



**Natural Resources Protection Act
Application Amendment for the
Kennebec River Horizontal Directional Drill**

New England Clean Energy Connect (NECEC)



Prepared for:

Maine Department of Environmental Protection
Land Use Planning Commission
United States Army Corps of Engineers

October 19, 2018

1.0 PROJECT DESCRIPTION

Central Maine Power Company (“CMP”) is amending its Natural Resource Protection Act (“NRPA”) and Site Location of Development (“Site Law”) Applications, filed September 27, 2017, to include a Horizontal Directional Drill (“HDD”) crossing beneath the Upper Kennebec River, between West Forks Plantation (“Plt”) and Moxie Gore. This document amends the September 27, 2017 NRPA application. For more detail, please see the Kennebec River HDD Site Law Application Amendment, Section 1.0 Development Description.

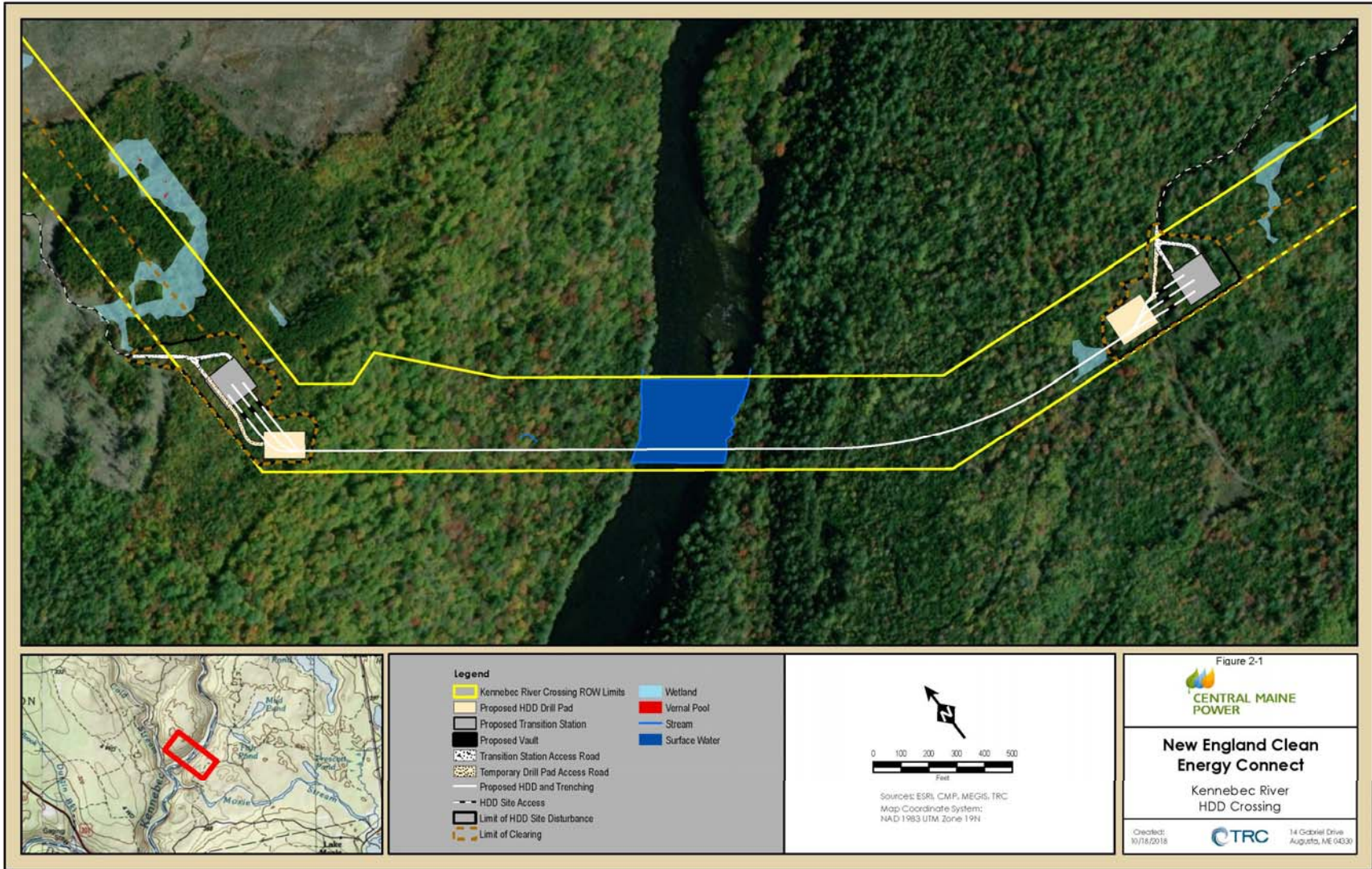
2.0 ALTERNATIVES ANALYSIS

CMP is proposing to replace the overhead crossing of the Upper Kennebec River with an underground crossing alternative using HDD technology to eliminate visual impacts on recreational users of this Outstanding River Segment and the associated concerns of environmental regulators, the host communities, and other stakeholders.

As discussed in CMP's September 27, 2017 NRPA application and as supplemented with this Application Amendment, there is no alternative site which is both suitable for the proposed (transmission line) use and reasonably available to the applicant. Further analysis of construction feasibility, operational and maintenance considerations, total project cost, environmental impact, and visual and recreational impact of the Underground Transmission Alternative described in the September 27, 2017 NRPA application has resulted in the conclusion that an HDD crossing beneath the Upper Kennebec River is preferred to an overhead crossing.

The Project corridor crosses the Upper Kennebec River in West Forks Plt and Moxie Gore. The transmission line within an HDD crossing would be entirely underground as it passes below the river. The termination stations that transition the transmission line from an underground to overhead configuration on each side of the river are in uplands and outside of protected natural resource areas (see Figure 2-1). The HDD installation and termination stations will not be visible from the Kennebec River and therefore visual impacts to recreational users will be avoided.

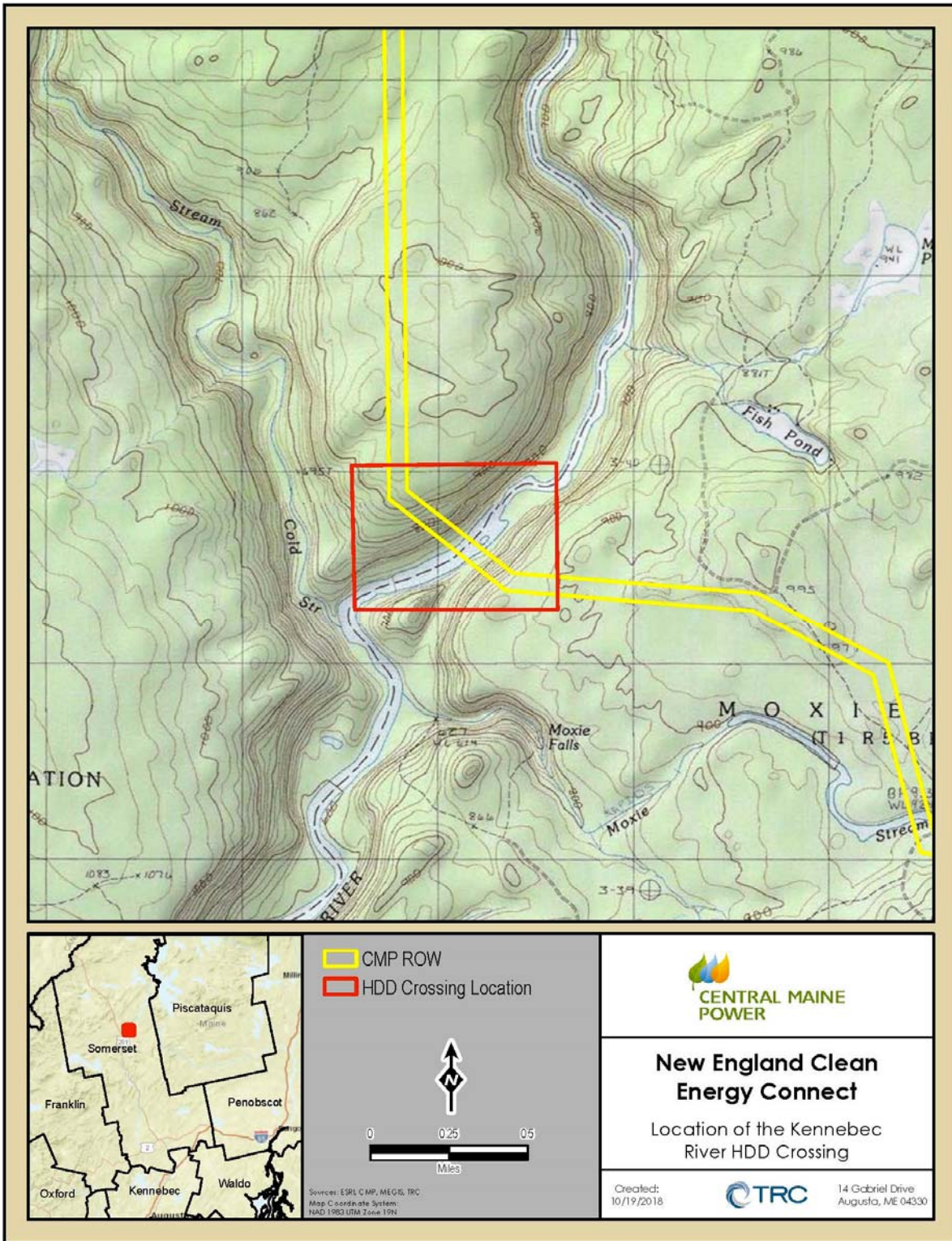
The positioning of the HDD entry and exit points will result in an expanded forested buffer on each side of the river as compared to the overhead crossing. Specifically, the forested buffer will expand from 300 feet to 1,450 feet on the east side of the river and 550 feet to 1,160 feet on the west side of the river. A biologically important deer wintering area ("DWA") that had been identified by the Maine Department of Inland Fisheries and Wildlife ("MDIFW") was not part of the geographic information systems ("GIS") data set provided by the agency, and therefore was inadvertently omitted from CMP's September 27, 2017 Site Law and NRPA applications. This DWA encompasses both sides of the Upper Kennebec River. As a result, an HDD crossing is preferred to the overhead crossing because the expanded forested buffers will minimize impact to this DWA and provide important habitat connectivity for overwintering deer. As compared to the overhead crossing, the HDD crossing will also avoid impacts to wetland (WET-49-01) resulting in a 9,384 square foot reduction of forested wetland conversion.



Based on this analysis, the overhead crossing is no longer suitable because it would have greater impacts than the HDD crossing. As described in the September 27, 2017 application, overhead conductors would be visible to rafters passing through or stopping in this portion of the river, and views of the transmission line structures would occur on the west side of the river with the overhead crossing. This will not occur with the HDD crossing.

The CMP Land Alternative and the Brookfield Alternative are not suitable or reasonably available for the reasons stated in the September 27, 2017 NRPA application, further supplemented by CMP's response to the MDEP/LUPC's May 7, 2018 additional information request for the Upper Kennebec River alternatives. Accordingly, no reasonable alternative to the HDD crossing exists which would have less adverse effect upon the natural and recreational features of this segment of the Kennebec River. 38 M.R.S. § 480-D(8).

3.0 USGS MAP



4.0 PHOTOGRAPHS



View facing east towards the Moxie Gore Termination Station.



View facing west towards the temporary drilling platform and trench locations for the Moxie Gore Termination Station.



View of WET 49-01 (PFO), approximately 65 feet west of the HDD drilling pad in Moxie Gore.



View facing east towards the West Fork Termination Station.



View facing southeast towards temporary receiving platform and trench locations for the West Forks Termination Station.



View of WET-48-03 (PFO/PEM), approximately 230 feet north-northwest of the West Forks Termination Station.



View of WET-48-01 (PFO/PEM), approximately 66 feet east of the West Forks Termination Station.

5.0 PROJECT PLANS

For Project Plans see the Kennebec River HDD Site Law Application Amendment, Attachments Description, listed below.

- Attachment 1- Engineered Plans – HDD and Termination Station Modification
- Attachment 2- Natural Resources Maps

The following attachments which were included within the September 2017 Application materials, remain unchanged and are thus not included within this Application Amendment: Attachment 3 - Aquifer Maps; Attachment 4- Floodplain and Soil Series Maps; Attachment 5- USGS Location Maps; and Attachment 6- Significant and Potentially Significant Vernal Pool Location Maps.

6.0 ADDITIONAL PLANS

No additional plans are required as part of this Application Amendment.

7.0 CONSTRUCTION PLAN

The following construction plan provides an overview of the process and techniques that will be implemented during the construction of the HDD project components. This plan is based on established HDD construction methods and is designed to minimize impacts to natural resources and expedite restoration after construction activities are completed. Construction will be performed in such a manner that: 1) natural resources are protected to the greatest extent practicable; 2) construction crews safely perform the HDD activities and construct the termination stations; and 3) erosion and sedimentation is minimized. Specific erosion control methods are discussed in the Erosion and Sedimentation Control Plan located in CMP's "Environmental Guidelines for Construction and Maintenance Activities on Transmission Line and Substation Projects" ("Environmental Guidelines"), which is referenced within the Basic Standards Submissions (Section 14.0) of the Kennebec River HDD Site Law Application Amendment. The construction of the HDD will also follow and implement the procedures outlined in the "Requirements for Inadvertent Fluid Release Prevention, Monitoring, and Contingency Plan for HDD Operations" ("Plan"), also provided in Section 14.0 of the Kennebec River HDD Site Law Application Amendment, which addresses potential release and response to break-out of drilling fluid.

As a result, the Project will not unreasonably interfere with natural water flow, violate any water quality law, or unreasonably cause or increase flooding. In addition, these plans ensure there will be no unreasonable harm to wildlife habitats, including fisheries.

Generally, the construction sequence for the HDD will be conducted in the following steps:

- Installation of erosion control devices;
- Initial clearing and grubbing;
- Access road improvements and construction;
- Temporary drilling site grading;
- HDD boring & conduit installation;
- Transition yard grading;
- Trench excavation and direct buried conduit installation;
- Transition station foundation, conduit, and ground grid installation;
- Transition station structure and equipment installation;
- Cable installation;
- Restoration and revegetation of temporary construction site areas;
- Removal of erosion control devices upon permanent stabilization.

It is estimated that construction of the HDD and termination stations will require approximately 6 months.

Tree clearing to accommodate the termination stations and temporary work areas will occur during transmission line clearing activities, as described in the September 27, 2017 NRPA application. Road improvements and extensions needed to gain access to the corridor will also occur during this time. Once clearing has been completed, access roads and temporary laydown areas established, erosion controls installed, and the temporary drill pads established, the construction process for the HDD boring and conduit installation will consist of four main steps: (1) pre-site planning; (2) boring a pilot hole; (3) expanding the pilot hole by reaming; and (4) pull-back of drill rig with simultaneous installation of casing (casing may or may not be required based on geotechnical study results). These four steps are discussed below.

7.1 Pre-Site Planning

The HDD process begins with conceptual engineering and a variety of data gathering activities including, but not limited to: area topographic survey, wetland and protected natural resource surveys and mapping, and geotechnical borings. Once the necessary data is accumulated, a conceptual bore hole alignment is defined. With the conceptual bore alignment defined, conceptual design is performed for the temporary construction areas and adjacent termination stations. Conceptual design of the construction areas and termination stations includes grading and drainage design, erosion and sedimentation control design, pre- and post-construction storm water management design, and site restoration design. The conceptual engineering phase will emphasize avoidance and minimizing impact to wetlands, vernal pools, forested communities, and sensitive wildlife areas. Conceptual engineering design will be performed in conjunction with the HDD contractor to ensure that the proposed bore alignment is achievable given geotechnical conditions as well as available equipment and expertise. The results of the pre-site planning phase will be used to determine the required size of drill rig, the number of drill head extensions, the conduit material, and the length and size of the conduit.

7.2 Drilling Pilot Hole

Upon completion of the pre-site planning phase, and once approval from the necessary agencies is obtained, HDD construction activities will begin with the drilling of the pilot hole. This is accomplished using a drill rig fitted with a drill pipe/steel and cutting head. The drill rig will be set on a level working area behind a temporary fluid return pit and will be anchored. The drill rig will elevate itself to achieve the required entrance angle in accordance with the design bore alignment. As the drilling commences, a

slurry composed of primarily water (95%) and a small amount of bentonite (approximately 5%), commonly called drilling mud, is pumped down the drill steel to the cutting head. Bentonite in the mud is a non-hazardous shrink swell clay material which helps keep the borehole stable and helps lubricate the drilling operations. The pressurized mud drives the cutting head through a device called a “mud motor” then it is exhausted in front of the drill. By injecting the mud at the drill head, the drill cuttings are suspended within the mud and pushed back out of the bore hole to the fluid return pit adjacent to the HDD drill rig. Once the drill head has bored the full length of the drill steel segment into the earth, another segment of drill steel is added, and drilling commences; this process is repeated until the full length of the pilot hole is achieved. Given the anticipated subgrade material at this site, it is expected that the bore process will advance between 150 feet to 200 feet per day. For the length of the proposed bore, the HDD operation will take approximately 6 months to complete the pilot hole and reaming operation. The duration of the operation could increase if very hard rock is encountered. At no point in the drilling operation, including drilling, reaming, and pulling conduit, is it advisable to stop longer than required to add a new length of drill steel or reamers. If drilling is halted for too long a period, the drill mud will adhere to the drill steel and cuttings will start to settle out. This can cause the drill stem to seize and the drilling fluid to stiffen. Re-mobilizing the drilling fluid is difficult and requires very high pressure. This constraint is given consideration in the pre-site planning phase.

7.3 Expanding the Pilot Hole

Once the drill head emerges at the far end of the planned bore (i.e., at the exit point), if necessary, the drill head will be removed, and a reamer head will be attached to the drill steel. The reamer head is a device that is a larger diameter than the drill head with similar cutting teeth. The reamer head is pulled back through the length of the bore hole to the original entry point. This operation incrementally increases the diameter of the bore. Depending on the final bore diameter, multiple push/pull passes may be taken with reamer heads of increasing diameter.

7.4 Installation of Conduit

Usually during the final reaming pass, when the bore hole is almost at its final diameter, a casing, duct, or sometimes the cable is pulled into the bore hole by attaching it to a swivel behind the reamer. In this way the final reaming pass also pulls the casing, conduit, or cable into the borehole. The need for casing is a function of the geological formation and construction schedule. If the hole is cased, it can be left open for some time which will provide some level of flexibility in the construction schedule. Additionally, in the event that a cable fails, a cased hole will allow the old cable to be pulled out and a new cable to be

installed. For this project, the HDD bore hole will be cased to act as an electrical conduit for the HVDC transmission cables. Casings usually consist of thick-walled, high-density polyethylene (“HDPE”), fusible PVC, or steel pipe. The selection of the casing material, and required strength of such material, is a function of the bore geometry, length, geology, and intended function. The final selection of the casing material is made when the geotechnical borings have been analyzed and the final bore geometry designed. For this application, it is assumed a steel pipe or similar casing will be required.

With the drill rig completely extended to the end of the bore hole, sticking out of the earth at the receiving end, a pulling head is attached, as previously stated, sometimes directly behind the reaming head. The conduit is attached to a swivel at the pulling head, and the drilling rig retracts back through the boring hole pulling the conduit. As mentioned above, it is important to the stability of the borehole not to stop boring activities once they begin. As such, the full length of conduit must be constructed on the receiving end of the bore and pulled through in one consistent motion. To ensure the casing does not buckle, sufficient equipment including cranes, backhoes, staging and roller stands must be provided to suspend the casing at an elevation consistent with the bore hole entry angle and allowable bending radius of the casing. An area approximately equal to the length of the bore path and approximately 50 feet wide will be required in-line with the bore entry hole. This area is required for the fabrication of the casing and equipment used to suspend it in a catenary as it is pulled into the HDD bore. The casing fabrication area will be within the current transmission ROW and no additional land will be impacted. In addition, since the casing will be under considerable strain during the pulling operation, it is necessary that a significant length of pipe be exposed above ground at each end of the completed bore when the pulling operation is complete. Once the stress is removed the casing will begin to relax and shrink back into the bore hole.

After the conduit is completely installed and allowed to relax, the transmission cables are pulled through using common cable pulling techniques. The conduit remains in place permanently to protect the transmission cables.

7.5 Trenching and Drilling Work Plan

The HDD drill rig will be set on a level graded working area. This temporary working area will be arranged in conjunction with the contractor to promote a safe and efficient workflow. The drill rig will be set behind an excavated pit which will collect and retain the drilling fluid (mud). The pit is estimated to be approximately 15 feet wide by 25 feet long and 5 feet deep. The drill fluid and cuttings will be collected in this pit and removed as necessary to keep drilling operations active. A system will be established to retain, process, and recirculate drilling fluids throughout HDD activities. Cuttings from the boring will be

removed from the drilling fluid through gravity separation, cyclonic separation, or with a shaker table. The cuttings will be temporarily stored on site in a cutting pit, or a dumpster. The cuttings will be removed from the site and disposed of at an approved location. The receiving pit will be a similar but slightly smaller pit. Both pits must be installed before drilling operations begin.

In an effort to minimize the length of the HDD bore, buried conduit will be used to carry the transmission cables from the HDD bore to the termination structures in the termination station. Less than 400 feet of temporary, open trenching is anticipated between each termination station and the HDD points of entry. Trenching required to install conduit will be performed by a wheeled or tracked excavator to the greatest extent possible. Typical trench dimensions will be 4 to 8 feet wide by 5 to 10 feet deep. If rock is encountered, it will be removed by the most suitable technique (e.g. hydraulic rock hammer or blasting) given the material characteristics of the rock. The preferred method for rock removal will be rock hammer. Trenches will be temporary and will be backfilled and revegetated after construction.

8.0 EROSION CONTROL PLAN

For the erosion control plan refer to Section 14.0 of the Kennebec River HDD Site Law aApplication amendment, which demonstrates that the project will not cause unreasonable soil erosion or unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment and will not violate State or Federal water quality laws.

9.0 SITE CONDITIONS

Wetlands adjacent to the HDD development areas were surveyed during the wetland field survey effort in 2015, consistent with the field survey methods described in Section 9.0 of the September 27, 2017 NECEC NRPA application. Wetlands were also classified in the field using the United States Fish and Wildlife Service's ("USFWS") classification system (Cowardin et al. 1979). Additionally, they were evaluated under the criteria for Wetland of Special Significance ("WOSS"). If a wetland did not meet this criteria, they were considered "Non-WOSS".

Two wetlands are located adjacent to the Moxie Gore Termination Station.

WET-49-01 is located approximately 65 feet west of the HDD entry point. WET-49-01 is classified as Palustrine Forested ("PFO"), characterized as permanently saturated and consisting of broad-leaved deciduous trees. This wetland was determined to be Non-WOSS. As a result of the HDD installation, forested wetland conversion will now be avoided in WET-49-01.

WET-49-02 is located approximately 220 feet east of the Moxie Gore Termination Station. It is classified as PFO and is considered Non-WOSS. Forested wetland conversion impacts as a result of overhead transmission line construction will remain unchanged in WET-49-02, and there will be no additional impacts to WET-49-02 as a result of the HDD installation and construction of the Moxie Gore Termination Station.

WET-48-03 is located approximately 230 feet north of the West Forks Termination Station. WET-48-03 is classified as a Palustrine Forested/Palustrine Emergent (PFO/PEM), characterized as saturated with areas dominated by trees and shrubs and areas of emergent marshes. This wetland was determined to be Non-WOSS. Forested wetland conversion impacts as a result of overhead transmission line construction will remain unchanged in WET-48-03, and there will be no additional impacts to WET-48-03 as a result of the HDD installation and construction of the West Forks Termination Station.

CMP conducted natural resource surveys in October 2018 along access roads that will be used for construction of the HDD development and to gain access to the termination stations for maintenance and/or emergency response after construction. The land management road that extends from Fish Pond Road to the transmission corridor is an existing gravel roadbed which will require improvement, likely some tree trimming, widening, and grading. The gravel road has two areas which were surveyed and are

in the process of reverting back to wetland conditions, totaling 11,279 square feet. Improvement of the access road will result in permanent wetland fill in this degraded area and is calculated within the Compensation Plan, submitted concurrently with this Application Amendment.

Photographs are provided in Section 4.0 of this Application Amendment.

10.0 PUBLIC NOTICE

No public notices are required as a result of the submittal of these Application Amendment materials.

11.0 MAINE HISTORIC PRESERVATION COMMISSION AND OUTREACH TO INDIAN TRIBES

For information regarding historic, cultural, or archeological values, refer to Section 8 of the Kennebec River HDD Site Law Application Amendment. No additional outreach to Indian Tribes was required as part of this Application Amendment.

12.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

The September 27, 2017 NECEC NRPA application defined the project impact types and evaluated the wetland functions and values which would be impacted as a result of construction and maintenance of the NECEC Project. As noted within Section 9.0 of this Application Amendment, two wetlands areas, totaling approximately 11,279 square feet, are located in the existing land management gravel road which will be used to access the Moxie Gore Termination Station. Development of these degraded wetland areas will result in a de minimis impact to wetland functions and values but are nonetheless accounted for in the In-Lieu Fee payment proposed in the Project's Compensation Plan.

13.0 COMPENSATORY MITIGATION

The September 27, 2017 NECEC NRPA application included a discussion of the compensation requirements under the NRPA Wetlands and Waterbodies Protection Rules (38 M.R.S. §480-A *et seq.*) and Section 404 of the Clean Water Act (“CWA”) (33.U.S.C. §1344). On August 14, 2018, CMP submitted the NECEC Compensation Plan which achieved a no-net-loss of ecological functions and values through a combination of: use of the In-Lieu Fee (“ILF”) Program by MDEP and the USACE as a compensatory mitigation option for permit applicants; preservation of regionally significant natural resources; and implementation of a number of wildlife habitat enhancement projects. The Plan meets the requirements of the MDEP, pursuant to NRPA, 38 M.R.S. §480-A *et seq.*, and of the USACE pursuant to Section 404 of the CWA.

As discussed in Sections 2.0, 9.0, and 12.0 of this Application Amendment, the proposed HDD project modifications will not impact additional protected natural resources and will result in a reduction of forested wetland conversion (i.e., preservation of wetlands) and a corresponding reduction in the compensation proposed by CMP in its August 2018 Compensation Plan. Of note, the total acreage of wetland preservation included in the August 2018 Compensation Plan to offset forested wetland conversion exceeded the amount required.

An updated NECEC Compensation Plan, which includes an adjustment of calculated natural resource impacts due to the HDD design change at the Kennebec River and a refinement of proposed compensation methods through ongoing agency consultation for a number of wildlife and rare species concerns, is included in the additional supplemental application materials, submitted concurrently with this amendment.