on: previous impacts, landscape position, topography, slope, stoniness, depth to seasonal water table, depth to bedrock, restrictive layers and soil textures as determined by observations.
4. All test pits and borings were observed using hand tools.
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N

250 Feet

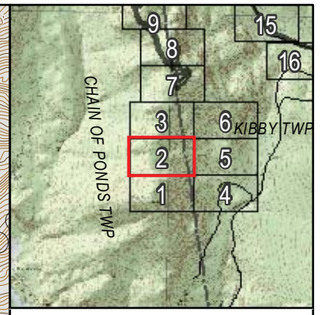
Kibby Expansion Wind Power Project

Soils Map

Page 1

TRC
14 Gabriel Drive
Augusta, ME 04330

Created: 11/25/2009



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STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

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250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 2

TRC
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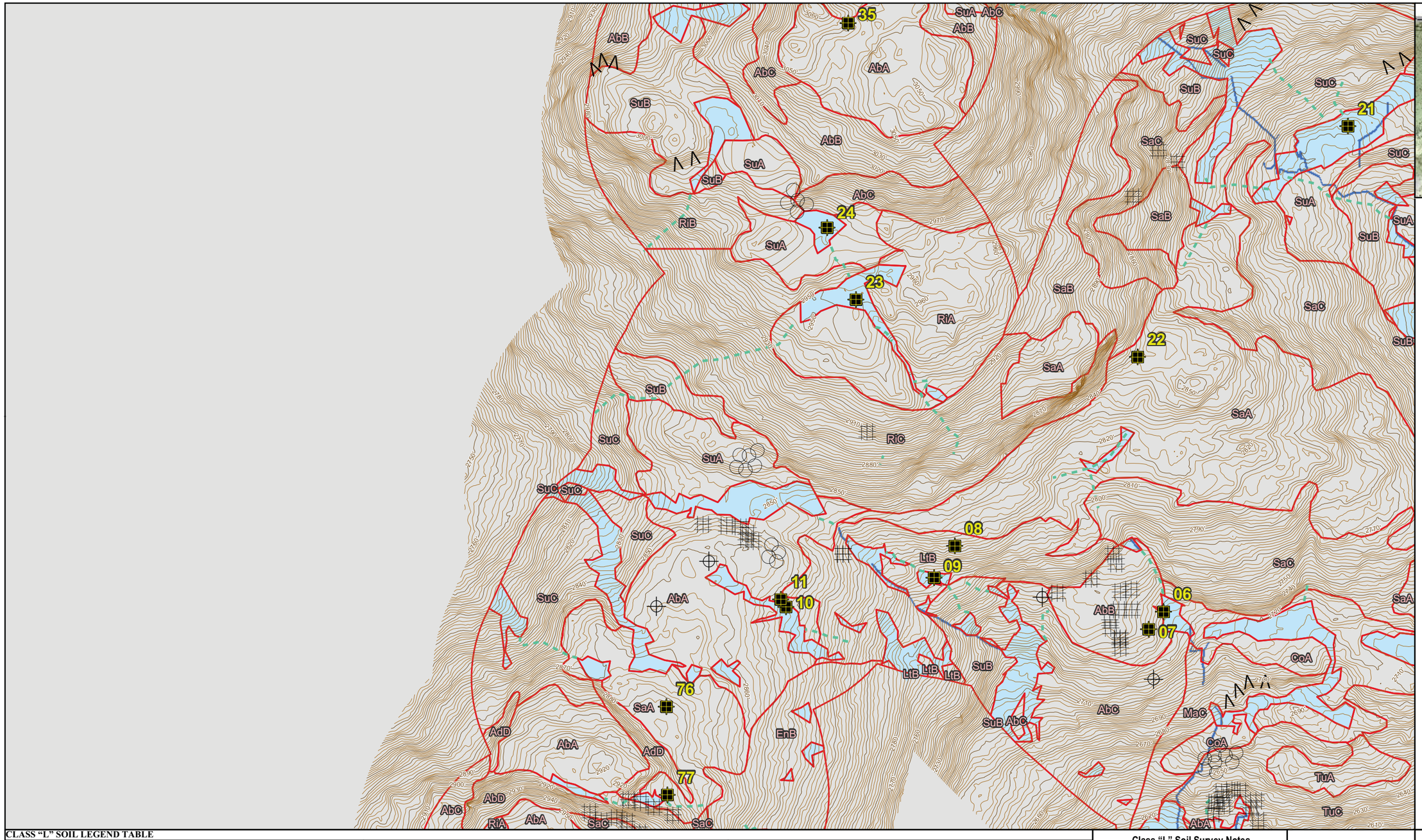
Created: 11/25/2009



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STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

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SiD	SISK	FSL	30-40%	WD[9]	C
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SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C
TuD	TUNBRIDGE	FSL	>40%	WD	C
UdA	UDORTHENTS	VARIABLE	0-5%	VARIABLE	D
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N

250 Feet

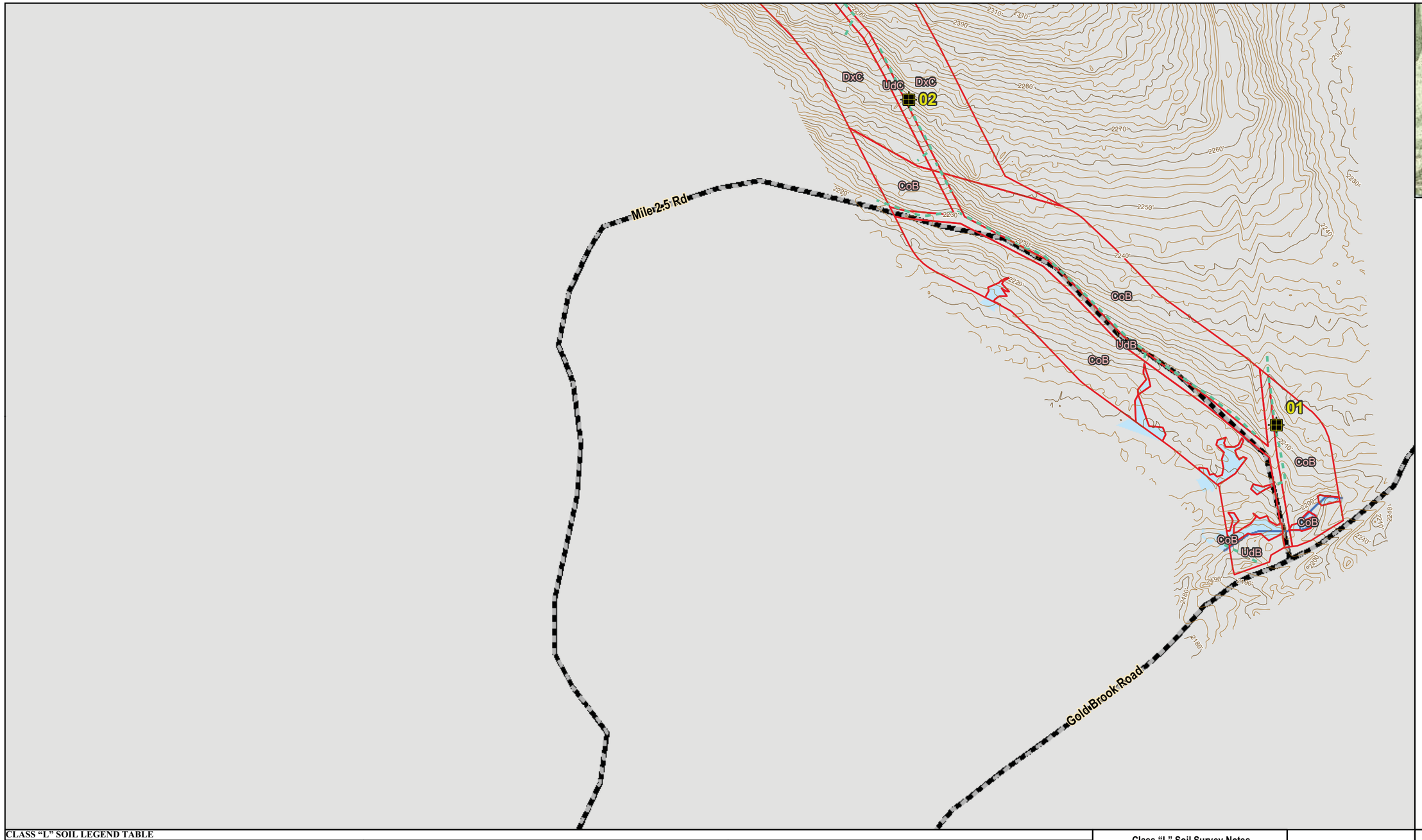
Kibby Expansion Wind Power Project

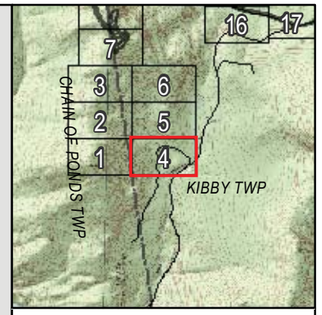
Soils Map

Page 3

TRC
14 Gabriel Drive
Augusta, ME 04330

Created: 11/25/2009





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STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

Sources: Maine OGIS, USGS and TRC

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SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
AbA	ABRAM	SL[1]	0-15%	ED[2]	D
AbB	ABRAM	SL[1]	15-30%	ED[2]	D
AbC	ABRAM	SL[1]	30-40%	ED[2]	D
AbD	ABRAM	SL[1]	>40%	ED[2]	D
CoA	COLONEL	FSL	0-15%	SWPD	C
BeA	BEMIS	L[8]	0-15%	PD[5]	C
BeB	BEMIS	L[8]	15-30%	PD[5]	C
BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
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CoA	COLONEL	FSL	0-15%	SWPD	C
CoB	COLONEL	FSL	15-30%	SWPD	C
DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
DxB	DIXFIELD	FSL	15-30%	MWD[7]	C
DxC	DIXFIELD	FSL	30-40%	MWD[7]	C

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
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EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
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LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
MaC	MAHOOSUC	PEAT	30-40%	SWED[10]	A
PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
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SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

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SiC	SISK	FSL	15-30%	WD[9]	C
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 4

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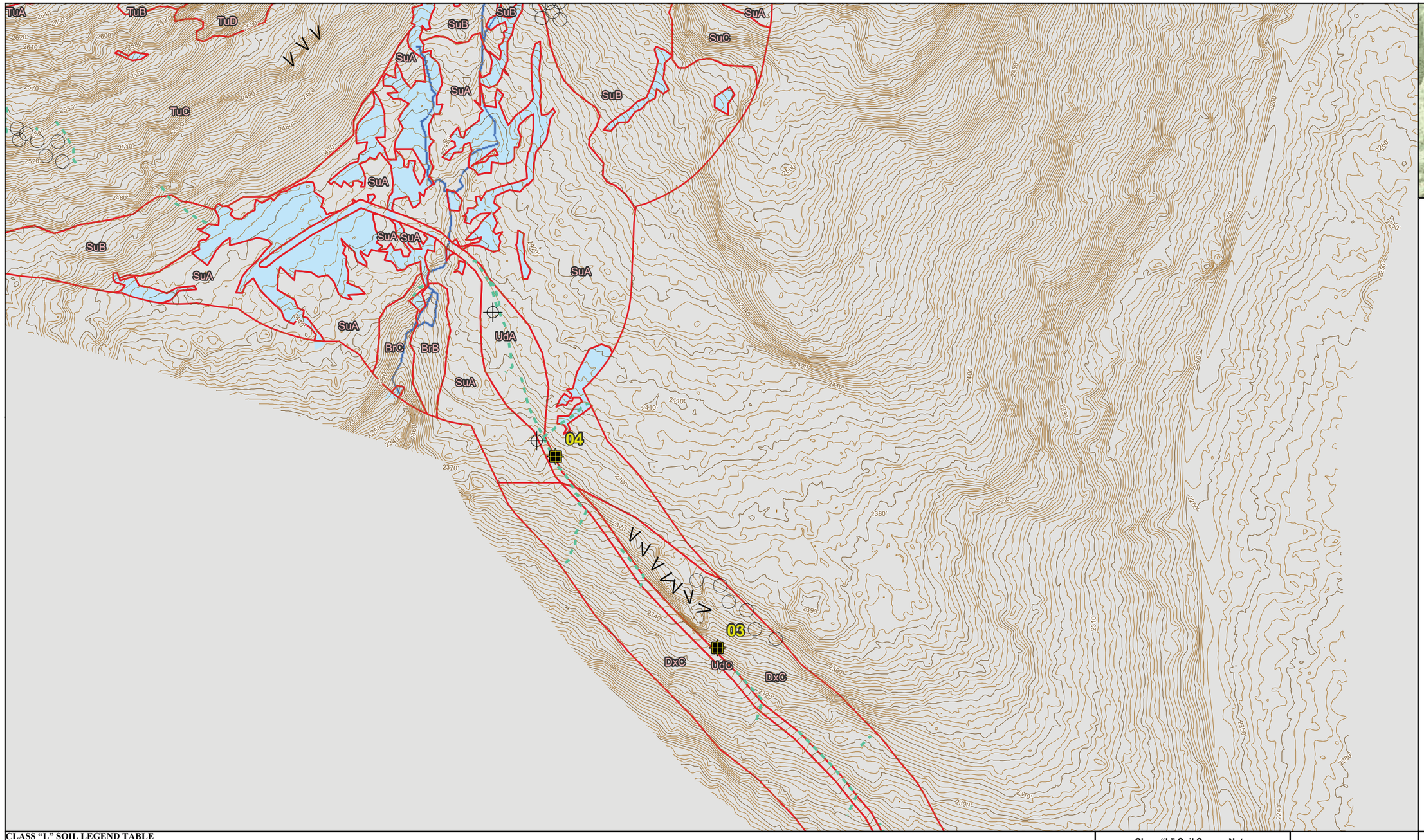

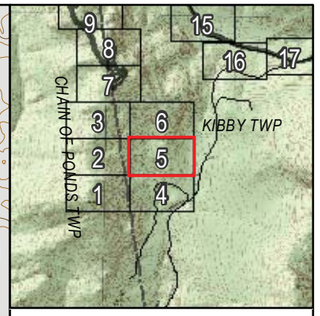

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STATE OF MAINE
DALE A. BREWER
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DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
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PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 5

TRC
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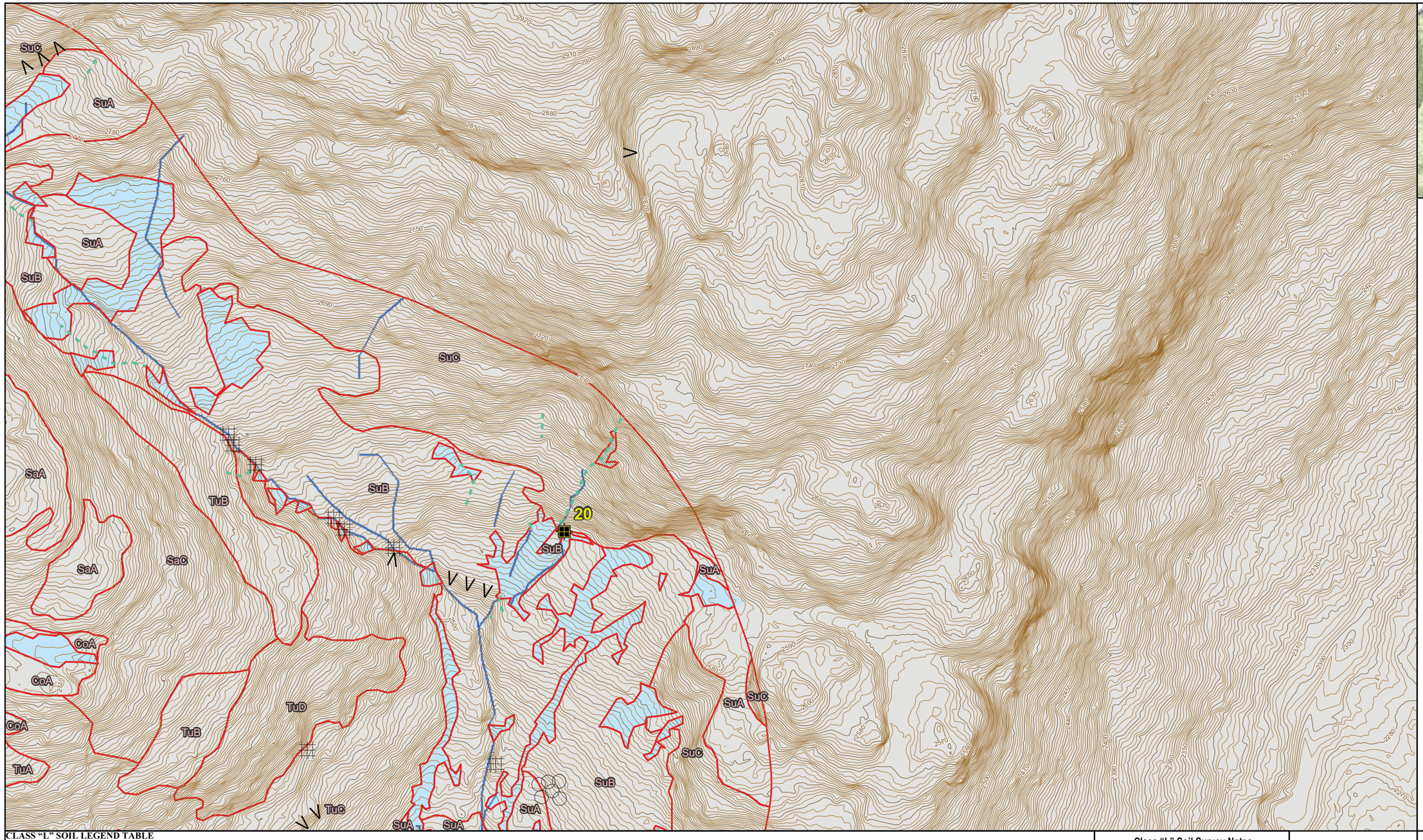
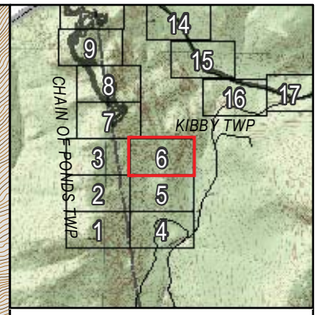
Created: 11/25/2009





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STATE OF MAINE
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 6

TRC
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STATE OF MAINE
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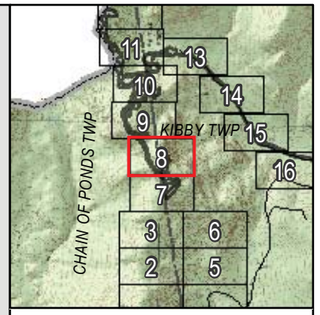

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STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

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BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
BrC	BRAYTON	FSL[3]	30-40%	SWPD[4]/PD[5]	C
CoA	COLONEL	FSL	0-15%	SWPD	C
CoB	COLONEL	FSL	15-30%	SWPD	C
DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
DxB	DIXFIELD	FSL	15-30%	MWD[7]	C
DxC	DIXFIELD	FSL	30-40%	MWD[7]	C

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
EnB	ENCHANTED	FSL	0-15%	WD[9]	C/D
EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
MaC	MAHOOSUC	PEAT	30-40%	SWED[10]	A
PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
RiB	RICKER	PEAT	15-30%	SWED[10]	A
RiC	RICKER	PEAT	30-40%	SWED[10]	A
RiD	RICKER	PEAT	>40%	SWED[10]	A
SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaC	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaD	SADDLEBACK	FSL	>40%	WD[9]	C/D
SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C
TuD	TUNBRIDGE	FSL	>40%	WD	C
UdA	UDORTHENTS	VARIABLE	0-5%	VARIABLE	D
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Class "L" Soil Survey Notes

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4. All test pits and borings were observed using hand tools.
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 8

TRC
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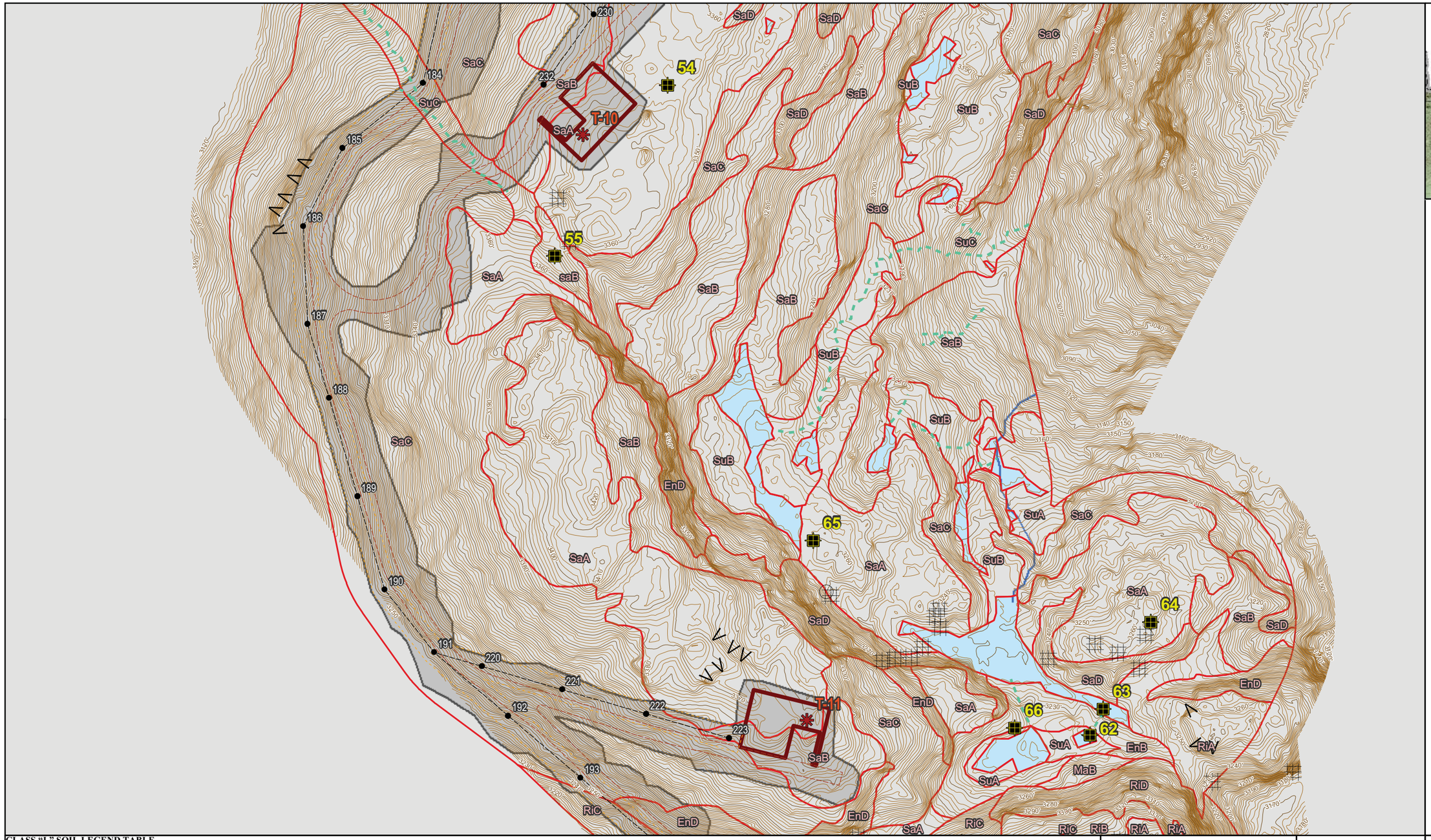
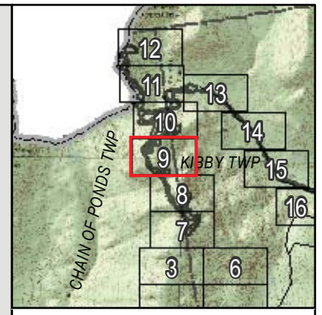
Augusta, ME 04330

Created: 11/25/2009





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STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

Sources: Maine OGIS, USGS and TRC

CLASS "L" SOIL LEGEND TABLE

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
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AbB	ABRAM	SL[1]	15-30%	ED[2]	D
AbC	ABRAM	SL[1]	30-40%	ED[2]	D
AbD	ABRAM	SL[1]	>40%	ED[2]	D
CoA	COLONEL	FSL	0-15%	SWPD	C
BeA	BEMIS	L[8]	0-15%	PD[5]	C
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EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
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PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
RiB	RICKER	PEAT	15-30%	SWED[10]	A
RiC	RICKER	PEAT	30-40%	SWED[10]	A
RiD	RICKER	PEAT	>40%	SWED[10]	A
SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaC	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaD	SADDLEBACK	FSL	>40%	WD[9]	C/D
SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 9

TRC
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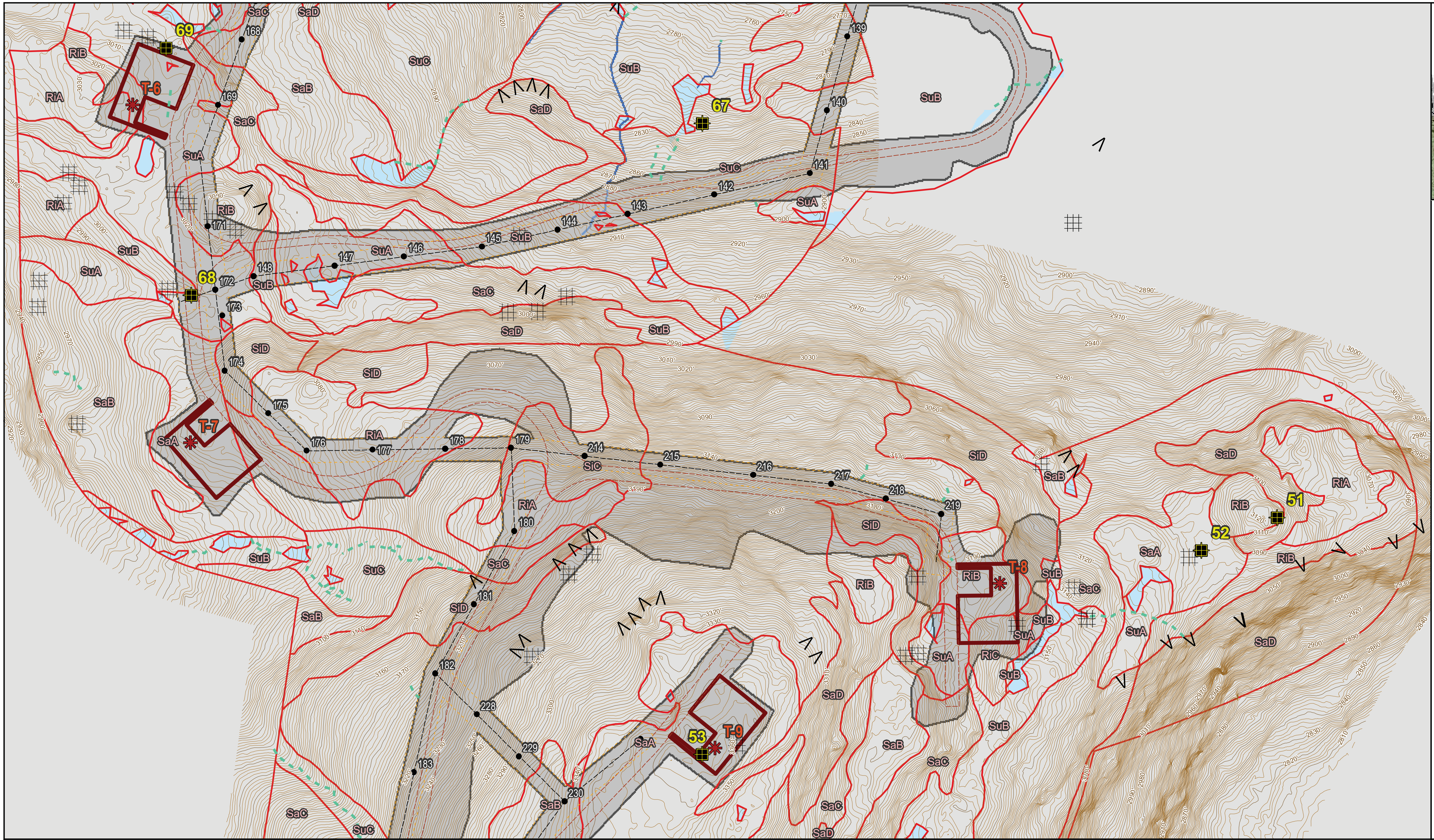
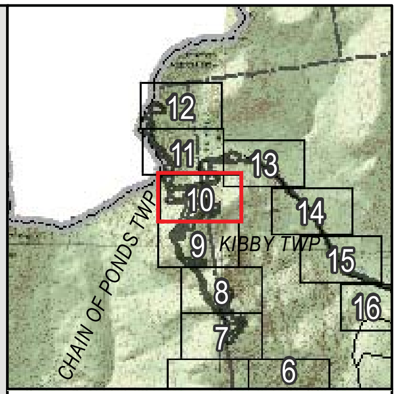
Created: 11/25/2009





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CoA	COLONEL	FSL	0-15%	SWPD	C
BeA	BEMIS	L[8]	0-15%	PD[5]	C
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DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
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DxC	DIXFIELD	FSL	30-40%	MWD[7]	C
EnB	ENCHANTED	FSL	0-15%	WD[9]	C/D
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LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
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SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 10

TRC
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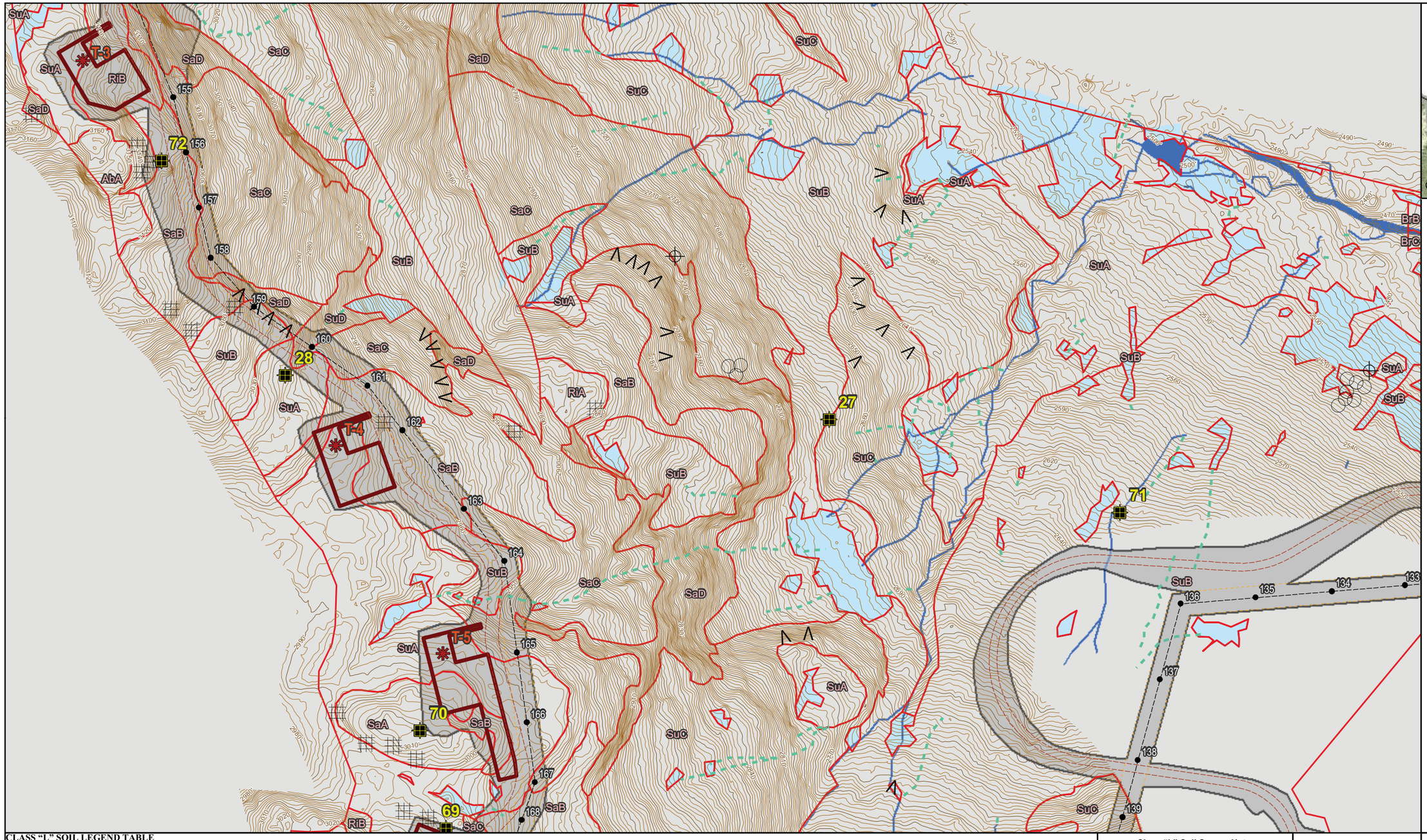
Created: 11/25/2009



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STATE OF MAINE
DALE A. BREWER
No. 304
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Sources: Maine OGIS, USGS and TRC

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Kibby Expansion Wind Power Project

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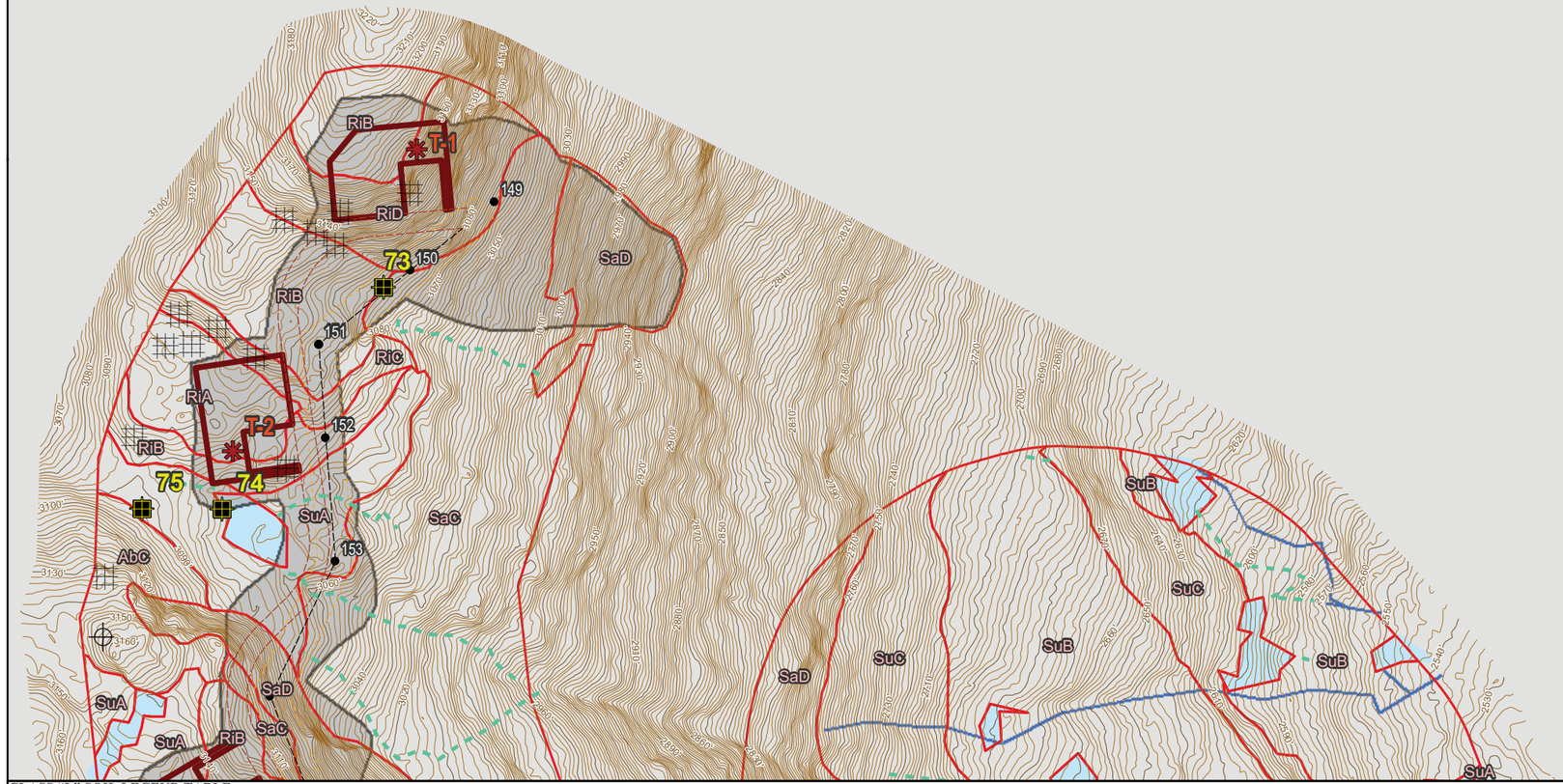

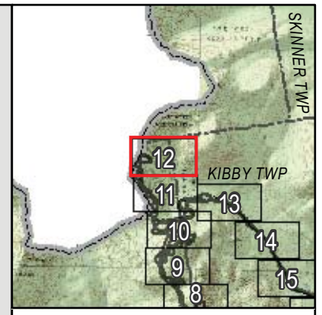

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N

250 Feet

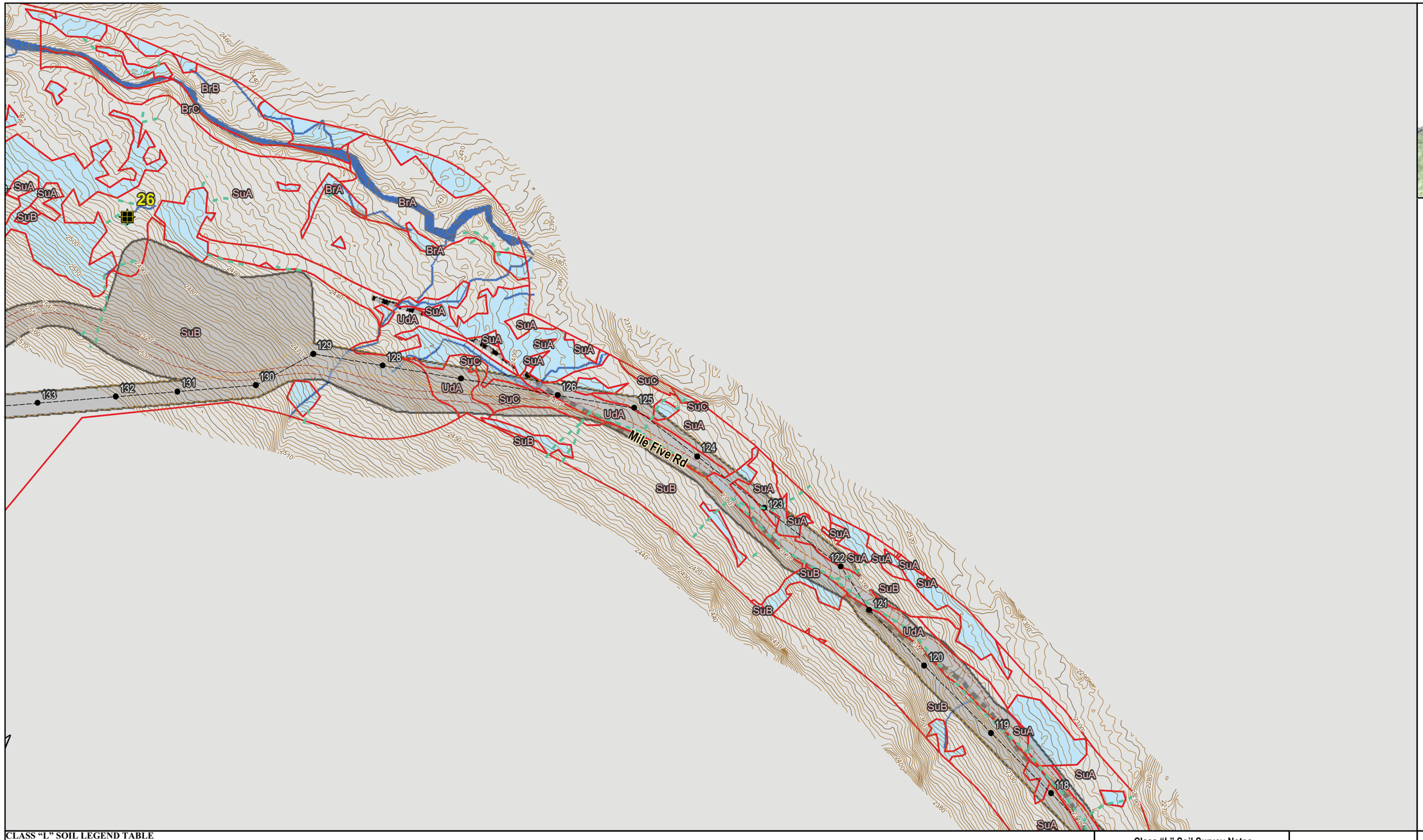
Kibby Expansion Wind Power Project

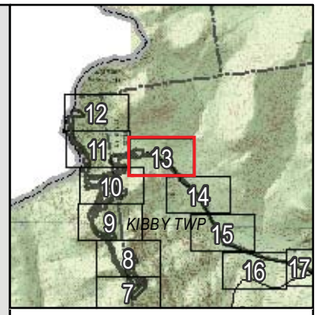
Soils Map

Page 12

TRC
14 Gabriel Drive
Augusta, ME 04330

Created: 11/25/2009





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STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

Sources: Maine OGIS, USGS and TRC

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SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
AbA	ABRAM	SL[1]	0-15%	ED[2]	D
AbB	ABRAM	SL[1]	15-30%	ED[2]	D
AbC	ABRAM	SL[1]	30-40%	ED[2]	D
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BeA	BEMIS	L[8]	0-15%	PD[5]	C
BeB	BEMIS	L[8]	15-30%	PD[5]	C
BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
BrC	BRAYTON	FSL[3]	30-40%	SWPD[4]/PD[5]	C
CoA	COLONEL	FSL	0-15%	SWPD	C
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DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
DxB	DIXFIELD	FSL	15-30%	MWD[7]	C
DxC	DIXFIELD	FSL	30-40%	MWD[7]	C

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
EnB	ENCHANTED	FSL	0-15%	WD[9]	C/D
EnD	ENCHANTED	FSL	>40%	WD[9]	C/D
LtB	LYMAN TUNBRIDGE	FSL/L[8]	15-30%	ED/WD[9]	CD/C
LtC	LYMAN TUNBRIDGE	FSL/L[8]	30-40%	ED/WD[9]	CD/C
LtD	LYMAN TUNBRIDGE	FSL/L	15-30%	ED/WD	CD/C
MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
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PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
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SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

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SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
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250 Feet

Kibby Expansion Wind Power Project

Soils Map

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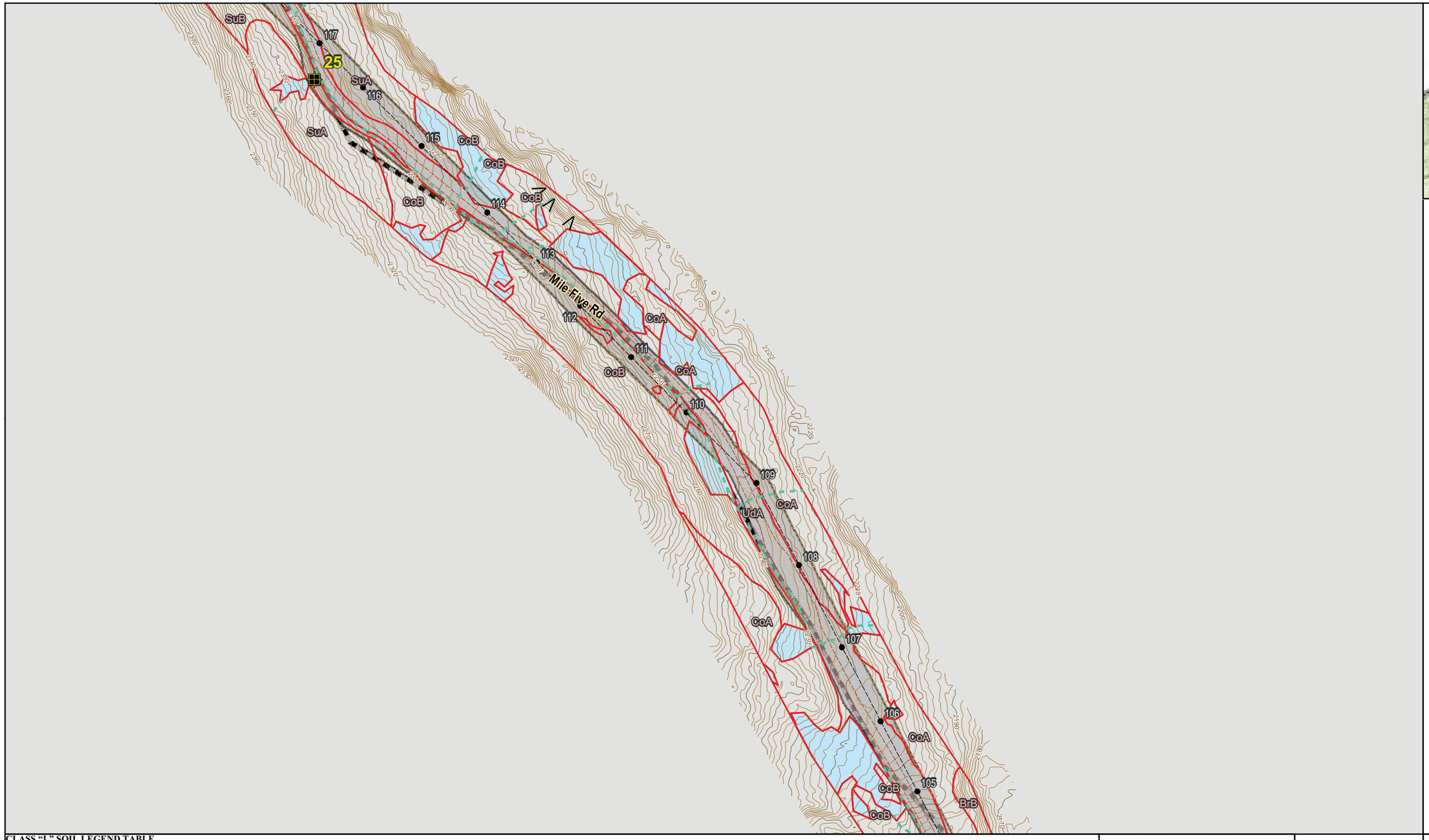

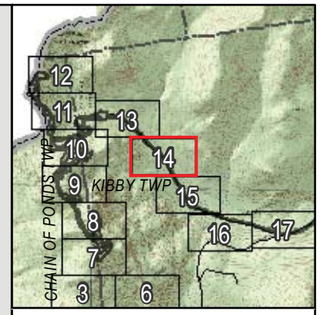

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BeA	BEMIS	L[8]	0-15%	PD[5]	C
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 14

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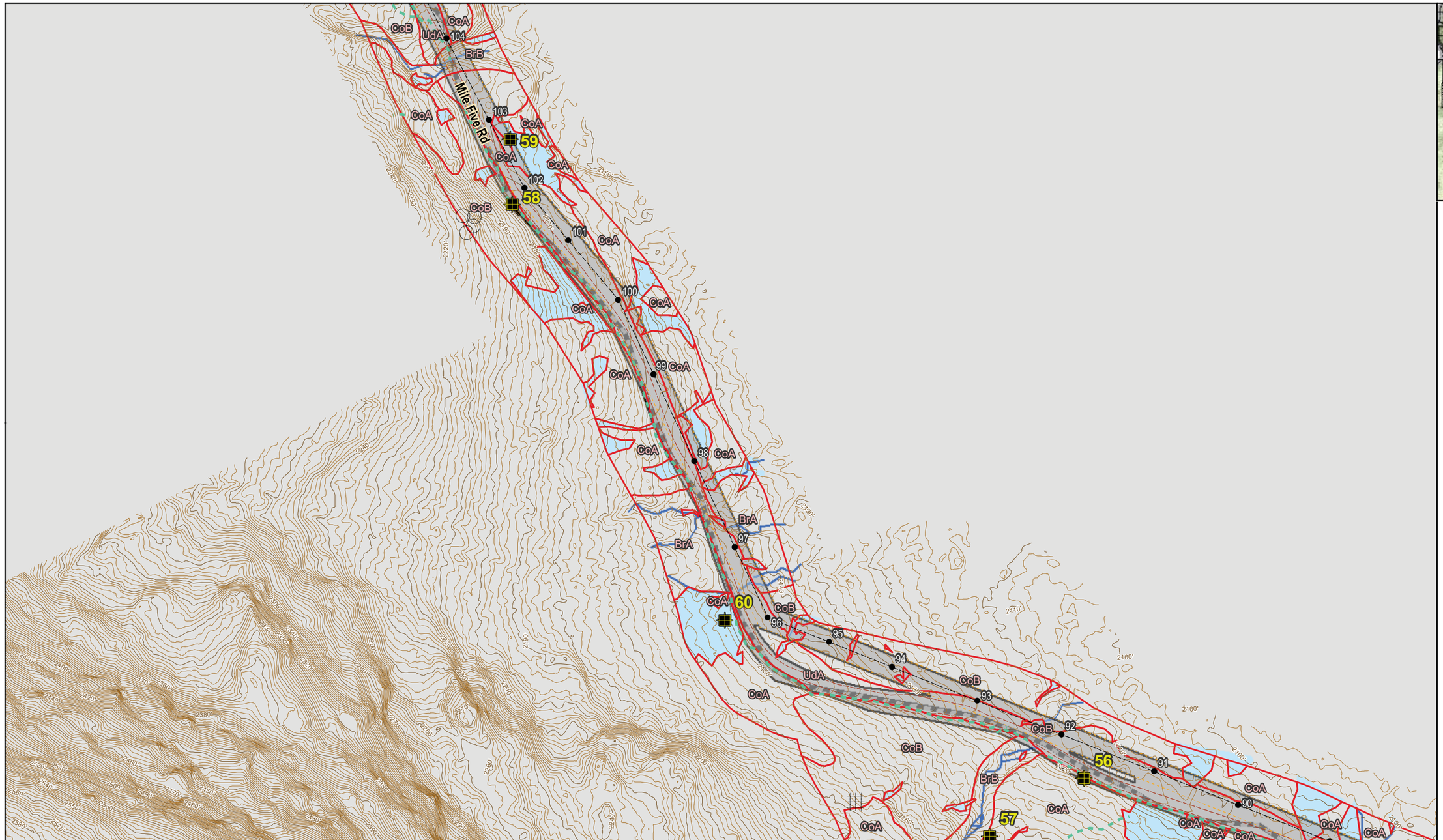

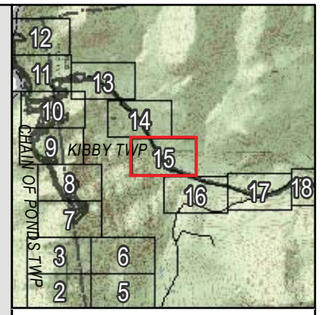

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250 Feet

Kibby Expansion Wind Power Project

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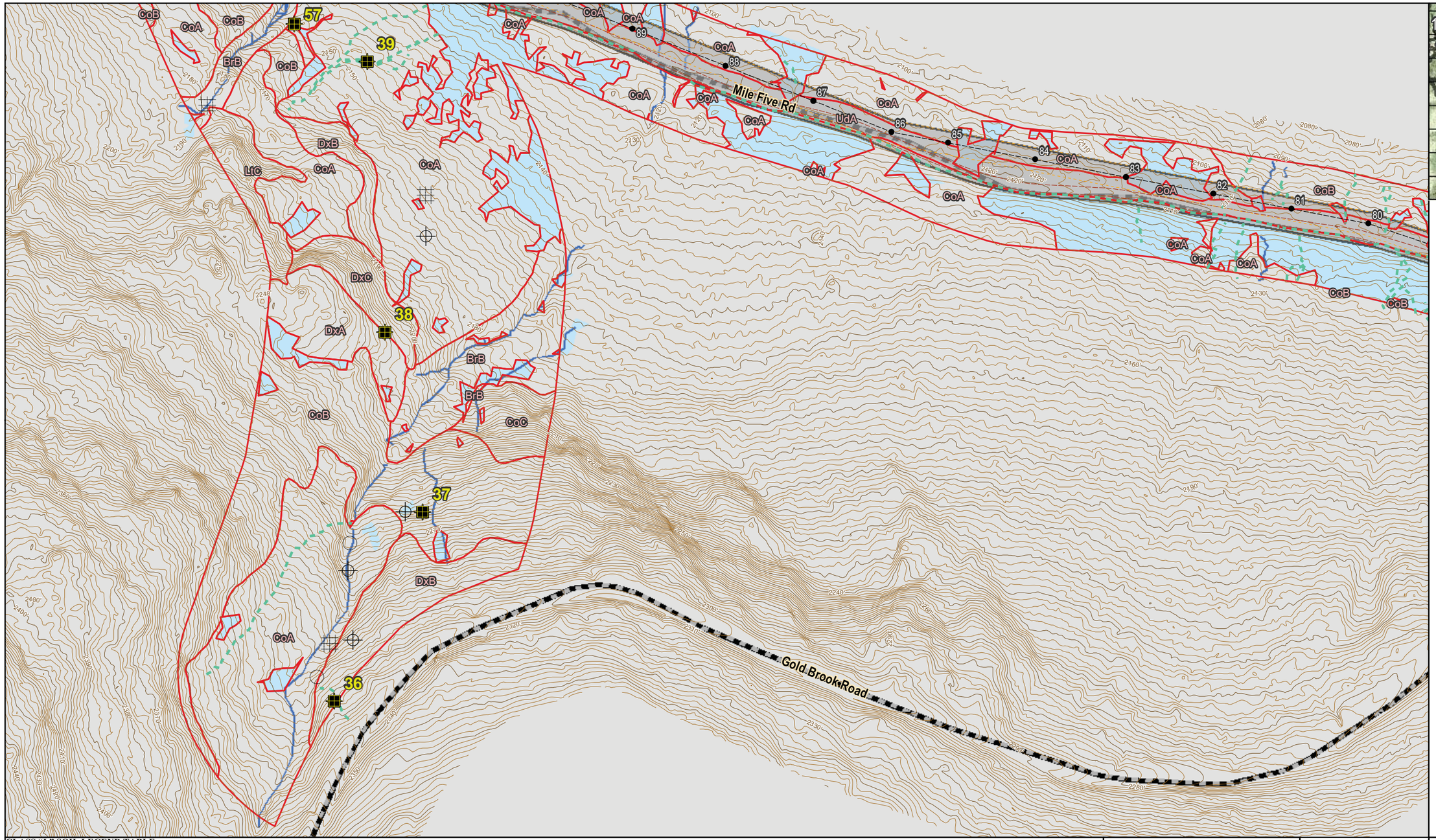

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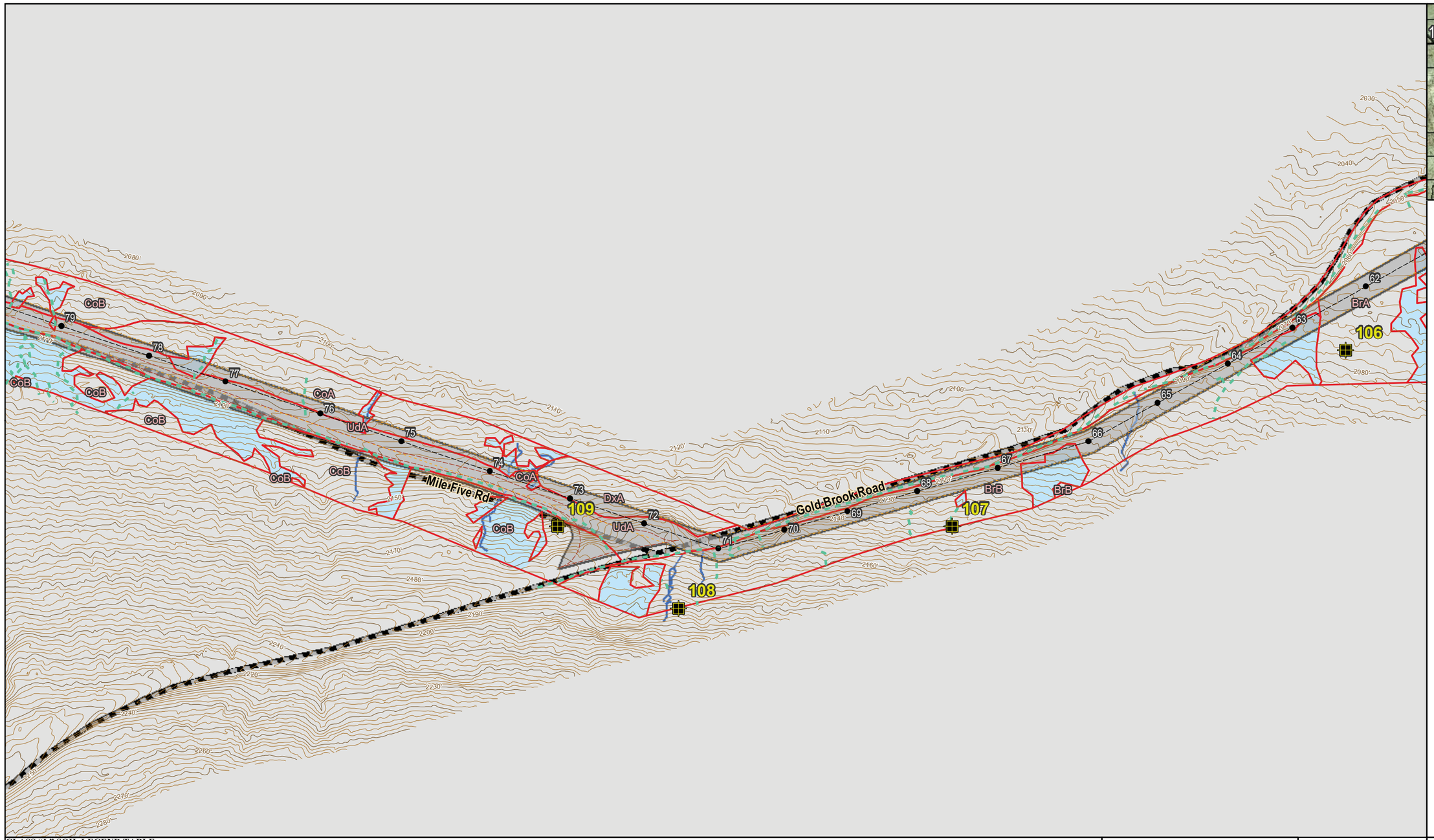

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MaB	MAHOOSUC	PEAT	15-30%	SWED[10]	A
MaC	MAHOOSUC	PEAT	30-40%	SWED[10]	A
PeA	PEACHAM	MUCK	0-15%	VPD[6]	D
PeB	PEACHAM	MUCK	0-15%	VPD[6]	D
RiA	RICKER	PEAT	0-15%	SWED[10]	A
RiB	RICKER	PEAT	15-30%	SWED[10]	A
RiC	RICKER	PEAT	30-40%	SWED[10]	A
RiD	RICKER	PEAT	>40%	SWED[10]	A
SeA	SEARSPORT	MUCK	0-15%	VPD[6]	D

SYMBOL	SERIES	TEXTURE	SLOPE	DRAINAGE	HSG
SaA	SADDLEBACK	FSL	0-15%	WD[9]	C/D
SaB	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaC	SADDLEBACK	FSL	15-30%	WD[9]	C/D
SaD	SADDLEBACK	FSL	>40%	WD[9]	C/D
SiC	SISK	FSL	15-30%	WD[9]	C
SiD	SISK	FSL	30-40%	WD[9]	C
SuA	SURPLUS	SL	0-15%	MWD/SWPD	C
SuB	SURPLUS	SL	15-30%	MWD/SWPD	C
SuC	SURPLUS	SL	30-40%	MWD/SWPD	C
TuA	TUNBRIDGE	FSL	0-15%	WD	C
TuB	TUNBRIDGE	FSL	15-30%	WD	C
TuC	TUNBRIDGE	FSL	30-40%	WD	C
TuD	TUNBRIDGE	FSL	>40%	WD	C
UdA	UDORTHENTS	VARIABLE	0-5%	VARIABLE	D
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 17

TRC
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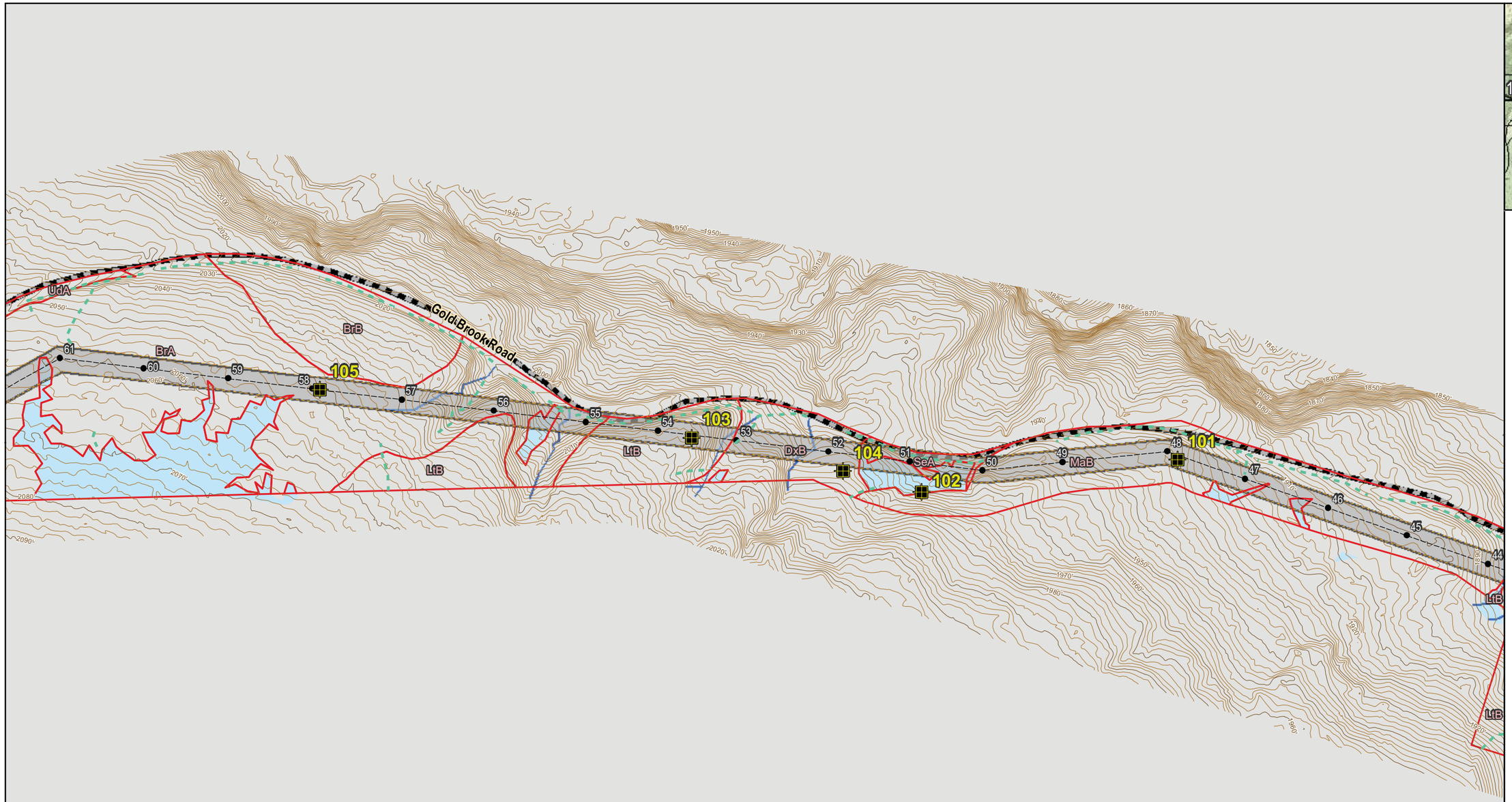
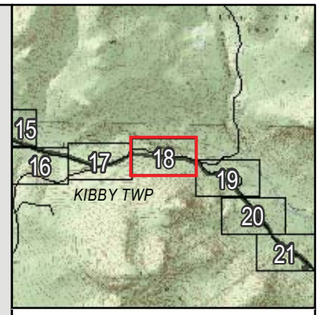
Augusta, ME 04330

Created: 11/25/2009





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STATE OF MAINE
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No. 304
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BeA	BEMIS	L[8]	0-15%	PD[5]	C
BeB	BEMIS	L[8]	15-30%	PD[5]	C
BrB	BRAYTON	FSL[3]	15-30%	SWPD[4]/PD[5]	C
BrC	BRAYTON	FSL[3]	30-40%	SWPD[4]/PD[5]	C
CoA	COLONEL	FSL	0-15%	SWPD	C
CoB	COLONEL	FSL	15-30%	SWPD	C
DxA	DIXFIELD	FSL	0-15%	MWD[7]	C
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SiD	SISK	FSL	30-40%	WD[9]	C
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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 18

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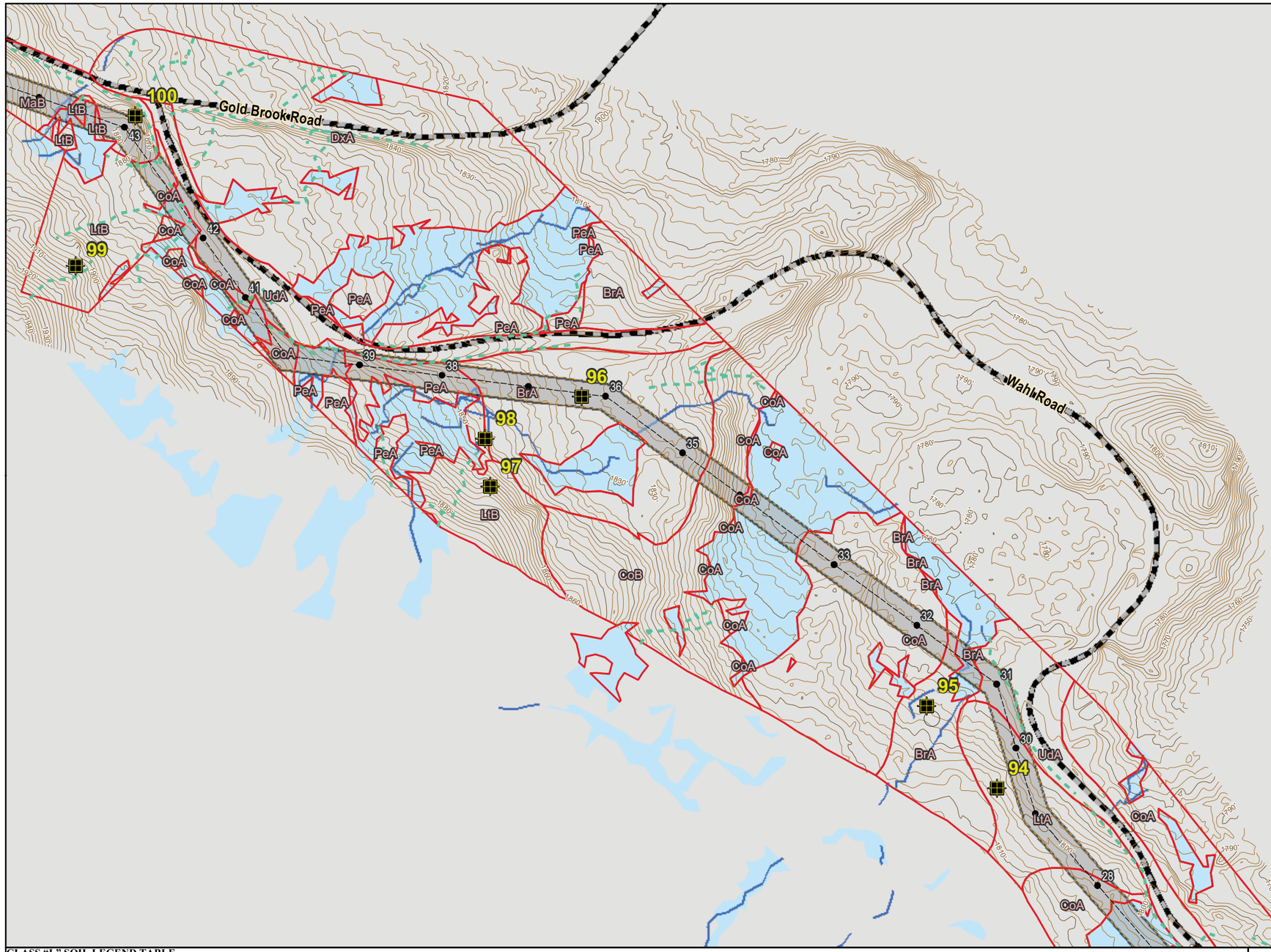

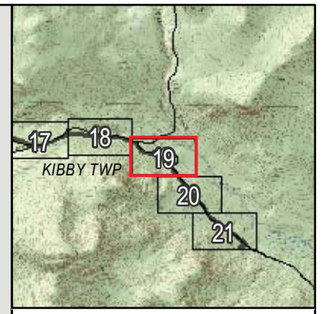

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STATE OF MAINE — DALE A. BREWER No. 304 — CERTIFIED SOIL SCIENTIST

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N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 19

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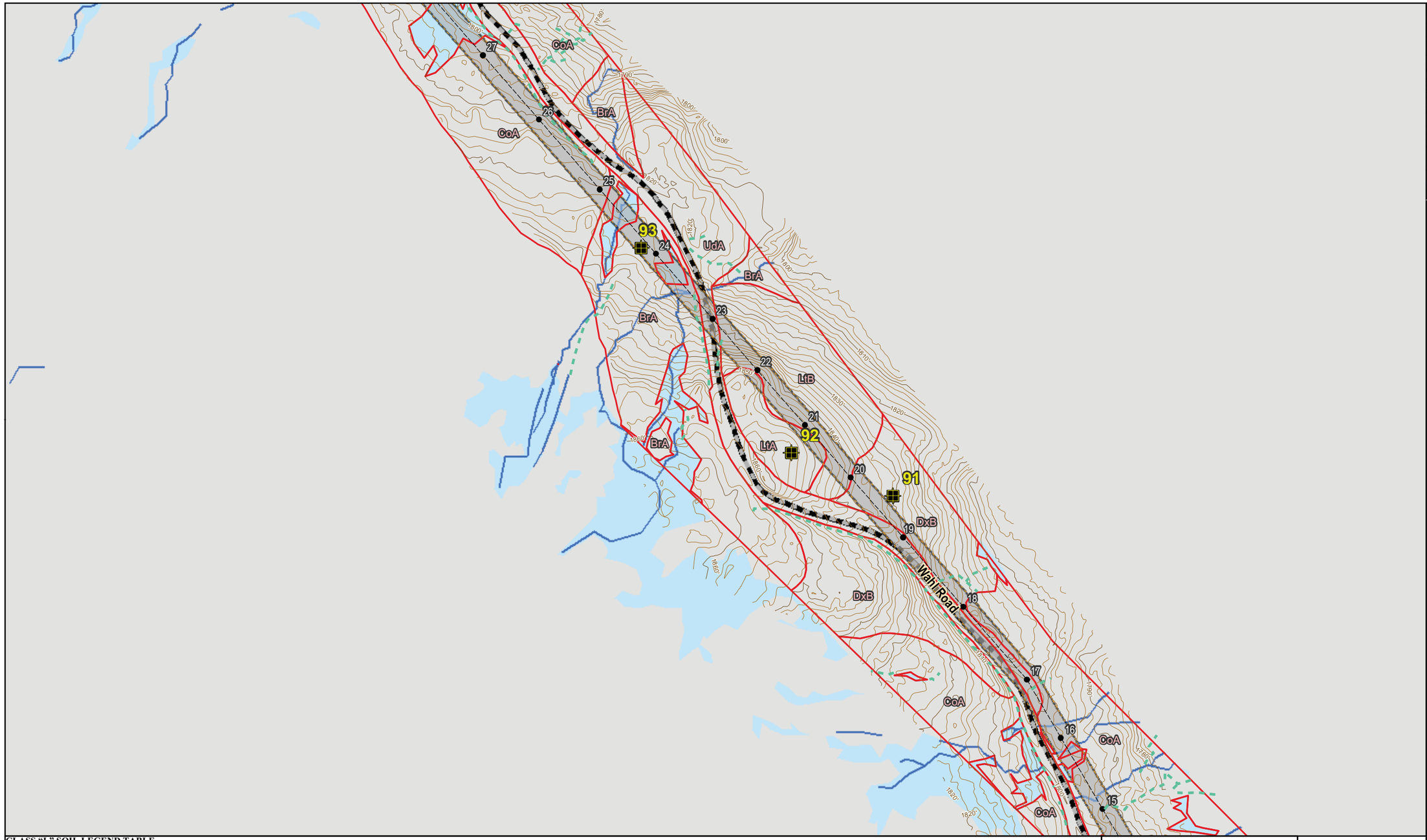
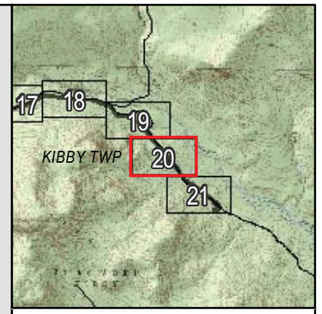
Created: 11/25/2009





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STATE OF MAINE · DALE A. BREWER · No. 304 · CERTIFIED SOIL SCIENTIST

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Kibby Expansion Wind Power Project

Soils Map

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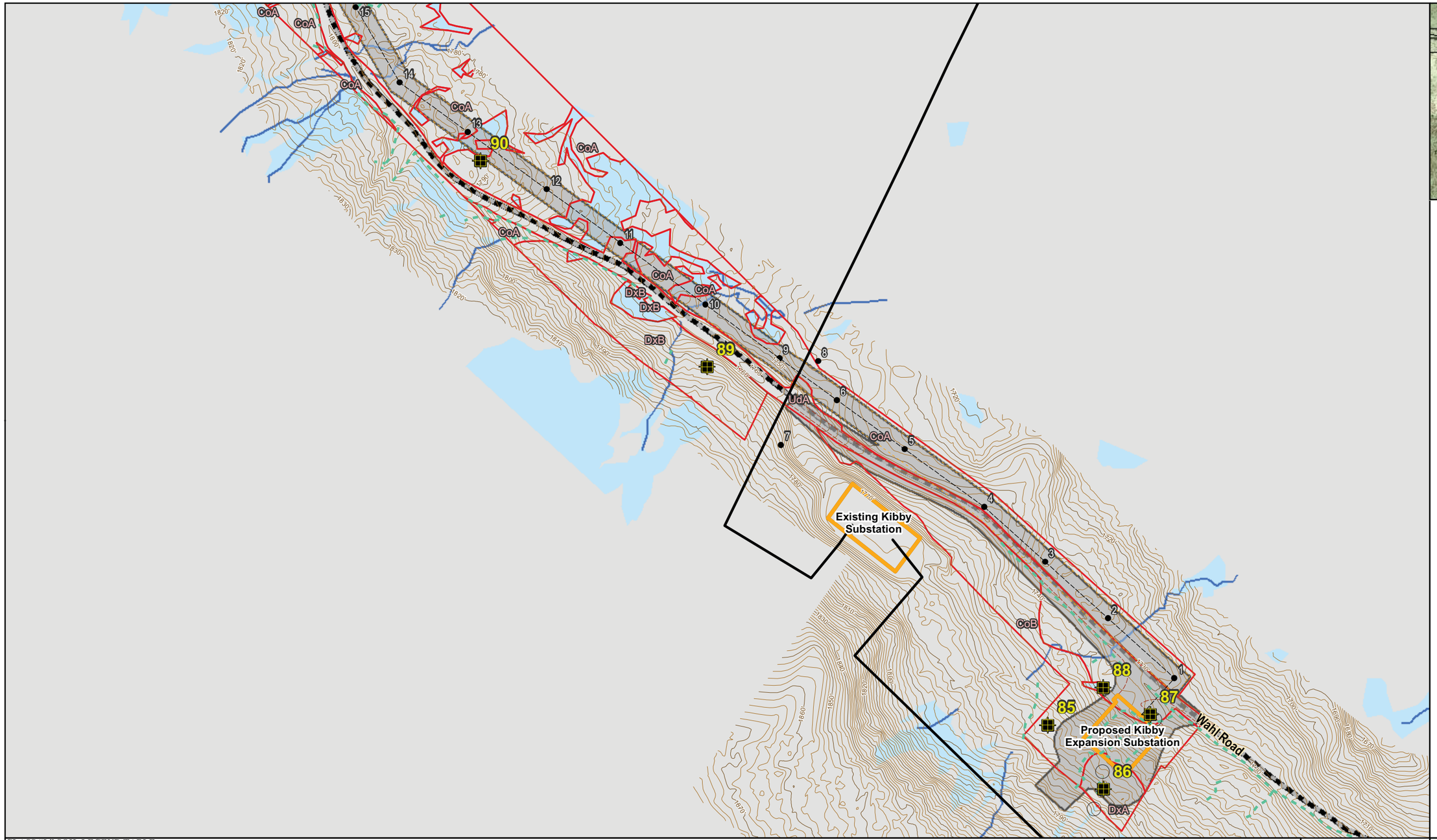

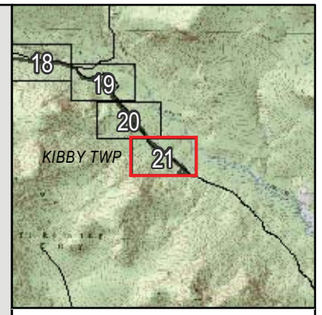

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1. This Class "L" Soil Survey was completed for a proposed wind turbine expansion along the ridgeline of Sisk Mountain. The soil survey was designed to provide the underlying soils limitations along the proposed access route and turbine locations.
2. The Class "L" Soil Survey is based on the standards for soil survey recently adopted by the Maine Association of Professional Soil Scientists (2009), excepting: the plan scale of 1" = 250'.
3. The map units shown are soil series that closely resemble the typical pedon description and may vary with more intensive surveys. The soil units were based on: previous impacts, landscape position, topography, slope, stoniness, depth to seasonal water table, depth to bedrock, restrictive layers and soil textures as determined by observations.
4. All test pits and borings were observed using hand tools.
5. All test pits and borings were located with Trimble Geo-XH GPS units.

N

250 Feet

Kibby Expansion Wind Power Project

Soils Map

Page 21

TRC
14 Gabriel Drive
Augusta, ME 04330

Created: 11/25/2009

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name:	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 20 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY	STONY	10YR 4/1	
LOAM			
SILT	VERY		
LOAM	FRIABLE	5YR 2.5/2	
SANDY			
LOAM			
VERY			
FINE		5YR 2.5/2	
SANDY	THIXOTROPIC		7.5YR 3/3
LOAM	FRIABLE		
SANDY			
LOAM		10YR 3/3	
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 10" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SURPLUS | STONY SANDY LOAM | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 21 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY			7.5YR 3/3
LOAM		2.5Y 3/2	
ORGANIC			
WITH		10YR 2/2	
SAND	VERY		
GRAINS	FRIABLE		
SILT		5GY 4/1	
LOAM			
REFUSAL	32"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: PEACHAM VARIANT | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 22 [X] Test Pit [ ] Boring

2 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY	7.5Y 5/1	
	FRIABLE	5YR 2.5/1	
VERY		5YR 2.5/2	
FINE			
SANDY			
LOAM	FRIABLE		
		10YR 3/3	
SANDY		10YR 4/4	
LOAM			
GRAVELLY	FIRM	2.5Y 4/2	
SL			
REFUSAL	21"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 19" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: EWD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 23 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		5YR 2. 5/1	
SANDY			
LOAM	FRIABLE		
			2.5Y 5/2
		2.5Y 4/3	7.5YR 2.5/2
REFUSAL	7"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: WONSQUEAK | MUCK | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic. #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

_____

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY, CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 24 [X] Test Pit [ ] Boring

>40 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1				
2				
3			BROWN	
4		VERY		
5		FRIABLE		
6				
7	ORGANIC			
8				
9	MUCKY			
10	PEAT			
12				
14				
16				
18				
20				
			BLACK	
30				
40				
	LIMIT	OF	TEST	PIT
60				

		Slope %	Limiting factor		
■	hydric			■	ground water
□	non-hydric	0-15	0"	□	restrictive layer
				□	bedrock

C.S.S.	Soil Series / phase name:		Drainage	HSG
	WASKISH	VARIANT MOD. DEEP	VPD	D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 25 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	LOAMY SAND	LOOSE	5Y 3/2	
2				
3	ORGANIC	MUCK	BLACK	
4				
5				
6				
7	FINE			
8	SANDY		10YR 4/3	
9	LOAM	VERY		
10		FRIABLE		
11				
12				
14			2.5Y 4/4	
16				
18				10YR 4/4
20	SANDY	FIRM	2.5Y 5/3	2.5Y 7/2
21	LOAM			
25				
				10YR 4/4
30		VERY	5Y 5/3	5Y 6/1
32		FIRM		
34				
			5Y 5/2	10Y 5/1
	LIMIT	OF	TEST PIT	10YR 4/4
40				
60				

		Slope %	Limiting factor		
□	hydric			□	ground water
■	non-hydric	15-30	16"	■	restrictive layer
				□	bedrock

C.S.S.	Soil Series / phase name:		Drainage	HSG
	SURPLUS	SL	SWPD	C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 26 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	VERY FINE		5YR 5/2	
2	SANDY LOAM		5YR 2.5/1	
3				
4		VERY		
5		FRIABLE	10YR 4/4	
6				
7				
8	LOAM		5YR 2.5/1	
9				
10	SILT LOAM	FRIABLE	2.5Y 3/2	
12				
14				10YR 4/4
16				2.5Y 5/2
18				
20				
		FIRM		
	SANDY			
	LOAM		2.5Y 4/3	
30				
40				
42				
43		VERY FIRM	2.5Y 3/3	7.5YR 3/3
	REFUSAL	43"	ASSUMED	BEDROCK

		Slope %	Limiting factor		
□	hydric			□	ground water
■	non-hydric	0-15	14"	■	restrictive layer
				□	Bedrock

C.S.S.	Soil Series / phase name:		Drainage	HSG
	SURPLUS	VARIANT MOD. DEEP	SWPD	C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 27 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	VFSL		10YR 5/1	
2			5YR 2.5/1	
3				
4		VERY	5YR 3/2	
5	LOAM	FRIABLE		
6				
7			7.5YR 3/3	
8				
9				
10				
12				
14				5Y 4/2
17	SANDY	FIRM	2.5Y 4/3	10YR 4/4
18	LOAM			
20				
26	LIMIT	OF	TEST	PIT
30				
40				
50				

		Slope %	Limiting factor		
□	hydric			□	ground water
■	non-hydric	15-30	10"	■	restrictive layer
				□	bedrock

C.S.S.	Soil Series / phase name:		Drainage	HSG
	SURPLUS	SL	SWPD	C

Professional Endorsements *(as applicable)*

C.S.S.			
	signature:		Date: 11/4/2009
	name: DALE A. BREWER		Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY, CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 28 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAM	VERY FRIABLE	10YR 4/2	
SILT LOAM		10YR 4/1	
			10YR 5/1
	FRIABLE		10YR 4/4
LOAM		2.5Y 4/2	
GRAVELLY SANDY LOAM	FIRM	2.5Y 4.3	
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 8" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SURPLUS | Drainage: SL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 29 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY LOAM	FRIABLE	5YR 5/1	
			2.5Y 4/5
COARSE FINE SAND	FIRM	2.5YR 4/2	2.5Y 5/1
REFUSAL	12"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 6" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SURPLUS | Drainage: SL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 30 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE SANDY LOAM	FRIABLE	7.5YR 5/1	
		5YR 2.5/1	
FINE SANDY LOAM		7.5YR 3/3	
	FIRM	2.5Y 4/3	7.5YR 3/3
			2.5Y 5/2
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: | Limiting factor: 7" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | Drainage: FSL | HSG: WD C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 31 [X] Test Pit [ ] Boring

7 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM		10YR 3/1	
VERY FINE SANDY LOAM	FRIABLE	10YR 5/1	
			2.5Y 4/3
SANDY LOAM	FIRM	10YR 3/3	OXYAQUIC
REFUSAL	14"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 8" | [■] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: RICKER | Drainage: WD | HSG: A

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 32 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
CHANNERY		2.5Y 4/2	
GRV SL			
SANDY	FRIABLE		
LOAM		10YR 2/2	
GRAVELLY		10YR 3/2	
SANDY	FIRM		
LOAM	VERY FIRM	10YR 3/3	
REFUSAL	18"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 12" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: ENCHANTED VFSL | Drainage: WD | HSG: B

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 33 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAMY		7.5YR 6/1	
SAND			
		5YR 2.5/2	
	FRIABLE		
LOAM		7.5YR 2/2	
		7.5YR 3/4	
GRAVELLY VFSL		7.5YR 4/4	
GRAVELLY	VERY		
LOAM	FIRM	10YR 4/3	
LOAM	FIRM	10YR 4/6	
REFUSAL	19"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 12" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 34 [X] Test Pit [ ] Boring

10 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 2/1	
	VERY FRIABLE		
COARSE SANDY LOAM			
	FRIABLE	2.5Y 4/2	
REFUSAL	28"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: WONSQUEAK MUCK | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 35 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY	5YR 2.5/1	
LOAM	FRIABLE		
		5YR 3/4	
SILT		10YR 5/1	
LOAM	FRIABLE		
REFUSAL	5"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 5" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: ABRAM SL | Drainage: ED | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

_____

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 36 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1				
2			2.5Y 5/1	
3				
4				
5	VERY			
6	FINE			
7	SANDY			
8	LOAM	VERY	10YR 4/4	
9		FRIABLE		
10				
12				
14				
16				
18			2.5Y 4/2	
20	LOAM			
22		FIRM	2.5Y 4/4	5Y 5/2
24				10YR 3/3
26	LIMIT	OF	TEST	PIT
30				
40				
60				

[ ] hydric / [■] non-hydric	Slope %	Limiting factor	[ ] ground water / [■] restrictive layer / [ ] bedrock
	15-30	20"	

C.S.S. Soil Series / phase name:		Drainage	HSG
	DIXFIELD	FSL	MWD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 37 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	SANDY			
2	LOAM		7.5YR 5/1	
3				
4			7.5YR 3/3	
5				
6		FRIABLE		
7	FINE			
8	SANDY		10YR 3/3	
9	LOAM			
10				
11				
12				
13	VERY			
14	FINE		2.5Y 4/3	
15	SANDY			
16	LOAM			5Y 6/1
18	GRAVELLY		2.5Y 5/4	
20	FINE	FIRM		
22	SANDY			
24	LOAM			
	LIMIT	OF	TEST	PIT
40				
60				

[ ] hydric / [■] non-hydric	Slope %	Limiting factor	[ ] ground water / [■] restrictive layer / [ ] bedrock
	15-30	15"	

C.S.S. Soil Series / phase name:		Drainage	HSG
	COLONEL	FSL	SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 38 [X] Test Pit [ ] Boring

2 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	FSL		7.5YR 5/1	
2			5YR 2.5/1	
3	VERY			
4	FINE			
5	SANDY		7.5YR 3/3	
6	LOAM			
7		VERY		
8		FRIABLE		
9				
10	FINE			
12	SANDY		10YR 3/3	
14	LOAM			
16		FRIABLE	2.5Y 4/3	
18				
20				
	SILT LOAM	FIRM	5Y 4/2	
24				
	LIMIT	OF	TEST	PIT
30				
40				
50				
60				

[ ] hydric / [■] non-hydric	Slope %	Limiting factor	[■] ground water / [ ] restrictive layer / [ ] Bedrock
	0-15	18"	

C.S.S. Soil Series / phase name:		Drainage	HSG
	DIXFIELD	FSL	MWD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 39 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1				
2			10YR 5/1	
3				
4	FINE			
5	SANDY	FRIABLE		
6	LOAM		2.5Y 4/1	
7				
8				
9				5Y 6/1
10	SANDY	VERY		10YR 4/4
12	LOAM	FIRM	2.5Y 5/3	
14				
17	LIMIT	OF	TEST	PIT
18				
20				
30				
40				
50				

[ ] hydric / [■] non-hydric	Slope %	Limiting factor	[■] ground water / [ ] restrictive layer / [ ] bedrock
	0-15	8"	

C.S.S. Soil Series / phase name:		Drainage	HSG
	COLONEL	FSL	SWPD C

Professional Endorsements *(as applicable)*

C.S.S.			
signature:		Date	11/4/2009
name:	DALE A. BREWER	Lic	#304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 40 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY	7.5YR 5/1	
VERY	FRIABLE	5YR 2.5/1	
FINE			
SANDY		5YR 2.5/2	
LOAM			
	FRIABLE		
			7.5YR 3/3
LOAM		10YR 3/4	OXYAQUIC
			CONDITION
GRAVELLY			7.5YR 3/3
SANDY	FIRM	5Y 4/2	5Y 6/1
LOAM			
REFUSAL	16"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 6" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 41 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY			
LOAM		10YR 5/1	
	FRIABLE		
GRAVELLY		2.5Y 4/3	
SANDY			
LOAM			
		2.5Y 4/4	5Y 2/2
			2.5Y 5/6
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 30-40 | Limiting factor: 12" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 42 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
GRV F SL	FIRM	7.5YR 5/1	
REFUSAL	2"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 30-40 | Limiting factor: 2" | [■] ground water [ ] restrictive layer [■] Bedrock

C.S.S. Soil Series / phase name: RICKER | PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 43 [X] Test Pit [ ] Boring

18 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY	FIRM	2.5Y 4/4	
LOAM			
REFUSAL	12"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: WONSQUEAK VARIANT | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: [signature] Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

[signature]

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 44 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	FRIABLE		
		7.5YR 5/1	
GRAVELLY			
SANDY			
LOAM			
		5YR 2.5/2	
	FIRM	10YR 3/6	
REFUSAL	14"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 30-40 | Limiting factor: 9" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 45 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY		7.5YR 5/1	
LOAM	FRIABLE		
		7.5YR 2.5/3	
REFUSAL	5"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 5" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: RICKER PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 46 [X] Test Pit [ ] Boring

12" * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
REFUSAL	0"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [ ] ground water [ ] restrictive layer [■] Bedrock

C.S.S. Soil Series / phase name: RICKER PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 47 [X] Test Pit [ ] Boring

18 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 3/4	
			2.5Y 4/3
GRAVELLY			5Y 5/1
SANDY	FIRM		7.5YR 4/4
LOAM		7.5YR 3/4	
REFUSAL	10"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: WONSQUEAK MUCK VARIANT | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

_____

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 48 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY		
FINE SANDY	FRIABLE	10YR 5/2	
LOAM-			
SANDY	FIRM	7.5YR 3/3	
LOAM-			
REFUSAL	5"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 3" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: RICKER | PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 49 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT		5Y 4/2	
LOAM			
		10YR 3/3	
SANDY	FRIABLE		
LOAM			
		7.5YR 2.5/2	
		10YR 3/4	7.5YR 2.5/2
			5Y 5/1
REFUSAL	10"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 10" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 50 [X] Test Pit [ ] Boring

14 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	FRIABLE	2.5Y 3/3	
STONY			
SANDY			
LOAM	FIRM		
		5Y 3/2	
REFUSAL	8"	ASSUMED	BEDROCK

[■] hydric [ ] non-hydric | Slope %: | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: WONSQUEAK | VARIANT | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 51 [X] Test Pit [ ] Boring

11 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VFSL	V FRIABLE	10YR 5/2	
REFUSAL	1"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 1" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: RICKER | PEAT | Drainage: EWD | HSG: A

Professional Endorsements *(as applicable)*

C.S.S. signature: | Date: 11/4/2009

name: DALE A. BREWER | Lic: #304

STATE OF MAINE
DALE A BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 52 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 4/1	
LOAMY	FRIABLE	7.5YR 3/1	
SAND			
SANDY		7.5YR 2.5/1	
LOAM	FIRM		
FINE			
SANDY		7.5YR 4/4	2.5Y 4/3
LOAM			5Y 5/1
REFUSAL	13"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 7" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 53 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY FRIABLE	10YR 5/1	
VERY FINE		7.5YR 2.5/1	
SANDY LOAM			
	FRIABLE	7.5YR 3/2	
			7.5YR 3/4
			OXYAQUIC
SANDY LOAM		2.5Y 4/4	
REFUSAL	24"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 24" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 54 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY LOAM		2.5Y 4/1	
CHANERY	FRIABLE		
SANDY		5YR 2.5/1	
LOAM			
	THIXOTROPIC		
	FIRM	5YR 3/4	
		2.5Y 4/4	
VERY FINE	FRIABLE		
SANDY		5Y 4/3	
LOAM			
REFUSAL	24"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 24" | [ ] ground water [ ] restrictive layer [■] Bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 55 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE		7.5YR 4/1	
SANDY LOAM	VERY FRIABLE	5YR 2.5/1	
LOAM			
	FRIABLE	7.5YR 2.5/3	
REFUSAL	5"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 5" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | FSL | Drainage: WD | HSG: C/D

Professional Endorsements *(as applicable)*

C.S.S. signature: | Dat: 11/4/2009

name: DALE A. BREWER | Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 56 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	SANDY	FRIABLE	10YR 5/2	
2	LOAM			
3	VERY FINE		5YR 2.5/2	
4	SANDY LOAM	VERY	7.5YR 4/6	
5		FRIABLE		
6				
7				
8				
9	GRAVELLY	FRIABLE	10YR 3/4	
10	SANDY			
12	LOAM			
14				
16				2.5Y 5/2
18				7.5YR 3/3
20				
22				7.5YR 2.5/2
24	STONY	FIRM	2.5Y 4/4	2.5Y 5/2
26	SANDY			
28	LOAM			
30				
32	GRAVELLY	VERY	5Y 4/3	10YR 3/4
34	SANDY LOAM	FIRM		5Y 5/1
40				
50	LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 14" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: COLONEL FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 57 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	VERY		7.5YR 5/1	
2	FINE			
3	SANDY LOAM	VERY	7.5YR 2.5/2	
4		FRIABLE		
5			7.5YR 2.5/3	
6				
7			10YR 3/3	
8	LOAM			
9		FRIABLE		
10			10YR 3/4	
12				2.5Y 4/3
14				2.5Y 5/2
15			2.5Y 4/3	10YR 4/4
17				
19	VERY FINE	FIRM		
20	SANDY LOAM		2.5Y 5/4	7.5YR 3/4
22		VRY FIRM		5Y 5/2
24	REFUSAL	22"	ASSUMED	BEDROCK
26				
28				
30				

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 10" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: COLONEL FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 58 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
1			5YR 2.5/2	
2		VERY	7.5YR 5/1	
3	VERY	FRIABLE	7.5YR 2.5/2	
4	FINE			
5	SANDY		7.5YR 3/3	
6	LOAM			
7		FRIABLE		
9				
11	SANDY		10YR 3/4	
13	LOAM			
15				
17				7.5YR 4/2
19			2.5Y 4/4	2.5Y 5/2
20		FIRM		
22	COBBLY			
24	GRAVELLY			
26	SANDY			
28	LOAM		2.5Y 4/3	
30				
35		VERY		
40		FIRM		
45				
50				
55				
60	LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 15" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: COLONEL FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 59 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
1				2.5Y 4/3
2			5Y 3/2	7.5YR 4/6
3	SANDY			
4	LOAM	FIRM		
5				
8				7.5YR 4/4
7			2.5Y 4/3	2.5Y 5/2
8	LOAMY			
9	SAND			2.5Y 4/3
10		VERY	10Y 5/1	
12		FIRM		
14	REFUSAL	12"	ASSUMED	BEDROCK
17				
18				
20				
30				
40				
50				

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: PEACHAM MUCK | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 60 [X] Test Pit [ ] Boring

8 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT LOAM	VERY FRIABLE	10YR 3/1	
			5Y 5/2
SANDY LOAM	FRIABLE	2.5Y 4/1	
	VERY FIRM	2.5Y 3/2	10YR 4/4 5Y 5/2
LIMIT	OF	TEST	PIT

[■] hydric [□] non-hydric | Slope %: 0-15 | Limiting factor: 3" | [■] ground water [□] restrictive layer [□] bedrock

C.S.S. Soil Series / phase name: PEACHAM | MUCK VARIANT | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 61 [X] Test Pit [ ] Boring

4 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
GRAVELLY FINE SADY LOAM	FIRM	7.5YR 5/1	
REFUSAL	4"	OBSERVED	BEDROCK

[□] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 4" | [□] ground water [□] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: RICKER | PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 62 [X] Test Pit [ ] Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	WETLAND		

[□] hydric [□] non-hydric | Slope % | Limiting factor | [□] ground water [□] restrictive layer [□] Bedrock

C.S.S. Soil Series / phase name: | Drainage | HSG

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 63 [X] Test Pit [ ] Boring

24 " Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
MOD DECOMPOSED ORGANICS			
	VERY FRIABLE	BLACK	
WELL DECOMPOSED ORGANICS			
REFUSAL	24"	ASSUMED	BEDROCK

[■] hydric [□] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [□] restrictive layer [□] bedrock

C.S.S. Soil Series / phase name: WASKISH | VARIANT MOD. DEEP | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 64 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling
VERY STONY LOAMY SAND		7.5YR 5/2	
GRAVELLY VERY FINE SANDY LOAM	FRIABLE THIXOTROPIC	5YR 2.5/1	
		7.5YR 2.5/2	
SANDY LOAM	FIRM	10YR 4/3	
REFUSAL	17"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 16" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 65 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling
FSL		7.5YR 4/1	
	VERY FRIABLE	5YR 2.5/1	
		5YR 3/2	
VERY FINE SANDY LOAM	FRIABLE	7.5YR 3/3	
		10YR 4/4	
	VERY FIRM	2.5Y 4/3	7.5YR 4/6 2.5YR 6/1 OXYAQUIC
REFUSAL	18"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 9" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 66 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling
		7.5YR 5/1	
CHANNERY SANDY LOAM		5YR 2.5/1	
	THIXOTROPIC FRIABLE	7.5YR 2.5/3	
VERY FINE SANDY LOAM		10YR 3/4	
		10YR 3/6	
SANDY LOAM	VERY FIRM	2.5Y 4/2 2.5Y 4/3	7.5YR 3/3 OXYAQUIC
REFUSAL	22"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 22" | [ ] ground water [ ] restrictive layer [■] Bedrock

C.S.S. Soil Series / phase name: ENCHANTED FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 67 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling
GRAVELLY SANDY LOAM		7.5YR 5/1	
	FRIABLE	7.5YR 2.5/2	
SANDY LOAM		10YR 3/3	
			7.5YR 2.5/1
GRAVELLY SANDY LOAM	VERY FIRM	2.5Y 4/3	OXYAQUIC
REFUSAL	22"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 30-40 | Limiting factor: 17" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SURPLUS VARIANT SL | Drainage: MWD | HSG: C

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

STATE OF MAINE DALE A. BREWER No. 304 CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 68 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1				
2			7.5YR 4/2	
3	GRAVELLY			
4	SANDY			
5	LOAM			
6			7.5YR 2.5/2	
7				
8				
9	SANDY		7.5YR 3/3	
10	LOAM	FRIABLE		
12	FINE		10YR 3/6	
13	SANDY LOAM			
15				2.5Y 5/6
17				
20	VERY		5Y 4/3	
	FINE			
	SANDY			
	LOAM			
28				
30	REFUSAL	28"	ASSUMED	BEDROCK
40				
60				

hydric	Slope %	Limiting factor	ground water
■ non-hydric	0-15	14"	□ restrictive layer
			□ bedrock

C.S.S. Soil Series / phase name: SURPLUS VARIANT SL Drainage SWPD HSG C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 69 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	FINE		7.5YR 4/1	
2	SANDY LOAM		7.5YR 5/1	
3				
4		FRIABLE	5YR 2.5/1	
5	SANDY		5YR 2.5/2	
6	LOAM			
7			10YR 4/4	
8				
9	GRAVELLY	VERY		10YR 4/4
10	FINE	FIRM	2.5Y 4/2	OXYAQUIC
12	SANDY LOAM			
14	LIMIT	OF	TEST	PIT
15				
18				
20				
25				
30				
40				
60				

hydric	Slope %	Limiting factor	ground water
■ non-hydric	0-15	8"	■ restrictive layer
			□ bedrock

C.S.S. Soil Series / phase name: SURPLUS VARIANT SL Drainage SWPD HSG C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 70 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	SANDY		7.5YR 5/1	
2	LOAM			
3			5YR 2.5/1	
4				
5			5YR 2.5/2	
6	FINE			
7	SANDY	FRIABLE		
8	LOAM		10YR 3/4	
9				
10				
12			2.5Y 4/4	
14				
16	GRAVELLY			2.5Y 5/6
18	FINE	VERY	2.5Y 4/3	
20	SANDY	FIRM		
22	LOAM			
	REFUSAL	22"	ASSUMED	BEDROCK
30				
40				
58				
90				

hydric	Slope %	Limiting factor	ground water
■ non-hydric	0-15	15"	■ restrictive layer
			□ Bedrock

C.S.S. Soil Series / phase name: SADDLEBACK FSL Drainage WD HSG C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 71 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1	SILT LOAM	VRY FRIABLE	10YR 2/1	
2				
3				
4	LOAM		10YR 3/2	
5			10YR 3/4	
6				
7		FRIABLE		
8				5Y 4/2
9				
10				
12	SILT LOAM		2.5Y 3/3	2.5Y 4/1
14				10YR 3/3
17				
18				
20	REFUSAL	18"	ASSUMED	BEDROCK
30				
40				
50				

hydric	Slope %	Limiting factor	ground water
■ non-hydric	15-30	8"	□ restrictive layer
			□ bedrock

C.S.S. Soil Series / phase name: SURPLUS VARIANT SL Drainage SWPD HSG C

Professional Endorsements *(as applicable)*

C.S.S.	signature:	Date	11/4/2009
	name: DALE A. BREWER	Lic	#304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 72 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY STONY			
SANDY	FIRM	7.5YR 4/1	
LOAM			
FINE	THIXOTROPIC	5YR 2.5/1	
SANDY LOAM	FIRM		
		7.5YR 2.5/3	
STONY			
FINE	VERY	7.5YR 3/3	
SANDY LOAM	FIRM		
REFUSAL	10"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ] [■] non-hydric	15-30	10"	[ ]	[ ]	[■]

C.S.S. Soil Series / phase name: SADDLEBACK FSL

Drainage	HSG
WD	C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 73 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
FINE			
SANDY	VERY	7.5YR 5/1	
LOAM	FRIABLE		
GRV. VFSL		5YR 2.5/1	
GRAVELLY			
LOAM	THIXOTROPIC	5YR 2.5/2	
SANDY	FRIABLE	2.5Y 4/4	
LOAM			
		2.5Y 4/3	7.5YR 3/3,2.5Y 4/2
			OXYAQUIC
REFUSAL	26"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ] [■] non-hydric	15-30	22"	[■]	[ ]	[ ]

C.S.S. Soil Series / phase name: SADDLEBACK FSL

Drainage	HSG
WD	C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 74 [X] Test Pit [ ] Boring

* Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
MODERATELY			
DECOMPOSED			
ORGANICS	FRIABLE	BLACK	
WELL			2.5Y 4/1
DECOMPOSED	FIRM	10YR 2/1	
ORGANICS			
REFUSAL	30"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water	restrictive layer	Bedrock
[■] [ ] non-hydric	0-15	0"	[ ]	[ ]	[ ]

C.S.S. Soil Series / phase name: WASKISH LIKE VARIANT

Drainage	HSG
VPD	D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 75 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
STONY			
SANDY	FRIABLE	10YR 5/1	
LOAM			
	THIXOTROPIC	5YR 2.5/1	
	FRIABLE		
VERY			
FINE			
SANDY		7.5YR 3/3	
LOAM	FRIABLE		
		7.5YR 3/4	
LOAM			
SANDY		10YR 3/4	
LOAM	FIRM	2.5Y 4/4	
REFUSAL	20"	POSSIBLE	BEDROCK

hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ] [■] non-hydric	0-15	18"	[■]	[ ]	[ ]

C.S.S. Soil Series / phase name: SURPLUS VARIANT

Drainage	HSG
WD	C

Professional Endorsements *(as applicable)*

C.S.S.	signature:	Date	11/4/2009
	name: DALE A. BREWER	Lic	#304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

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SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 76 [x] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY	10YR 5/1	
	FRIABLE		
		5YR 2.5/1	
	FRIABLE		
FINE		7.5YR 2.5/3	
SANDY			
LOAM			
	VERY	7.5YR 3/3	
	FRIABLE		
	FIRM	2.5Y 4/4	
			10YR 4/4,2.5Y 6/2
LOAM	VRY FIRM	10YR 4/3	OXYAQUIC
REFUSAL	20"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water / restrictive layer / bedrock
[ ] hydric [■] non-hydric	0-15	12"	[ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | Drainage: FSL | HSG: WD | C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 77 [x] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY	VERY		
FINE	FRIABLE	10YR 6/1	
SANDY			
LOAM			
	THIXOTROPIC	2.5YR 2.5/1	
	VERY FRIABLE		
LOAM		5YR 2.5/2	
	VERY		
	FRIABLE		
		7.5YR 3/4	
ROCK			
FRAGMENTS		10YR 4/4	
	FRIABLE	2.5Y 4/4	
SANDY			
LOAM			2.5Y 5/6
	VERY	2.5Y 4/2	7.5YR 3/3
	FIRM		
FINE		2.5Y 4/1	
SANDY			
LOAM			
LIMIT	OF	TEST	PIT
	ASSUMED	BEDROCK	

hydric	Slope %	Limiting factor	ground water / restrictive layer / bedrock
[ ] hydric [■] non-hydric	0-15	22"	[ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: ENCHANTED | CHANNERY | Drainage: VFSL | HSG: WD | B

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 78 [x] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
GRAVELLY			
FINE	FIRM	10YR 6/1	
SANDY			
LOAM			
BROKEN	STONE	WEATHERED	ROCK

hydric	Slope %	Limiting factor	ground water / restrictive layer / Bedrock
[ ] hydric [■] non-hydric	0-15	5"	[ ] ground water [■] restrictive layer [■] Bedrock

C.S.S. Soil Series / phase name: RICKER | PEAT | Drainage: EWD | HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 79 [x] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SILT			
LOAM		10YR 2/2	
	VERY		
VERY	FRIABLE	10YR 4/1	
FINE			
SANDY			
LOAM			
		2.5Y 3/4	5Y 5/1
	FRIABLE		7.5YR 3/3
FINE		2.5Y 4/3	7.5YR3/3
SANDY LOAM			
REFUSAL	16"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water / restrictive layer / bedrock
[■] hydric [ ] non-hydric	0-15	0"	[■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: WONSQUEAK | MUCK | Drainage: VPD | HSG: D

Professional Endorsements *(as applicable)*

C.S.S. signature:		Date:	11/4/2009
name:	DALE A. BREWER	Lic:	#304

STATE OF MAINE
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No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
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Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 80 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY		7.5YR 6/1	
FINE	VERY	5YR 2.5/1	
SANDY	FRIABLE	7.5YR 3/4	
LOAM			
F S L	FRIABLE	10YR 4/4	
REFUSAL	5"	ASSUMED	BEDROCK

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	0-15	5"	[ ]	[ ]	[■]

C.S.S. Soil Series / phase name: SADDLEBACK — Drainage: FSL — HSG: WD C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 81 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
V F S L	FRIABLE	10YR 5/1	
RUFUSAL	1"	ASSUMED	BEDROCK

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	0-15	1"	[ ]	[ ]	[■]

C.S.S. Soil Series / phase name: RICKER — PEAT — Drainage: EWD — HSG: A

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 82 [X] Test Pit [ ] Boring

* Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
MODERATELY			
DECOMPOSED			
ORGANICS			
	FRIABLE		
		BLACK	
WELL			
DECOMPOSED			
ORGANICS			
REFUSAL	34"	ASSUMED	BEDROCK

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	Bedrock
[■]	[ ]	0-15	0"	[■]	[ ]	[ ]

C.S.S. Soil Series / phase name: WASKISH — LIKE VARIANT — Drainage: VPD — HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 83 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
GRAVELLY			
FINE	VERY	7.5YR 6/1	
SANDY	FRIABLE		
LOAM			
FINE		7.5YR 2.5/2	
SANDY LOAM	FRIABLE		
REFUSAL	10"	ASSUMED	BEDROCK

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	30-40	10"	[ ]	[ ]	[■]

C.S.S. Soil Series / phase name: SADDLEBACK — FSL — Drainage: WD — HSG: C/D

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

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SOIL PROFILE/CLASSIFICATION INFORMATION
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Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 84 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
1	F SANDY LOAM		7.5YR 6/1	
2		VERY		
3		FRIABLE	2.5YR 2.5/1	
4				
5	VERY			
6	FINE			
7	SANDY	THIXOTROPIC		
8	LOAM		5YR 2.5/2	
9		FRIABLE		
10				
12				
14				
16				
17				
18	REFUSAL	17"	ASSUMED	BEDROCK
20				
22				

hydric	Slope %	Limiting factor	ground water
■ non-hydric	30-40	17"	restrictive layer
			■ bedrock

C.S.S. Soil Series / phase name: SADDLEBACK | Drainage: FSL | HSG: WD C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 85 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
1	SILT		2.5Y 4/2	
2	LOAM			
3	V F S L	VERY	5Y 5/3	
4		FRIABLE		
5	SILT		2.5Y 3/1	
6	LOAM			
7				
8			5Y 5/3	
9	GRAVELLY			10YR 4/4
10	SANDY	VERY		
12	LOAM	FIRM		
14				
16				
18				
20				
22	SANDY		2.5Y 5/4	
24	LOAM			
26				
28		FRIABLE		
30	STONY		5Y 4/2	
32	LOAMY			
34	SAND			
36				
38				
40		VERY		
50	SANDY	FIRM		
60	LOAM			
68				
	LIMIT	OF	TEST	PIT

hydric	Slope %	Limiting factor	ground water
■ non-hydric	0-15	6"	■ restrictive layer
			bedrock

C.S.S. Soil Series / phase name: COLONEL | Drainage: FSL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 86 [X] Test Pit [ ] Boring

0 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
1				
2				
3	VERY		10YR 2/2	
4	FINE			
5	SANDY			
6	LOAM	VERY		
7		FRIABLE	10YR 2/1	
8				
9	SILT		2.5Y 5/2	
10	LOAM			
12				
14	STONY		10YR 3/3	
16	SILT			
18	LOAM			
20				10Y 5/1
22	LOAMY	FRIABLE	5Y 4/2	7.5YR 3/3
24	SAND			
26				
28				
30				
	SANDY			7.5YR 3/3
40	LOAM			10Y 5/1
	STRATIFIED			
50	SILT CLAY	FIRM		
56	BANDS			
	ASSUMED	BEDROCK	56"	

hydric	Slope %	Limiting factor	■ ground water
■ non-hydric	0-15	18"	restrictive layer
			Bedrock

C.S.S. Soil Series / phase name: DIXFIELD | STONY Drainage: FSL | HSG: MWD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 87 [X] Test Pit [ ] Boring

0 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
	GRAVEL	LOOSE	2.5Y 3/2	
	FILL			
20				
22				
24	VERY	VERY	2.5Y 3/1	
26	FINE	FIABLE		
27	SANDY		2.5Y 5/1	
28	LOAM		7.5YR 2.5/2	
30			7.5YR 3/4	
32				
34			2.Y 5/3	
36		FRIABLE		
38				5YR 3/4
40	SANDY			
42	LOAM		2.5Y 5/4	
44				
48				
50	GRAVELLY	FIRM	5Y 5/2	
	SANDY LOAM			
56				
60	SILTY		10GY 4/1	
66	CLAY LOAM	VERY		
		FRIABLE		
	LOAMY		5Y 5/3	
80	SAND			
84				
	REFUSAL	84"	ASSUMED	BEDROCK

hydric	Slope %	Limiting factor	ground water
■ non-hydric	0	0	restrictive layer
			■ fill

C.S.S. Soil Series / phase name: UDORTHENTS | FILL Drainage: VAR | HSG: VAR

Professional Endorsements *(as applicable)*

C.S.S.	signature:	Date:	11/4/2009
	name: DALE A. BREWER	Lic:	#304

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SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 88 [X] Test Pit [ ] Boring

0 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY STONY LOAMY SAND NATIVE FILL	FRIABLE	10YR 3/1	
STONY LOAM	FRIABLE	2.5Y 3/1	
SANDY LOAM		5Y 6/1	5Y 6/1
			7.5YR 3/3
			5Y 6/1
			10YR 4/4
SANDY LOAM	FIRM	5Y 4/2	
GRAVELLY LOAMY SAND		5Y 4/3	
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [ ] ground water [ ] restrictive layer [■] ledge

C.S.S. Soil Series / phase name: UDORTHENTS FILL | Drainage: VAR | HSG: VAR

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 89 [X] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY LOAM		2.5Y 5/1	
FINE S L	V FRIABLE	5YR 2.5/1	
STONY WITH CHANNERS		7.5YR 3/3	
SANDY LOAM	FRIABLE		
		10YR 4/4	
LOAMY SAND	FIRM	2.5Y 4/4	2.5Y 5/2
	FRIABLE	2.5Y 4/3	7.5YR 3/3
REFUSAL	22"		

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 18" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: DIXFIELD FSL | Drainage: MWD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 90 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
FINE SANDY LOAM			
		2.5Y 3/3	
SANDY LOAM	VERY FRIABLE		
			5Y 6/2
			7.5YR 4/4
		2.5Y 4/2	
LOAMY SAND			
REFUSAL	22"		

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 8" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: BRAYTON FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 91 [X] Test Pit [ ] Boring

1 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 5/1	
VERY FINE SANDY LOAM	VERY FRIABLE	7.5YR 2.5/2	
		7.5YR 3/3	
SANDY LOAM	FRIABLE	2.5Y 4/4	
			7.5YR 3/3
	FIRM	5Y 4/4	5Y 6/2
REFUSAL	23"		

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 22" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: DIXFIELD FSL | Drainage: MWD | HSG: C

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

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KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 92 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1				
2	FINE		10YR 6/1	
3	SANDY			
4	LOAM			
5	VERY FINE	VERY	7.5YR 2.5/2	
6	SANDY LOAM	FRIABLE		
7				
8				
9	LOAM		5YR 3/4	
10				
12				
14	REFUSAL	12"	ASSUMED	BEDROCK
16				
17				
18				
20				
22				

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 12" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: LYMAN | STONY L | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 93 [X] Test Pit [ ] Boring

9 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
0				
1			10YR 2/1	
2				
3				
4	SILT	VERY		
5	LOAM	FRIABLE	2.5Y 3/3	
6				
7				
8				
9				
10	VERY FINE	FRIABLE	2.5Y 5/2	
12	SANDY LOAM	VERY		2.5Y 5/6
14		FIRM		7.5YR 3/3
15	LIMIT	OF	TEST	PIT
18				
20				
25				
30				
40				
60				

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 10" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: BRAYTON | FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 94 [X] Test Pit [ ] Boring

7 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
1				
2	SANDY		10YR 6/1	
3	LOAM	VERY		
4		FRIABLE		
5			5YR 2.5/1	
6				
7	FINE			
8	SANDY			
9	LOAM		7.5YR 3/3	
10		FRIABLE		
12				
14	GRAVELLY			
16	FINE		10YR 3/4	
17	SANDY LOAM			
18	GRAVELLY	VERY		
20	SANDY LOAM	FIRM	2.5Y 5/4	
	REFUSAL	20"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 17" | [ ] ground water [■] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: TUNBRIDGE | FSL | Drainage: WD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 95 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

	Texture	Consistency	Color	Mottling
1				
2				
3				
4	VERY		2.5Y 3/2	
5	FINR			
6	SANDY	VERY		
7	LOAM	FRIABLE		
8				
9				
10			2.5Y 4/2	
12				
14				
16		FRIABLE	5Y 4/2	5Y 6/1
18	REFUSAL	16"	FIRM	10YR 4/4
20				
30				
40				
50				

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: <16" | [■] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: BRAYTON | BOULDERY FSL | Drainage: SWPD | HSG: C

Professional Endorsements *(as applicable)*

C.S.S. signature: _____ Date: 11/4/2009

name: DALE A. BREWER Lic: #304

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CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 96 [x] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
4		VERY	2.5 Y 4/2	
5	SANDY	FRIABLE		
6	LOAM			
9				2.5Y 4/3
10				7.5YR 3/3
16			5Y 5/1	
18	LOAMY	FRIABLE		
20	SAND			
30	SANDY LOAM		2.5Y 5/3	7.5Y 3/3
	REFUSAL	30"	NOT	BEDROCK

□ hydric ■ non-hydric | Slope %: 0-15 | Limiting factor: 8" | ■ ground water □ restrictive layer □ bedrock

C.S.S. Soil Series / phase name: BRAYTON FSL | Drainage: SWPD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 97 [x] Test Pit [ ] Boring

9 * Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
2	GRAVELLY	VERY	7.5YR 5/1	
3	FINE	FRIABLE		
4	SANDY LOAM		7.5YR 2.5/2	
8		FRIABLE	10YR 3/6	
9	SANDY			
10	LOAM			
14		VERY	10YR 3/3	
16		FIRM		
20	REFUSAL	18"	ASSUMED	BEDROCK

□ hydric ■ non-hydric | Slope %: 15-30 | Limiting factor: 10" | □ ground water ■ restrictive layer □ bedrock

C.S.S. Soil Series / phase name: TUNBRIDGE FSL | Drainage: WD | HSG: C/D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 98 [x] Test Pit [ ] Boring

12 * Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
3	SILT	VERY	5Y 2.5/1	
4	LOAM	FRIABLE		
8	FINE	VERY		
9	SANDY LOAM	FIRM	5Y 4/2	
14	LIMIT	OF	TEST	PIT

■ hydric □ non-hydric | Slope %: 0-15 | Limiting factor: 0" | ■ ground water □ restrictive layer □ Bedrock

C.S.S. Soil Series / phase name: PEACHAM MUCK | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 99 [x] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
1	FINE			
2	SANDY LOAM	VERY	7.5YR 6/1	
3		FRIABLE		
4			5YR 2.5/1	
6	VERY			
7	FINE			
8	SANDY LOAM	FRIABLE	7.5YR 3/3	
14				10YR 4/4
16	CHANNERY	VERY	2.5Y 4/4	OXYAQUIC
18	SANDY LOAM	FIRM		
	REFUSAL	20"	ASSUMED	BEDROCK

□ hydric ■ non-hydric | Slope %: 15-30 | Limiting factor: 12" | ■ ground water ■ restrictive layer □ bedrock

C.S.S. Soil Series / phase name: TUNBRIDGE L | Drainage: WD | HSG: C/D

Professional Endorsements *(as applicable)*

C.S.S.	
signature: [signature]	Date: 11/4/2009
name: DALE A. BREWER	Lic: #304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST
[signature]

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 100 [X] Test Pit [ ] Boring

9 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 5/1	
VERY FINE SANDY LOAM	VERY FRIABLE	7.5YR 3/3	
GRAVELLY VERY FINE SANDY LOAM		5YR 2.5/1	
	FRIABLE	10YR 3/3	
LOAM			7.5YR 2.5/2
	VERY FIRM	2.5Y 4/3	
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 22" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: MARLOW | BOULDERY FSL | Drainage: WD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 101 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY FRIABLE	7.5YR 5/1 5YR 2.5/1	
VERY FINE SANDY LOAM		7.5YR 2.5/3	
	FRIABLE		
GRV.S LOAM	VERY FIRM	2.5Y 4/3	
LIMIT	OF	TEST	PIT

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 14" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: MARLOW | STONY FSL | Drainage: WD | HSG: C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 102 [X] Test Pit [ ] Boring

10 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
			5Y 6/1
STONY COARSE SAND	FRIABLE	5Y 3/1	
REFUSAL	15"		

[■] hydric [ ] non-hydric | Slope %: 0-15 | Limiting factor: 0" | [■] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: SEARSPORT | STONY MUCKY PEAT | Drainage: VPD | HSG: D

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 103 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
VERY FINE SANDY LOAM	VERY FRIABLE	7.5YR 5/1	
		5YR 2.5/1	
FINE SANDY LOAM	FRIABLE	5YR 3/3	
		2.5Y 4/2	
REFUSAL	20"	ASSUMED	BEDROCK

[ ] hydric [■] non-hydric | Slope %: 0-15 | Limiting factor: 20" | [ ] ground water [ ] restrictive layer [■] bedrock

C.S.S. Soil Series / phase name: TUNBRIDGE | FSL | Drainage: WD | HSG: C

Professional Endorsements *(as applicable)*

C.S.S.	signature:		Date	11/4/2009
	name:	DALE A. BREWER	Lic	#304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F 09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 104 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
SANDY LOAM	VERY FRIABLE	7.5YR 5/1	
	FRIABLE	5YR 2.5/2	
LOAM	VERY FRIABLE	5YR 3/2	
STONY SANDY LOAM		2.5Y 5/4 7.5YR 2.5/2 2.5Y 5/2	
ROCK FRAGMENTS	FIRM	2.5Y 5/4	
REFUSAL	26"	ASSUMED	BEDROCK

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	0-15	16"	[ ]	[■]	[ ]

C.S.S. Soil Series / phase name: DIXFIELD | Drainage: STONY FSL | HSG: MWD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 105 [X] Test Pit [ ] Boring

3 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY FRIABLE	2.5Y 5/1	
	FRIABLE	2.5Y 3/3	
SANDY LOAM			
	FIRM	2.5Y 5/2 7.5YR 3/3	
	VERY FIRM	2.5Y 5/4	5Y 6/1 10YR 4/4
REFUSAL	22"		

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	0-15	8"	[■]	[■]	[ ]

C.S.S. Soil Series / phase name: BRAYTON | Drainage: FSL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 106 [ ] Test Pit [ ] Boring

6 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
MUCKY		10YR 2/2	
SANDY LOAM	VERY FRIABLE		5Y 5/2 7.5YR 4/4
		2.5Y 4/3	
SIL	VERY FIRM	2.5Y 4/2	7.5YR 2/3
LIMIT	OF	TEST	PIT

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	Bedrock
[ ]	[■]	0-15	8"	[■]	[ ]	[ ]

C.S.S. Soil Series / phase name: BRAYTON | Drainage: FSL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 107 [D] Test Pit [ ] Boring

9 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
	VERY FRIABLE		
FINE SANDY LOAM		10YR 2/2	
		2.5Y 3/1	
SILT LOAM	FRIABLE		5Y 6/1 7.5YR 2/4
		2.5Y 3/2	
LOAMY SAND		2.5Y 5/3	
REFUSAL	28"		

hydric	non-hydric	Slope %	Limiting factor	ground water	restrictive layer	bedrock
[ ]	[■]	15-30	12"	[■]	[ ]	[ ]

C.S.S. Soil Series / phase name: BRAYTON | Drainage: FSL | HSG: SWPD C

Professional Endorsements *(as applicable)*

C.S.S. signature:		Date:	11/4/2009
name:	DALE A. BREWER	Lic.	#304

STATE OF MAINE
DALE A. BREWER
No. 304
CERTIFIED SOIL SCIENTIST

FORM F

09013SS

SOIL PROFILE/CLASSIFICATION INFORMATION
for subsurface investigations at DEP Site Location Projects

Project Name:	Applicant Name: SISK WIND POWER	Project Location (municipality)
KIBBY EXPANSION CLASS L	TRANSCANADA	KIBBY/CHAIN OF PONDS

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 108 [X] Test Pit [ ] Boring

4 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		10YR 2/2	
VERY FINE		10YR 2/1	
SANDY LOAM			
	VERY		
	FRIABLE		
		10YR 3/2	
LOAM			
	FIRM		5Y 6/1
		2.5Y 3/2	
REFUSAL	18"		

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 15" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: BRAYTON | Drainage: FSL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 109 [X] Test Pit [ ] Boring

8 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
LOAMY		10YR 5/1	
SAND			
	FRIABLE		
STONY		10YR 2/2	
SANDY			
LOAM			
			5Y 6/2
		2.5Y 4/4	
	FIRM		
REFUSAL	STONES		

[ ] hydric [■] non-hydric | Slope %: 15-30 | Limiting factor: 8" | [ ] ground water [■] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: BRAYTON | Drainage: STONY FSL | HSG: SWPD C

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: TP 110 [X] Test Pit [ ] Boring

5 * Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling
		5YR 3/2	
SANDY			
LOAM			
		5YR 4/4	
LIMIT	OF	TEST	PIT

[ ] hydric [ ] non-hydric | Slope %: | Limiting factor: | [ ] ground water [ ] restrictive layer [ ] Bedrock

C.S.S. Soil Series / phase name: | Drainage: | HSG:

SOIL DESCRIPTION AND CLASSIFICATION

Exploration Symbol: [ ] Test Pit [ ] Boring

* Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (Inches)

Texture	Consistency	Color	Mottling

[ ] hydric [ ] non-hydric | Slope % | Limiting factor | [ ] ground water [ ] restrictive layer [ ] bedrock

C.S.S. Soil Series / phase name: | Drainage | HSG

Professional Endorsements *(as applicable)*

C.S.S. signature:		Date:	11/4/2009
name:	DALE A. BREWER	Lic:	#304

STATE OF MAINE
DALE A. BREWER
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CERTIFIED SOIL SCIENTIST

ATTACHMENT B.14-2

Erosion and Sedimentation Control Plan

TransCanada Maine Wind Development Inc.

Kibby Expansion Wind Power Project

Erosion and Sedimentation Control Plan

Prepared for:

TransCanada Maine Wind Development Inc.

Prepared by:

TRC
14 Gabriel Drive
Augusta, ME 04330

October 13, 2009

TABLES

APPENDICES

1.0 INTRODUCTION

TransCanada originally prepared this Erosion and Sedimentation Control Plan (E&S Plan) as part of its application for development of the Kibby Wind Power Project (the "Kibby Project). It is now being used in connection with the proposed Kibby Expansion Wind Power Project (the "Kibby Expansion Project" or "Project"). The Kibby Expansion Project consists of 15 Vestas V90 3 MW wind turbines along the Sisk Mountain ridgeline, adjacent to and west of the current Kibby Project. Associated elements of the Project include: access to the turbines utilizing the existing forestry roadway network to the greatest extent possible, aboveground 34.5 kilovolt ("kV") electrical interconnections (collector lines) between the turbines and to a common, newly proposed Kibby Expansion Project Substations, and a short 115 kV electric transmission tap line between the new Kibby Expansion Project Substation and the existing Kibby Project 115kV electric transmission line.

This E&S Plan contains erosion and sedimentation control requirements, standards, and methods that will be used to protect soil and water resources during construction of the proposed project. This E&S Plan is largely based on Land Use Regulation Commission (LURC) standards in Chapter 10.25 and 10.27; the Maine Department of Environmental Protection's (DEP) Maine Erosion and Sediment Control Best Management Practices (BMPs), dated March 2003; and specific BMPs appropriate for this type of construction.

The primary goals of any erosion and sedimentation control plan are to minimize soil movement and loss, preserve the integrity of environmentally sensitive areas, and maintain existing water quality. This document will supply TransCanada personnel and their representatives and contractors with a single, cohesive set of erosion control specifications for construction associated with the Kibby Expansion Project. This document is designed to provide specifications for the installation and implementation of soil erosion and sedimentation control measures while allowing adequate flexibility for application of the most appropriate measures based on site-specific conditions. All bid packages and contracts for work performed for the Kibby Expansion Project will include these specific guidelines to ensure the work is completed in an environmentally sensitive manner. TransCanada personnel and their representatives will ensure that the procedures contained in this E&S Plan are followed by regularly inspecting all work and requiring corrective action when necessary.

Implementation of the following objectives is required to achieve the goals of this plan:

- Minimize the extent and duration of disturbance;
- Protect exposed soil by diverting runoff to stabilized areas;
- Install temporary and permanent erosion control measures (including site restoration) and
- Establish an effective inspection and maintenance program.

The remainder of this E&S Plan is organized as follows:

- Section 2.0 describes the planning and design considerations that are utilized to minimize the potential for soil erosion and sedimentation into protected natural resources during construction of the project;
- Section 3.0 provides the general construction sequence for the project, including the implementation of erosion and sedimentation control measures;
- Section 4.0 describes the typical construction techniques used to minimize the potential for erosion and sedimentation;
- Section 5.0 provides the specific types of wetland and waterbody crossing methods to be used during construction;
- Section 6.0 describes the specific water diversion structures to be used, primarily water bars;
- Section 7.0 includes detailed descriptions of the types and proper installation of structural methods for erosion and sedimentation control;
- Section 8.0 provides detailed descriptions of the types and proper application of nonstructural erosion and sedimentation control measures;
- Section 9.0 describes the modified techniques and application of control measures to be used during winter time construction (November 1 through April 15 of any given year);
- Section 10.0 summarizes restoration procedures;
- Section 11.0 provides details of the multiple levels of supervision and inspection for compliance with environmental requirements that will be implemented during construction; and

- Section 12.0 describes the environmental training program for construction contractors and subcontractors.

This document includes appendices that contain: definitions of scientific and technical terms; a list of project contact personnel; illustrations of proper application of erosion and sedimentation control techniques along with illustrations of improper application as a basis for comparison; site-specific erosion and sedimentation control drawings; and other generic and specific references to ensure the proper and adequate implementation of erosion and sedimentation control methods during construction activities. All scientific and technical terms used in this document are defined in Appendix A.

2.0 PLANNING AND DESIGN CONSIDERATIONS

2.1 Resource Identification

Sensitive natural areas that will receive priority treatment include:

- Streams and rivers;
- Wetlands;
- Waterbody and wetland buffers;
- Significant Wildlife Habitat; and
- Habitat for rare species.

Sensitive natural areas that may receive priority treatment, depending upon the specific construction activities and timing of the project, include:

- Steep slopes;
- Unstable soil conditions; and
- Areas that have high potential to be prehistoric sites (e.g., well-drained soils on terraces overlooking streams and rivers).

Wetland delineation efforts, vernal pool surveys, and inventories of other sensitive natural resources have been completed and sensitive natural areas that require priority treatment have been identified. Procedures for avoiding or crossing sensitive natural areas will be incorporated into construction planning to ensure that the E&S Plan is properly implemented. Construction plans are designed and drawn to provide contractors and inspectors with a comprehensive reference guide that includes, but is not limited to, locations of sensitive natural areas, access, and abutter and landowner information. If modifications to the plans with respect to natural resources need to be made in the field, the TransCanada project environmental manager will make necessary changes and will notify all necessary personnel.

Copies of the construction plans will be provided and explained to construction foremen and equipment operators to ensure that construction practices meet the intent of avoiding or minimizing impacts to the identified sensitive natural areas. In addition to the plans, the proposed access ways and water/wetland crossing locations, as well as other environmentally sensitive areas where activities will be restricted or prohibited, will be flagged and/or will have signs posted in the field.

Prior to any clearing or construction work in or near any sensitive natural areas, a "walk-through" will be conducted. Typically, "near" a sensitive area is defined as within 100 feet of the closest edge of the resource, although more distant resources may be considered where steep slopes or easily eroded soils are present. Attendees at the walk-through will include: 1) the contractor; 2) TransCanada personnel and/or any designated representative(s); and may include 3) agency representatives (e.g., LURC staff, DEP project manager, U.S. Army Corps of Engineers [USACE] personnel). The purpose of the walk-through is to achieve the following objectives:

- Review available or alternate points of access;
- Review sensitive natural areas within or adjacent to the project access and project construction areas;
- Review wetland and stream locations in order to confirm appropriate crossing methods (mats, frozen ground, tracked equipment) where unavoidable;
- Review the locations of rare plants;
- Review appropriate methods to be used to protect sensitive areas in accordance with the specifications in this plan;
- Identify future "No-Access" areas and buffers;
- Review color designation for all flagging used;
- Establish the Communication Chain of Command (Contact Point); and
- Identify routes and flag within ROW construction roads.

In order to minimize impacts to sensitive natural areas, the above objectives will continually be evaluated throughout the construction process. Project superintendents, foremen, and inspectors will also monitor weather conditions and reports on an on-going basis. Knowledge of changing or anticipated wet weather will allow time to plan for and address erosion control needs. In this way, TransCanada and its contractors will be prepared to respond to changing environmental conditions (e.g., unusually wet or dry weather) and other unknowns that are inherent in any construction project.

2.2 "Walk-Through" Mechanics

2.2.1 Use of Flagging and Signs

Flagging of no-access areas and travel ways will be conducted at the time of the walk-through in order to identify visually select features or construction methods to be used. All wetlands and streams crossed were flagged earlier as part of the wetland delineation effort; where replacement flagging is required, it will be provided. During the walk-through it is especially important to identify areas with water that are not protected resources (i.e., not wetlands or streams), as such areas are common in the project area during rain events or snow melt. These can be problematic areas for equipment access and construction and unless identified and addressed properly, may pose erosion and sedimentation problems. Signs will also be installed following the walk-through to direct construction to approved access routes and away from "no-access" areas. The Kibby Expansion Project flagging color-code is as follows:

Glow-pink with the printed words "Wetland Delineation," "Wetland Boundary" or "Wetlands" denotes the edge of wetlands. Each flag has a field team, wetland identification, and flag sequence number noted as designated during the delineation and can be cross-referenced to field notes, photos, and wetland impact data.

Yellow without printed words denotes the location of a stream or river channel and will have a stream designation written on each as with the wetland delineation flags. The yellow flags were tied at the centerline of each stream or on the banks of larger streams and rivers. For each of these resources, specific vegetation management buffers are required that restrict vegetation removal and will require environmental measures such as water bars, erosion control mulching, or silt fence.

Red with or without the printed words – "Do Not Cross" – denotes a No-Access Area where no equipment is allowed.

Glow-green with no printed words denotes approved travel ways. This is typically flagged on each side of the access-way to denote the designated travel lane for all access.

Glow-pink with black stripes, or otherwise printed with the words "Waterbody Buffer" or "Stream Buffer," denotes a setback from a water resource and will be treated the same as a No-Access Area. It also designates the area where special clearing and vegetation maintenance requirements apply at designated waterbodies and streams (see Section 4.3).

2.2.2 Identification and Use of Access

TransCanada will utilize existing public roads, maintained logging roads, or dormant logging roads to access the project construction area. These roads provide access for equipment to travel back and forth to the project area for clearing and construction activities. The access roads were selected to avoid natural resource impacts to the greatest extent practicable. Improvements to these access roads will be limited to trimming overhanging vegetation, replacing damaged or malfunctioning culverts, and installing temporary mats or bridges over wetlands and streams as needed to allow safe, reliable passage of construction equipment and materials. In a limited number of areas, additional gravel may need to be added to logging road surfaces to improve the road for passage of construction equipment. This will help prevent rutting and off-road sedimentation. Any new gravel and grading will be limited to that necessary to maintain a safe and reliable road surface and will not be placed in protected resources such as wetlands.

The movement of equipment and materials will be confined as much as possible to a single road or travel corridor within the project construction area. Wetland and waterbody crossings within the construction area have been kept to the minimum number and length. Wetland and waterbody crossings have been sited to minimize the span of a wetland or stream crossing, and to avoid the more environmentally sensitive portions of a wetland or stream.

In all cases, TransCanada and its contractors will avoid and minimize impacts to sensitive natural areas to the greatest extent practicable. As a result of this planning and preconstruction walk-through process, adverse impacts from construction near and in wetland and stream crossings, steep slopes, unstable soils, and other sensitive natural areas will be minimized to the extent possible.

3.0 GENERAL CONSTRUCTION SEQUENCE

Generally, the construction of a wind project includes the following activities:

- pre-construction meeting;
- preparation of the construction site (mobilization, surveying, signage, technical evaluation);
- clearing of existing vegetation
- installing perimeter permanent and temporary stormwater controls as shown on plans (i.e. off-site diversion channels, filter berms, diversion berms, sediment traps, etc.)
- grubbing for the construction of the turbine access roads, improvement of the existing roads and the preparation of the work areas;
- road construction;
- installation of the wind turbines;
- installation of the electrical lines and construction of the substation; and
- stabilization (following completion of each work element).

Construction of the Kibby Expansion Project will generally occur over two construction years. The schedule assumes that most types of construction efforts will be curtailed during winter months through the spring mud season, and that work would recommence once suitable ground conditions for heavy loads are available in late spring. Construction activities can be discussed with respect to two distinct construction areas, the turbine locations (which includes roads, collector lines, substation and turbines), and the transmission line. Each of these activities will be discussed in the following sections.

3.1 Pre-construction Meeting

A pre-construction meeting will be held between TransCanada and relevant regulatory agencies to review project activities and regulatory requirements no less than seven (7) calendar days prior to construction. The objective of the meeting will be to establish communication protocols for construction activities, review the construction activities and schedule, identify site security measures and review permit requirements. The meeting will be attended by representatives from TransCanada, TransCanada construction contractors (including logging contractor), Land Use Regulatory Commission (LURC), and Maine Department of Environmental Protection (MEDEP). At the meeting, a TransCanada representative will provide details and a schedule for planned construction activities. TransCanada and LURC will also establish an inspection procedure and schedule. Upon completing the meeting, minutes from the meeting will be circulated to all parties in attendance prior to the start of construction.

3.2 Preparation of the Construction Site

Preparation of the construction site will consist of many different activities, including, surveying, signage and traffic control, site technical evaluation, site mobilization, and pre-clearing. These activities are detailed in Table 1.

TABLE 1: PREPARATION OF CONSTRUCTION SITE

Surveying	- Measurement and identification using Global Positioning System (GPS), flagging tape and other survey markers the exact site of the access roads, the wind turbines and the electrical interconnection lines. This makes it possible to determine with accuracy that work will proceed inside the limits of the project. (If necessary, this work will include some minor center line and traverse line clearing to make the survey possible).
Signage and Traffic Control	- Installation of the road signage required within the limits of the project and a reasonable surrounding area. - Special signage will be developed in conjunction with the property owner for any shared roads and facilities. Traffic control and communication protocols will be developed to ensure safe and efficient movement of both construction equipment and logging vehicles. - Determination and identification of the exact sites for storage and work areas.
Site technical evaluation	- Various expert evaluations of the technical needs for site preparation (clearing, grubbing, etc). - Geotechnical evaluation of the project site.
Site mobilization	- Install rock construction entrance at access point off public roads (as shown on plans). - Mobilization and installation of construction trailers and first aid facilities for the employees.
Pre-clearing	- Minimal clearing of trails to allow geotechnical testing equipment to drill boreholes at wind turbine sites and other areas requiring specifics of subsurface conditions for design purposes. - The Contractor shall install temporary sediment barriers (i.e. filter berms) along constant elevations just downslope of areas where grubbing activities will take place.

3.3 Road and Turbine Pad Construction

Construction of the access and turbine roads will be initiated within 30 days after clearing and grubbing. TransCanada expects to sequence crews in an order that will allow construction to occur in two sub-operational areas at one time. This approach to the construction will initiate with grading of road and pad areas within one area. Once the area is accessible, turbine construction and installation of electrical cable will be undertaken. As earthwork activities in one area are complete and turbine construction begins, earthwork activities on the next area will be initiated. This approach to construction sequencing will shorten the overall construction schedule. Within each operational area, activities will be similar and include the steps below:

Install rock construction entrance at access point off public roads (as shown on plans) and mobilize construction equipment to the designated staging/operational area. Clear existing vegetation along the proposed roadway corridors but do not commence grubbing and grading activities until temporary and permanent stormwater measures are installed. TransCanada will work closely with the property owner to coordinate the removal of merchantable timber from the project area.

In advance of grubbing and road grading operations, the Contractor shall construct measures to control off-site (clean) runoff from mixing with on-site (sediment laden) runoff including permanent diversion channels, temporary pipe slope drains, riprap slope protection, cross culverts (temporary or permanent), riprap outlet protection, and level spreaders. The diversion of off-site (clean) runoff shall be accomplished in the following manner:

- When grading the access road in an upslope direction, off-site runoff will be directed to the already-constructed temporary pipe slope drains, riprap slope protection, cross-culverts, and level spreaders using the permanent diversion channels. See the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, for details.

- When grading the road in a down slope direction, the permanent diversion channels will be constructed ahead of grading activities to intercept off-site runoff. In between cross-culverts (and associated temporary pipe slope drain, outlet protection, and level spreaders), the Contractor will construct a temporary berm or swale to direct the intercepted runoff around and ahead of the advancing grading operations, releasing it just downslope of the roadway. As the level spreaders, outlet protection, cross-culverts, and temporary pipe slope drains are installed and stabilized, runoff from the temporary or permanent diversion channels can be redirected to the temporary pipe slope drain and conveyed through the construction site while remaining "clean" water and prevented from interacting with sediment-laden runoff. The Contractor may opt to install a temporary metal pipe in place of the permanent HDPE pipe until the permanent pipe can be installed.

- In general, runoff from roads and turbine pads will occur as overland/sheet flow and will be controlled during construction using mulch filter berms. Where concentration of on-site runoff is unavoidable runoff will be collected in a roadside channel and directed to a temporary sediment trap. Once at least a uniform 70% perennial vegetation cover is established and the sediment trap is removed, flow in the channel shall be directed to a permanent level spreader.

- Construct wind turbines and electrical cables. Disturbed areas will be regraded and stabilized with seeding and mulch within 24 hours after reaching final grade and completion of turbine erection. See section 3.4 for installation of wind turbines.

- Demobilization construction area **-** Remove all contractor equipment and stockpiles. Properly dispose of any spoil material. Seed and mulch any remaining disturbed areas to permanently stabilize the site. See section 3.6 for restoration.

As one operational area is completed, equipment will then be shifted to the construction of the next operational area. Separate contractors will perform each Activity above and there may be multiple contractors performing tasks within each Activity simultaneously. The Activities of the project will be completed in a sequential manner and each Activity should follow not more than 20 days behind its predecessor.

3.4 Installation of Wind Turbines

Installation of the wind turbines will include work space preparation, construction of foundations, and erection of wind turbines. In addition, the electrical collection system, transformer substation, and service building will be installed at this point in the sequence. Activities are described in Table 2 below.

TABLE 2: INSTALLATION OF WIND TURBINES

Work space preparation	- Each wind turbine site will require clearing of approximately 1.0 acre of land but only a small portion of that land will be levelled, compacted and prepared for the wind turbine foundation and a permanent crane pad. The remaining area will be cleared and grubbed such that it can be used for component laydown and assembly of the crawler crane boom, but following construction the laydown and assembly area will be allowed to revegetate.
Mechanical excavation and blasting	- Mechanical excavation using backhoes and other earthmoving equipment will be performed according to site specific ground conditions related to each wind turbine site. Controlled blasting methods will be employed to remove rock in specific areas such as wind turbine foundations or difficult road cuts.
Foundations	- The casting of the concrete foundation is generally carried out in one continuous pour. Up to 700 cubic yards of concrete could be required, depending on conditions at each specific wind turbine site and they type of foundation selected.

Turbine erection	- Once turbine foundations have been installed, mid-sized cranes (75 tons) will proceed to the first wind turbine site in a "cluster" or grouping of turbines where they will be used to erect the first two tower sections. These cranes will then move ahead to the next turbine site to repeat the operation. A heavy lift crane, with a capacity of 600 tons or more, will be used for the next step in the erection sequence. This large crane will be delivered to the initial turbine site on special transport vehicles and then it will be assembled at the prepared crane pad before it is used to erect the top tower sections and the nacelle. The hub and blades will be installed individually and in sequence either by the heavy lift crane or by the mid-sized cranes depending on the requirements of the erection contractor. Once the heavy lift crane has completed its work, it can be partially disassembled and then "walked" or driven along the ridgeline access roads to the other turbine sites.
Other Activities	
Installation of the medium voltage electrical collection system	- Medium voltage electrical lines will be buried within the turbine pad area to connect the wind turbine to the electrical switch on the wooden pole structure at the edge of the road. The collector lines will then be strung on wooden poles along the side of the road and terminated at the transformer substation.
Transformer substation installation	- Preparation and grading of surface, installation of grounding equipment and security fencing. - Installation of transformers and electrical protection devices.
Service Building installation	- Excavation and casting of a concrete slab foundation, then construction of the building, the dimensions of which are approximately 50 feet by 70 feet.

3.5 Transmission Line

Construction of the proposed 115 kV transmission line will consist of two main activities. The first activity is the clearing of vegetation, followed by the installation stage. Implementation of these two activities will be done by section (e.g., Mile 0 to Mile 1.5), according to site conditions. An on-site project manager will dictate the day to day activities during both stages. The project manager's responsibilities include ensuring compliance with all applicable environmental standards and conditions of agency permits.

The 115 kV transmission line will consist of an up to 150-foot-wide ROW cleared of overstory vegetation through the working forest. For the portions of the proposed transmission line route adjacent to existing ROW, a clearing 125 feet wide is necessary. A portion that passes through state-owned land will be 100 feet wide, and the last portion of the line, approaching the grid interconnection at Bigelow Substation, will be underground in the shoulder of Route 27 and the substation driveway.

Pole structure construction work areas will not be grubbed or cleared of brush, unless leveling of the area is required. The only soil disturbance will be associated with the drilling/excavation of a hole for the installation of poles and, in some cases, due to the need to level the work area or for access along and adjacent to the ROW. Appropriate erosion and sedimentation control measures will be installed prior to ground disturbance, as determined during the site walk-through.

After clearing and preparation of the ROW, the first step in transmission line construction is to erect the poles. The primary pole structure will be wooden H-frames which consist of two in-ground poles connected by cross members. Some poles will be erected by drilling a hole with an auger, placing the pole in the hole and backfilling around the pole with any excess soil material. This backfill is tamped in (or packed down) to provide a firm base. Other poles will be erected using a small excavator to excavate approximately 5.5 cubic yards of material, allowing each pole to be placed up to 10 feet deep. The excavated area around the poles will then be backfilled. This backfill is also tamped in to provide a firm base. The use of heavy earth moving equipment such as bulldozers will not be required. In all cases, poles are buried to a depth equalling 10 percent of their length, plus two feet (for example, an 80-foot pole would be buried 10 feet [8 feet plus 2 feet]).

It will likely be necessary to blast ledge and large rocks at a number of locations during construction of the 115 kV transmission line. Blasting will be limited to pole locations where bedrock is exposed or shallow, and may be necessary to move or break up large boulders in order to provide access to pole locations.

On occasion, it may be necessary to create level work pads for the equipment in order to allow for proper (vertical) and safe installation of pole structures. In most cases appropriate topography exists. However, in locations where the terrain is not level, it is expected that a level working area will need to be created by pulling material (rocks and soil) from the area immediately adjacent to the pole location to create level and safe working conditions. These activities will be limited to only those places where the topography is too steep to allow equipment to level itself. All necessary erosion and sedimentation control measures will be installed at areas requiring levelling and will be left in place until the area is restored to original contours and stabilized.

Guy wires will be anchored in the ground and attached to angle pole structures to off-set any tension that is transferred from the conductor (electrical wire) to each angle pole. Anchors are generally screwed into the ground or buried and attached to steel cables, which are attached directly to the poles. All necessary erosion and sedimentation control measures will be installed at anchor locations and will be left in place until the area is stabilized.

After installation of cross-arms and the horizontal insulators which hold the conductors, the next step involves running a pull line (a rope known as a “p-line”) along pulleys attached to each insulator. In all sensitive areas, the p-line will be pulled across the resource by construction personnel “walking” the line across, to avoid unnecessary crossing of the resource by construction equipment and to minimize impacts. This is particularly true along streams and larger wetlands. The p-lines are then connected to the conductors, which are pulled from pole to pole until they are run the entire length of the line. The last step involves attaching the conductors into each insulator.

The time needed for the installation of each pole structure (including excavating, placing the pole, backfilling, seeding, and mulching) is less than one day. To the extent possible, work within inundated or saturated wetlands will be limited to the winter months to take advantage of frozen ground conditions. All work areas will be restored and stabilized after construction work in those areas is completed.

3.6 Restoration

After construction, the majority of the area used for the installation of the wind turbines will be allowed to revegetate; only the areas occupied by turbine foundations and the crane pad will be permanently disturbed area. Road widths will be maintained only to a final width of 16 feet. All other temporary work areas (such as overburden and other materials storage, etc.) will be allowed to revegetate. The specific restoration measures, where appropriate, will be done according to the specific characteristics of the site.

3.7 Erosion and Sediment Control Implementation

The best method to limit erosion and sedimentation is to prevent it from occurring by protecting exposed soils or sensitive areas. The placement and types of erosion control measures will be determined during the preconstruction walk-through. The following general sequence of work will be followed to mitigate the potential for erosion of exposed soils and/or discharge of sediment-laden water from the work area.

- Conduct a walk-through of the construction areas to establish limits of work for construction activity; identify and mark sensitive resources, seep areas, springs, and the location of travel lanes.
- Complete and stabilize with gravel any needed access road improvements.
- Install and stabilize temporary equipment crossings over wetlands and waterbodies, in accordance with Section 5.0 and the BMPs.
- Clear timber and brush.
- Grubbing only where necessary.
- Divert off-site (clean) runoff away and through the construction area without mixing with on-site (sediment laden) runoff).
- Install silt fencing, stump grindings, mulch filter berms, diversion berms, and sediment traps.
- Construct temporary or permanent water bars (or rubber strips), if needed, and stabilize in accordance with Section 6.0 and the BMPs.
- Level and stabilize construction areas and conduct any blasting, as needed.

- Pump or divert excavation seepage and runoff to temporary sedimentation trap(s), prior to discharge to a well-vegetated upland area. Control and direct runoff from the excavation areas using water bars, berms, or hay bales.
- Monitor any paved public road(s) used for access, for signs of tracking and spilling of spoils on the roadway. Construct a stabilized construction entrance if required.
- Complete construction and final grade.
- Stabilize upon reaching final grade or in areas where grading activities temporarily cease for a period of at least 21 days with mulch, stone, and/or erosion control mix.
- Stabilize disturbed soils associated with temporary wetland and stream crossings in accordance with the Section 10.0 and the BMPs within 48 hours of removal of the temporary crossing.
- Loam, seed, mulch, and anchor all exposed soils, as necessary, within 7 days of final grading in accordance with the Section 10.0 and the BMPs.

3.8 Seepage Areas and Springs

Seep areas and springs will be identified in the pre-construction walk-through to the extent possible. During construction, additional seep areas and springs may be encountered, especially in large cut areas. The following measures will be implemented where such conditions occur:

- Review the proposed profile and determine if an adjustment of the profile can be made to elevate the section of roadway over the wet seepage area. If so the design profile should be readjusted, being cautious to remain within the basis of design parameters established for the established roadway. A rock blanket shall be placed below the roadway subgrade to maintain subsurface drainage.
- Grub the wet area – The grubbing should attempt to remove the organics directly under the roadbed area only and in accordance with the geotechnical engineering report.

- For isolated seep areas, install a seep levee to contain and divert the seep around the construction area. A seep levee is a u-shaped berm that can be constructed with sandbags, Filtrexx Sock, or riprap. The seep levee will outfall into a temporary slope drain. See Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, detail 2, sheet 0026 and detail 1, sheet 0027.
- For a continuous seep area, install a temporary channel or diversion berm along the toe of the cut slope where the seep occurs. A check dam, which can be constructed of sandbags, Filtrexx Sock, or riprap, is to be placed at the outlet of the diversion and will outfall through a temporary slope drain. See Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, detail 2, sheet 0027.
- For the permanent conditions, place fabric, drainage stone, and pipe, as applicable to the situation, as shown in the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, details on sheets 0020 and 0023.
- Install cross culvert – In most areas at least a 12-inch culvert will be installed within or below the stone bedding. This may be done concurrently with the stone placement or as a subsequent step. However, if done later, the fabric will need to be cut and repaired.
- Place and secure fabric over the stone (unless stipulated otherwise by the geotechnical representative).
- Cover fabric with common borrow to provide at least 24 inches of cover over the top of the culvert.
- Install the riprap culvert inlet and outlet aprons and channel including the flow dispersion lip for the culvert outlet.

4.0 STANDARDS FOR CONSTRUCTION

4.1 Travel Lanes, Laydown, and Yarding Areas

The following six standards apply to the location of travel corridors and the location and/or upgrade of all roads, yarding areas, and construction laydown areas or work pads.

Vegetated Buffers Between Work Areas and Water Resources. Where travel lanes or work areas will be located near water resources, such that material or soil may be washed into them, these disturbances will be set back from the edge of the water resource to maximize the amount of vegetated buffer between the disturbed area and the resource, to the extent practicable. These "filter strips" will consist of an area of undisturbed vegetation between the edge of disturbed area and/or silt fence/hay bale barriers placed to intercept any sediment load in runoff water before it can enter the resource area. Table 3 below provides the recommended widths for the filter strips according to the slope of land between the edge of the resource and any exposed soil.

TABLE 3. RECOMMENDED FILTER STRIP WIDTHS BETWEEN DISTURBED AREAS AND WATER RESOURCES

Slope of Land Between Disturbance and the Resource (Percent)	**Width of Filter Strip* (Feet)**
0	25
10	45
20	65
30	85
40	105
50	125
60	145
70	165

*Measured along surface of the ground

2. Safe Work on Steep Slopes. Wherever possible, construction equipment will either avoid steep slopes or proceed across the slope in a safe manner to avoid excessive disturbance of vegetation and soils. Equipment will not travel straight up or down any slopes with a grade steeper than 10 percent, except where necessary due to safety concerns and/or terrain and other access constraints.

3. Slope Stabilization. Where travel lanes or construction areas cross slopes, the area will be properly stabilized and maintained to retain the existing surface and shallow subsurface drainage to the extent practicable.

4. Finish Grade Slope Restrictions. Slopes of levelled areas will be no steeper than 2 horizontal to 1 vertical (2:1) unless otherwise indicated on the drawings. The drawings provide for alternative cut/fill slope construction methods for slopes ranging from 3:1 to 1:5 (in rock cuts).

5. Minimize Wetland and Water Resource Crossings. Rivers, streams, and wetland areas will be crossed, where necessary, at right angles to the channel and/or at points of minimum impact. To ensure that natural drainage patterns will not be altered or restricted as a result of construction activities, crossings will be designed and constructed according to specific standards outlined below.

6. Limit, Monitor and Restore Work in Waterbody Buffers. In cases where mobilized tree harvesting equipment (feller-buncher) is being used to remove trees, their limited reach may require access ways within waterbody buffers to enable cutting and removal of large trees, if necessary. Each of these situations will be reviewed on a case-by-case basis and the various options for vegetation cutting will be considered to minimize disturbance in the buffer zones. On the collector and transmission line ROWs, plant species that are not capable of growing into the electric conductors (i.e., shrubs) will remain following the completion of clearing activities. Temporary erosion and sedimentation control measures will be implemented along the access ways, as required. As will be the case along either electrical ROW, ground disturbance caused by the use of harvesting equipment will be repaired by returning the ground to its original contour, as needed, and seeding and mulching any bare ground.

4.2 Stream or Wetland Crossings

The following standards apply to all unavoidable stream, drainage way, or wetland crossings encountered while accessing the proposed work areas.

4.2.1 Types of Crossings Used

The type of crossing used for access is dependent on: the purpose and use of the crossing; the nature of the resource being crossed; ground conditions present at the time of construction; and construction materials available. Some planning guidance is provided below. The appropriate means and location of the crossing will be determined at the time of the formal walk-through.

- Permanent culverts will be used only where long-term, continued, and frequent access is required, such as the new access roads to turbine sites. No permanent culverts will be installed along the transmission line ROW.
- Temporary crossings will be used at all other locations. Temporary bridges or equipment mats must be used to cross any streams, drainage ways, or wetlands that contain: (1) flowing water; (2) standing water; (3) saturated soils; or (4) organic/mucky soils. No equipment will operate in or travel through the water or on soft or saturated wetland soils.
- The use of corduroy as crossing material will be limited to wetlands not anticipated to have flowing or standing water or saturated soils during the construction period. The use of corduroy will be limited and must be pre-approved by a TransCanada representative. Equipment mats may be used in wetland crossings to reduce soil disturbance, especially when saturated soils or standing water are present. Typically, equipment mats are removed when construction is complete, during final restoration.
- All temporary waterbody crossings must be temporarily stabilized upon installation and permanently stabilized, as needed, within 48 hours of removal, unless specified otherwise.

4.2.2 Construction in Wetlands

Construction in the turbine areas will minimize impacts wetland areas to the extent possible, however wetlands found within the proposed new road area will be permanently impacted with fill. Specialized construction techniques to help maintain hydrology in these areas have been recommended by the state soil scientist, and these methods are being proposed by TransCanada (see Figures 1 and 2 in Appendix C for design details of the rock "sandwich" roadway design and typical wetland road crossing section).

Work in the transmission line construction area will largely avoid permanent impacts to wetlands, and most wetland impacts will be temporary in nature, and primarily from construction access. Construction on the transmission line will also be conducted during the winter, as the schedule allows, taking advantage of frozen ground conditions. Otherwise, wide tracked or balloon-tired equipment will cross or work in wetlands using timber equipment mats. Where structures are to be placed in wetlands, topsoil will be excavated first, and stockpiled separate from subsoil. Soils will be replaced into the excavated area in the opposite order they were removed. After pole installation, topsoil will be restored to the original surface grade, except where mounding around a structure is necessary for structure stability.

4.3 Construction in Buffer Areas

Vegetative buffers of 100 feet (as measured from the top of both banks) will be established and maintained on perennial streams and rivers. In the turbine construction area, project features generally cross these resources in a perpendicular fashion, and will only impact the buffers at these crossing areas. Where perennial streams and rivers are crossed by the 115 kV transmission line, it also typically crosses the resources in perpendicular fashion, and structures will only be located within these buffers as engineering standards require. Minimal soil disturbance will occur in the buffers. No vehicular traffic will be allowed in the buffers other than that necessary to remove trees and construct and utilize temporary equipment crossing bridges authorized during the walk-through. As described in Section 4.1, three access ways may be required within these buffers during initial clearing to enable tree harvesting equipment to reach all trees that need to be removed. Each of these situations will be reviewed on a case-by-case basis and the various options for vegetation cutting will be considered to minimize disturbance in the buffer zones. All appropriate

erosion and sedimentation controls will be implemented and maintained along these access ways during and following construction.

Construction activities within these waterbody buffers on the transmission line will be limited to the cutting of only species capable of growing into the electric conductors and large snags that are greater than 8 to10 feet tall (Figure 3, Appendix C). Cutting of these trees will be done by hand or by a feller-buncher reaching into the buffer from outside the zone, if possible, and from the three access ways as needed. Erosion control barriers will be established and maintained along the access ways within the buffers and along the approach to all stream crossings and will be supplemented, as appropriate, by water bars and/or erosion control barriers extending outside the buffer zone. The use of herbicides in waterbody buffers will not be allowed.

5.0 INSTALLATION OF CROSSINGS

5.1 Bridges

5.1.1 Materials

Typically bridge construction will entail the use of log stringers or equipment mats as construction materials covered by decking planks or equipment mats.

5.1.2 Sizing

Table 4 illustrates the log sizing requirements depending on the span and anticipated loads.

TABLE 4. LOG BRIDGE STRINGER REQUIREMENTS

Span	Minimum Log Diameter* (80,000 lb. Load)	(40,000 lb. Load)
8 ft.	16 in.	12 in.
12 ft.	18 in.	14 in.
16 ft.	20 in.	16 in.

Wheel guards: 10" diameter

- Size of deck planks: 4" x 12" x 12'

* Assume 6 stringers at 24" centers

5.1.3 Positioning

Figures 4 and 5 in Appendix C illustrate the proper use and installation of crossing bridges.

- Temporary bridges will cross streams at right angles to the channel at a location with firm banks and level approaches whenever possible.
- At the crossing location, the ends of the stringers will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the bridge.
- Mats, corduroy logs or a stone pad installed on top of geotextile fabric will be used, where necessary, to provide a smooth transition for equipment travel from the adjacent ground or temporary road onto the bridge.
- Temporary bridges for the Kibby Expansion Project will not require vertical support piers or abutments in a stream or inundated wetland.

5.1.4 Maintenance

Bridges will be continually monitored to ensure that they are stable and functioning correctly. Bridges will be kept clean and any accumulated soil materials will be removed and disposed of and stabilized in an upland location. The material will not be scraped and shoveled into the water resource. The contractor will replace timbers or decking in poor condition as soon as deterioration is observed. At a minimum, the contractor will be responsible for inspecting all bridges once per week and will keep a log of all changes, improvements, and other maintenance performed.

5.1.5 Removal

Bridges will not be removed until their use is no longer necessary. Tree cutting and final restoration work on and around the stream banks will be completed prior to removing the bridge from the crossings. The banks of streams and drainage ways will then be graded back to original conditions. Exposed soils on the banks and within 100 feet of the crossing will be stabilized using seed and mulch. Banks of drainage ways (excluding streams and rivers) that are expected to receive high flows will be stabilized with seed and curlex or jute matting (Figure 6, Appendix C). All bridges will be removed from the ROW upon completion of construction.

5.2 Culverts

Permanent culverts may be installed to replace existing damaged or malfunctioning culverts along existing access roads, and also in several locations along the proposed new access roads to maintain existing drainage. Only one perennial stream will require a permanent culvert crossing in the turbine construction area. No permanent culverts will be required for equipment access within the transmission line ROW. Temporary culverts may be installed as a means of equipment mat support for wide or deep temporary stream crossings.

5.2.1 Materials

Permanent culverts will be either corrugated metal or plastic pipe. Temporary culverts will be corrugated metal, plastic pipe, or lumber ties. Chemically-treated wood will be not used.

5.2.2 Sizing

Culvert size will be determined by the largest pipe diameter equal to the undisturbed cross sectional area of the bank full condition of the stream. It should fit into the existing channel without major excavation of the waterway channel or without major approach fills. If a channel width exceeds 3 feet, additional pipes may be used until the cross sectional area of the pipes approaches that of the existing channel. The minimum size culvert that may be used is an 18-inch diameter pipe. The maximum flow capacity of the culvert(s) ("bank full") will be determined at highest flows or will be approximated during periods of lower flows using the apparent natural high water marks remaining on the stream banks.

5.2.3 Positioning

The following guidelines will be used for the positioning of all permanent and temporary culverts:

Culverts will be placed to allow for the crossing to take place at right angles to the channel to ensure that natural drainage patterns will not be altered.
Culverts will be placed at the point of narrowest crossing and where firm banks and level approach slopes are available. Slopes should not exceed 1.5 to 1.

5.2.4 Installation

The following guidelines will be used for the installation of all permanent and temporary culverts:

- Culverts will be of sufficient length to allow both ends to extend at least one foot beyond the toe of any fill used to cover the culvert.
- Culverts will be bedded on firm ground. Supplemental use of geotextile with gravel can be used to create this firm base. Permanent culvert installation will include firm compaction of the foundation and the fill around the sides of the culvert. Compaction will be done in no less than 8-inch lifts.
- Both the inlet and outlet ends of the culverts will be set at or slightly below the natural stream bottom to allow passage of fish and other aquatic life at all levels of flow. At no point will either end of an installed culvert be positioned in the air out of the water.
- Multiple culverts must be offset in order to concentrate low flows into the culvert within the natural channel.

- Fill used to bury the culvert will be compacted at least half-way up the side of the culvert for its full length to ensure that flowing water will not undermine the culvert.
- Culverts will be covered with fill to a depth of at least one foot or one-half the culvert diameter, whichever is greater.
- Road fill at the upstream (headwall) and downstream (outfall) ends of culverts will be armored with rock rip-rap to protect the road fill from being eroded by the action of water or road traffic. This material will be installed up to the level of anticipated high water.
- In areas where the streambed appears highly susceptible to erosion, the streambed at the outlet end of the culvert will be lined with riprap to prevent erosion and potential streambed scour. Table 5 indicates the distances away from the culvert to install such riprap. Figures 7 and 8 in Appendix C illustrate possible culvert installation options with inlet and outlet protection.

TABLE 5. CULVERT SIZE - LENGTH OF ROCK PROTECTION

Culvert Diameter (Inches)	**Length of Rock Protection From Culvert (Feet)**
12 – 20	7
21 – 24	9
30	11
36	13
42 – 48	18
54 – 60	24
66 – 78	32

5.2.5 Removal

Temporary culverts used to support bridge spans will be removed from the stream channel and ROW at the same time the span is removed. Where damaged or malfunctioning culverts were replaced, the new culverts will be left in place.

5.3 Mats (Timber, Construction, or Equipment Mats)

Equipment mats will be used for temporary access across streams and wetlands. TransCanada will require the contractor to ensure that adequate equipment mats (both in terms of quantity and quality) are present at the project site prior to construction. Additional sources of equipment mats will be identified should the effort require more mats than originally anticipated.

5.3.1 Materials

A number of differently sized and constructed equipment mats are typically available and the appropriately sized mats will be used for the each crossing. For example:

Longer mats will be used for spanning the wider crossings. This practice avoids the need to install additional mats within the crossing area in order to support the “span” mats.
Mats will be in good condition to allow for their “clean” installation and use. Using mats with timbers and cables in good condition minimizes the potential for breakage during installation. Furthermore, using materials in good condition helps to prevent mats from becoming imbedded in mud and reduces the need to drag them in or out of the resource versus carrying them above the resource. Mats with partial/short timbers joined end to end will not be used to cross stream channels.

5.3.2 Installation

Illustrations of the proper use and installation of mats are depicted in Figures 9 and 10 of Appendix C.

Whenever possible, mats will be carried and not dragged. Dragging mats creates more soil disturbance, which can result in additional erosion control or final restoration work.
At the crossing location, the ends of the timber mats will extend at least two feet onto firm banks or several feet into the upland edge of a wetland to ensure a dry, firm approach onto the mats.
For wetland crossings that require multiple mats, mats will be oriented with their longest dimension perpendicular to the direction of travel. This configuration reduces the potential for the mats to work into the wetland soils as vehicles cross, thus reducing disturbance of the wetland surface.

Mats used as temporary bridges for the Kibby Expansion Project will not require support piers or abutments to cross a stream or inundated wetland. The contractor will use appropriately sized and spaced timbers (Table 4) to span the resource and support the mats. In certain instances, a culvert may be used to provide midstream support if more than one mat is required to cross a long span. Support culverts will be oriented parallel to the direction of flow and fish passage maintained.

At "dry" crossings where no water is present or anticipated during project construction, the mats may be placed directly onto the sensitive natural area in order to prevent excessive rutting, provided stream banks and bottoms are not altered.

5.3.3 Maintenance

Matted crossings will be continually monitored to ensure that they are in good condition. Mats will be kept clean and any accumulated soil materials will be removed and disposed of and stabilized in an upland location. The material will not be scraped and shoveled into the water resource. Mats which become imbedded will be reset or layered to prevent mud from covering them or water passing over them. The contractor will replace mats as soon as deterioration is observed. At a minimum, the contractor will be responsible for inspecting all matted crossings once per week and will keep a log of all changes, improvements, and other maintenance performed.

5.3.4 Removal

Mats will not be removed until their use is no longer necessary. Specifically, all final restoration work along the adjacent ROW will be completed prior to removing the mats from the crossings. All mats will be removed from the ROW upon completion of construction. Exposed soils within 100 feet of the crossing will be stabilized.

5.4 Corduroy

Corduroy crossing use should be limited to those situations when there are no other readily available options, and only in consultation with TransCanada and agency staff (LURC or DEP, as applicable, and USACE).

5.4.1 Materials

Corduroy material will consist of de-limbed trees or logs. The logs must have a diameter greater than three inches at the small end and lengths greater than 18 feet. Shorter length material may be used only as described below. In general, corduroy crossings will only be used when the use of equipment mats is not practical.

5.4.2 Positioning

The use of corduroy as crossing material will be limited to wetlands which are not anticipated to have flowing or standing water or saturated or soft soils during the construction period. Corduroy will be placed perpendicular to the direction of travel. Corduroy will be placed at the point of narrowest crossing and where firm ground and level approach slopes are available. Corduroy may also be used to help stabilize and level the approaches to a bridge crossing. Illustration of the proper use and installation of corduroy logs is depicted in Appendix C, Figure 11.

5.4.3 Installation

Corduroy will be placed with the longer length pieces laid down first. Once a thick base of corduroy has been laid, pieces shorter than 18 feet can be used to fill gaps and raise the elevation of the corduroy to provide for a more stable crossing.

5.4.4 Maintenance

Corduroy will be continually monitored to ensure that it is functioning correctly. Corduroy logs will be kept clean to the maximum extent practical and when possible, accumulated soil material will be removed and disposed of and stabilized in an upland location. The material will not be scraped and shoveled into the water resource. Corduroy that becomes imbedded in mud will be replaced by timber mats or other more suitable crossing materials as soon as significant surface disturbance is observed. At a minimum, the contractor will be responsible for inspecting all corduroy logs once per week and will keep a log of all changes, improvements, and other maintenance performed.

5.4.5 Removal

Removal is the reverse of the installation process. Once the corduroy has been removed from the crossing, it will be moved off the right-of-way and burned, chipped, or cut into smaller pieces consistent with state and local laws. If cut or chipped, the material may be spread and distributed in upland areas. If this approach is taken, all materials will be disposed of in accordance with the Maine Slash Law (Appendix F).

6.0 SURFACE WATER DIVERSION STRUCTURES (WATER BARS)

A number of above-ground structures or techniques are available to divert water out of travel ways and work areas in order to prevent subsequent runoff and erosion. Water bars, also called slope breakers, may be required in a limited number of locations in the Kibby Expansion Project construction area to redirect water moving down a prolonged steep slope with disturbed soils, into adjacent vegetated upland areas (i.e., filter strips).

6.1 Materials

Water bars will be constructed by excavating or moving and shaping soil from within the ROW to form a shallow cross-drainage swale. The excavated material will be used to form an elevated bar immediately downslope of the swale. Permanent rubber water bars can also be installed per detail 9 on sheet 0023, in the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines.

6.2 Positioning

Water bars will be installed immediately above and along steep pitches in the construction area, and below seepage areas on natural or cut banks, as determined during the preconstruction site walk-through and also during construction as appropriate situations arise. They will be sited to take advantage of existing vegetation for filtering and slope away from the areas susceptible to erosion. The interval for installing diversion structures depends on the slope of the area, the soil permeability of the soils, and saturated soils. Generally, steeper slopes require shorter distances between water bars in order to control the higher volume and velocity of surface water flow. Water bars will be sized in anticipation of greater flows resulting from snow melt, spring runoff, and storm rains. Table 6 contains typical recommended distances between installed structures depending on slope. For spacing of permanent rubber waterbars, see Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, detail 9 on sheet 0023.

TABLE 6. RECOMMENDED DISTANCES BETWEEN WATER DIVERSION STRUCTURES

Slope (Percent)	Spacing (Feet)
0 – 2	250
3 – 5	135
6 – 10	80
11 – 15	60
16 – 20	45
21+	35

6.2.1 Installation

Water bars will be installed at 30 degrees angled down grade. The shape of the backside portion of the structure will have a reverse slope of about 3 percent. Use of a pop-level is recommended to ensure that drainage is away from the areas susceptible to erosion. Water bars will be constructed with rounded mounds and dips to allow for firm compaction and to allow re-vegetation. Illustrations of the proper installation of water bars are provided in Appendix C, Figures 12 and 13.

The inlet end of water bars will extend beyond the edge of the area susceptible to erosion, so that it fully intercepts water flows that may flow onto the area. The outlet end of the structure will extend out far enough to prevent water from flowing around and re-entering the work area. The discharge ends will outlet into a vegetated filter strip. Where heavy flows are encountered or anticipated, the outlet end of the water bar will incorporate an apron of rock and/or geotextile fabric to reduce water velocities and prevent erosion.

Where the water bar is within 100 feet of a stream or wetland, a small, excavated settling basin or ditch turnout will be incorporated to reduce the velocity of flows and the continued movement of sediment downslope. In addition, stone check dams, silt fencing or staked hay bales will be installed at the outlet of the diversion structure, where vegetated filter strips are narrow or sparsely vegetated, in order to prevent sediment from entering water resources. Additionally, a temporary mulch liner (anchored erosion control blanket) will be installed immediately upslope of the sediment barrier to reduce the erosion potential of the concentrated flow. The proper installation of stone check dams and other swale stabilization measures is shown in Appendix C, Figure 14.

6.2.2 Maintenance

Maintenance is critical to the effective functioning of the diversion structures due to repeated travel over them. The structures will be re-excavated or graded to ensure the interception and redirection of water runoff, as the structure becomes flattened or rutted. The outlet ends, sediment basins and sediment barriers will be maintained by clearing away any potential blockages and accumulated sediments. In areas where silt fence or hay bale barriers are used, the barriers will be replaced with stone check dams if inspections during construction indicate that channelized runoff is undercutting the barrier. The contractor will be responsible for inspecting all diversion structures in active construction areas weekly and will keep a log of all changes, improvements, and other maintenance performed.

6.2.3 Removal

After the completion of the construction project, removal of these structures is not a requirement. Water bars can be left in place provided they have been suitably stabilized with seed and mulch. Hay bale or silt fence barriers at the outlet of the structure will be removed when these areas have vegetative cover.

7.0 SEDIMENT BARRIERS (STRUCTURAL MEASURES)

7.1 Introduction

The standards and procedures outlined in this section are meant to address a majority of the situations encountered during the Kibby Expansion Project construction activities. For additional information on sediment and erosion control methods and techniques, or to address a particularly problematic situation, the information in this section may be supplemented by the DEP's Maine Erosion and Sediment Control BMPs, dated March 2003.

The use of properly installed erosion and sediment control barriers is the most fundamental and critical component for stopping and controlling erosion during the Kibby Expansion Project construction. Erosion control barriers include silt fences, and/or erosion control mix berms. In some cases, these barriers may be deemed unnecessary due to factors including slope and the presence of filter strips within project boundaries. Typically, earth work near water will require the use of at least one of these types of barriers or some combination of them to effectively prevent and/or control erosion near water resources. Installation and diligent maintenance of these barriers serves the following purposes:

- Ensures the environmental integrity of those upland and water resource areas not designated or permitted for disturbance. Specifically, it maintains the onsite vegetative community and water quality of the surface water within the watershed.
- Ensures compliance with all applicable federal, state, and local environmental and land use regulations or permit conditions.

Generally, erosion control mix berms are a preferred barrier to silt fencing for this project because it is generally easier to install, obtain, and transport; it is made of native organic materials; and it is easy to remove and stabilize.

7.2 Use of Silt Fence

7.2.1 Materials

Silt fencing is provided by a number of manufacturers and is generally a synthetic fabric pre-attached to wooden staking. The fabric must be pervious to water allowing a flow-through rate of 0.3 gallon per square foot per minute. The fabric must contain stabilizers and ultraviolet ray inhibitors to allow it to sustain exposure of a minimum of 6 months. The height of the filter fabric must not exceed 3 feet above the ground surface.

7.2.2 Placement

Silt fencing may be utilized at the edge of any planned work area or area which will incur soil disturbance. It will be installed on slope contours to intercept sheet flow, maximize ponding, and detain sediment from entering water resources or leaving the project site. It will be installed prior to construction activity that results in exposure or disturbance of soil. The amount of silt fencing and placement must be selective given the size of the Kibby Expansion Project construction area; however, it will be used in amounts sufficient to meet potential changing conditions in a proactive manner. The placement of silt fence along the construction area will be determined during the preconstruction walk-through. Silt fencing will be used, as appropriate, in the following locations:

- Along all access roads or work areas that are within 100 feet of water resources or wetlands.
- Along all access roads or work areas in upland settings that encounter seepage moving across slope.
- Around all stockpiled soils.

In general, the placement of silt fencing is appropriate when:

- Serving a drainage area of no more than 0.25 acre per 100 feet of silt fence length.
- The maximum slope length behind the fence is 100 feet or less.
- The maximum gradient behind the fence is 50 percent or 2:1 horizontal/vertical.
- Where the filter strip is not able to meet the optimal width.

7.2.3 Installation

The following installation guidelines are the minimum which will be implemented; however, appropriate adjustments to silt fence installation will be made as conditions change during construction. Illustrations of the proper use and installation of silt fence are provided in Appendix C Figures 15 through 18.

Silt fencing will be placed an adequate distance (6 to10 feet) beyond the toe of the slope, where there is sufficient room to allow for sediment accumulation between the disturbed area and the down-gradient water resources. If there is not sufficient room to place the silt fence an adequate distance beyond the toe of the slope, the barrier will be installed along the contour, within reason. The goal is to slow and pool sediment-laden runoff to allow fine sediments to settle out before the runoff enters a water resource. The ends of the barrier will be turned up-slope to maintain the barrier volume.

A trench will be excavated approximately 6 inches wide and 6 inches deep on the up-slope side of the silt fence alignment. The lower edge of the silt fence fabric will be entrenched for a distance of at least 6 inches up-slope and then back-filled. Should frozen or rocky ground conditions prevent the effective or practical use of trenching, materials such as bark/wood chips, wood fiber mulch, or a soil erosion control mixture can be used. This material is to be mounded on top of at least 8 inches of filter fabric placed on the ground surface, which would otherwise be trenched.

Silt fence will be installed in a continuous roll to avoid a joint between different pieces of fence. If joints are necessary, filter fabric will be “spliced” together at a support post, securely sealed, and with a minimum of 6 inches of overlap. Splicing rolls of silt fence entails twisting end posts together, creating a continuous section of silt fence.

Support posts will be placed on the down-slope side or the side closest to or facing the water resource. The posts will be placed 6 feet apart (a maximum of 10 feet may be acceptable in some locations), and driven securely into the ground, typically about 18 inches deep. If ponded water behind the silt fence is anticipated or occurs, additional stakes will be added for support and attached to the fabric with staples or zip-ties.

Silt fence will not be installed in streams or drainageways where water flow is present or where concentrated flows that could undercut the barrier are anticipated.

7.2.4 Maintenance

Once a week, or after rainstorms producing at least ½ inch of rainfall, whichever is more frequent, the contractor will inspect all temporary erosion and sediment control barriers. During a prolonged rainfall, barriers will be inspected at least daily. Such inspection is necessary to ensure that the barriers are functioning properly as well as identifying new areas requiring installation. A maintenance log will be kept of all erosion control changes, improvements, and maintenance performed.

If any barriers are not functioning properly, they will be repaired or replaced. A sediment control barrier is not functioning if:

- Water is flowing around the sides or under the barrier.
- Soil has built up behind the barrier to the point more than half-way up the fence.
- There is excessive sag in the fence.
- There is evidence of sedimentation such as gully erosion, slumping of banks, or the discoloration of water outside of the perimeter silt fence.

Corrective measures include removing accumulated sediment from behind the barrier, restaking, extending the ends of the fence, installing another fence further upslope, or replacing the fence with a stone check dam in areas of significant concentrated flow. Soil removed from behind a barrier will be spread in an upland area and will be stabilized with mulch.

7.2.5 Removal

Installed silt fence will be removed once it is evident that the soils have become stabilized and the potential for erosion no longer exists, generally reflected by a healthy growth of vegetation over at least 90 percent of the stabilized area (Section 10.0). In most cases, the silt fence will not be removed until at least one growing season has past. Removal of silt fence will be coordinated with TransCanada or its designated representative.

Any ridges or mounds of soil or caught sediment remaining in place after the silt fence has been removed will be leveled-off to conform to the existing grade. Any newly exposed soil that may erode will be seeded and mulched. All removed silt fence will be properly disposed of at a licensed solid waste facility.

7.3 Use of Erosion Control Mix Berms

Erosion control mix berms are practical and effective in most situations, but are especially suited for frozen ground, outcrops of bedrock, and forested areas with many roots where silt fence or hay bales cannot be effectively anchored. Erosion control mix consists primarily of organic materials such as wood chips, waste wood, bark mulch or similar materials. Construction debris and reprocessed wood products are not acceptable for use in erosion control mix. Erosion control mix can be manufactured on or off site, and will contain a well-graded mix of particle sizes and may contain rocks up to 4 inches in diameter and some soil. TransCanada anticipates manufacturing erosion control mix on site, utilizing stumps and other clearing debris. Any erosion control mix used on the Kibby Expansion Project will have:

- organic matter content between 80 and 100 percent (dry weight);
- 100 percent of particles passing a 6-inch screen;
- the organic portion will be fibrous and elongated,
- only small proportions of silts, clays, or fine sands; and
- pH between 5.0 and 8.0.

When using erosion control mix, a continuous berm is placed between the earth work and the resource being protected as discussed below.

7.3.1 Installation

Illustration of a cross-section of a properly installed erosion control mix berm is provided in Appendix C, Figure 23. As with other barriers, to be most effective these berms must be placed along the contour of the slope. It will be necessary to cut tall grasses or woody vegetation to avoid creating voids and “bridges” that may enable runoff and sediment to wash under the barrier. For erosion control mix berms on slopes less than 25 percent (4:1), the barrier must be a minimum of one foot deep and a minimum of 2 feet wide. On longer or steeper slopes, the barrier must be wider to accommodate additional runoff.

Erosion control mix berms will not be used at low points of concentrated runoff, below culvert outlet aprons, around catch basins and closed storm systems, in areas of forceful winds, and at the bottom of steep perimeter slopes that have large watersheds.

7.3.2 Maintenance

Once a week, or after rainstorms producing at least ½ inch of rainfall, whichever is more frequent, the contractor will inspect all temporary erosion and sediment control barriers. During a prolonged rainfall, barriers will be inspected at least daily. Such inspection is necessary to ensure the berms are functioning properly as well as identifying new areas requiring installation. A maintenance log will be kept of all erosion control changes, improvements, and maintenance performed. If any of the erosion control mix berms are not functioning properly, they will be repaired or replaced. A sediment barrier is not functioning if:

- Water is flowing around the sides or under the barrier.
- Soil has built up behind the barrier to the point more than half-way up the barrier or where there is excessive lean to the barrier.
- There is evidence of sedimentation such as gully erosion, slumping of banks, or the discoloration of water outside of the barrier.

Corrective measures include removing accumulated sediment from behind the barrier, re-staking, extending the barrier at the ends, reshaping the erosion control mix berm, or installing another barrier further up-slope.

8.0 TREATMENT OF CONCENTRATED FLOW

Where runoff from disturbed areas was transported via concentrated flow, sediment traps or check dams were used to treat the sediment laden runoff before leaving the site.

8.1 Materials

Sediment traps are to be constructed of Filtrexx socks, as shown on detail 3, sheet 0026, in the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines. The Filtrexx sediment trap was chosen to reduce the limit of disturbance in steep slopes as well as ease of installation and removal.

Check dams can either be constructed of stone or hay bales. Stone check dams are to be constructed of 2 to 3 inch stone. All hay bales are to either be wire bound or string tied. See Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, details 3 and 4 on sheet 0027.

8.2 Placement

Sediment traps are to be placed at the proposed outfall locations of road-side ditches carrying concentrated sediment laden runoff. These sediment trap locations will be re-graded into ditch turnouts or level spreaders once the road surface and cut slopes are stabilized. Sediment traps will also be installed, in some situations, at the toe of fill slopes where a channel is formed between fill and existing ground.

Check dams will be placed along the toe of fill slopes where a channel is formed between the fill slope and existing ground. A temporary diversion berm will divert off-site water around this toe of slope channel.

8.2.1 Installation

Filtrexx Sediment traps are to be installed per detail 3, sheet 0026, in the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, and manufacturers instructions. Sediment traps are to be installed with the outflow lip parallel to the existing contours.

Rock check dams are to be installed along channels and placed from downstream to upstream so that the toe of the upstream check dam is at the same elevation as the top of the downstream check dam. Rock check dams are to be constructed by piling 2 to 3 inch stone to a height of 2 feet with 2:1 sideslopes. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to ensure the center of the dam is lower than the edges. See Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, detail 4, sheet 0027, for proper installation.

Hay bales shall be placed in a single row, across the swale, tightly abutting one another. All bales shall be either wire-bound or string-tied. Bales shall be installed so that bindings are oriented around the sides, parallel to the ground surface to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. At least two stakes or rebars driven through the bale shall securely anchor each bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or re-bars shall be driven deep enough into the ground to securely anchor the bales. The gaps between bales shall be chinked (filled by wedging) with hay to prevent water from escaping between the bales. See Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines, detail 3, sheet 0027, for proper installation.

8.2.2 Maintenance

Once a week, or after rainstorms producing at least ½ inch of rainfall, whichever is more frequent, the contractor will inspect all sediment traps. During a prolonged rainfall, sediment traps will be inspected at least daily. Such inspection is necessary to ensure the sediment traps are functioning properly. A maintenance log will be kept of all erosion control changes, improvements, and maintenance performed. If any of the sediment traps are not functioning properly, they will be repaired or replaced. A sediment trap is not functioning if:

- Water is flowing around the sides or under the trap.
- Soil has built up in the trap to the point more than half-way up the trap or where there is excessive lean to the trap.

Corrective measures include removing accumulated sediment from inside the trap, re-staking, enlarging the trap, re-orienting the trap, or installing another trap further up-slope.

For check dams, regular inspections must be made to ensure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam must be corrected immediately. If evidence of siltation in the water is apparent downstream from the check dam, the check dam must be inspected and adjusted immediately. Check dams must be checked for sediment accumulation after each significant rainfall. Sediment must be removed when it reaches one half of the original height or before.

8.2.3 Removal

Sediment traps are to remain in place until all construction activities are complete and disturbed areas are stabilized. FIltrexx socks are to be removed and disposed of and the sediment trap footprint is to be re-graded into a ditch turnout or level spreader.

If it is possible, check dams are to be left in place permanently. Another option is to spread the material, i.e. stone or hay along the ditch invert to provide additional protection. In temporary ditches and swales, check dams must be removed and the ditch filled in when it is no longer needed. In permanent structures, check dams can be removed when a permanent lining has been established. If a check dam must be removed from a grass lined ditch, wait until the grass has matured to protect the ditch or swale. The area beneath the check dam must be seeded and mulched immediately after they are removed.

9.0 NONSTRUCTURAL EROSION CONTROL MEASURES

9.1 Nonstructural Measures Defined

Nonstructural measures can be either temporary or permanent methods used to cover exposed soil areas to prevent erosion from occurring. Often these techniques and materials are used on slopes along roads, areas where soil has been regraded, and generally areas where the soil has been exposed. Their purpose is to cover the entire area of exposed soil to prevent initial erosion of soil from a construction site. Examples of nonstructural measures include hay or straw mulch, erosion control blankets, brush-slash-tops, matting, or seeding. There are two types of nonstructural measures: temporary and permanent. Temporary measures are typically used during construction, while permanent measures are usually applied after construction is complete (i.e., restoration).

9.2 Importance of Nonstructural Measures

Nonstructural measures are important because they provide both temporary and permanent protective cover to exposed soils. Generally, they provide the first line of protection against erosion, and can be the most effective means of erosion prevention. This protection is important because exposed soils are easily eroded by wind or water. Some soils such as silts can easily be removed from a construction site by rainwater. The impact of individual raindrops on exposed soils can loosen soil particles, and these particles can then be carried off the work site by runoff and deposited into water resources including streams, rivers, wetlands, ponds, and lakes. Silt particles stay suspended in water for prolonged period and siltation can pollute surface waters and harm aquatic creatures such as insects and fish.

Dry soil conditions and high winds can also cause siltation. When small particle soils such as silts become dry, they have a powder-like texture and can easily be swept away by winds. Nonstructural measures help prevent wind erosion because they hold moisture next to the soil, keep the soil from drying out due to wind exposure, and prevent winds from carrying away dry soil particles.

9.3 Placement of Nonstructural Measures

Nonstructural measures will be used whenever there is a possibility that exposed soils on a construction site could wash into adjacent sensitive water resources, and where a barrier will not protect exposed soil from rain and runoff. Temporary nonstructural measures such as hay or straw mulch will be spread on all exposed soils within 100 feet of water resources within 48 hours of initial soil disturbance, or before any predicted storm event. Mulch will also be applied immediately to areas that have been seeded. All mulch materials will receive periodic inspection by the contractor (especially after rainstorms) to be sure that they are covering the soil they are meant to protect and are functioning properly. Mulches that are removed by excessive flow or wind will be replaced or reinstalled.

9.3.1 Temporary Measures

Temporary, nonstructural erosion control measures are summarized in Table 7 and include the following:

- Hay or straw mulch (unanchored on slopes less than eight percent, anchored on slopes greater than eight percent) on exposed soil areas and soil stockpiles in the construction area. Appendix C, Figure 24 illustrates proper mulch anchoring using netting.
- Between April 16 and October 31, temporary seeding covered by hay or straw mulch on soil stockpiles or areas of exposed soil within 100 feet of sensitive resources that are not scheduled for final restoration for 30 days. Temporary seeding is not required during the winter construction season; however, daily mulching is required on all exposed soils, including those exposed during winter, followed by temporary or permanent seeding, as appropriate, as soon as growing conditions allow. (See Section 9.0 for details of winter construction.)
- Erosion control mix (as described in Section 7.4) can be used as slope reinforcement or mulch on slopes that are 4:1 or less, on frozen ground or forested areas, and at the edge of gravel parking areas and active construction areas. Erosion control mix will be applied 2 inches thick plus an additional 1/2 inch per 20 feet of slope up to 100 feet (e.g., 3 inches thick for 60 feet of slope; 4 inches thick for 100 feet of slope). For slopes between 3:1 and 2:1, erosion control mix will be applied 4 inches thick

plus an additional 1/2 inch per 20 feet of slope up to 100 feet (e.g., 5 inches thick for 60 feet of slope; 6 inches thick for 100 feet of slope).

- Erosion control mix must be spread evenly and must provide 100 percent soil coverage.
- Erosion control mix will not support grass, but will support clover and other legumes and woody vegetation. Vegetation can be promoted by seeding, or it can be left to occur naturally.
- Curlex or jute matting (also known as erosion control blankets) can be used on areas of high wind exposure, slopes steeper than eight percent grade, unstable soils, and stream/river bank restoration areas. Matting is typically anchored with large staples, as recommended by the manufacturer (Appendix C, Figure 25). Although this type of material is usually used during final restoration, it is considered a temporary measure because it generally deteriorates within two years.
- Brush-slash-tops include woody pieces removed from trees that are otherwise unusable. These items can be placed on skidder trails as the machines cut and remove timber. This debris reduces the opportunity for skidder tires to sink into soft soil when they are spread out along the skidder trail.

TABLE 7. TEMPORARY NONSTRUCTURAL EROSION CONTROL MEASURE SUMMARY

Mulch on slopes less than 8%	Within 100 feet of wetlands or waterbodies apply hay and/or straw mulch at a minimum of 70 lbs./1,000 square feet of exposed soil (about 2 bales). Must be done within 48 hours of initial soil disturbance and before storm forecasted events, unless specified otherwise.
Mulch on slopes greater than 8%	Hay or straw mulch can be applied without being anchored, unless specific site conditions may require use of anchoring.
Temporary seeding in uplands	Within 100 feet of wetlands or waterbodies, apply annual ryegrass at 1 lb./1,000 square feet. Mulch with hay or straw. Must be done if final restoration is not scheduled within 30 days.
Temporary seeding in wetlands	If required, apply annual ryegrass at a rate of 1 lb./1,000 square feet and cover with only **straw** mulch. Do not add lime or fertilizer to wetlands. When in doubt, ask the TransCanada representative.
Temporary seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-10-10 fertilizer may be applied at a rate of 600 lbs./acre and limestone at 3 tons/acre.

9.3.2 Permanent Measures

Permanent measures included the following:

- Permanent grass and/or legume seeding covered by hay or straw mulch on all areas that have been restored to final grade. This is required to establish permanent, perennial, vegetative cover on exposed soils. This seeding generally applies between April 16 and October 31. Permanent seeding is not required during the winter construction season, although dormant seeding may be performed (See Section 9.0).
- Seeding covered by anchored Curlex or jute matting in areas of high wind exposure, on slopes steeper than eight percent grade, unstable soils, and stream/river bank restoration areas. Generally the matting provides temporary protection while the vegetation becomes established.
- Proper soil preparation before any seed is placed on the ground, as necessary. Soil preparation may include addition of lime and fertilizer in areas that have not been tested, or in areas that have been tested and are found to be deficient in plant nutrients. Lime and fertilizer will only be used in designated upland areas and never within waterbody buffer zones.

Summary information regarding proper permanent seed mix, application rates, locations, and mulching requirements is provided in Section 10.0 and Table 9.

10.0 WINTER CONSTRUCTION CONSIDERATIONS

In general, construction in the turbine area will not take place during winter frozen ground conditions. Limited activities, such as survey, tree clearing, and collector line construction are the only activities likely to occur in the turbine construction area. Properly conducted winter construction, however, may provide a unique opportunity to complete work along the transmission line in and around sensitive resources with a minimum of environmental impact. For instance, construction of the Kibby Expansion Project 115 kV transmission line in wetlands is anticipated to be completed during frozen ground conditions as much as possible.

Construction activities that are conducted between November 1 and April 15 will follow the erosion and sediment control BMPs that were developed by the DEP for winter construction, as applicable (BMP A-3 in the DEP *Maine Erosion and Sedimentation Control BMPs*). More frequent, heavier application of temporary mulch, increased dormant seeding rates, the substitution or additional use of erosion control mix berms in erosion control barriers and other supplemental erosion controls will be used, as required.

However, it is important to note that following the winter construction BMPs may not be necessary at all times during winter construction, and in some situations their use may increase the potential for erosion and sedimentation. For example, if there is no snow on the ground or the ground is not frozen by November 1, or at any time during winter construction, silt fencing will be installed if it can be properly anchored. Similarly, if saturated or inundated wetlands are not frozen, all work will be performed from construction mats. Also, if the ground thaws and the snow is gone before April 15, resumption of the standard BMPs may be appropriate. Temporary bridges will still be used for all stream crossings, regardless of the season or frozen ground or stream conditions. All areas stabilized during the winter construction period will be inspected once snow cover is gone in the spring and remedial measures taken as needed.

Table 8 highlights some of the major differences between winter construction and typical construction season BMPs. The table presents differences for temporary erosion control and stabilization measures that will be used during construction, and permanent measures when construction is completed.

TABLE 8. SEASONAL DIFFERENCES IN CONSTRUCTION BMP REQUIREMENTS

Control Measure	General Construction	Winter Construction
	April 16 through October 31	November 1 through April 15
Mulch on slopes less than 8%	Within 100 feet of wetlands or waterbodies apply hay and/or straw mulch at a minimum of 70 lbs/1,000 square feet of exposed soil (about 2 bales). Must be done within 7 days of initial soil disturbance and before storm forecasted events.	Within 100 feet of wetlands or waterbodies apply and maintain properly anchored hay and/or straw mulch at a minimum of 150 lbs/1,000 square feet of exposed soil (about 5 bales) at all times (double the April 16 – October 31 rate). Or apply anchored erosion control mats or the appropriate layer of erosion control mix (Section 8.3.1). Do not apply mulch on top of more than 1 inch of snow. Remove snow as necessary. Apply anchored mulch after each day of final grading.
Mulch on slopes greater than 8%	Hay or straw mulch can be applied without being anchored, though specific site conditions may require use of anchoring.	Apply mulch as specified above and anchor with Curlex, jute matting, or similar mulch netting. Erosion control mix can be used on slopes in place of anchored hay or straw mulch.
Area of exposed soils allowed at any one time	No restriction on area exposed, but contractor must attempt to minimize amount of exposed soil at any one time, especially next to water resources.	Not more than 1 acre of exposed (not mulched or otherwise devoid of vegetative cover) soil.
Sediment barriers	A single line of sediment barriers including silt fence or erosion control mix filter berms must be installed between water resources and disturbed soils.	If soil is frozen, use erosion control mix filter berms in place of silt fence sediment barriers. After Dec. 1, install 2 lines of sediment barriers if wetlands or waterbodies are within 100 feet of disturbed soils.
Temporary seeding in uplands	If required, apply annual ryegrass at 1 lb/1,000 square feet. Mulch with hay or straw.	Not required, but if temporary seeding is desired, it must be applied at a rate 2 times higher than the General Construction Season, and covered with mulch.
Temporary seeding in wetlands	If required, apply annual ryegrass at a rate of 1 lb/1,000 square feet and cover with straw mulch. Do not add lime or fertilizer to wetlands. When in doubt, ask the TransCanada representative.	Not required, but if temporary seeding is desired, it can be applied at a rate 3 times higher than the General Construction Season, and covered with straw mulch. Apply only annual rye grass and do not add lime or fertilizer.
Permanent seeding in uplands	Apply seed mixture and mulch as specified in Table 8.	Not required before April 16, but if dormant seeding is desired, the site will receive an adequate cover of loam, if necessary, be seeded at a rate 2 times higher than the General Construction Season, and covered with mulch at a minimum of 150 lbs/1,000 square feet.

TABLE 8. SEASONAL DIFFERENCES IN CONSTRUCTION BMP REQUIREMENTS

Control Measure	General Construction	Winter Construction
	April 16 through October 31	November 1 through April 15
Permanent seeding in wetlands	If required, apply annual ryegrass at a rate of 1 lb/1,000 square feet and mulch with straw. Do not add lime or fertilizer to wetlands.	Not required, but if temporary seeding is desired it can be applied at a rate 2 times higher than the General Construction Season, and covered with straw mulch. Do not add lime or fertilizer.
Temporary seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-10-10 fertilizer may be applied at a rate of 600 lb/acre and limestone at 3 tons/acre.	Not required, but seedbed can be prepared according to General Construction requirements.
Permanent seedbed preparation	Apply limestone and fertilizer (uplands only) according to soil test data. If soil test is not possible, 10-20-20 fertilizer may be applied at a rate of 800 lbs/acre and limestone at 3 tons/acre.	Not required before April 16, but if dormant seeding is desired, the seedbed can be prepared according to the General Construction requirements.
Inspection and monitoring	Erosion controls will be inspected weekly and after a ½ inch or greater rain storm to ensure proper function. Monitoring will be performed until a new, healthy vegetative cover is attained over at least 90% of the site. This applies to both temporary and permanent seeding.	Monitoring will be performed weekly during all periods when significant runoff could occur to ensure proper stabilization and re-vegetation (both temporary and permanent). Starting in the spring following completion of the project, inspections will be performed. Areas with less than 75% vegetated cover will be reseeded and mulched and monitoring continued until a new, healthy vegetative cover is attained over at least 90% of the site.
Maintenance of erosion controls	If any evidence of erosion or sedimentation is evident, repairs will be made to existing controls or other methods will be used.	If any evidence of erosion or sedimentation is evident, repairs will be made to existing controls or other methods will be used.

11.0 SITE RESTORATION STANDARDS

Following completion of the construction work, the contractor will be responsible for conducting site restoration work. The following guidelines will apply to all activities, including temporary and permanent roads, stream/wetland crossings, staging and work areas.

11.1 General Procedures

Near the completion of construction, TransCanada or its designated representative and the contractor will review the project restoration needs and prioritize the restoration work to be completed. This prioritization will consider time of year, ground conditions, re-vegetation probabilities, and equipment availability. A restoration "walk-through" will be conducted with the contractor and TransCanada's representative.

Highest priority restoration areas include, but are not limited to:

- All wetland, stream, or brook crossings, particularly the disturbed areas within 100 feet and stream banks;
- Drainage ways or ditches;
- Cut/fill banks and steep slopes (over eight percent);
- Around the substation construction area;
- Around pole and anchor pole placement; and
- All temporary access roads, ROW travel corridors, yarding, and construction laydown areas.

11.2 Methods of Restoration

All soil that is excavated, mounded, or deposited during construction will be regraded. All regrading and redistribution of soil will be completed to approximate existing grades. The banks of streams and rivers will be restored to natural conditions as much as practicable. In general, logs, timbers, construction mats or other material or any structure used at temporary crossings will be removed, and the banks restored to their original depth and contour. Any bridge materials or support culverts within the channel will be removed.

All construction mats used to cross or work in wetlands will be removed and any surface damage repaired, as needed. Exposed wetland soils will be stabilized by seeding with annual rye. Any construction mats, corduroy logs or bridges used to protect water resources on construction access roads will be removed and the road surface re-graded to original conditions, as needed.

Previously installed water bars may remain or new ones will be installed at locations designated by a TransCanada representative. Permanent water bars will be constructed to a sufficient height and width to divert the amount of water anticipated at each location as well as to provide some post-project permanence to the site. Water bars will be permanently seeded to ensure their long-term stability.

All areas severely rutted by construction equipment will be regraded and permanently revegetated. Upon completion of the project, all areas of exposed soil will be permanently revegetated or otherwise permanently stabilized. Lime, fertilizer, seed and hay or straw mulch will be applied in upland areas as specified in Table 9.

TABLE 9. PERMANENT SEEDING SPECIFICATIONS

Type of Area	Soil Amendments	Seed Mix Components/(varieties)	Seed Rate (lbs/acre[1])	Mulch (tons/acre)
Uplands[2,3]	Apply ground limestone at 3 tons/acre	Creeping red fescue/(Pennlawn, Ensyla, Wintergreen)	20	1.5-2 (90 -100 bales)
	Apply 10-20-20 fertilizer at 800 lbs/acre	Redtop/(any native species)	2	
		Tall fescue/(Kentucky 31)	20	
Wetlands	None	Annual ryegrass/(any native species)	40	1.5-2[4] (90 -100 bales)

1. Increase seeding rates by 10% when hydroseeding.
2. Add winter rye to the mix at a rate of 120 lb/acre after October 1.
3. Do not lime or fertilize any areas within the waterbody buffers.
4. Mulch wetlands with weed-free straw only.

The contractor will be responsible for the proper maintenance of all revegetated areas until the project has been completed and accepted by TransCanada. Where seeded areas have become eroded or damaged by construction operations, or where poor germination is observed, the affected areas will be promptly re-graded, limed, fertilized, and re-seeded as needed. Areas that are revegetated following construction activities will be considered properly stabilized when healthy vegetation covers at least 90 percent of the seeded area unless adjacent, undisturbed areas indicate that achieving that level of vegetation in the area is unlikely.

The contractor will perform all erosion control work to the complete satisfaction of TransCanada before the work is accepted. TransCanada will base acceptance of the erosion control and stabilization work on a final inspection.

11.3 Timing of Restoration

Final restoration of areas disturbed by construction will be completed within the following time periods:

- At permanent river, stream or brook crossings, complete final restoration (finish grade, seed and mulch) of all areas within 100 feet of the waterbody within 48 hours of the final grading, unless specified otherwise.
- At temporary river, stream or brook crossings, complete final restoration (finish grade, seed and mulch) of all areas within 100 feet of the waterbody within 48 hours of the removal of the crossing, unless specified otherwise.
- Complete final restoration of all other areas within 100 feet of the waterbody or wetland within 48 hours of final grading.
- Complete final restoration of all other areas within 7 days of final grading.

12.0 SUPERVISION AND INSPECTION

To effectively mitigate project-related impacts, the Kibby Expansion Project E&S Plan must be properly implemented. Field decisions may be required regarding timing of construction activities and erosion and sedimentation control measures, proper placement and installation of erosion controls, restoration and revegetation and other construction-related items. Construction will be continually monitored and inspected in the field for compliance with the E&S Plan, as well as other environmental permit requirements and regulations, through the combined efforts of the contractors and TransCanada representatives. A description of the responsibilities of each of these groups for supervising and inspecting construction activity and sites for compliance with the E&S Plan is provided below.

12.1 Contractor Representative

All contractors working on construction of the Kibby Expansion Project will be required to designate an individual that is present on the ROW on a daily basis as the contractor's representative. The contractor representative will be responsible for monitoring the activities of its employees for compliance with the E&S Plan and other environmental permit requirements. The contractor representative will work closely with its personnel and TransCanada to ensure compliance. The contractor representative will be responsible for completing the Contractor's Weekly Inspection Form of Erosion and Sedimentation Control Measures, included in Appendix D.

12.2 TransCanada Representative

To ensure proper implementation of the erosion control plan, TransCanada employees or representatives will be assigned as environmental inspectors and be on the project site during active construction. The environmental inspectors will supervise the environmental aspects of construction activities and will report directly to the TransCanada construction field supervisor(s). TransCanada environmental inspectors will have the authority to stop activities that violate the environmental conditions of the E&S Plan or other permit requirements and order corrective action. The environmental inspectors will have construction experience, be experienced in erosion control techniques and have an understanding of the wetland and waterbody resources required to be protected.

Responsibilities of the TransCanada environmental inspectors include working with the contractor to ensure project compliance with all environmental requirements permits and approvals, and the contractor has performed erosion control work that meets the applicable standards. Specific duties include: participation in the pre-construction and post-construction walk-throughs; verifying and marking the location of sensitive resource areas; verifying that all authorized construction work areas are marked before clearing; verifying the proper installation and maintenance of erosion control devices; verifying the repair of all ineffective temporary erosion control measures within 24 hours of identification; determining corrective action and implementation of additional measures deemed necessary based on field or weather conditions; working with the contractors and TransCanada to ensure compliance with environmental permit conditions and the spill prevention and control plan; documentation of temporary and permanent revegetation programs; verifying restoration of contours and topsoil; and coordination with environmental regulatory agencies.

The TransCanada environmental inspectors will participate in the pre-construction walk-through of the ROW, followed by a meeting with the construction field supervisor(s) and the contractors to determine the sequence of construction and the placement of erosion control measures to be employed. The environmental inspectors will also participate in periodic coordination meetings with the construction field supervisor(s) and contractor personnel during construction. In addition, the environmental inspectors will perform independent inspection of erosion control devices to ensure proper functioning in areas of active construction. Furthermore, field inspections and documentation of erosion controls will be conducted on a weekly basis in areas with no construction, and following major storm events. The environmental inspector will keep records of compliance with the environmental conditions and mitigation measures required by federal and state environmental permits during active construction and restoration.

13.0 ENVIRONMENTAL TRAINING FOR CONTRACTORS

Environmental training will be provided by TransCanada to both TransCanada and contractor personnel whose activities or responsibilities could impact the environment during project construction. The level of training will be commensurate with the type of duties of the personnel. All personnel who will be working at a construction site at any time during construction, will be provided environmental training relating to erosion and sedimentation control before being allowed access to a construction site. The training will be given prior to the start of construction with refresher training provided on a monthly basis throughout the construction process to reinforce the importance of compliance with environmental requirements, and identify potential changes in erosion and sedimentation control or other requirements that have occurred during construction.

The training program will cover LURC standards, DEP standards, the Maine Erosion and Sedimentation Control Law, this E&S Plan, Maine Pollutant Discharge Elimination System (MPDES) Construction General Permit requirements for storm water management, the Spill Prevention Control and Countermeasure Plan, threatened and endangered species restrictions, job-specific permit conditions, TransCanada company policies, and any other pertinent information related to the job. In addition to the environmental compliance officer and other inspectors, the construction field supervisor(s) and all construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction. A record will be kept of the date, location, attendees and topics covered at all training sessions.

APPENDIX A
DEFINITION OF TERMS

APPENDIX A

DEFINITION OF TERMS

Adjacent to a natural resource: Within 100 feet or in a position to wash into a water resource (river, stream, brook, pond, wetland, or tidal area).

Annual seed mix: Seed mixture largely made up of plants that only persist one growing season.

Brook: Essentially the same as a stream, a water course that has a defined channel, a gravel, sand, rock or clay base, and flows at least part of the year. It may be a dry channel part of the year.

Corduroy: Logs greater than 3 inches in diameter at the small end and at least 18 feet long that are placed perpendicular to travel direction, on approaches to and in wetlands for crossings. The purpose of the logs is to prevent rutting and preserve vegetation root integrity in and adjacent to wetland areas. May also be used on approaches to mats or bridge stream crossings.

Crossing: Any activity extending from one side to the opposite side of a sensitive natural resource whether under, through, or over that resource. Such activities include, but are not limited to, roads, fords, bridges, culverts, utility lines, water lines, sewer lines, and cables, as well as maintenance work on these crossings. Crossings should be done to minimize impact. For example, crossing at a right angle to the resource and finding the driest or narrowest spot is one method for minimizing impact.

Cross-sectional area: The cross-sectional area of a stream channel is determined by multiplying the stream channel width by the average stream channel depth. The stream channel width is the straight-line distance from the normal high water line on one side of the channel to the normal high water line on the opposite side of the channel. The average stream channel depth is the average of the vertical distances from a straight line between the normal high water marks of the stream channel to the bottom of the channel.

Culvert: A pipe or box structure of wood, metal, plastic, or concrete used to convey water.

Erosion: Movement of earthen material by water or wind.

Erosion control blanket (matting): Manufactured material made out of natural or synthetic fiber designed to control movement of earthen material when installed properly.

Erosion control mix: Erosion control mix consists primarily of organic materials such as shredded bark, wood chips, stump grindings, composted bark, or similar materials. Ground construction debris or reprocessed wood products are not acceptable for use in erosion control mix. It contains a well-graded mix of particle sizes and may contain rocks up to 4 inches in diameter. Properly manufactured mix will have organic matter content between 80 and 100 percent (dry weight), 100 percent of particles must pass a 6-inch screen, the organic portion needs to be fibrous and elongated, only small proportions of silts, clays, or fine sand, and a pH between 5.0 and 8.0. Its applications include erosion control berms and mulch.

Erosion control plans: Written guidelines specific to a project or activity, describing various techniques and methods to control erosion for specific construction activities.

Fill: Any earth, rock, gravel, sand, silt, clay, peat, or debris that is put into or upon, supplied to, or allowed to enter a water body or wetland. Material, other than structures, placed in or adjacent to a water body or wetland.

Filter strip: Undisturbed areas of ground consisting of natural vegetation and natural litter such as leaves, brush, and branches, located between a water resource and access road, skid road or trail, or other area of disturbed soil.

Ford: A permanent crossing of a stream utilizing an area of existing, non-erodible substrate of the stream, such as ledge or cobble, or by placing non-erodible material such as stone or geotextile on the stream bottom.

Geotextile, Non-woven: Synthetic material made of spun polypropylene fiber used to support wetland fill or stabilize soils.

Geotextile, Woven: Synthetic material of woven polypropylene used to stabilize soils and make sediment barriers (silt fence).

Great pond: An inland water body which in a natural state has a surface area in excess of 10 acres, and any inland water body which is artificially formed or increased which has a surface area in excess of 30 acres.

Intermittent watercourse: Water course that has water in it only part of the year. It is still considered a natural resource.

Mats: Pre-constructed, portable, timber platforms used to support equipment or travel in or over wetlands or water bodies.

Mulch: Temporary erosion control such as hay, bark, or some similar natural material utilized to stabilize disturbed soil.

Perennial seed mix: Seed mixture made up of seeds from plants that persist for several years.

Perennial watercourse: A river, stream, or brook depicted as a solid blue line on the most recent edition of a United States Geological Survey 7.5 minute series topographic map. Typically has water in it year round.

Permanent access road: Project access road that is not restored after project construction completion. Permanent access roads should be designed and constructed so they are not an erosion problem. They are associated with turbine access and none are currently anticipated to be constructed for the proposed 115 kV transmission line.

Permanent stabilization: Establishment of a permanent vegetative cover on exposed soils where perennial vegetation is needed for long-term protection.

Permanent vegetative cover: Perennial seed stock, including but not limited to grasses and legumes that persist for more than several growing seasons.

Protected Natural Resource: Coastal sand dune system, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds or rivers, streams, or brooks. This definition is taken from the Maine Natural Resources Protection Act dated August 23, 2006.

Riprap: Heavy, irregular-shaped rocks that are fit into place, usually without mortar, on a slope in order to stabilize and prevent soil erosion.

Sediment barrier: Staked hay bales, silt fence, or similar materials placed in a manner to intercept silt and sediment laden water runoff.

Sedimentation: Deposition of earthen material in a water body or wetland.

Sensitive Natural Resource: Area that deserves special attention because it is significant wildlife habitat, fisheries habitat, or has other natural resource values. These areas may require the use of minimum impact construction techniques such as use of mats, leaving vegetation intact for buffers, special timing of construction, or other specific techniques.

Settling basin (sediment/catch basin): Excavated pit placed to intercept water running off disturbed soils or dirt road bed. Usually used only where filter strip is inadequate to protect a stream, pond, or wetland from silt and sediment.

Silt fence: Woven geotextile sediment barrier. Proper installation requires placement on-contour and keying the fabric in at ground level.

Steep slopes: Slopes in excess of eight percent.

Stone check dam: A small, temporary dam constructed across a swale or drainage ditch. The purpose is to reduce the velocity of concentrated flows, reducing erosion and trapping sediment generated in the ditch.

Stream: Generally, a channel between defined banks with a gravel, sand, rock, or clay base that flows at least part of the year. It may be a dry channel part of the year. The Maine Natural Resources Protection Act contains a more detailed definition.

Structure: Anything built for the support, shelter, or enclosure of persons, animals, goods, or property of any kind, together with anything constructed or erected with a fixed location on or in the ground. Examples of structures include buildings, utility lines, and roads.

Temporary access road: Road constructed solely for project access which is restored to original grade upon project completion, if not sooner. All exposed soils on access road adjacent to water bodies or on slopes steeper than eight percent must be stabilized with a permanent seed mix and mulch or matting.

Temporary stabilization: Mulch, matting, or seed, or a combination thereof, utilized to stabilize soil. Soil stock piles left in place longer than 14 days must have temporary stabilization.

Temporary vegetative cover: An annual seed mixture, typically annual rye and oats.

Topography: The contour and elevation of the surface of the ground.

Turn out: Water diversion that directs water out of a ditch or off a travel-way and into a vegetated buffer.

Upland edge: The area of uplands alongside a wetland, stream, or water body.

Wastes requiring special handling: Wastes generated from construction activity including engine oil, hydraulic oil, gear oil, diesel, gasoline, or coolants.

Water bar: Constructed bar across an access road or skid trail that directs surface water off the road or trail into a stable vegetated surface or filter strip. They are used as a temporary measure on active roads or when closing roads permanently to prevent erosion.

Water body: River, stream, brook, pond, wetland, or tidal area.

Water resource: River, stream, brook, pond, wetland, or tidal area.

Wetland: An area that is inundated or saturated by surface or groundwater at a frequency and for a duration sufficient to support, and which under normal circumstance do support, a prevalence of wetland vegetation typically adapted for life in saturated soils. The Maine Natural Resources Protection Act contains a more detailed definition.

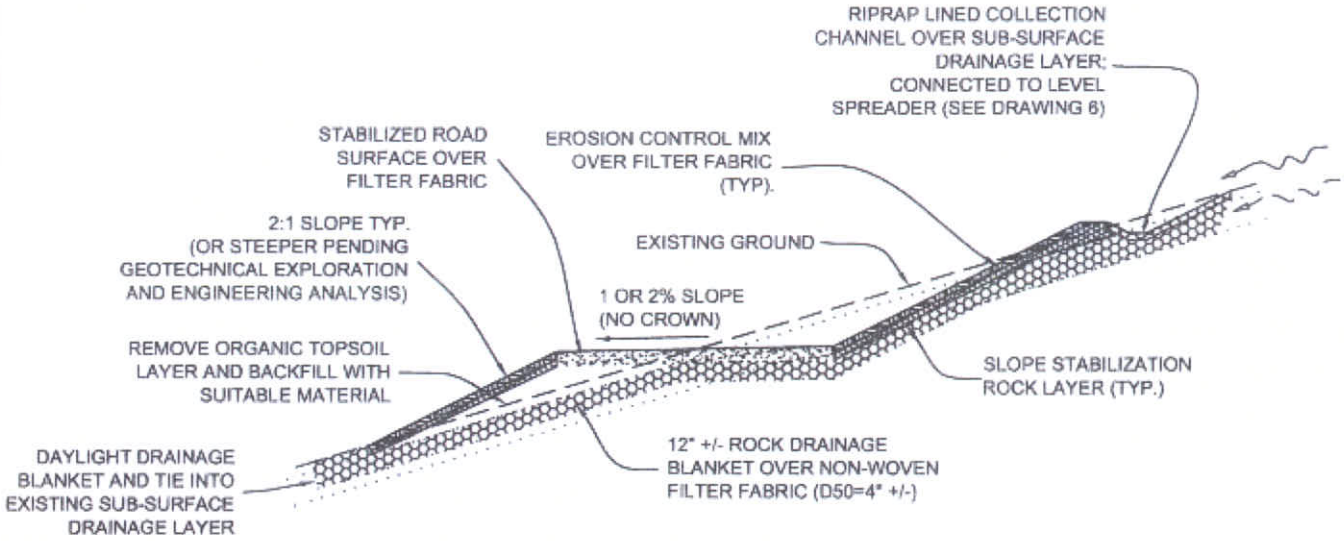
APPENDIX B
PROJECT CONTACT LIST

APPENDIX B

PROJECT CONTACT LIST

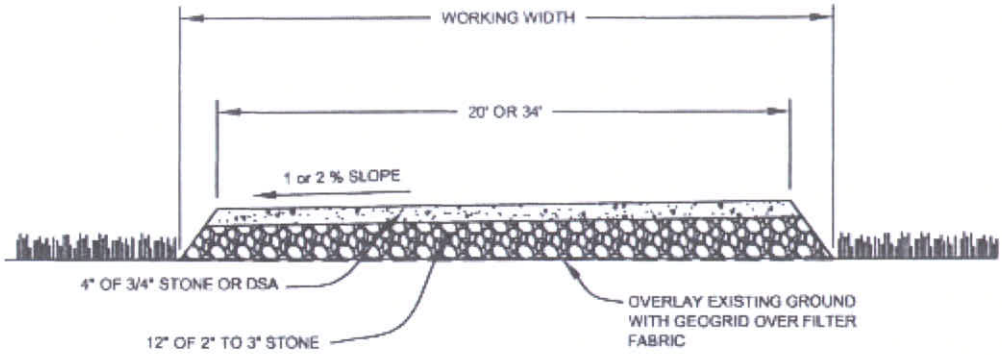
To be determined	Office:
TransCanada	Mobile:
Construction Project Manager	
To be determined	Office:
Lead Environmental Inspector	Mobile:
To be determined	Office:
Environmental Compliance Manager	Mobile:
To be determined	Office:
Land Agent	Mobile:
To be determined	Office:
Public Relations	Mobile:
Marcia Spencer-Famous	Office: (207) 287-2631
LURC Contact	Mobile:

APPENDIX C
CONSTRUCTION TECHNIQUE ILLUSTRATIONS
(Refer also to Erosion and Sediment Control Drawings in the Final Development Plan Application, Appendix F – Design Drawings – Roads and Turbines)



Note: The above drawing represents a situation where the roadway cuts into an existing slope with shallow groundwater; which may be managed using the drainage blanket or trench drains. These measures would not be necessary if the roadway does not cut into the subsurface drainage layer.

KIBBY EXPANSION WIND POWER PROJECT Original: 11-28-06 Revision 1: 12 06 06 Revision 2: 12-19-06	**Rock "Sandwich" Roadway Design**	TransCanada *In business to deliver* Figure 1



(NOT TO SCALE)

KIBBY EXPANSION
WIND POWER PROJECT

Original: 11-28-06
Revision 1: 12-05-06

Typical Road Section Wet Areas

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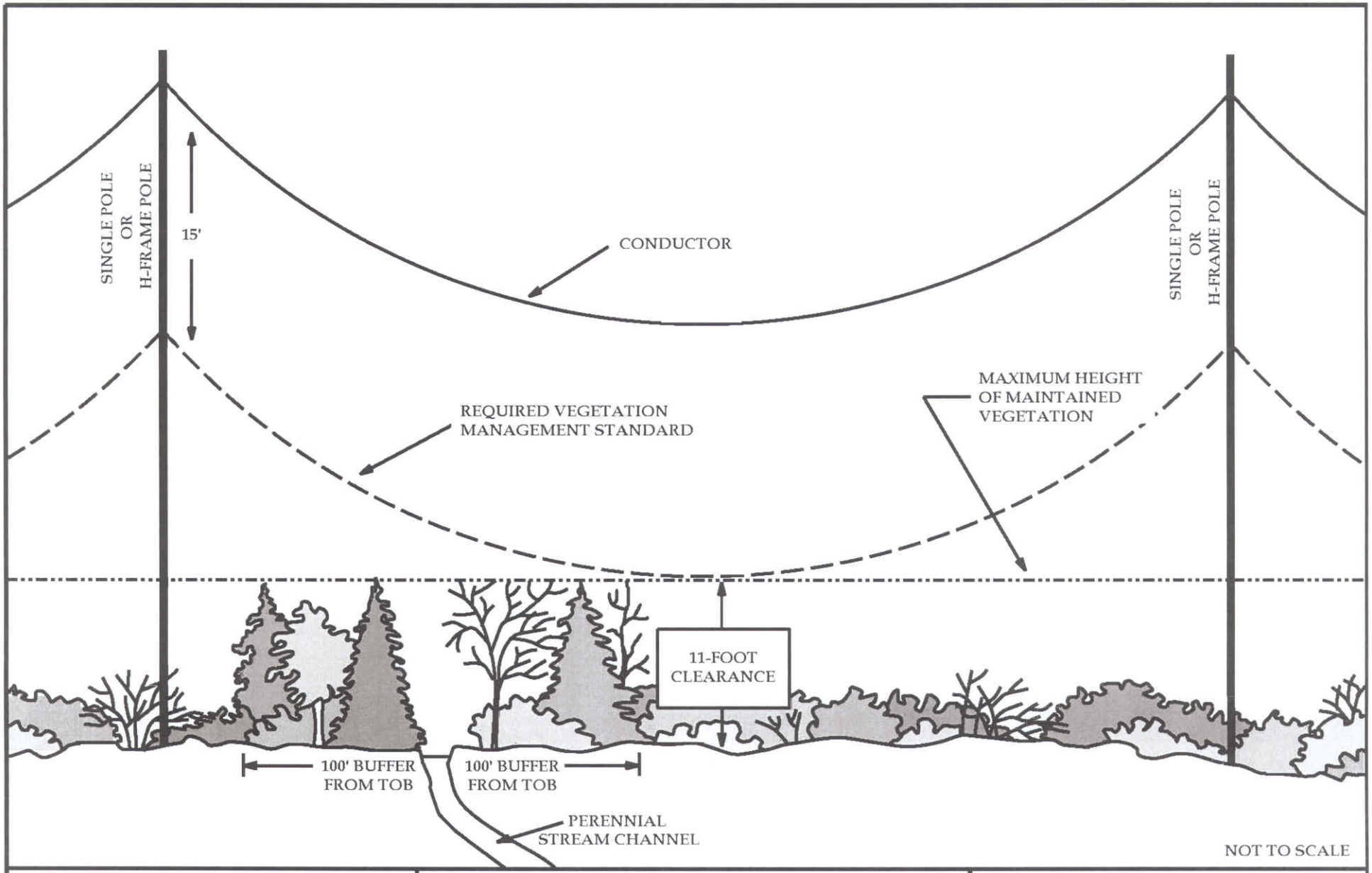
Figure 2



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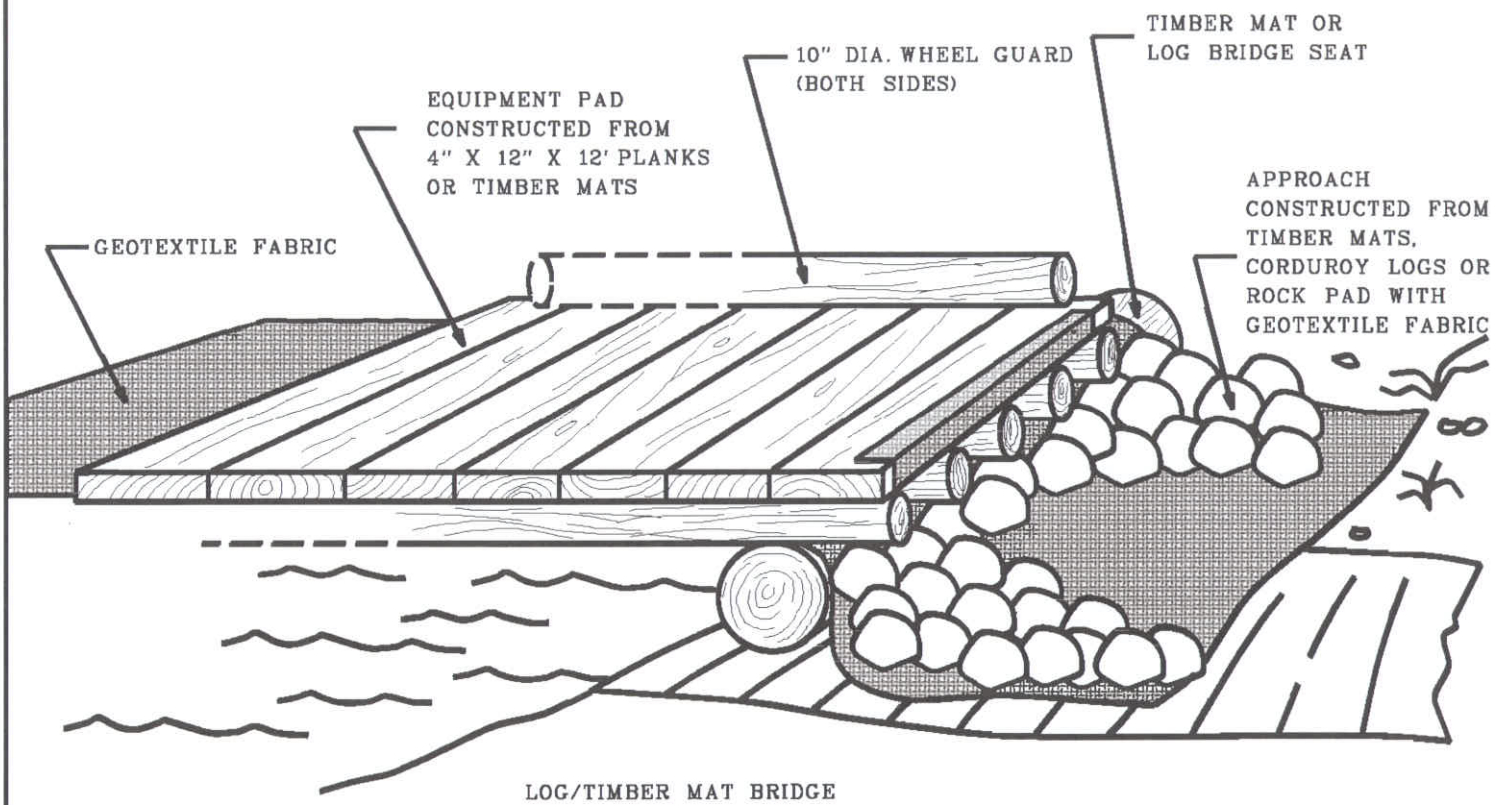
KIBBY EXPANSION WIND POWER PROJECT

FIGURE 3

TYPICAL ROW VEGETATION CLEARING / MAINTENANCE

SPAN	DIAMETER	
	(80,000 lb. load)	(40,000 lb. load)
8 ft.	16 in.	12 in
12 ft.	18 in.	14 in.
16 ft.	20 in.	16 in.



LOG/TIMBER MAT BRIDGE

(TEMPORARY)

NOTES:

1. Span small crossings with mats.
2. Add support culverts to stream if the stream is too wide to span with one mat length. (Ensure fish passage requirements)
3. Add geotextile fabric under equipment pad to prevent soil from entering stream.
4. Install wheel guards to ensure that soil does not spill over into stream.
5. Approaches to equipment pad may be timber mats, corduroy logs, or a rock pad over geotextile fabric.
6. Additional pads can be placed side by side if extra width is required.
7. Equipment pad typically contructed of hardwood; must accommodate the largest equipment utilized.

FIGURE 4
LOG / TIMBER MAT BRIDGE
KIBBY EXPANSION
WIND POWER PROJECT

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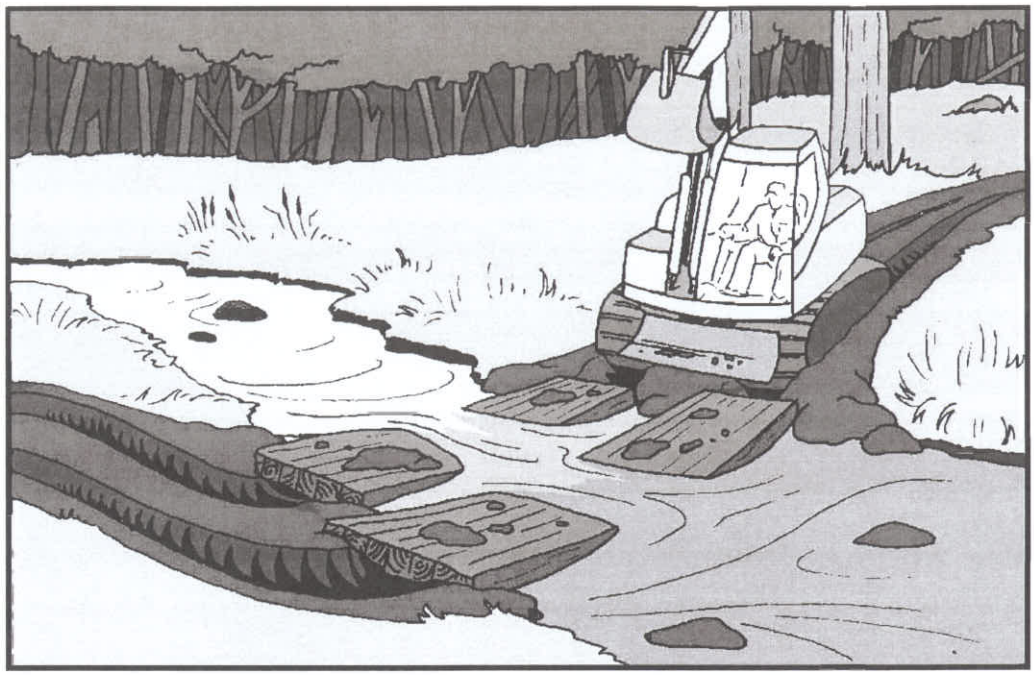
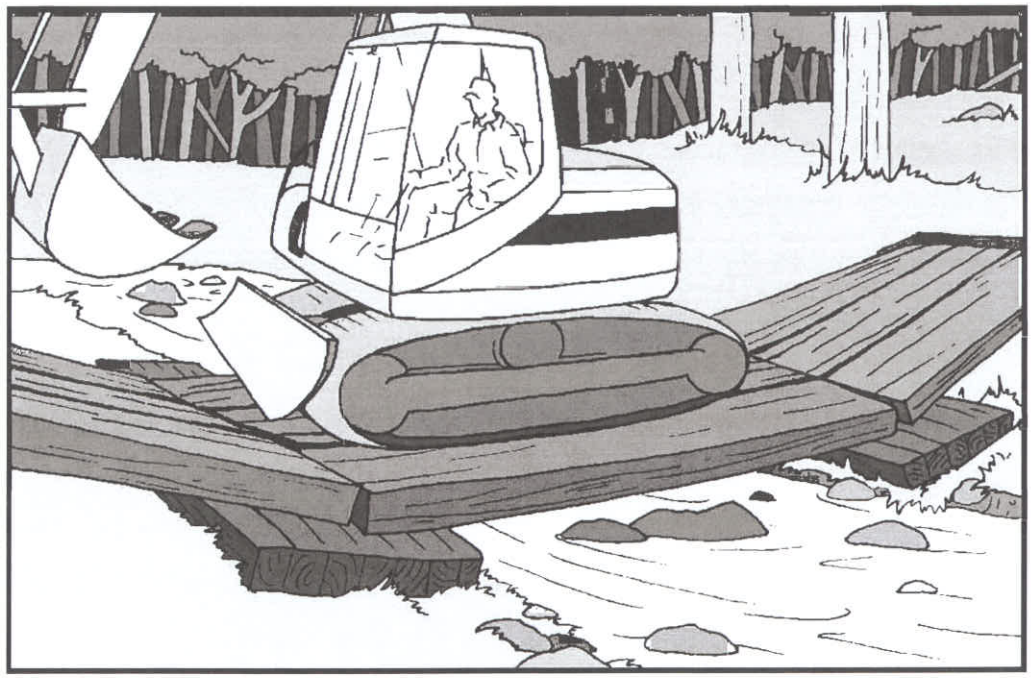
TIMBER MAT - WATERBODY CROSSING



IMPROPER INSTALLATION

- Mats not long enough to keep equipment out of water and wetland soils
- Lacks cross supports which elevate travel mat
- Mats do not extend far enough to protect wetland soils from rutting



PROPER INSTALLATION

- Mats are elevated by cross-supports on stream banks, keeping them up out of water and out of wet soils
- Water flows under mats
- Mats extend over approaches to crossing, protecting soils from eroding
- Equipment stays out of water and wetlands

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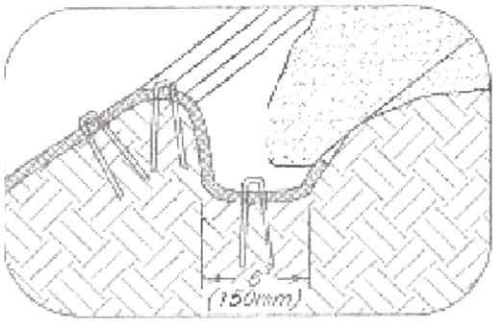
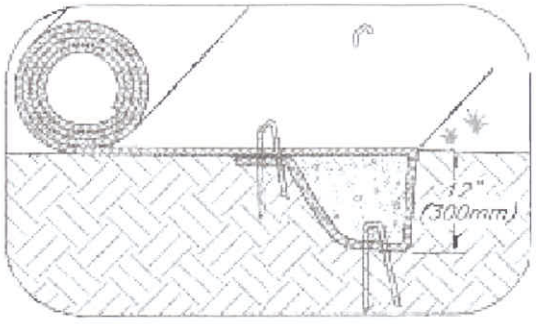
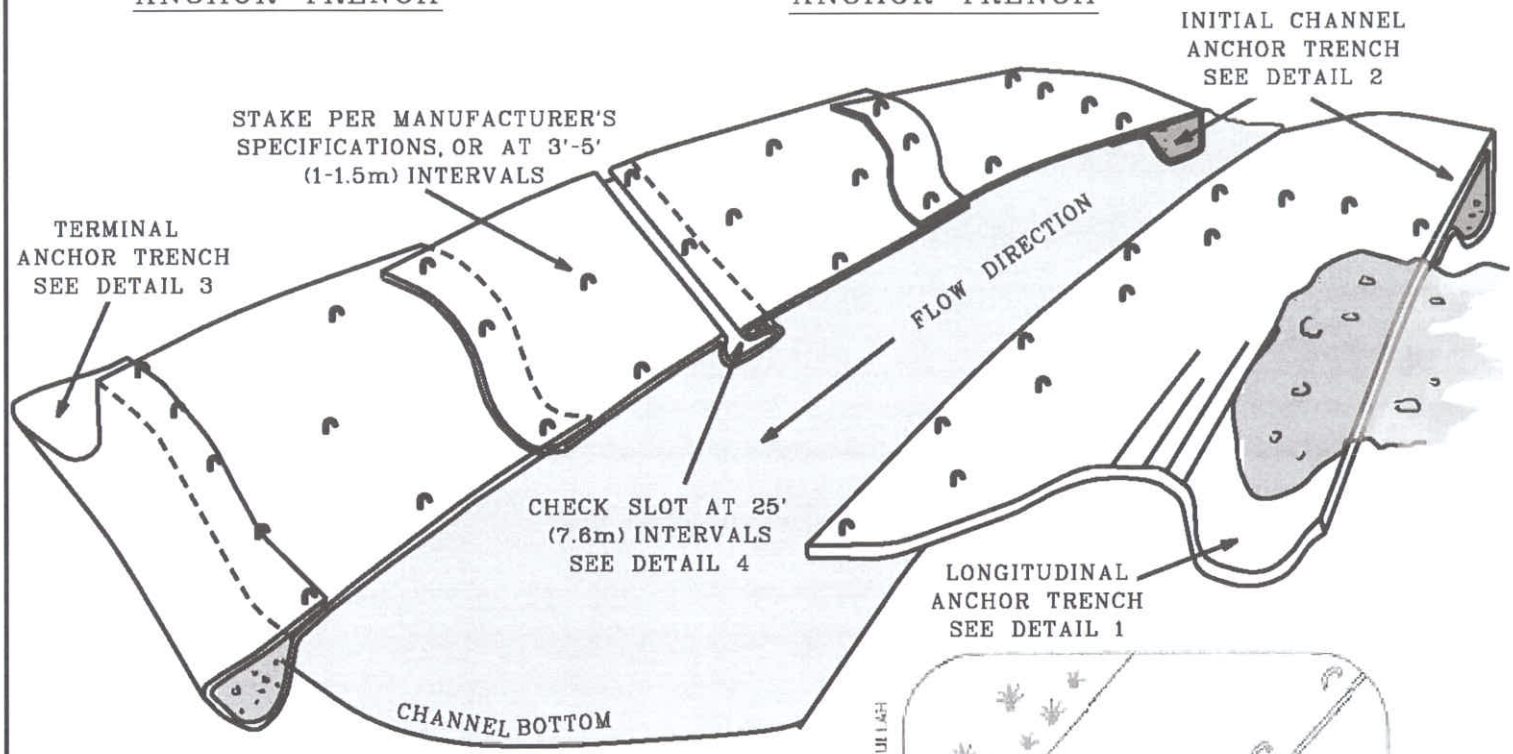
FIGURE 5
TIMBER MAT
WATERBODY CROSSING

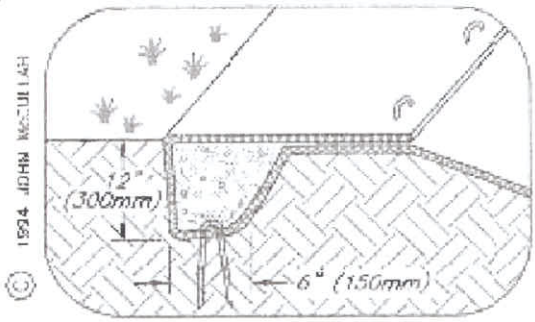


DETAIL *1: LONGITUDINAL ANCHOR TRENCH

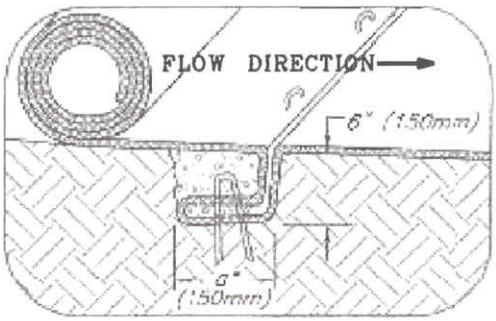


DETAIL *2: INITIAL CHANNEL ANCHOR TRENCH





DETAIL *3: TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH



DETAIL *4: CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURER'S SPECIFICATIONS.

2. STAKING OR STAPLING LAYOUT PER MANUFACTURER'S SPECIFICATIONS.

3. FIRM CONTINUOUS CONTACT BETWEEN SOIL AND MAT IS CRITICAL FOR PROPER FUNCTION (I.E. TO PREVENT EROSION).

FIGURE 6
STREAM BANK STABILIZATION USING EROSION CONTROL BLANKETS

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WIND POWER PROJECT

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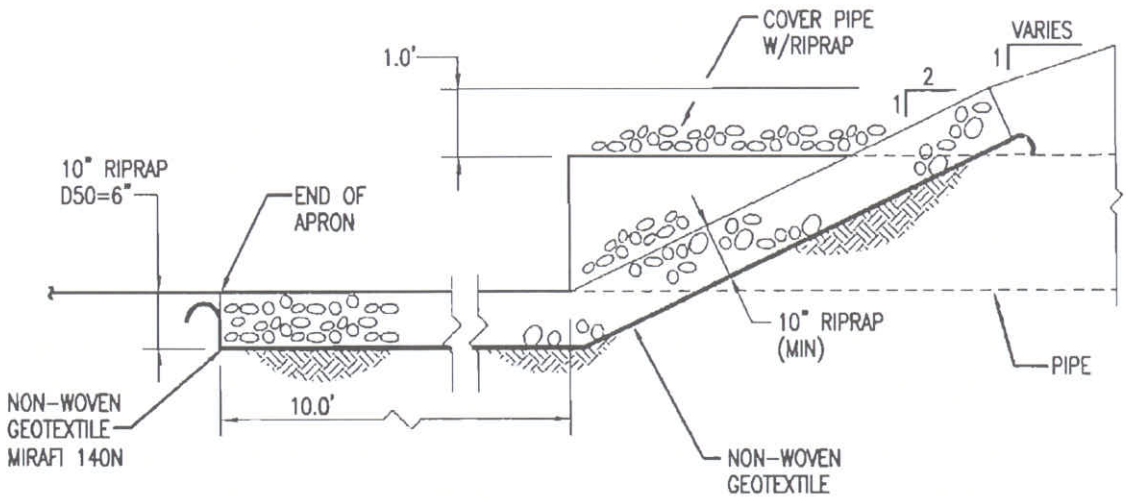
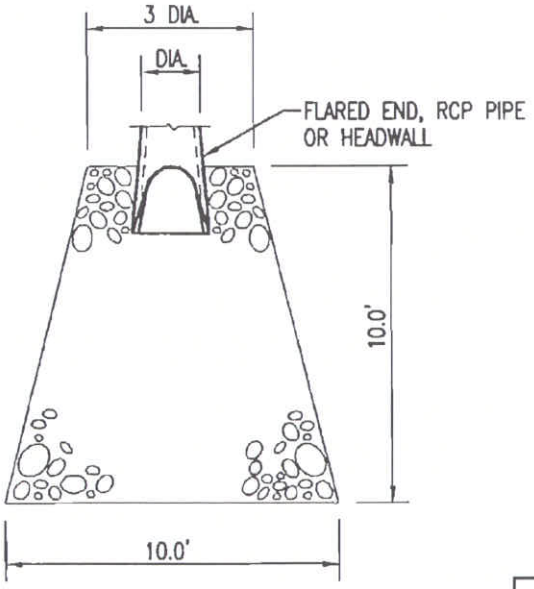


TYPICAL CULVERT INLET/OUTLET PROTECTION

NOTE: PLACE GEOTEXTILE ON CUT SUBGRADE AND BURY ENDS.



TYPICAL PLAN OF OUTLET RIPRAP PROTECTION

FIGURE 7
CULVERT INLET / OUTLET
PROTECTION

KIBBY EXPANSION

WIND POWER PROJECT

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CULVERT CROSSING

IMPROPER INSTALLATION

- Culvert is undersized, allowing overflow to cross travel-way
- Insufficient cover thickness over culvert
- Outlet is not stable, leading to erosion
- Culvert outlet is set too high, causing it to be impassable to fish and other aquatic organisms

PROPER INSTALLATION

- Culvert is adequately sized for flow
- Sufficient cover thickness over culvert
- Inlet and outlet are adequately supported by gravel and rock to protect and maintain stability
- Outlet is properly seated at or below stream bottom, allowing aquatic organisms to travel upstream

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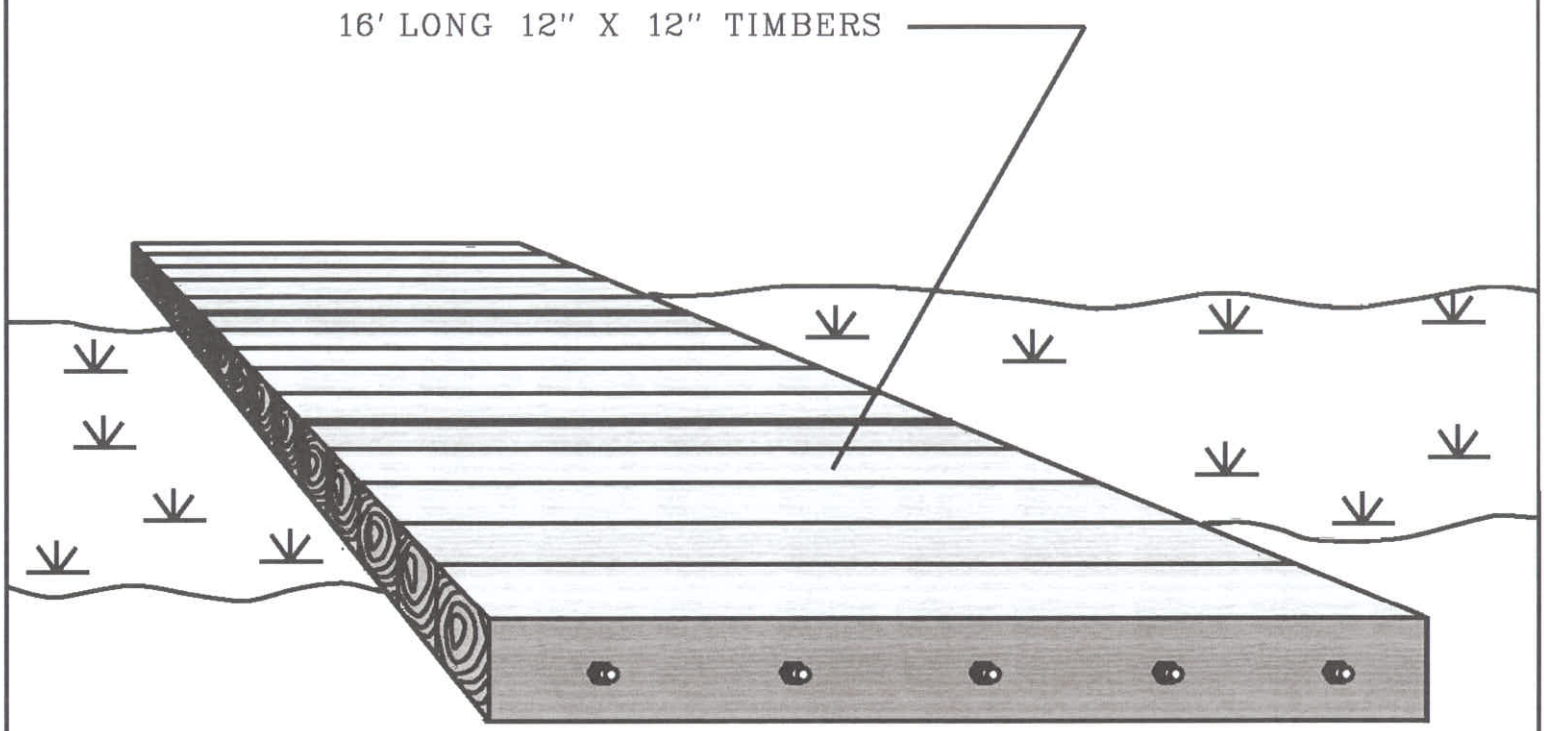
KIBBY EXPANSION
WIND POWER PROJECT

FIGURE 8
CULVERT CROSSING



PREFABRICATED
TIMBER MAT ROAD
(TEMPORARY LIGHT DUTY)

NOTE: TIMBER MATS TO BE PLACED WITH THE LONGEST DIMENSION OF THE MAT PERPENDICULAR TO THE DIRECTION OF TRAVEL.

FIGURE 9
TIMBER MAT ROAD
KIBBY EXPANSION
WIND POWER PROJECT

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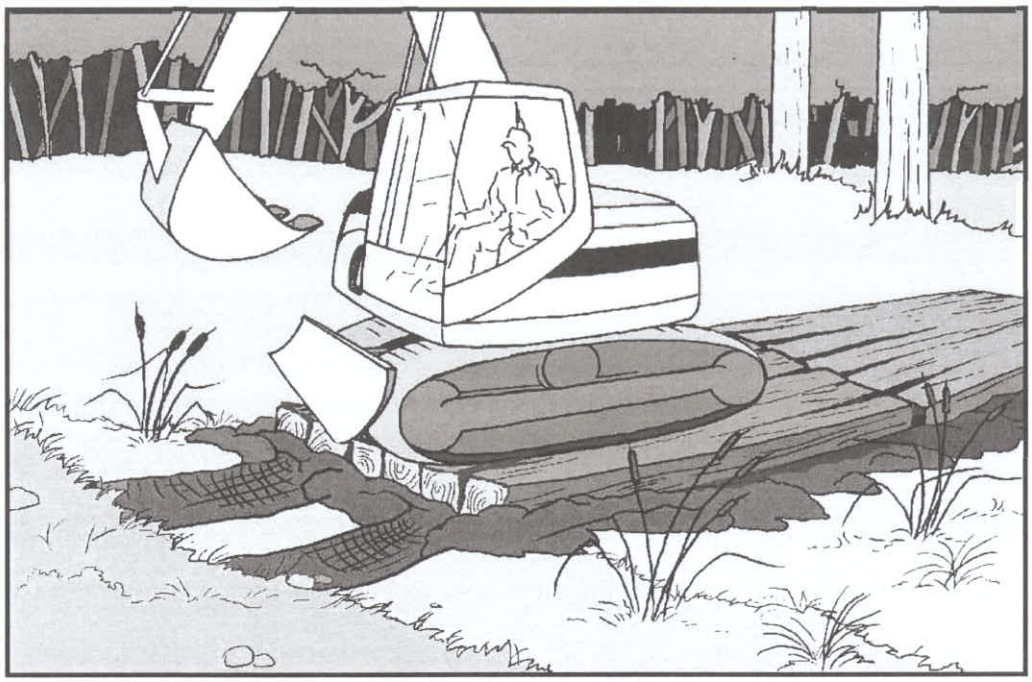
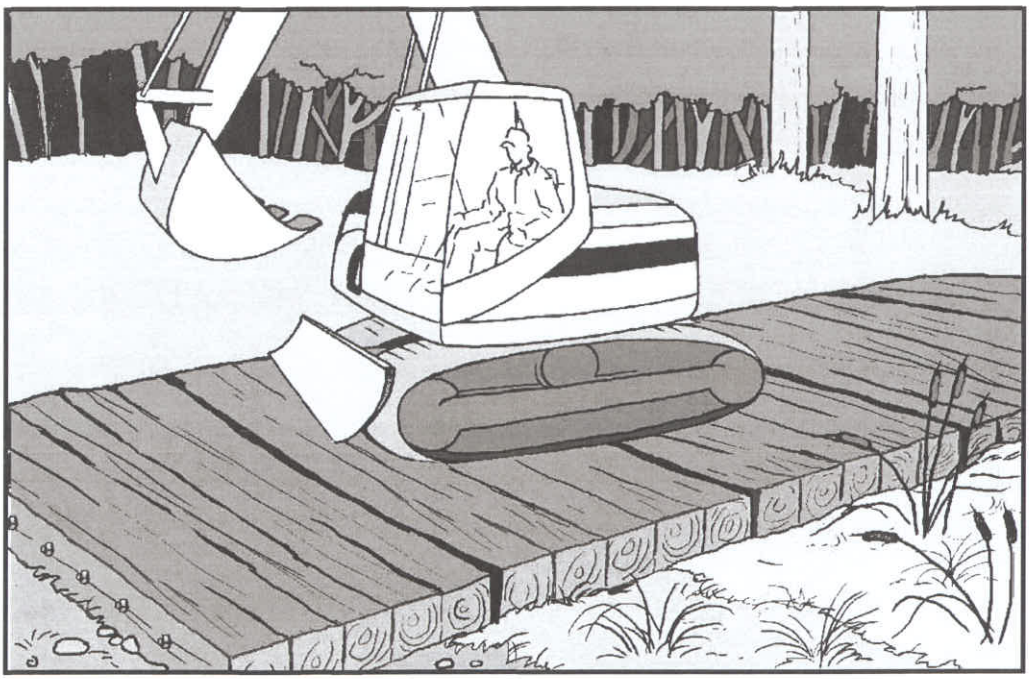
fo business to deliver

TIMBER MAT - WETLAND CROSSING



IMPROPER INSTALLATION

- Long axis of mats is not perpendicular to travel direction
- Mats are working down into wetland causing significant disturbance and picking up mud
- Mats do not extend beyond wetland edge to solid ground



PROPER INSTALLATION

- Correct orientation relative to travel direction
- Entire wetland is spanned, preventing rutting at ends of crossing

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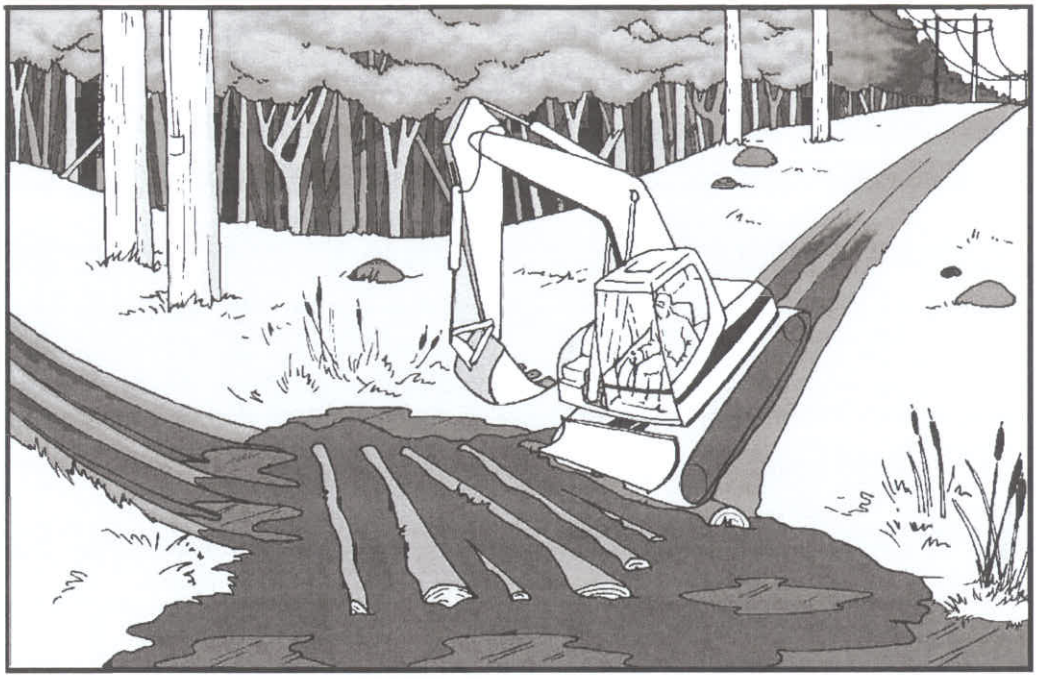
KIBBY EXPANSION
WIND POWER PROJECT

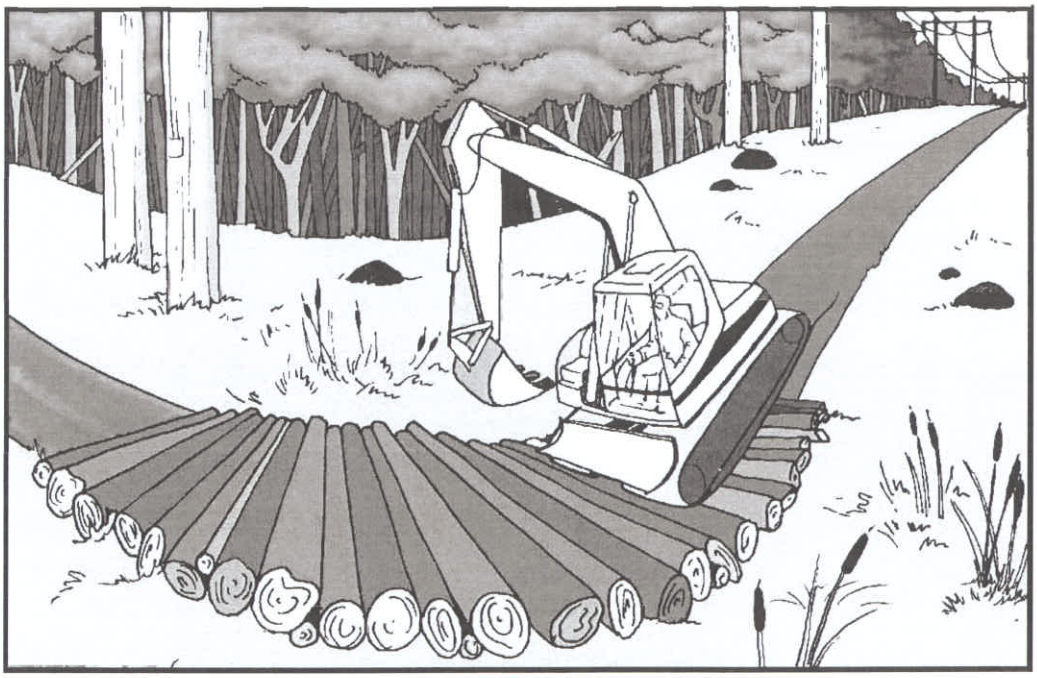
FIGURE 10
TIMBER MAT
WETLAND CROSSING

CORDUROY CROSSING



IMPROPER INSTALLATION

- Area is too wet for proper application of corduroy
- Insufficient corduroy to support equipment
- Corduroy is sunken into wetland soil
- Approaches are steep, rutted, and are not protected with additional corduroy or mats



PROPER INSTALLATION

- No flowing or standing water or saturated soil present
- Adequate amount of layered corduroy to protect soil from rutting
- Approaches are protected from rutting by extension of corduroy beyond edges of crossing

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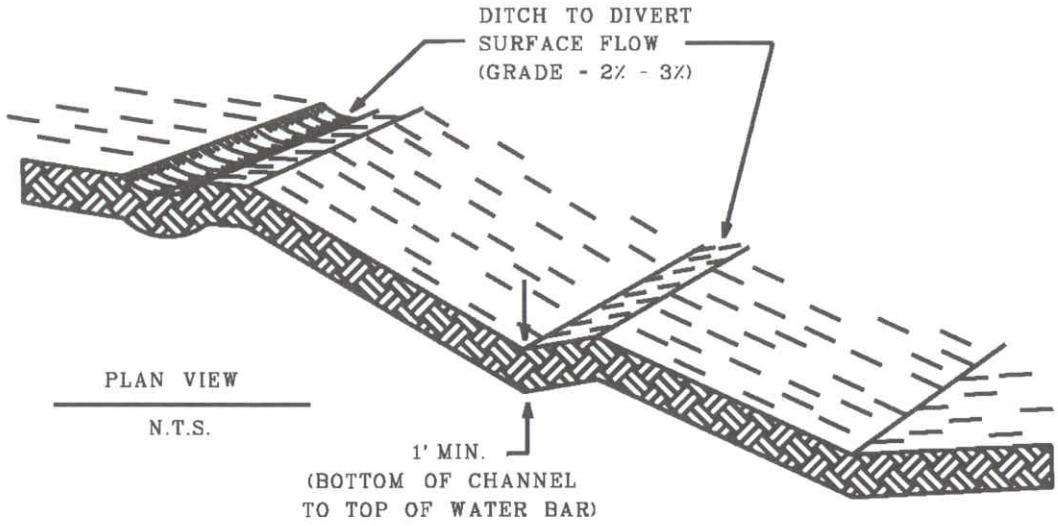
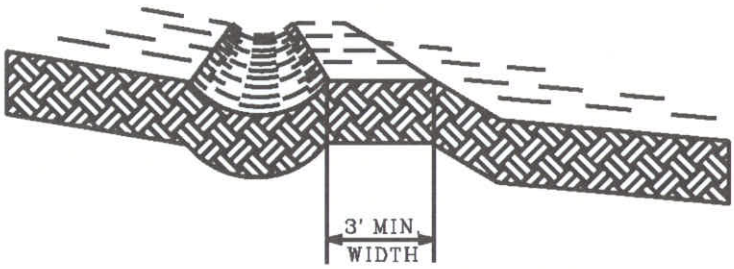
KIBBY EXPANSION
WIND POWER PROJECT

FIGURE 11
CORDUROY CROSSING

TYPICAL WATER BAR CONSTRUCTION





CROSS SECTION

N.T.S.

RECOMMENDED SPACING BETWEEN WATER BARS	
SLOPE (PERCENT)	SPACING (FEET)
0-2	250
3-5	135
6-10	80
11-15	60
16-20	45
21+	35

NOTES:

1. All trees, brush, stumps, rocks, and other obstructions shall be removed and disposed of to prevent interference with the proper functioning of the diversion.
2. Fills shall be compacted as needed to prevent unequal settlement or failure.
3. All graded areas shall be stabilized with temporary or permanent seeding.
4. Diversion channel should be lined with erosion control fabric as soil conditions require.
5. The outlet of the water bar must be to a well vegetated area or be stabilized by installing a stone check dam, haybale/silt fence dissipating device or synthetic geomat, depending on the amount of channelized flow expected. If used, the geomat will consist of a geotextile fabric 8 feet wide and 10 feet long. The end of the fabric at the right-of-way must be toed into the ground.

FIGURE 12
TYPICAL WATER BAR
KIBBY EXPANSION
WIND POWER PROJECT

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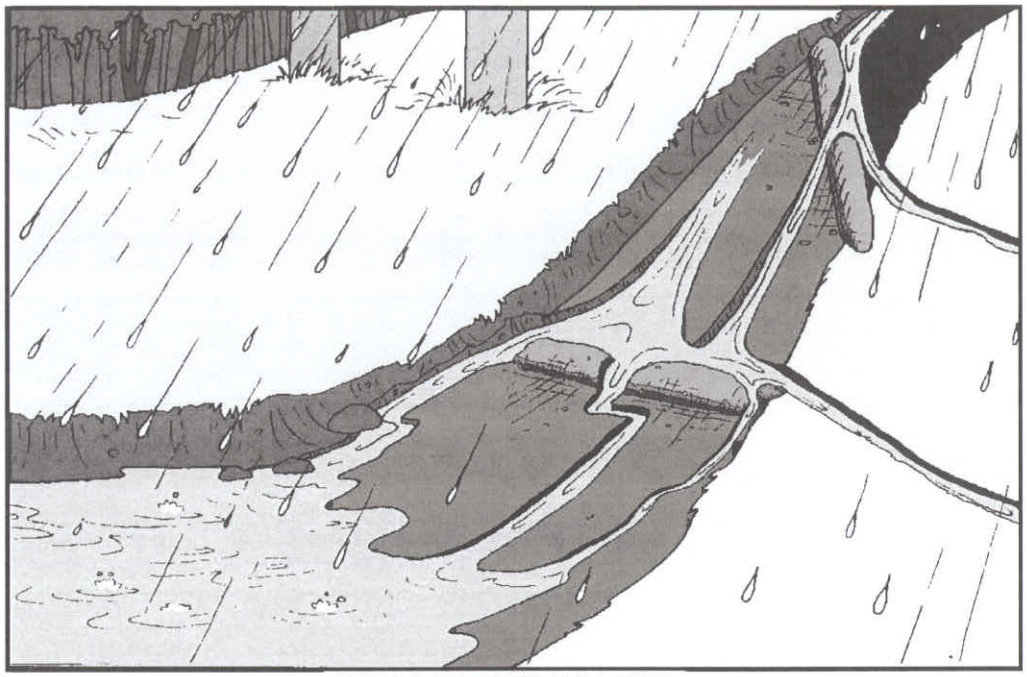
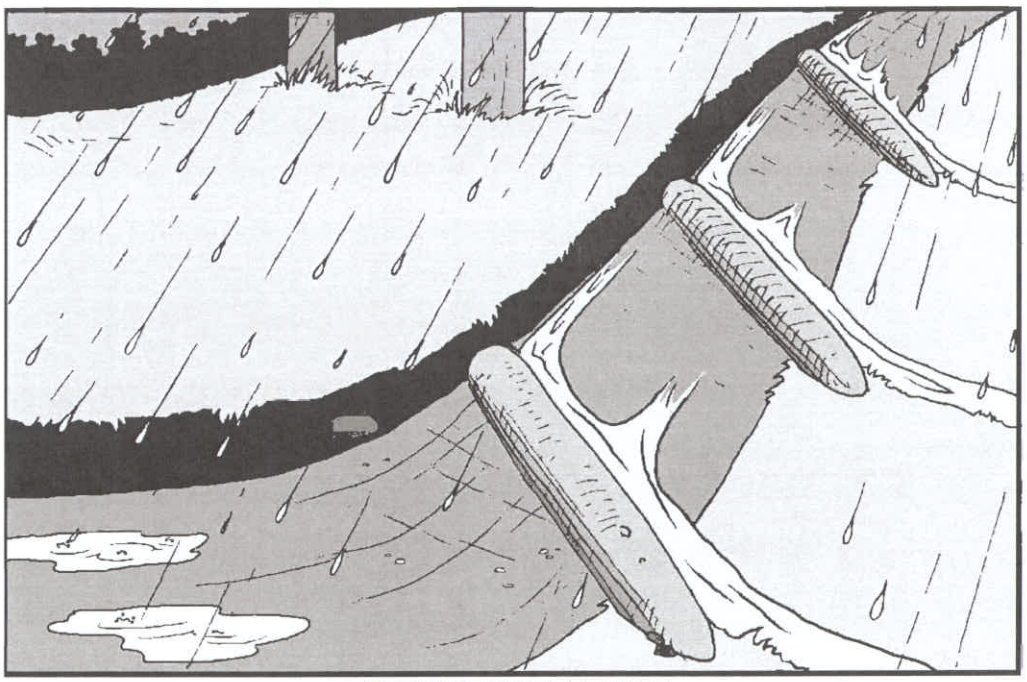
WATER BARS



IMPROPER INSTALLATION

- Upper bar is too steeply angled
- Angle of lower bar is too shallow
- Lower bar does not extend far enough, allowing water to escape around ends
- Bars are not high enough, allowing water to flow over top, eroding them



PROPER INSTALLATION

- Bars are at moderate angles
- There are enough bars to divert all water flowing down slope
- Bars are high enough to prevent water from flowing over them
- Bars extend beyond edges of road, preventing water from flowing around them

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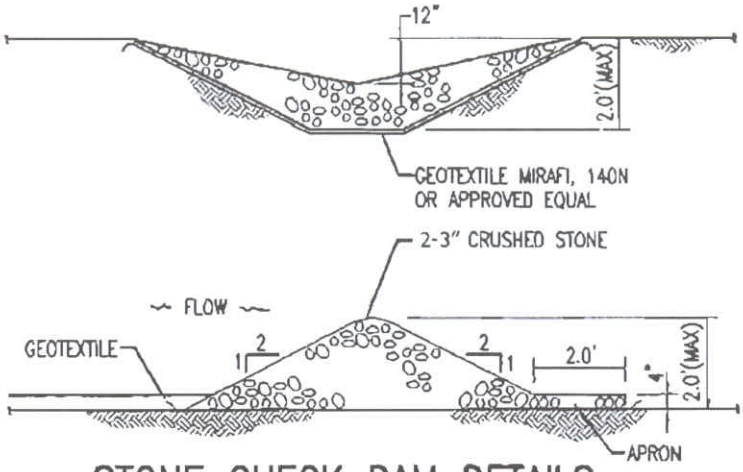
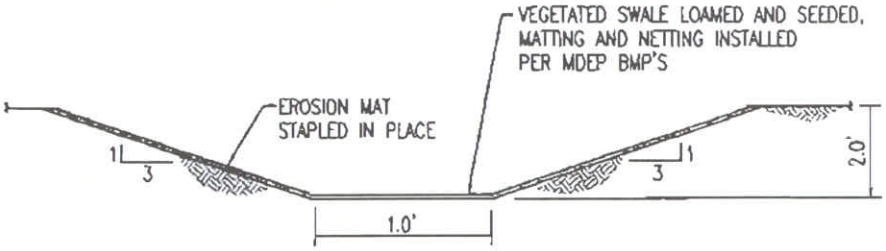
KIBBY EXPANSION
WIND POWER PROJECT

FIGURE 13
WATER BARS



STONE CHECK DAM DETAILS



VEGETATED SWALE DETAIL

FIGURE 14
TYPICAL SWALE STABILIZATION METHODS

KIBBY EXPANSION

WIND POWER PROJECT

TransCanada
In business to deliver

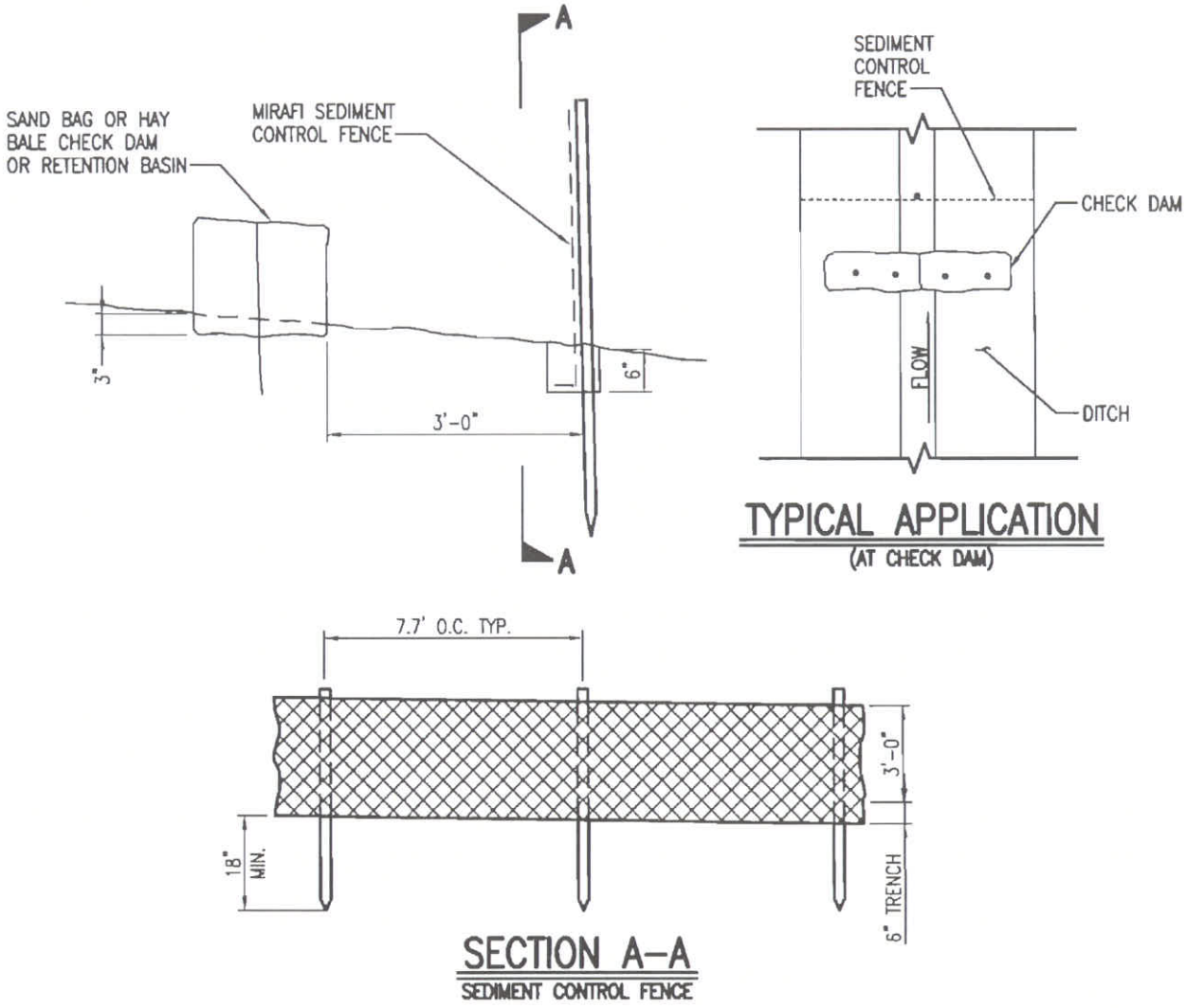


FIGURE 15
TYPICAL SILT FENCE EROSION CONTROL BARRIER

KIBBY EXPANSION

WIND POWER PROJECT

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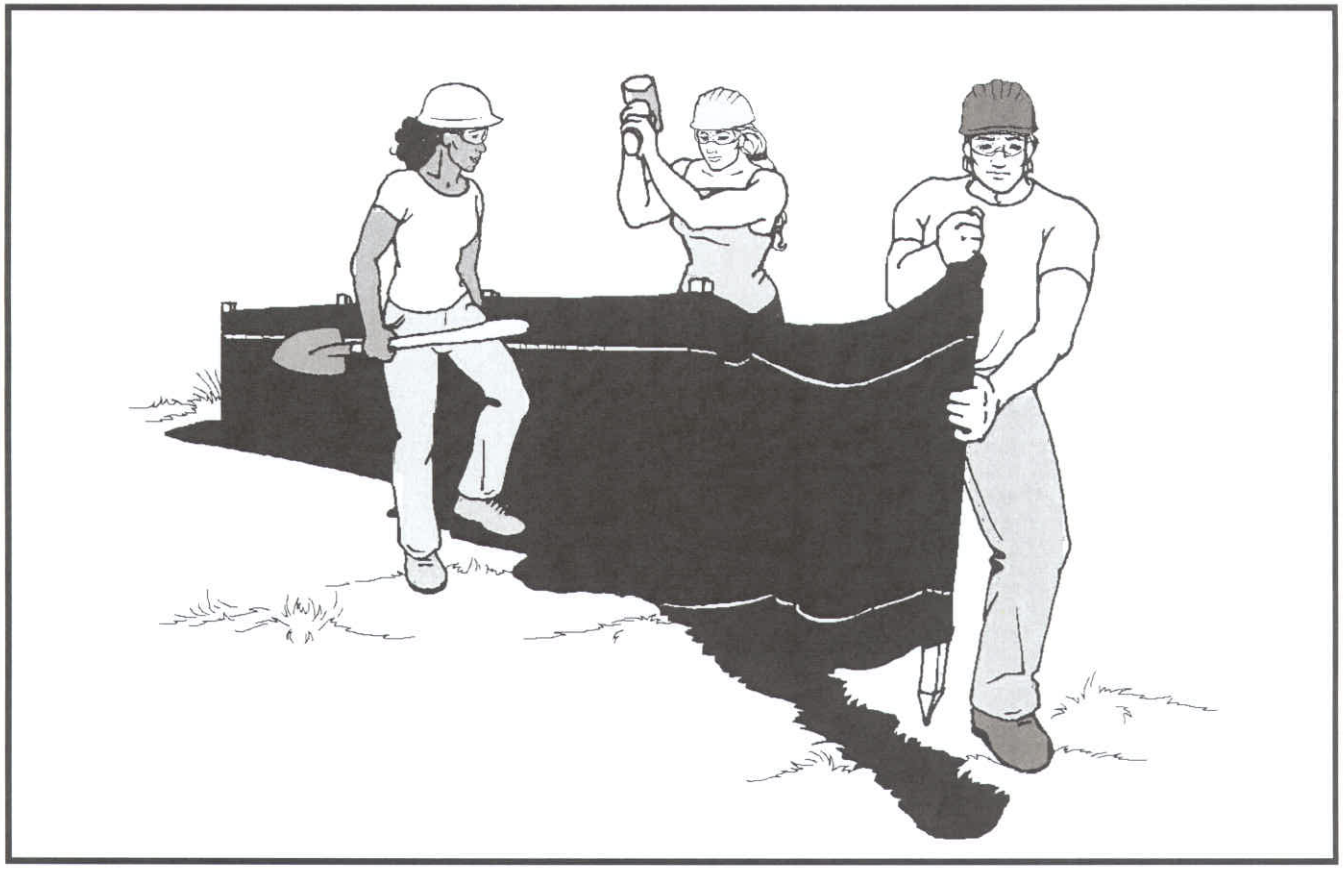
SEDIMENT BARRIER - SILT FENCE

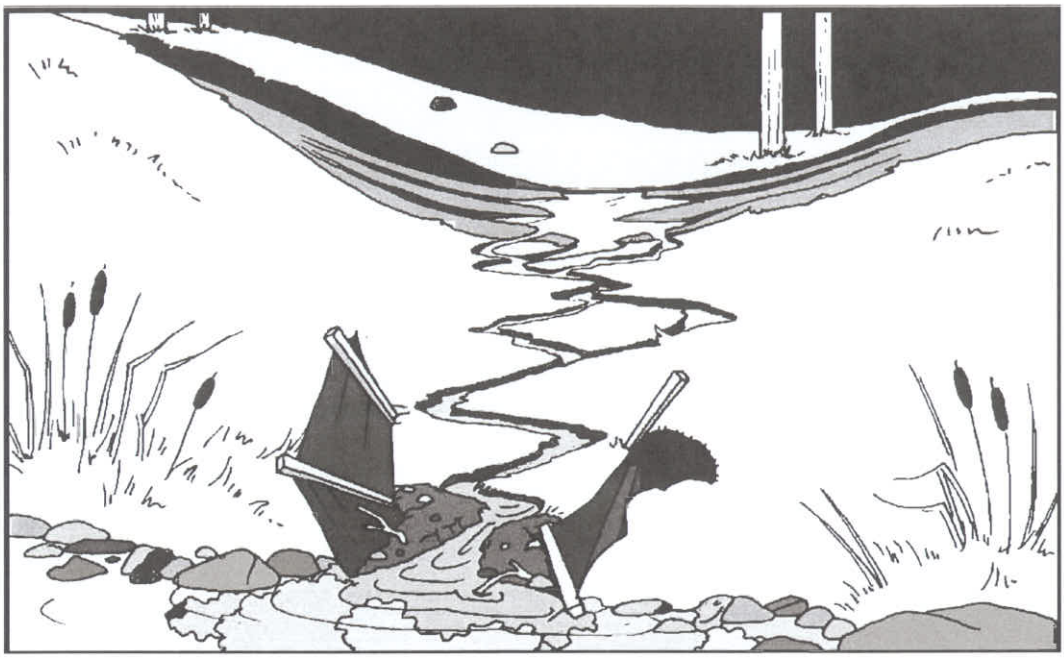
PROPER INSTALLATION



- Dug trench to key material into ground
- Stakes are placed facing away from disturbed area
- Excess material on bottom is buried with excess dirt to prevent water from flowing under fence

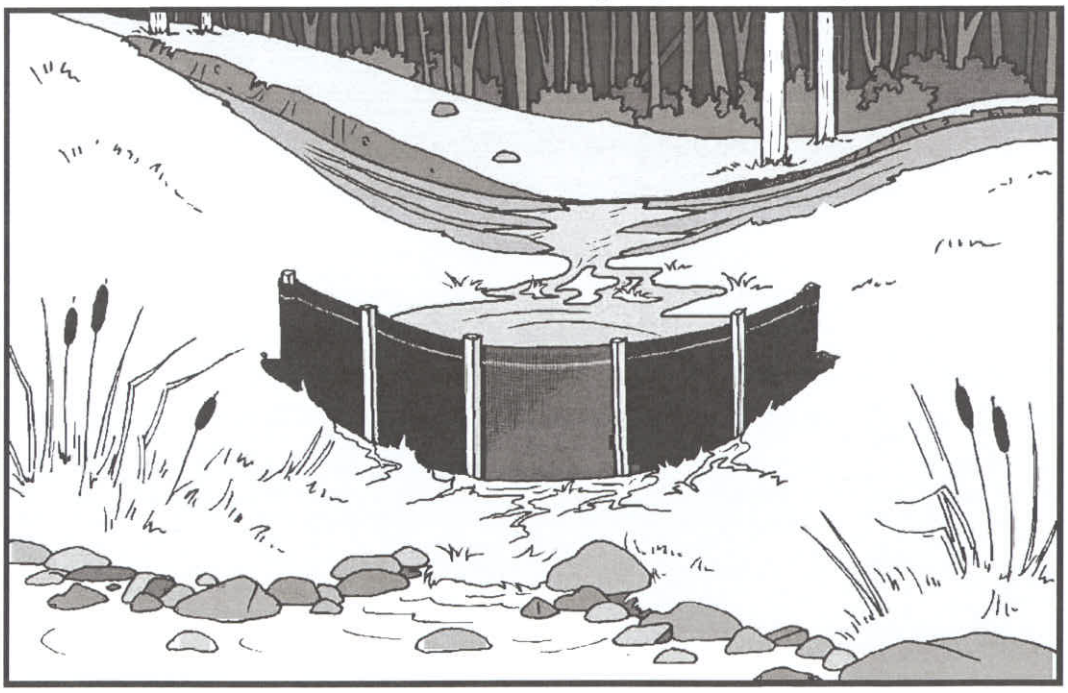
TransCanada *In business to deliver*	KIBBY EXPANSION WIND POWER PROJECT	FIGURE 16 SEDIMENT BARRIER -SILT FENCE- PROPER INSTALLATION

SEDIMENT BARRIER - SILT FENCE



IMPROPER INSTALLATION

- Fence located too far from road and too close to resource
- Stakes installed on wrong side of fence
- Needs maintenance (restaking, restapling, or even replacement)



PROPER INSTALLATION

- Adequate distance from road and resource allows silt fence to capture and slow water, and allows silt fence to filter it before reaching resource
- Stakes placed on correct side; facing resource, while filter fabric faces disturbed area
- Adequate length; fence is long enough to prevent water from escaping around edges

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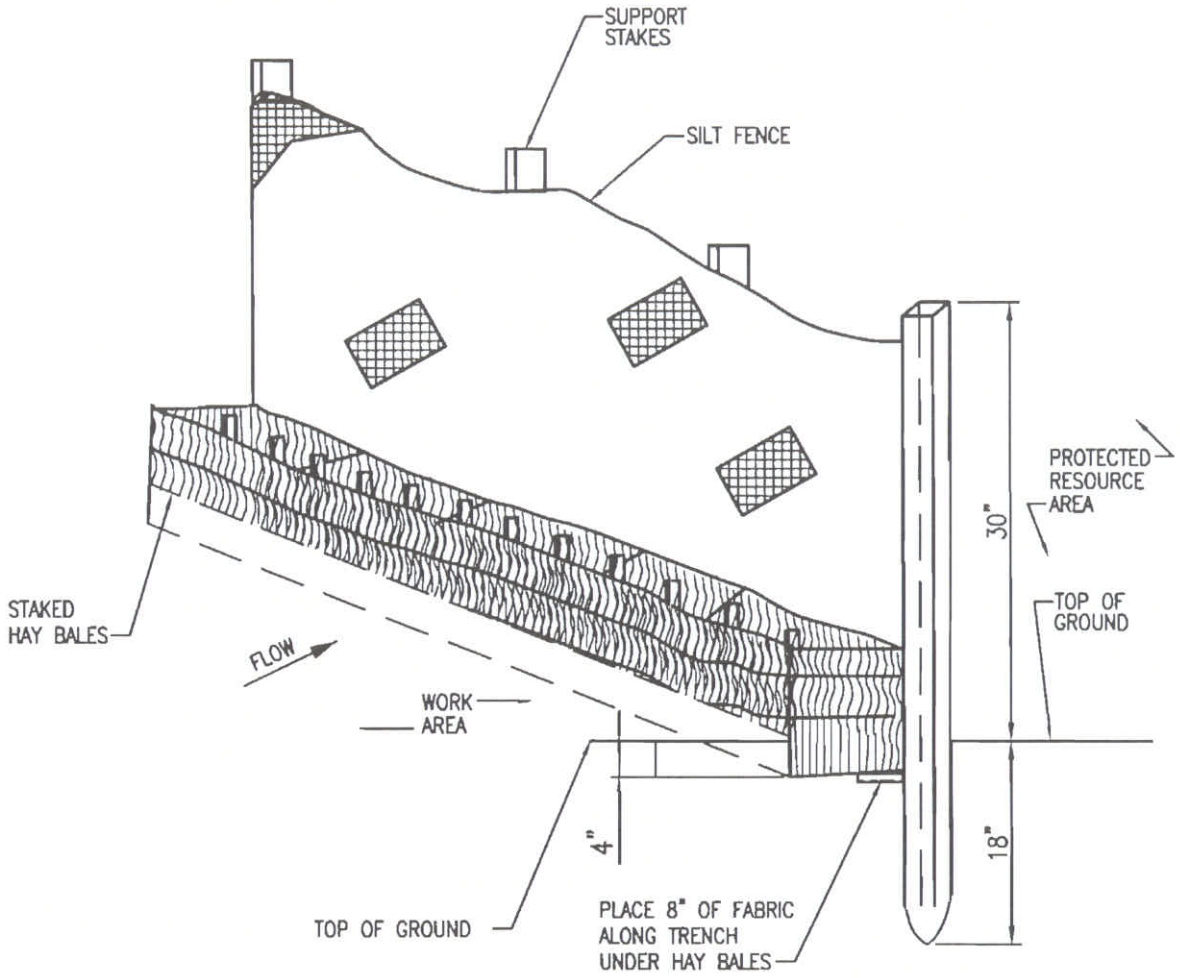
KIBBY EXPANSION
WIND POWER PROJECT

FIGURE 17
SEDIMENT BARRIER
SILT FENCE



NOTES

1. ESTABLISH TEMPORARY EROSION CONTROL AT LIMIT OF WORK UNLESS INDICATED OTHERWISE.
2. INSTALL WITH SILT FENCE ON WORK SIDE OF SUPPORT STAKES.

FIGURE 18
TYPICAL SILT FENCE/HAYBALE EROSION CONTROL BARRIER
KIBBY EXPANSION
WIND POWER PROJECT

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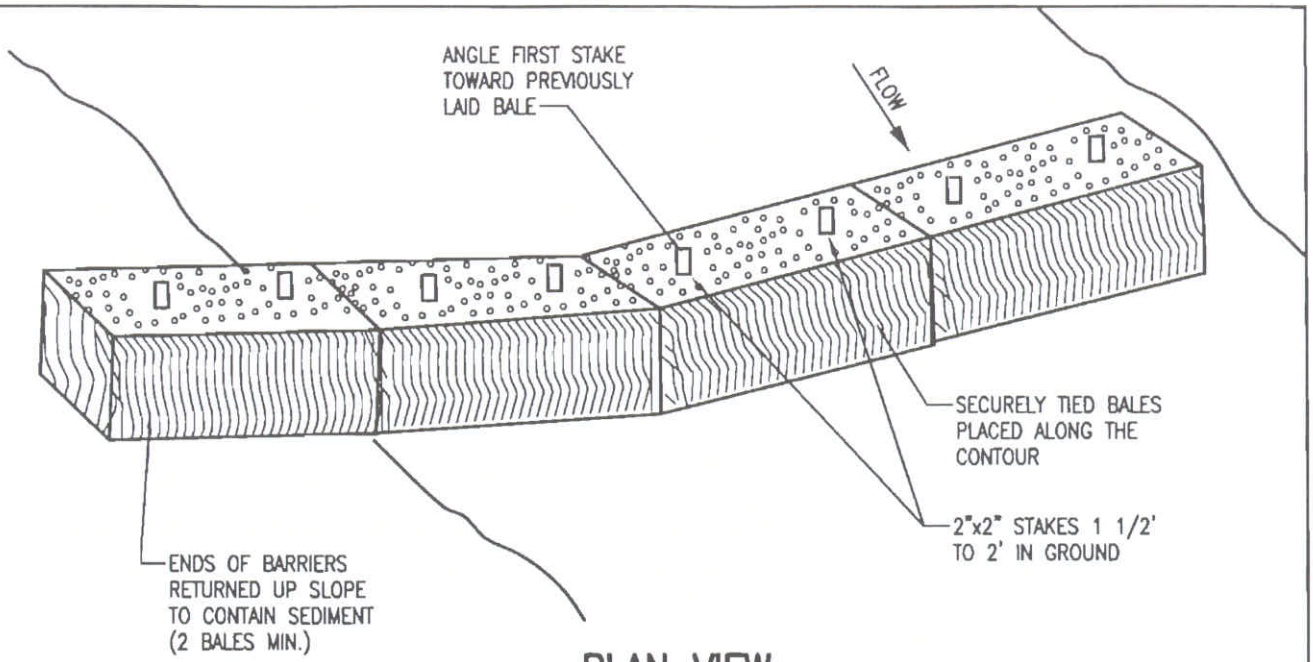
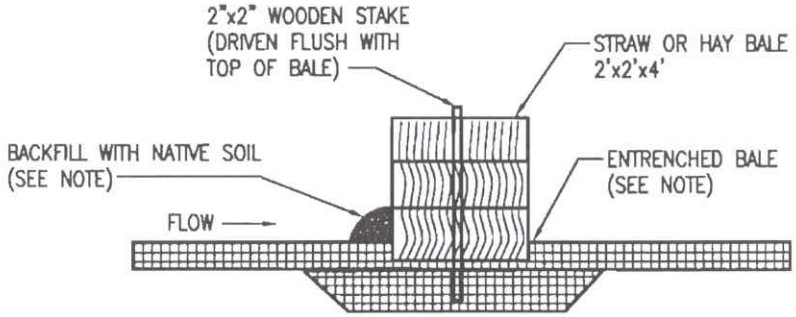


PLAN VIEW



CROSS-SECTION

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. TRENCH IN BALES EXCEPT WHERE LEDGE IS ENCOUNTERED, WHERE SOIL IS ROCKY, OR WHERE MANY LARGE TREE ROOTS ARE ENCOUNTERED.
3. WHERE ENTRENCHMENT IS NOT POSSIBLE, EACH BALE SHALL BE BACKFILLED WITH NATIVE SOIL ON THE UPSLOPE SIDE A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
4. BALES SHALL BE SECURELY ANCHORED IN PLACE BY TWO WOODEN STAKES DRIVEN THROUGH THE BALE. THE FIRST STAKE SHALL BE DRIVEN TOWARD THE PREVIOUS LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER.

FIGURE 19
TYPICAL HAYBALE EROSION CONTROL BARRIER
KIBBY EXPANSION
WIND POWER PROJECT

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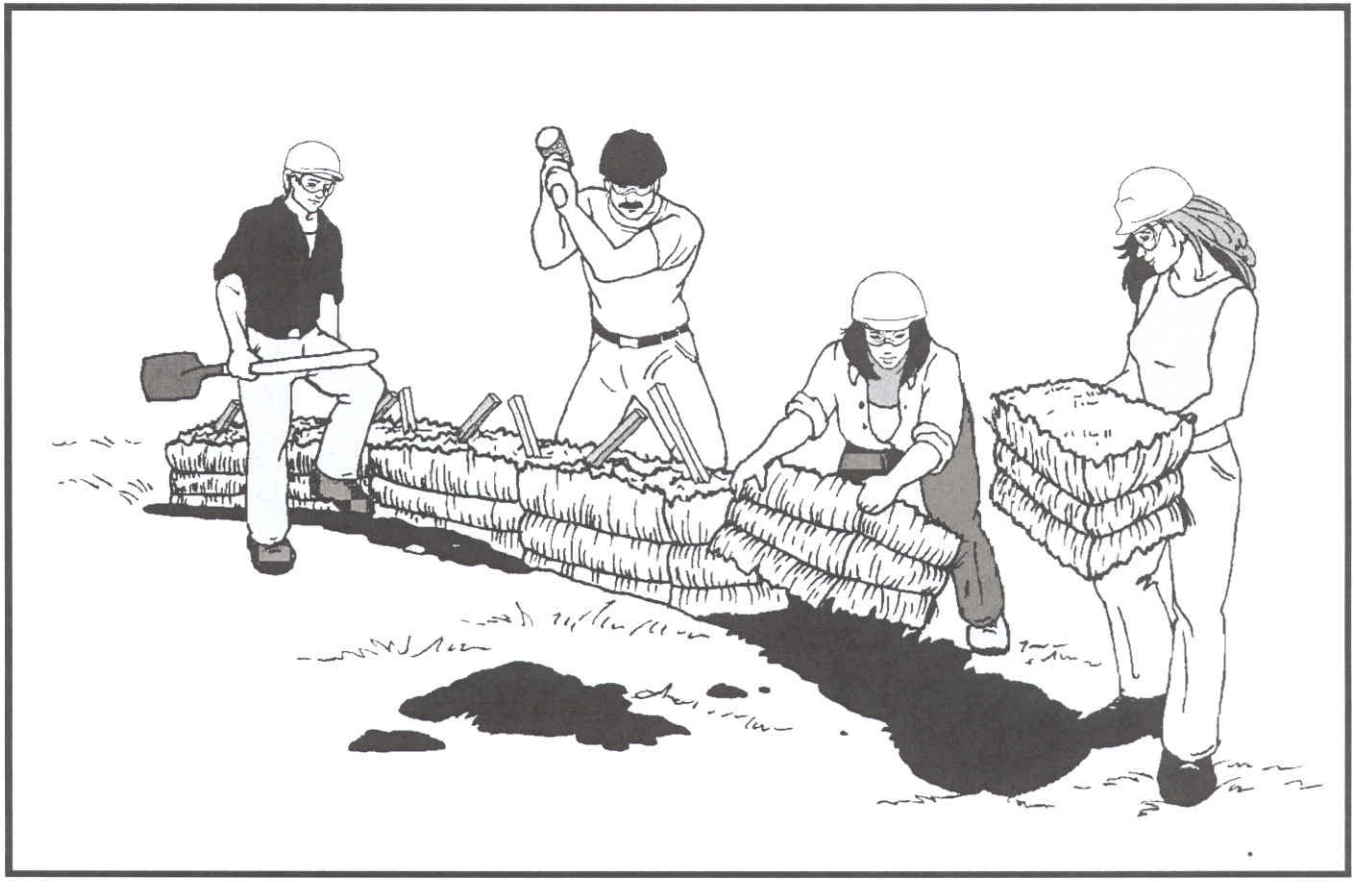
SEDIMENT BARRIER - HAY BALES

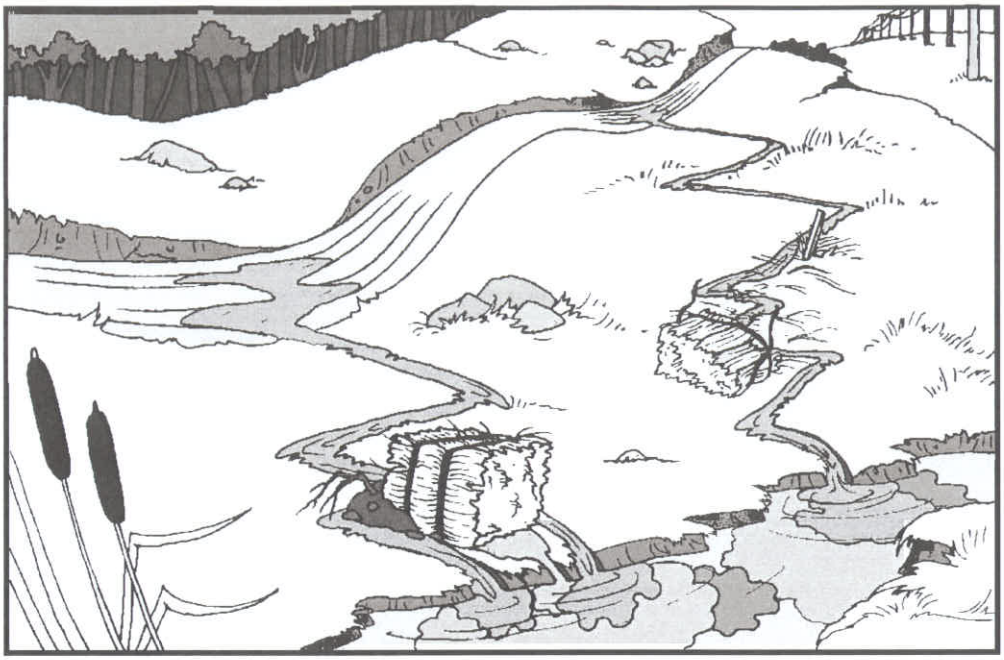
PROPER INSTALLATION



- Dug trench to key bales into ground
- Stakes placed and driven in at angles to snug bales together
- Excess dirt used to cover openings and cracks
- Baling twine does not contact ground

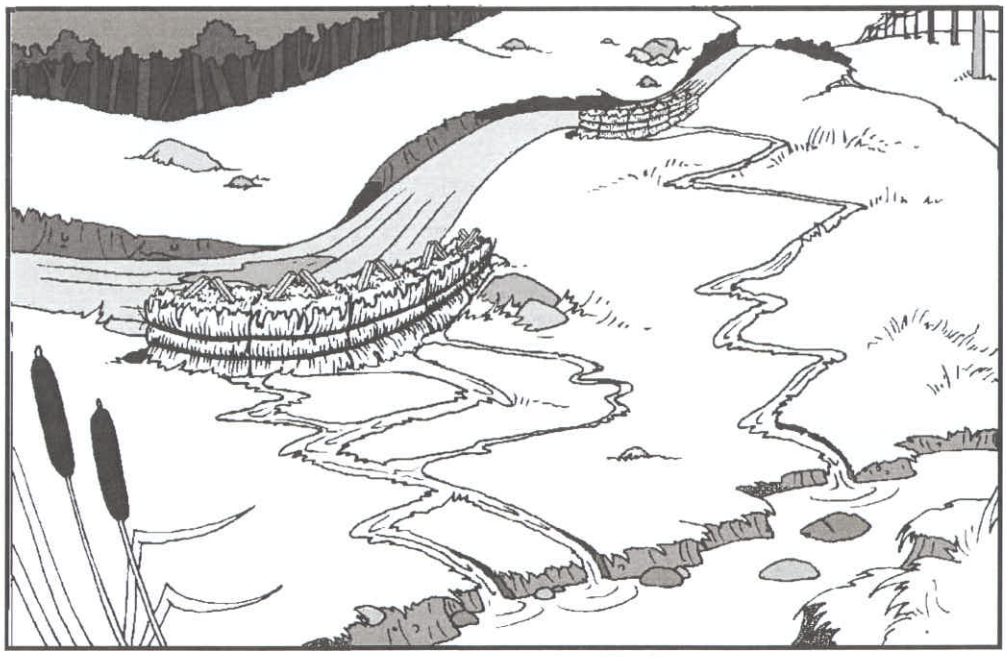
TransCanada *In business to deliver*	KIBBY EXPANSION WIND POWER PROJECT	**FIGURE 20** **SEDIMENT BARRIER** **-HAY BALES-** **PROPER INSTALLATION**

SEDIMENT BARRIER - HAY BALES



IMPROPER INSTALLATION

- Hay bales are not staked
- Not enough hay bales to adequately capture and slow flow
- Too far from source of runoff and sediment
- Improper orientation of bales; horizontal grass fibers do not provide adequate filtration
- Baling twine in contact with ground



PROPER INSTALLATION

- Staked properly; bales are secure and snug to one another
- Sufficient number of bales to slow flow and insure that no water escapes around edges
- Positioned close to disturbance, and far from resource to allow proper filtration
- Vertical orientation of grass fibers provides adequate filtration
- Baling twine does not contact ground

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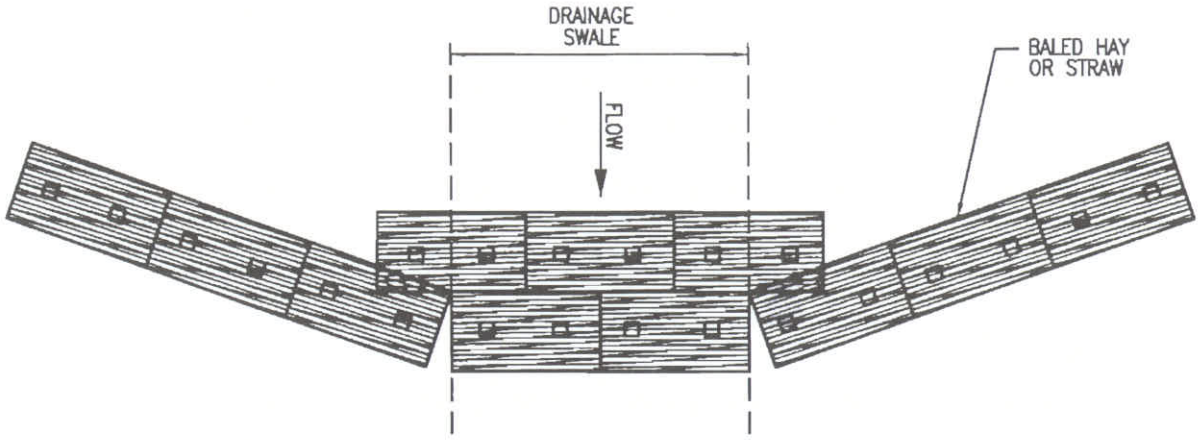
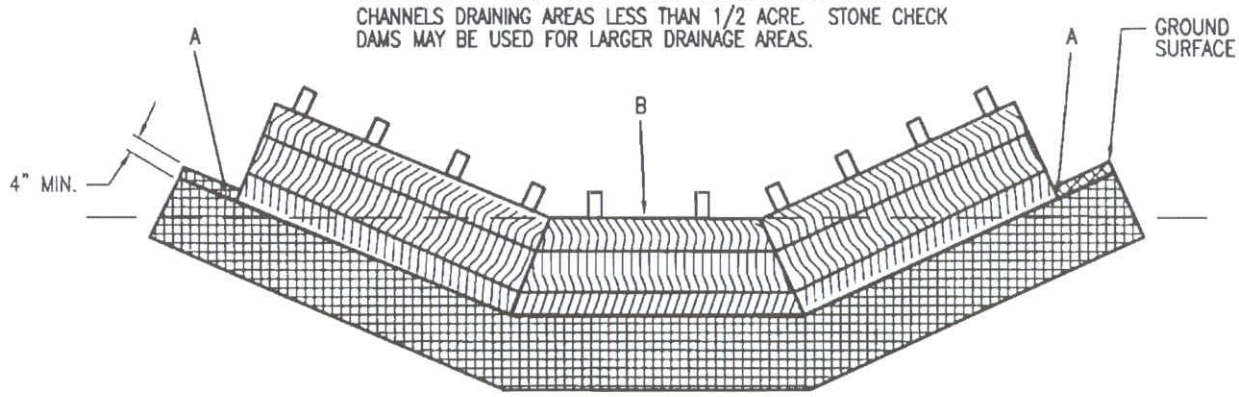
KIBBY EXPANSION
WIND POWER PROJECT

FIGURE 21
SEDIMENT BARRIER
HAY BALES



PLAN VIEW

NOTE:
PLACEMENT OF STRAW BALE BARRIER CHECK DAM IS LIMITED TO CHANNELS DRAINING AREAS LESS THAN 1/2 ACRE. STONE CHECK DAMS MAY BE USED FOR LARGER DRAINAGE AREAS.



POINTS "A" SHALL BE HIGHER THAN POINT "B"

CROSS-SECTION

HAY BALE CHECK DAM

FIGURE 22
TYPICAL HAY BALE
CHECK DAM

KIBBY EXPANSION

WIND POWER PROJECT

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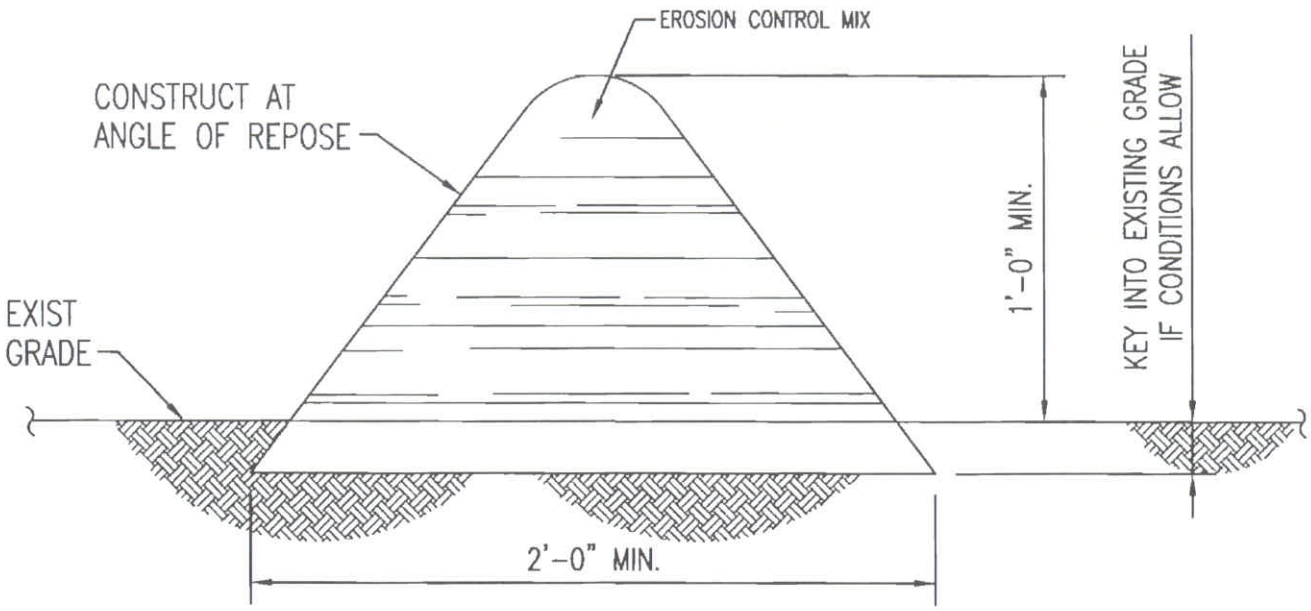

EROSION CONTROL MIX BERM

FIGURE 23
EROSION CONTROL MIX
BERM DETAIL

KIBBY EXPANSION

WIND POWER PROJECT

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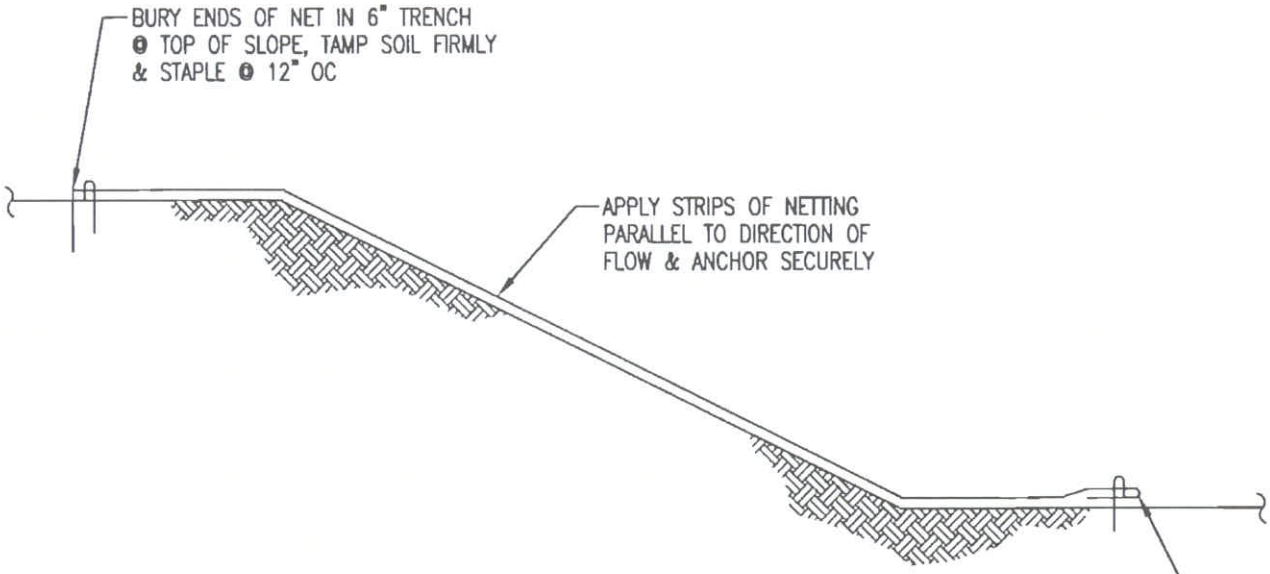

MULCH ANCHORING DETAIL

NOT TO SCALE
NOTE: OVERLAP EDGES OF STRIPS 4"
& STAPLE @ 3' OC @ CENTER
OF OVERLAP USING NETTING

FIGURE 24
MULCH ANCHORING DETAIL
USING NETTING
KIBBY EXPANSION
WIND POWER PROJECT

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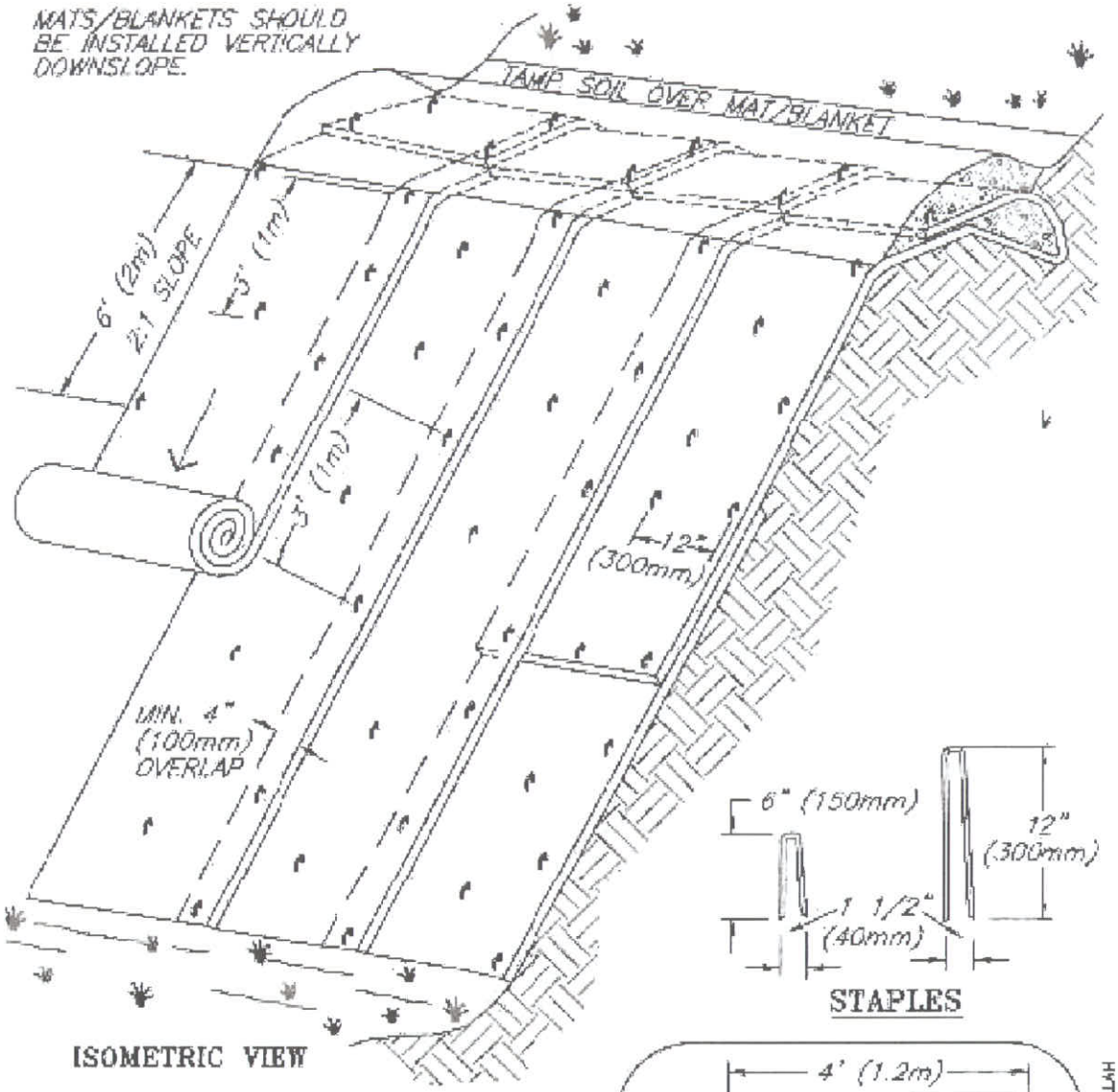
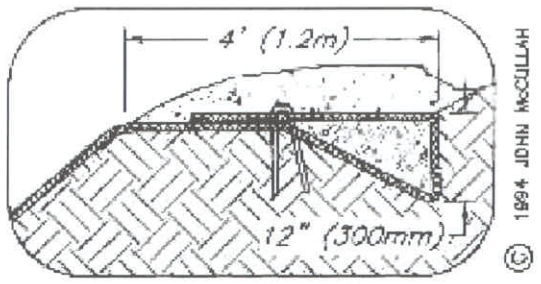


ISOMETRIC VIEW

STAPLES



TOP OF SLOPE ANCHOR DETAIL

TYPICAL SLOPE SOIL STABLIZATION

NOT TO SCALE

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

FIGURE 25
SLOPE STABILIZATION USING EROSION CONTROL BLANKETS
KIBBY EXPANSION
WIND POWER PROJECT

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APPENDIX D

CONTRACTOR'S WEEKLY INSPECTION FORM

TRANSCANADA KIBBY PROJECT 115 kV TRANSMISSION LINE

TEMPORARY STREAM CROSSING AND

EROSION AND SEDIMENTATION CONTROL INSPECTION FORM

Date: _____

Inspector:

_____

Location (mile post, structure number, access road):

_____

_____

Do adequate winter conditions exist (frozen ground and at least six inches of snow cover)?

Yes No Comments:

_____

Have temporary stream crossings (bridges) been properly installed and are they intact?

Yes No Comments:

_____

Are stream channels clear of debris such that the stream channel is not obstructed?

Yes No Comments:

_____

Are Best Management Practices (BMPs) for erosion and sediment control being employed (such as silt fence, water bars, haybale check dams, seeding, hay mulch)?

Yes No

Circle all erosion and sediment control BMPs currently in use:

Silt Fence Water Bars Hay Bale Check Dams Seeding Mulching

Are BMPs being used properly (i.e., silt fence properly anchored and maintained, proper seeding and use of hay mulch)?

Yes No Comments:

_____

Have temporary timber mats been used for wetland crossings?

Yes No Comments:

_____

Is there any evidence of excessive rutting of soils, wetland crossing without use of temporary mats, soil erosion, or sedimentation of waters along any portion of the areas inspected?

Yes No Comments:

_____

If yes, please explain who was notified and directed to take corrective action and the date and time they were notified:

_____

_____

Acknowledgement	TransCanada	Contractor
	Print:_____	Print:_____
	Signature:_____	Signature:_____

_____

Completion of Actions	Print:_____	Print:_____
	Signature:_____	Signature:_____

APPENDIX E
MAINE EROSION AND SEDIMENTATION CONTROL LAW
38 MRSA §420-C

APPENDIX E

MAINE EROSION AND SEDIMENTATION CONTROL LAW*

38 MRSA §420-C

A person who conducts, or causes to be conducted, an activity that involves filling, displacing or exposing soil or other earthen materials shall take measures to prevent unreasonable erosion of soil or sediment beyond the project site or into a protected natural resource as defined in section 480-B. Erosion control measures must be in place before the activity begins. Measures must remain in place and functional until the site is permanently stabilized. Adequate and timely temporary and permanent stabilization measures must be taken and the site must be maintained to prevent unreasonable erosion and sedimentation.

This section applies to a project or any portion of a project located within an organized area of this State. This section does not apply to agriculture fields. Forest management activities, including associated road construction or maintenance, conducted in accordance with applicable standards of the Maine Land Use Regulation Commission, are deemed to comply with this section. This section may not be construed to limit a municipality's authority under home rule to adopt ordinances containing stricter standards than those contained in this section.

* The Erosion and Sedimentation Control Law is administered by DEP. Please contact the DEP in Augusta, Maine with specific questions regarding this law.

APPENDIX F
MAINE SLASH LAW
12 MRSA §9333

APPENDIX F

MAINE SLASH LAW*

12 MRSA §9333

§9333. Disposal along railroad and utility lines

1. **Stumpage owner**. A stumpage owner, operator, landowner or agent who cuts or causes or permits to be cut any forest growth on lands that are within or border the right-of-way of a railroad, a pipeline, or an electric power, telegraph, telephone or cable line may not place slash or allow it to remain on the ground within the right-of-way or within 25 feet of the nearer side of the right-of-way.

2. **Construction**. Slash accumulated by the construction and maintenance of a railroad, a highway, a pipeline or electric power, telegraph, telephone or cable line may not be left on the ground but must be hauled away, burned or chipped. Slash may not be left or place within the right-of-way or within 25 feet of the nearer side of the right-of-way. If a burning permit is denied or revoked under this chapter, the director may allow logs that are too large to be chipped to remain in the right-of-way until the director determines that their removal is economically feasible.

3. **Utility line maintenance**. Slash accumulated by the periodic maintenance of a pipeline or an electric power, telegraph, telephone or cable line may be disposed of in the following manner.

A. Slash with a diameter of 3 inches or less may be left in piles on the ground within the maintained portion of the right-of-way. A pile may not be higher than 18 inches from the ground or longer than 50 feet and must be separated from other piles by a minimum of 25 feet in every direction. A buffer strip with a minimum width of 10% of the total width of the maintained right-of-way must be kept totally free of slash with a diameter of 3 inches or less.

B. Slash with a diameter of more than 3 inches must be removed, chipped or limbed and placed on the ground surface. The pieces must be separated and may not be piled one piece over another. Slash of this size may be left within the maintained buffer strips.

C. If a utility line right-of-way is adjacent to a road, slash that is 3 inches or less in diameter must be removed, burned or chipped. Slash with a diameter of more than 3 inches may be left on the ground within the right-of-way and must not be limbed and separated and may not be piled one piece over another. Usable timber products generated from the maintenance of a utility right-of-way may be piled within the right-of-way but must be removed within 30 days.

* Note that this is an excerpt from the full text of the law. Please contact the Maine Forest Service, Augusta, Maine, for the full text of the law or with specific questions regarding the Slash Law.

APPENDIX G
OTHER RECOMMENDED REFERENCES

APPENDIX G
OTHER RECOMMENDED REFERENCES

Maine Erosion and Sediment Control BMPS. Bureau of Land and Water Quality, Maine Department of Environmental Protection, Augusta, Maine. March 2003. DEPLW0588.

Best Management Practices for Forestry: Protecting Maine's Water Quality. Maine Forest Service, Augusta, Maine. 2004. www.state.me.us/doc/mfs/pubs/bmp_manual.htm

Forest Transportation Systems: Roads and Structures Manual. Seven Islands Land Company, Bangor, Maine. Third Edition, 1999.

APPENDIX H
CONSTRUCTION MATERIALS SOURCE LIST

APPENDIX H
CONSTRUCTION MATERIALS SOURCE LIST

The following list of vendors has been selected given the wide variety of construction materials they offer. The list is not meant to be all-inclusive or an indication of favored vendors.

W.H. Shurtleff Company (Culverts, Geotextiles)

One Runway Road
Suite 8

South Portland, Maine 04106-6169

1-800-663-6149

info@whshurtleff.com

A. H. Harris (Geotextiles, i.e. Curlex Excelsior Blankets)

22 Leighton Road	585 Riverside Street
Augusta, Maine 04332	Portland, Maine 04103
(207) 622-0821	(207) 775-5764
Attn: Daryl Harvey	Attn: Andy Morrison

North American Green (Erosion control materials, including silt fence, geotextiles)
Maine Distributor:

E.J. Prescott Inc.

P.O. Box 600

32 Prescott Street, Libby Hill Business Park

Gardiner, Maine 04345-0600

(207) 582-1851

Attn: Greg Hinkley

Lane's Erosion Control Services (Erosion Control Mulch Mix)

199 Neck Road

West Gardiner, Maine 04345

(207) 724-7369

New England Organics (Erosion Control Mulch Mix)
5 Fundy Road
Falmouth, Maine 04105
Local Distributors: Jordan Lumber Company, Kingfield, Tel. 778-1334 (also source of silt fence, other materials);
Norpine Landscape Inc., Kingfield, Tel. 265-2430 (also source for hay bales, seed mixes);