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FORESTRY SERVICES ~ WETLAND IMPACT ASSESSMENTS
WETLAND DELINEATIONS AND PERMITTING ~ E&S/SITE MONITORING
WETLAND FUNCTION & VALUE ASSESSMENTS

3/19/2023

Killingly Engineering Associates
P.O. Box 421
Dayville, CT. 06241

Attn: Norm Thibeault

Re: Wetland function & value and impact assessment report for the proposed site development for the Collins property, 210 Snake Meadow Road, Killingly, Connecticut.

Dear Mr. Thibeault,

At your request, I have reviewed the preliminary site plan for the driveway and single-family residence and I have inspected the above referenced property for the purposes of assessing the wetland functions and values and potential impacts to the inland wetlands and watercourses from the construction of the driveway.

The wetland function and value assessment was conducted on March 8th, 2023.

Existing Conditions

The property is 97.6 acres in size and is located on the southeast side of Snake Meadow Road in Killingly CT.

The general topography across the property is nearly level to moderately sloping.

The majority of the parcel was recently logged, with the majority of the understory and overstory being removed.

In the western portion of the property 3 separate palustrine forested wetland corridors and watercourses were found where the driveway was constructed. Smaller isolated wetland pockets were also found in the south-central portion of the property.

Upland Review Areas

The 200- foot upland review areas adjacent to the various inland wetlands and watercourses are sparsely vegetated in the overstory with mixed hardwoods in the sawtimber and

polewood size classes. Species observed included: red maple, white ash, white pine, hemlock, black and white oaks, hickory, and birch.

The sparsely vegetated understories are comprised of polewood and saplings in these species as well as shrub species such as ironwood, spicebush, and sweet pepperbush. Vine species included poison ivy, round leaf green briar, and bittersweet.

Herbaceous vegetation observed included numerous fern species, goldenrod, mugwort, black raspberry, skunk cabbage and miscellaneous grasses such as sedges, foxtail and reed canary grass.

Invasives noted included Japanese barberry, multiflora rose, Asiatic bittersweet, mugwort, and winged euonymus.

Wetlands

The first of 3 separate wetland corridors in the western portion of the parcel is the watercourse that the existing driveway crosses via a wooden bridge.

This brook flows to the south from a large palustrine forested wetland found in the northwest portion of the property and the State of Connecticut parcel located to the north.

This wetland corridor is vegetated with red maple in the overstory, and the understory is mainly comprised of shrub species such as sweet pepperbush, speckled alder, spicebush, highbush blueberry, and Japanese barberry. Vines included grape vines, poison ivy and greenbrier.

Herbaceous vegetation included skunk cabbage, cinnamon ferns, wild violets, water pennywort, sphagnum moss and sedges.

Wildlife tracks/sign found or directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon, red tailed hawk, American crow, and numerous songbird species.

No fish, reptiles or amphibians were observed although undoubtedly, this wetland complex and brook serves as habitat to these species.

The second palustrine forested wetland corridor, (Wetland #2 delineated by the B and C series flagging), was found to the east of the existing lawn area at the top of the hill. This corridor is oriented north to south and has an intermittent watercourse that flows slowly to the south during significant storm events and when the water table is high.

This wetland corridor is thinly vegetated with black oak, white ash, white pine and red maple in the overstory, and the understory is mainly comprised of shrub species such as sweet pepperbush, spicebush, highbush blueberry, and Japanese barberry. Vines included poison ivy and greenbrier.

Herbaceous vegetation included sphagnum moss and sedges.

Wildlife tracks/sign found or directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon, red tailed hawk, American crow, and numerous songbird species.

No reptiles or amphibians were observed although undoubtedly, this wetland complex serves as habitat to these species.

The third palustrine forested wetland corridor, (Wetland #3 delineated by the C and D series flagging), was found to the east of Wetland #2. This corridor is also oriented north to south and has an intermittent watercourse that flows to the south during significant storm events and when the water table is high. Currently it flows across the surface of the constructed driveway.

This wetland corridor is sparsely vegetated with red oak, beech, hickory, white pine and yellow birch polewood in the overstory, and the shrub understory is almost non-existent from the heavy logging that occurred in this area.

Herbaceous vegetation included sphagnum moss and sedges.

Wildlife tracks/sign found or directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon, red tailed hawk, American crow, and numerous songbird species.

No reptiles or amphibians were observed although undoubtedly, this wetland complex serves as habitat to these species.

The last two wetlands in close proximity to the constructed driveway and proposed residence are emergent wetland pockets 4 and 5, delineated by the K and H series flagging.

These wetlands were forested wetlands prior to the logging operation, but are now for the most part, emergent wetlands with very few polewood and sapling species such as red oak, and hickory adjacent to or in them. A few highbush blueberry bushes were found along with sphagnum moss and sedges in the depressed areas.

Wildlife tracks/sign found or directly observed in and adjacent to the wetland/watercourse included mammals and bird species such as: white tailed deer, eastern coyote, red fox, raccoon, red tailed hawk, American crow, and numerous songbird species.

No reptiles or amphibians were observed although undoubtedly, these wetland pockets serve as habitat to these species.

Wetland Functions and Values

The forested wetlands and watercourse(s), were inspected to determine wetland functions and values utilizing the Army Corps. Of Engineers methodology as outlined in ~~the~~ The Highway Methodology Workbook Supplement.

This methodology recognizes 8 separate wetland functions: groundwater recharge/discharge, floodflow alteration/storage, fish/shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization and wildlife habitat.

The 6 wetland values include: recreational value, educational/scientific value, uniqueness/heritage value, visual quality/aesthetics, threatened/endangered species habitat and marine fish & shellfish habitat.

The first watercourse/wetland corridor functions:

The following is a list of the wetland functions exhibited by these wetlands and watercourse and their rationale:

Ground water recharge/discharge: The wetland is associated with a watercourse; signs of groundwater recharge and discharge are present and the quality of the water associated with this wetland is high.

Sediment/toxicant retention: Potential sources of sediments/toxicants are present in the watershed above this wetland, mineral, fine grained and organic soils are present, the wetland edge is broad and intermittently anerobic, this wetland corridor is associated with a watercourse, and no indicators of erosive forces or high water velocities are present.

Nutrient removal/retention: This wetland is large relative to the size of its watershed, overall potential exists in the wetland, potential sources of nutrients exist, the wetland is saturated for most of the season, slowly drained mineral and organic soils are present, dense vegetation is present, the opportunity for nutrient attenuation exists and water moves slowly through this wetland.

Production export: Wildlife food sources grow within the wetland, detritus development is present, there is evidence of wildlife use in this wetland, high vegetation density is present, the wetland contains flowering plants that are used by nectar gathering insects, and indications of export are present.

Sediment & shoreline stabilization: Roots from herbaceous grasses and plants, shrub species and trees found in the wetlands bind and stabilize soils which helps prevent erosion along steeper edges of the watercourse & wetlands.

Fish habitat: This watercourse is capable of sustaining a fish population and the water quality associated with the watercourse is high.

Wildlife habitat: The water quality associated with the wetlands and watercourse is high, the wetland is not fragmented by development, the wetland is contiguous with other wetland

systems, wildlife overland access to other wetlands is present, wildlife food sources are present, and the dominant wetland class includes a wooded swamp and animal signs observed. Wildlife habitat is the primary function of this wetland.

The forested wetlands and watercourse did not exhibit the wetland function of floodflow alteration, due to the lack of flood storage capacity, the presence of the watercourse transporting flood flows downstream.

The first watercourse/wetland corridor values:

This wetland did not exhibit the wetland values of recreation, uniqueness/heritage value, visual quality/aesthetics value, educational/scientific value, endangered species habitat or marine fish/shellfish habitat.

These values were not exhibited due to the lack of public access, there are no historic features associated with the wetland or watercourse, high noise levels are present, the lack of scenic views, and the property and surrounding area are not shown within the shaded areas on the D.E.E.P. Natural Diversity Database mapping for state or federal listed threatened or endangered species.

Forested wetland/intermittent watercourse functions:

As the forested wetland/intermittent watercourse corridors #2 and #3 are nearly identical in their nature and characteristics, I have grouped them together for function and value.

The following is a list of the wetland functions exhibited by these wetlands and watercourse and their rationale:

Ground water recharge/discharge: The wetlands are associated with an intermittent watercourse; signs of groundwater recharge and discharge are present and the quality of the water associated with the wetlands is high.

Sediment/toxicant retention: Mineral, fine grained and organic soils are present, the wetland edge is broad and intermittently anerobic, these wetland corridors are associated with intermittent watercourses, and no indicators of erosive forces or high water velocities are present.

Nutrient removal/retention: The wetlands are large relative to the size of its watershed, overall potential exists in the wetlands, potential sources of nutrients exist, the wetlands are saturated for most of the season, slowly drained mineral and organic soils are present, opportunity for nutrient attenuation exists and water moves slowly through the wetlands.

Production export: Wildlife food sources grow within the wetlands, detritus development is present, there is evidence of wildlife use in the wetlands, the wetlands contain flowering plants that are used by nectar gathering insects, and indications of export are present.

Sediment & shoreline stabilization: Roots from herbaceous grasses and plants, shrub species and trees found in wetlands bind and stabilize soils which helps prevent erosion along steeper edges of the watercourse & wetlands.

Wildlife habitat: The water quality associated with the wetlands and watercourses is high, the wetlands are not fragmented by development, the wetlands are contiguous with other wetland systems, wildlife overland access to other wetlands is present, wildlife food sources are present, and the dominant wetland class includes a wooded swamp and animal signs observed. Wildlife habitat is the primary function of these wetlands.

The forested wetlands and watercourses did not exhibit the wetland functions of floodflow alteration and fish habitat due to the lack of flood storage capacity, the presence of the watercourse transporting flood flows downstream, and lack of perennial streamflow/deepwater fish habitat.

The forested wetland/intermittent watercourse values:

These wetlands did not exhibit the wetland values of recreation, uniqueness/heritage value, visual quality/aesthetics value, educational/scientific value, endangered species habitat or marine fish/shellfish habitat.

These values were not exhibited due to the lack of public access, there are no historic features associated with the wetland or watercourse, the lack of scenic views, and the property and surrounding area are not shown within the shaded areas on the D.E.E.P. Natural Diversity Database mapping for state or federal listed threatened or endangered species.

Emergent wetland functions:

As the emergent wetlands #4 and #5 are nearly identical in their nature and characteristics, I have grouped them together for function and value.

The following is a list of the wetland functions exhibited by these wetlands and their rationale:

Ground water recharge/discharge: Signs of groundwater recharge and discharge are present and the quality of the water associated with the wetlands is high.

Sediment/toxicant retention: Mineral, fine grained and organic soils are present, the wetland edge is broad and intermittently anaerobic, and no indicators of erosive forces or high water velocities are present.

Nutrient removal/retention: Overall potential exists in the wetlands, potential sources of nutrients exist, the wetlands are saturated for most of the season, slowly drained mineral and organic soils are present, the opportunity for nutrient attenuation exists and water moves slowly through these wetlands.

Wildlife habitat: The water quality associated with the wetlands is high, the wetlands are not fragmented by development, the wetlands are contiguous with other wetland systems, wildlife overland access to other wetlands is present, wildlife food sources are present, and animal signs were observed. Wildlife habitat is the primary function of this wetland.

The emergent wetlands did not exhibit the wetland functions of production export, sediment and shoreline stabilization, floodflow alteration and fish habitat due to the lack of flood storage capacity, the lack of an associated watercourse, lack of wildlife food sources, and lack of perennial streamflow/deepwater fish habitat.

Emergent wetland values:

These wetlands did not exhibit the wetland values of recreation, uniqueness/heritage value, visual quality/aesthetics value, educational/scientific value, endangered species habitat or marine fish/shellfish habitat.

These values were not exhibited due to the lack of public access, there are no historic features associated with the wetland or watercourse, the lack of scenic views, and the property and surrounding area are not shown within the shaded areas on the D.E.E.P. Natural Diversity Database mapping for state or federal listed threatened or endangered species.

Potential wetland impacts:

The preliminary project plans and site were reviewed to assess the potential impacts to the wetlands and watercourses from the construction of the existing driveway and the proposed single-family residence.

On or about the same time, the property was heavily logged, some land clearing and stumping was completed, and a gravel access road was constructed across the two central forested wetlands, (Wetlands #2 and #3).

Timber harvesting impacts:

The timber harvest would be classified as a final harvest, where the majority of the timber 12 to 14 inches in diameter was removed.

This harvest was intensive, where the majority of the forest overstories and understories were mostly removed in both upland and wetland areas. Specifically, wetlands #3, #4, and #5 were heavily cut, with only a few larger trees and smaller saplings left in or adjacent to the wetlands and watercourses.

Technically speaking, wetlands #1, #2, and #3 were not clearcut, as there are still many trees in the 3 inch or larger diameter range in and adjacent to the wetlands.

As defined by CT D.E.E.P. and section 2.1 (e) of the Town of Killingly Inland Wetlands and Watercourses Regulations the definition of clearcutting is as follows:

"Clear-Cutting" means the harvest of timber in a fashion which removes all trees down to a two-inch diameter at breast height. (DBH or diameter at breast height is measured 4.5' above ground level.)

In wetlands #4 and #5, the overstories were completely removed, and the shrub/sapling understories were either cut or damaged to the point of non-existence, resulting in almost no

tree cover. Whether they were clearcut or not is arguable, as much of the wetland delineation flagging is no longer present and there are still few trees above 2 inches in diameter present in and around these areas.

Although this is a significant impact, I would consider this a temporary impact to wildlife habitat in the wetlands due to the lack of cover.

There will be increases in water temperatures within the wetlands and the intermittent watercourses, (wetlands #2 through #5), during periods of inundation when water tables are high. I do not consider this as adverse, as there are no fish populations within these wetlands and watercourses.

The removal of the majority of the canopy however, will benefit the wetlands in several ways.

Firstly there will be a substantial increase the amount of light reaching the ground now, the remaining herbaceous and shrub/sapling vegetation will now grow at an accelerated rate. Species that were light suppressed or currently dormant, in the form of seeds, and species that stump sprout will increase vegetation density significantly within the next growing season. Within the next year, the wetland herbaceous and shrub vegetation will be more dense than it ever was prior to the harvest.

Secondly, with the removal of the majority of the sawtimber and polewood sized trees, losses in wetland hydrology due to water uptake and transpiration will no longer exist. This will significantly increase hydrology and result in longer periods of inundation and soil moisture in the wetlands.

It should also be noted that I observed no significant rutting in or adjacent to the wetlands as a result of the timber harvesting or land clearing. No significant amounts of sediments or erosion were found within the wetlands or watercourse channels.

Overall, I see no significant impacts to water quality as a result of the harvest.

The impacts to wildlife habitat will be temporary, until the existing and future herbaceous and shrub vegetation can respond to the increases in light and water levels.

I would recommend that in wetlands #4 and #5, the remaining treetops be removed and the wetlands should be seeded with New England Wetmix seed mix to help restore herbaceous vegetation quickly.

Access road impacts:

Fill was placed over an existing, historic crossing at wetland #2. This crossing was comprised of a large stone base which was top dressed with gravel. The gradual stream flows from the intermittent watercourse flow through the stone base under the roadbed and emerge on the south side of the crossing.

The second crossing sites at wetland #3 was newly constructed on the portion of a very stony, muddy and rutted woods road. A small upland island exists between the two fingers

of wetlands that the road crosses. The intermittent watercourse flowed over the existing woods road to the south prior to the construction of the gravel access road.

On a routine basis, the frequent disturbance from truck and ATV traffic created significant amounts of erosion and sedimentation within the wetlands and intermittent watercourse.

The new access road has a stone base with a top dressing of stone and gravel. The section of the roadbed where the stream crosses has a depressed stone ford built so the stream flows over the roadbed.

As far as wetland impacts are concerned, in wetland corridor #3, all existing wetland functions within the newly filled sections of the wetlands are now non-existent. The filling of the roadbed also fragments the wetland and may hinder amphibian travel within the corridor.

Although no E&S measures were implemented, no significant amounts of sediments or erosion were found within the wetlands or watercourse channels adjacent to the new roadbed.

No impacts were noted in wetland pockets #4 and #5 as a result of the construction of the access road.

Lastly, there was clearing, grubbing, stump removal and grading performed directly adjacent to the first watercourse where the proposed driveway entrance is located before the bridge crossing. Currently the soils are not stable.

All vegetation was removed along the northwest side of the stream channel and wetland boundary.

Although all the vegetation was removed on this side of the stream channel, I do not think there will be increases in stream temperatures, as there is mature forest canopy shading the stream on its southeast side.

Despite the fact that no E&S measures were installed, I saw only minimal amounts of erosion and sedimentation within the wetlands and watercourse.

I would recommend that silt fencing backed by staked haybales be installed, and the disturbed soils adjacent to the proposed driveway location be seeded and mulched ASAP.

Proposed activity potential impacts:

The proposed activity consists of the construction/completion of the access road to the residence, the construction of a 3-bedroom single family residence with associated well and septic system, pool and cabana.

Significant portions of the driveway, the well, and a portion of the yard & residence are proposed within the 200-foot upland review areas.

Direct wetland impacts:

The only direct proposed impacts are the construction, widening and completion of the wetland crossings and driveway construction in wetlands #2 and #3, where reinforced concrete culvert pipes are proposed for a total of 3,400 square feet of disturbance.

No direct wetland disturbance is proposed for the construction of the bridge crossing of the first watercourse

Potential indirect impacts:

The potential short-term impacts associated with any remaining land clearing, stumping, grading and construction activities would include potential sediment discharges during significant storm events if the E&S measures breach.

I would recommend that the following E&S measures be implemented into the project plans:

- E&S measures along the first section of driveway, adjacent to the bridge, adjacent to the wetland/stream crossings and adjacent to wetland #4 should consist of standard silt fencing backed by staked haybales. The staked haybales will do a better job of stopping sediments in the uneven rocky terrain in and adjacent to the wetlands.
- E&S inspections should occur at least weekly and prior to/after significant rainfall events.

It should be noted that 2,760 square feet of wetland mitigation is proposed in wetland #3.

No detail or description is provided for the wetland restoration or mitigation areas, this should be addressed on the detail sheet of the plans.

I would recommend that to further mitigate and augment wetland herbaceous vegetation in the crossing sites and wetlands #4 & #5, any existing tree tops should be removed and the areas should be seeded in with New England Wetmix seed mix.

Conclusions:

It is my opinion that overall, the timber harvest did not adversely impact the wetlands or watercourses. The lack of cover and habitat due to the removal/damage to the understory in the wetlands is temporary until the understory re-establishes.

The N.R.C.S foresters, and D.E.E.P. Wildlife Division commonly prescribe partial clearcuts in and adjacent to wetlands to help establish early successional habitat for grouse and woodcock habitat.

The impacts to the wetlands and watercourses from the filling in the crossing sites is significant and adverse, within the footprint of the filled areas, however the remaining wetlands and sections of the watercourses still exhibit their functions and values.

It is my opinion, provided that the E&S measures are correctly implemented and maintained throughout the project timeframe, the E&S inspections are conducted as proposed and no significant discharges of sediments reach the wetlands or watercourses, the disturbance associated with the construction within the upland review areas adjacent to the wetlands will not significantly impact the wetlands or their existing functions due to erosion and sedimentation.

Once the disturbed areas are re-vegetated and stabilized, the moderately well-drained soils will allow for good infiltration of storm water runoff both during and after construction.

The gradual topography of the site and gentle slopes adjacent to the wetlands will help prevent erosion.

The quick and permanent establishment of vegetation in the disturbed areas is crucial to the prevention of post-construction erosion.

The paving of steeper sections of the driveway & construction of the rip-rap plunge pools and swales to channel, attenuate and treat stormwater off sections of the driveway will help prevent impacts to water quality in the wetlands and watercourses.

In summary, I see no direct or adverse impacts to the existing wetlands or watercourses or their functions and values as a result of the construction of the upland portions of the driveway and residence.

This is provided that the recommended erosion and sedimentation control features are implemented, maintained and monitored throughout the construction and post construction timeframe.

If you have any questions concerning the site assessment or this report, please feel free to contact me.

Sincerely,

Joseph R. Theroux

Joseph R. Theroux
Certified Forester and Soil Scientist
Member SSSSNE, SSSA