

**Brooklyn Inland Wetlands Commission
Regular Meeting Minutes
February 11, 2020**

Call to Order: The meeting was called to order at 6:00 p.m.

Members Present: Demian Sorrentino, George Sipila, Richard Oliverson, James Paquin.

Absent: Jeffrey Arends with notice.

Staff Present: Margaret Washburn, Wetlands Agent, Audrey Cross-Lussier, Recording Secretary.

Also Present: Attorney Harry Heller, David Held, Madilyn Smith, Paul Terwilliger, Joe Theroux, Seth Duval, Alan Rawson, Mark Curreri, David Gokey, Richard Desrosiers, Michael Wolchesky, Evan Sigfridson, public in attendance.

Seating of Alternates: None.

Election of Officers: Commission Members unanimously deferred this to the March 10, 2020 regular meeting.

Public Commentary: None.

Additions to the Agenda:

A motion was made by Jim Paquin to add Application 021120B – Vachon Brooklyn, LLC, 512 Providence Road, Map 41, Lot 13A/14, PC Zone; Construction of (2) 16 ft wide access driveways to access proposed new vehicle storage lots, drive to the larger of the two proposed parking areas will be in an area historically used for an agricultural crossing, to item #3 under New Business. The motion was seconded by George Sipila. No discussion held. All in favor. The motion passed unanimously.

Approval of Minutes:

1. Regular Meeting Minutes January 14, 2020.

Regular Meeting Minutes of January 14, 2020 approved as written with no changes.

2. Site Walk Meeting Minutes January 26, 2020:

Site Walk Meeting Minutes January 26, 2020 approved as written with no changes.

Continued Public Hearings:

1. 102219B Strategic Commercial Realty, Inc., d/b/a Rawson Materials, Maynard Road, Map 29, Lot 5, RA Zone: Excavation of approximately 1.2 million cubic yards of sand and gravel.

Mr. Sorrentino asked the applicant if there is anything to add.

Attorney Harry Heller represents the applicant along with David Held, P.E., of Provost and Rovero and Joseph Theroux, wetland consultant/soil scientist. Attorney Heller refers to the revised report dated 2/6/20, from the GZA hydrogeologist, Richard Desrosiers, with regards to the hydrogeologic assessment of isolated kettle wetlands. Attorney Heller commented they have extrapolated information obtained from the report into a table: Summary of Hydrologic Recharge to Kettle Wetland System. This is a summary of the impact to the kettle wetland as a result of the proposed excavation as presented in the original plans and revised plans dated 2/10/20, with the proposed 75-foot set back from the kettle wetland. The purpose of the hydrogeologic report was to determine the impact that this proposed excavation would have on the hydrology which supports the kettle wetland. It is broken down into three sources of hydrology; Direct Precipitation on Wetland; Surface Runoff to Wetland; Infiltrated Precipitation showing Existing Conditions (gpy), 75-foot setback (gpy), Change (%), 125-foot setback (gpy) and Change (%). Attorney Heller reviews the summary in detail with Commission Members. Attorney Heller submits to the Commission that there is no significant impact to the resource from hydrology perspective as a result of the proposed excavation.

The second consideration is how the proposal impacts the resource with regards to erosion and sedimentation. That gets to the short term and long-term effects of the excavation. The site development plan and application indicates the total excavation will be constructed in a bowl as the project proceeds from phase 1 through phase 5. The initial access road will be developed into the middle of the site, excavation commenced in phase 1. As excavation continues sequentially throughout operation, all earth product will be pulled down into the site itself. There will never be operation on any exterior slope of the site. The only time there will be activity in these areas is in the initial phase of clearing the area. Joe Theroux recommended the applicant beef up the erosion and sediment control in those areas, even though they are not proposing any earth disturbance on the exterior slope. The modified plan shows silt fence backed by staked hay bales. Attorney Heller demonstrates this on the site plan. Once the silt fence and staked hay bales are installed prior to excavation occurring, the applicant is offering to construct a diversion trench. A trench will be dug on the upland side of the erosion control measures. If there is any erosion on that embankment the sediment will be caught in the diversion trench. The diversion trench flows

so that it outlets outside any regulated area adjacent to the kettle wetland or the Quinebaug River. This makes the erosion and sedimentation control plan for this operation fool-proof.

GZA Consultant Richard Desrosiers arrived at the meeting at 6:12 p.m.

David Held, P.E, Provost and Rovero reviews the plan revisions dated 2/10/20 with Commission Members.

Revisions have been made to comments and suggestions from Syl Pauley, P.E., and Joe Theroux, Soil Scientist.

Mr. Held reviews Sheet 3 overall site and phasing plan. Adjacent to Maynard Road, the grading and location of the access of the driveway changed slightly due to recognition that the zoning regulations require that within 200 feet of highway no grades are no greater than 10%.

Mr. Held reviews Sheet 7 site plan #4 reviews the diversion swales and proposed silt fence backed with staked hay bales. The location of three additional monitoring wells are demonstrated as GZ1, GZ2 and GZ3. The location of three piezometers in the upper kettle hole were located on the plan. On site plan #4 there are noted wetland buffer signs showing the locations of signs, 25 feet apart on center, at the clearing limits of excavations. The detail of the installation of the signs is on sheet 10. They will be nailed to trees at the clearing limits or installed on pressure-treated posts on the clearing limits. The specific wording and sign design will be worked out with Ms. Washburn.

Mr. Sorrentino asked has the grading adjacent to the kettle wetland changed? Mr. Held commented no, grading has not changed.

Mr. Held reviews Sheet 10 excavation notes addressing Syl Pauley's comment regarding vegetation restoration and excavation notes.

Mr. Held commented on the change in the grading immediately adjacent to Maynard Road to address Zoning Regulation concerns. Everything in the regulated area remains the same with the exception of the showing of the monitoring well locations, E & S controls and the diversion swale on the perimeter.

Mr. Sorrentino asked for a summary of the work that was done assessing the grading plan that would have an effect on the hydrology of the kettle wetland.

Richard Desrosiers, P.G., LEP, GZA Environmental Inc., gives a summary of the report dated 2/6/20 (see attached). Mr. Desrosiers stated in the assessment three groundwater monitoring wells were installed – GZ-1 to the west of the kettle GZ-2 between the upper (north) and lower (south) kettle, and GZ-3 by the eastern property line. GZ-1 was installed approximately 130-feet west of the upper kettle wetland, near SB-4. GZ-1 was used to measure groundwater elevation upgradient of the upper kettle. GZ-2 was installed between the upper and lower kettle wetlands, near SB-1. GZ-2 was used to measure groundwater elevations between the kettles.

GZ-3 was installed approximately 225-feet east of the upper kettle and approximately 100-feet east from the lower kettle to measure groundwater downgradient of the upper/lower kettle wetlands and upgradient of the Quinebaug River. Mr. Desrosiers demonstrates this on the site plan.

Three small diameter- piezometers designated P-1, P-2, and P-3, were installed by hand at locations along the east, west, and southern shores of the upper kettle wetland, as shown on Figure 1. P-1 was installed adjacent to SB-2 and P-2 was installed near SB-3. The soil encountered at these piezometers is summarized in table 3.0. Mr. Desrosiers demonstrates this on the site plan.

Mr. Desrosiers reviews Appendix C: Predicted Seasonal High Gradients, Groundwater Elevation., and Drainage Basin Recharge.

Mr. Desrosiers recommends the following:

- To limit reduction of infiltration of precipitation recharge to the Upper Kettle wetland, GZA recommends that the IWWC consider applying 125-foot excavation setback from the wetland boundary for the project. This is consistent with the IWWC setback to wetlands regulations.
- Should the IWWC consider a lesser setback, GZA recommends that the steep vegetated slopes surrounding the Upper Kettle wetland be maintained, preserving the mature forest to maximize the runoff and infiltration to the Upper Kettle wetland (i.e. rainfall and snowpack).
- Consistent with Provost & Rovero's existing proposed excavation plan, the applicant should maintain proper erosion control measures to protect the Upper Kettle wetland.
- The limited network of groundwater monitoring wells within the limits of the proposed S&G excavation area, limits the extent in which the seasonal high groundwater can be estimated. Rawson may wish to install additional monitoring wells proximate to the excavation to allow for adequate groundwater level monitoring to document seasonal fluctuations and to maximize the depth and volume of the excavation.

Ms. Washburn had questions with regards to the Summary of Hydrologic Recharge to Kettle Wetlands System prepared by Mr. Held in comparison to the GZA Report, page 15, Table 12.0A of Percentage Change in runoff to Upper/Lower Kettle Wetland Basin Existing and Post-Excavation Conditions. Discussion ensued.

Mr. Sorrentino asked if the plan Mr. Desrosiers is referring to is within the report. Mr. Desrosiers commented no, he will leave the plan tonight. Mr. Desrosiers, Mr. Held, Attorney Heller and Ms. Washburn further discuss the percentage of run-off.

Ms. Washburn asked if there were any lab tests done on the organic soils dug up from the western basin. Mr. Desrosiers commented no. Mr. Desrosiers refers to Appendix B-GZ1 with regards to the peat.

Joe Theroux, certified soil scientist, performed the wetland delineation on the property. It was Mr. Theroux's determination that is not a wetlands there and the soils are mineral-based.

Mr. Sorrentino asked if the kettle wetlands hold standing water throughout the year. Mr. Theroux stated when he did the impact assessment there was standing water; he did not observe it in the driest conditions. It would be his opinion it holds water year-round. Mr. Sorrentino asks if that meets statutory qualifications for classifications as both a wetland and a watercourse. Mr. Theroux commented technically if there is water there year-round that it becomes a watercourse. Mr. Sorrentino commented that within the IWWC regulations it is 125-feet for wetlands and 175-feet for a watercourse with continuous flow, Ms. Washburn commented yes.

Mr. Sorrentino commented upon hearing the soil scientist say this is a watercourse, would Mr. Desrosiers change his recommendations and justify the 175-foot setback as opposed to the 125-foot recommended setback? Mr. Desrosiers commented upon looking at the hydrology it is going back to the recharge. At 175-foot is starting to look at the high point, at 125-foot the slopes are towards the kettle wetlands. The 175-foot to the watercourse is a determination to the Board. Hydrologically 125-foot versus 175-foot in terms of run off differential is very small in point of the infiltration itself to the lower kettle. Mr. Desrosiers refers to table 13.0A and discusses recharge.

Mr. Sorrentino wanted it on the record that the bullet point #1 of the recommendations for observing the 125-foot setback was not based on whether it was considered a wetlands, watercourse or both, it was based on the analysis of the contributing area. Mr. Desrosiers commented they look at this as a wetland, they understand it could be a watercourse, they were not told one way or another it was both. The recommendation of the 125-foot would be whether it was one or the other.

Mr. Held commented that Mr. Desrosiers original task was to determine what is the impact on the wetland hydrology with what is being proposed. If what is proposed will cause meaningful impact, a change is recommended to the application to prevent that. Mr. Held feels that Mr. Desrosiers report, regardless of the conclusion section, demonstrates there is not a meaningful impact. It is Mr. Held's understanding that the 125-ft recommendation is based on what is outlined in the regulations as a regulated area. Mr. Sorrentino commented that he does not have this misunderstanding.

Attorney Heller commented that Mr. Desrosiers testified as a Geologist, not a Soil Scientist. Mr. Desrosiers confirmed this. Attorney Heller commented that the GZA report and the evaluation done by Mr. Held evidences that there is a statistically insignificant difference in the recharge to the kettle wetland, whether you take the 75-foot, 125-foot or 175-foot buffer. The preamble to the IWWC act recognizes that wetlands and watercourses are valuable natural resources that require protection. The preamble also indicates that the purpose of wetlands regulations is to balance the protection of the wetland and watercourse resources with the economic development of the State of Connecticut. An upland review area is an area which the Commission and legislative capacity have determined is in close enough proximity to a wetland or watercourse under certain circumstances to have potential impact on those resources and thus require evaluation by the Commission when activities are occurring within the upland review area.

However, the purpose is review in order to make a determination as to whether or not the activity proposed is likely to have an adverse impact on the resource. There are two potential areas that are seen that this proposed excavation could have an impact on the resources, the kettle wetland and the Quinebaug River. Those two areas are adversely impacting the hydrology which sustains the wetlands and erosion and sedimentation control events. The testimony induced this evening indicates the vast majority of the recharge of the hydrology of this wetland system occurs through direct precipitation or from infiltration, that there is no significant impact as a result of this proposed activity and therefore no justification for requiring a setback of greater than 75-feet. There is a report prepared by a wetland scientist which is the only direct evidence in the record of this proceeding as to an impact and analysis and as well as an evaluation of the functions of the wetlands. Attorney Heller recognizes the fact that Mr. Sorrentino is a wetland scientist and has expertise in this area, therefore as long as his evidence is put on the record would also constitute evidence for consideration by the commission. Mr. Theroux in detailed analysis goes through each function of a wetlands system based on the Army Corps methodology, he evaluates whether or not these wetland systems are performing those functions; also evaluates from the Army Corps methodology the values of these wetland systems. In Mr. Theroux's professional opinion has concluded that a 75-foot setback from the wetland resource is sufficient based upon the fact that there is no significant impact to the hydrology of the wetlands at any of the setbacks that have been discussed. With the methodologies for erosion and sedimentation control which he has recommended and incorporated into the plan are sufficient to prevent any type of erosion and sedimentation event into the kettle. Attorney Heller would submit to the Commission that this application complies with the permitting parameters in both statutes and in regulations and would ask the Commission to approve the application as it has been revised to February 10, 2020.

Ms. Washburn asked if the Commission has ever had any experience with a swale/ditch dug in front of the sediment controls. Mr. Sorrentino has seen and designed benches in consistent slopes; every 14-feet have a reversed bench to serve that kind of purpose, however, he has never personally witnessed that at the top of a significant slope. Ms. Washburn asked Mr. Theroux asked if he has worked on a project with similar slopes. Mr. Theroux commented he worked on a similar project in Sprague, CT, with steep slopes. Attorney Heller commented a project was done years ago in Montville, CT using the exact same methodology.

Mr. Sorrentino asked Mr. Desrosiers if he was a licensed environmental professional? Mr. Desrosiers stated he was. Mr. Sorrentino asked what are the qualifications of John Paquin? Mr. Desrosiers commented that Mr. Paquin is also a geologist. Mr. Sorrentino asked if any other professionals from GZA were involved with compilation of this report? Mr. Desrosiers commented he had Ben Rock, environmental scientist as well as office staff doing the CAD work. There were also wetland people who came down to look at conditions of the kettle. From the geologic and the hydrogeologic aspect, it was predominantly Mr. Desrosiers and Mr. Paquin. Mr. Sorrentino commented that proper credit should be paid to the recommendations of the professionals. Ms. Washburn, Wetlands Agent has been a wetland scientist for 24 years.

Mr. Sorrentino asked if there were any further questions for the applicant. No further comments or questions were received.

A motion was made by Jim Paquin to close the public hearing at 7:18 p.m. This motion was seconded by George Sipila. No discussion held. All in favor. The motion passes unanimously.

Old Business:

1. 102219B Strategic Commercial Realty, Inc., d/b/a Rawson Materials, Maynard Road, Map 29, Lot 5, RA Zone: Excavation of approximately 1.2 million cubic yards of sand and gravel.

Ms. Washburn reviewed her suggested conditions of approval with Commission Members:

- “When the excavation is approximately 20 feet above the proposed bottom elevation, contact the Land Use Department to schedule witnessing deep test pits in order to evaluate the depth of seasonal high ground water. If no seasonal high groundwater indicators are observed, when the excavation is approximately 10 feet above the proposed bottom elevation, contact the Land Use Department to schedule witnessing deep test pits in order to evaluate the depth to seasonal high ground water.”
- “After clearing limits have been flagged by a licensed land surveyor, the applicant shall contact the Wetlands Enforcement to review the limits of work.”
- “Within 12 months after clearing the site, the applicant shall contact the Wetlands Enforcement Officer to review the wetland buffer signs.” Discussion ensued.

Mr. Sorrentino asked Commission Members and Ms. Washburn how they feel about the evidence that has been presented, the potential impact and mitigation thereof to that wetland and the flood plane wetland associated with the Quinebaug River.

Mr. Paquin and Mr. Sipila would like to see a greater setback to the resource. Mr. Paquin suggests 125-foot setback observing the upland review area. Ms. Washburn does not disagree with Mr. Paquin.

Ms. Washburn commented that Chairman Arends expressed his concern that the maximum setback be used from the Quinebaug River. Discussion ensued.

Mr. Sorrentino asked Ms. Washburn how she feels about the proximity to the riparian wetland. Ms. Washburn commented they should use the maximum 175-foot setback to the Quinebaug River and the 125-foot to the riparian wetland.

Mr. Oliverson suggests that Chairman Arends listen to the recording of the meeting and give written input.

Ms. Washburn commented the terminal date to render a decision is March 17, 2020 unless another extension is requested.

A motion as made by Richard Oliverson to table application 102219B to next month’s meeting March 10, 2020. Jim Paquin seconds this motion. No discussion held. All in favor. The motion passes unanimously.

2. 121019A Hearing for violation at 260 Woodward Road, Owner Richard and Sandra Duval. Cease and Desist order on 12/2/19 for site work consisting of excavating material from the channel of Sandy Brook, excavating material from an existing ford in Sandy Brook, and depositing excavated material on the bank of Sandy Brook, in the upland review area and/or wetlands.

A site walk was done on January 26, 2020, members in attendance were George Sipila, Richard Oliverson and James Paquin.

Mr. Paquin commented there was evidence of an old ford with approximately 18 inches of water flowing over the top. It appeared that the section of the old ford on the farther side of the crossing had been dug out and deposited on top of the nearer section, to make it higher. There was a gravelly material with fines placed on top of the newly altered near section. Water was flowing readily through the section that had been dug down.

Seth Duval, property tenant represents the application. Wetlands delineation was conducted by Gibson Environmental Services, report dated February 8, 2020.

Mr. Sorrentino asked Mr. Duval what his plan is at the present time. Mr. Duval would like to replace what was excavated and finish the top with flat rock and clear the bank up the sides which are inside the delineation and move some stones. If engineers are to be involved, he will just replace the top with flat rock. The dirt piles are outside the wetlands area. Mr. Duval would like to rake this back into the bank, seed it and take what is left over out. Mr. Sorrentino asked if this is what he intended to put in the wetland. Mr. Duval stated no. Ms. Washburn commented that is what he dug out of the bottom of the stream. Mr. Duval stated there is a large area outside the wetland area that was moved just to get the machine on.

Mr. Paquin voiced his concerns, when all is said and done there is not a ford that is significantly higher in elevation than what it was. In times of low flow, drier conditions there is still water going over the top of that and feeding the down stream system. Mr. Duval commented that water runs through it year-round. Mr. Paquin commented that it probably did, he just wants to make sure that it continues to do that. With the fines on top his concerns are they will work their way in and turn that ford into a dam. Mr. Duval does not want to build a dam with a pipe going through it.

Mr. Sorrentino asked Mr. Paquin's opinion, if you are envisioning driving vehicles across would this involve an engineer. Mr. Paquin stated if you are planning to build it to drive a vehicle across most times of the year without getting the tires wet, it will require an engineer.

Ms. Washburn commented a decision has to be rendered on this application, the terminal date to render a decision would be 2/13/20. Members reviewed the photographs. Discussion ensued.

Mr. Oliverson recommended the applicant, Seth Duval, shall restore the original with native material by April 11, 2020, the applicant shall attend the April 14, 2020 IWWC meeting if deemed necessary. No engineering will be required.

Mr. Sorrentino stated to Mr. Duval that the IWWC cannot give a permit for what is proposed because there is no plan prepared by an engineer to confirm the sizing of the culvert and improved crossing. Mr. Duval understands this. Mr. Sorrentino suggests Mr. Duval withdraw the application with the applicant understanding that the Wetlands Agent is going to issue a revised violation with a new remediation plan which is restore it to what it was by April 11, 2020. Mr. Sorrentino stated the applicant can withdraw the application submitted or the IWWC can deny without prejudice.

Seth Duval will e-mail the application withdrawal to Ms. Washburn by 2/12/20.

A motion was made by Jim Paquin to direct the Wetlands Agent, Ms. Washburn to send an enforcement action ordering the ford returned to its original condition, elevation, size, done by hand, within 60 days

and to be inspected a few days prior to the 60 days. Richard Oliverson seconds this motion. No discussion held. All in favor. The motion passes unanimously.

3. 011420B Evan Sigfridson, 15 Hyde Road, Map 25, Lot 58, VCD; New Commercial Construction.

The application was presented at last month's meeting January 14, 2020, by Bruce Woodis from KWP Associates. The location is at the corner of Hyde Road and Route 6-Providence Road. Evan Sigfridson is present to represent the application.

Commission Members reviewed the site plan and photographs. Mr. Sigfridson stated that there is a big maple tree that will be coming down. Ms. Washburn stated there is a gentle slope, vegetated and no potential for any impacts at the site.

A motion was made by Jim Paquin to approve application 011420B Evan Sigfridson, 15 Hyde Road, Map 25, Lot 58, VCD; New Commercial Construction pursuant to site development plan prepared for Evan and Michele Sigfridson, prepared by KWP Associates, dated December 5, 2019, with standard conditions. Richard Oliverson seconds this motion. No discussion held. All in favor. The motion passes unanimously.

4. 011420C River Junction Estates, LLC; South of Rukstela Road, Map 29, Lot 1, Map 30, Lot 16; Grading and restoration of a previously disturbed gravel excavation area. Restoration will establish a vegetation cover on 4+/- acres of disturbed area. The restored area will be used for agricultural crop production.

David Held, Provost and Rovero represents the application. Revised plans were submitted two weeks ago to Ms. Washburn. The only change was the adjustment of the erosion and control berm at the request of Mr. Sorrentino.

Mr. Sorrentino asked if the reason for close proximity is to level the topography out. Mr. Held stated yes. Mr. Sorrentino asked if there is a net export. Mr. Held stated the intention is to bring in a load or two of topsoil for restoration. Mr. Sorrentino asked if any of the piles there are topsoil. Mr. Held stated there are piles of topsoil stockpiled there. Mr. Sorrentino asked Ms. Washburn if everything seems in order. Ms. Washburn stated yes.

A motion was made by Jim Paquin to approve application 011420C River Junction Estates, LLC; South of Rukstela Road, Map 29, Lot 1, Map 30, Lot 16; Grading and restoration of a previously disturbed gravel excavation area. Restoration will establish a vegetation cover on 4+/- acres of disturbed area. The restored area will be used for agricultural crop production matching the site plan dated January 10, 2020, revised January 23, 2020 by Provost and Rovero. Upon completion and inspection by the Wetlands Enforcement Officer, the enforcement order issued by Jana Roberson in 2014 can be rescinded. George Sipila seconds this motion. No discussion held. All in favor. The motion passes unanimously.

Mr. Paquin asked Mr. Held to thank his client for working with the IWWC in a timely manner.

5. Mark Curreri, Flooding to 316 Hartford Road and Appell Road due to Yee Kim Logging Operation.

Ms. Washburn has issued violation orders to Yee Kim, David Gokey and Michael Wolchesky.

Mr. Sorrentino stated that they looked through the old minutes and there was opposition by Mr. Curreri in the beginning, Attorney Norman attended a meeting. There was an agreement between the parties. The

IWWC stepped back as long as the parties worked it out and the IWWC approved the timber harvest as an as of right use.

Mr. Sorrentino stated there has been considerable discussion about the culvert. David Smith, P.E. from KWP visited the site and submitted a letter stating the culvert was okay. Mr. Sorrentino reviews the letter with Commission Members.

Mr. Sorrentino's discussion with Ms. Washburn was the application was approved based on an expectation the culvert was adequate and the logging operation would return whatever had been modified during the process to the previous condition. It is Mr. Sorrentino's understanding this is not what happened. It is a use permitted as of right but impacts to wetlands are within the IWWC jurisdiction.

Mr. Sorrentino reviews with Members Ms. Washburn's violation letter.

David Gokey stated that the culverts were already separated that is why the mats were placed. Ms. Washburn asked Mr. Gokey what he means by separated. Mr. Gokey stated that the culverts come in 3 to 4 pieces and had pulled apart, that is what the hole is. Mr. Gokey stated the hole was there when they got there, and the mats were placed to protect the area from collapse. Mr. Gokey stated Appell Road was graded back to what they presumed was the prior condition.

Mr. Paquin asked if they have any evidence the culvert was broken before they got there. Mr. Gokey stated the mats were placed over it at the request of former wetlands agent Martha Fraenkel. Ms. Washburn stated that David Smith from KWP stated the culvert was in operational condition. Mr. Curreri states that Yee Kim Logging Operation broke the culvert. Discussion ensued.

Property owner, Michael Wolchesky, stated the hole was there before, the culvert has been there for years and in bad shape. This once was a town road but has been discontinued when he wanted to put a lot in there. Once the road was discontinued the owners have a right of way to use the road to get to their property. It is at the end of the Curreri property. There is no additional flooding, there has been the same amount of water for the past 30 years.

Ms. Washburn commented there is three issues here:

1. Damage on a part of the Tourtellotte property. It was never listed on the timber harvest application in a place where they were going to work and not given permission to traverse. There was a wooden structure/pipe that got compromised and ruts made in the wetlands. (Commission has jurisdiction)
2. Controversy over the culvert.
3. Condition of road as to whether or not it is returned to the pre-logging job condition.

Mr. Sorrentino asked if the portion of the road in the upland review area. Ms. Washburn commented that part of the road is, and part of the road is not.

Mr. Curreri discussed his concerns (see attached 1-13-20)

Mr. Gokey stated that if there is something that the IWWC wishes them to fix they will fix it.

Mr. Gokey agreed to fix the puddles, pipe, and replace wood bridge. Mr. Sorrentino asked this work to be complete, resolved and reported back to the Commission by next month's meeting March 10, 2020.

New Business:

1. DR20-001 FCR Realty, LLC, Owner, Joseph Theroux, Forester 110 Day Street, Map 19 Lot 7 and Map 19, Lot 6; Clear Cut/Final Harvest Areas: Removal of all merchantable timber and firewood. Treetops and slash will be chipped. No excavation or removal of stumps. No clear cutting within 100 feet of delineated wetlands selective harvest areas; only trees designated by blue paint will be harvested. Tree tops will be left for woody debris habitat.

Joe Theroux, Certified Forester/Soil Scientist represents the application. A selective harvest is proposed. Part of the selective timber harvest is a clear cut/final harvest area. Because this activity is going on in the upland review areas, some of the skid trails will be located within 50 to 100-feet from the wetland. Mr. Theroux is seeking a non-jurisdictional ruling, as a permitted use as of right. Mr. Theroux reviews his letter dated 1/28/20 with Commission Members (see attached). Ms. Washburn has no issues with the timber harvest. Discussion ensued.

A motion was made by George Sipila to approve as declaratory ruling, use as of right, DR20-001 FCR Realty, LLC, Owner, Joseph Theroux, Forester 110 Day Street, Map 19 Lot 7 and Map 19, Lot 6; Clear Cut/Final Harvest Areas: Removal of all merchantable timber and firewood. Treetops and slash will be chipped. No excavation or removal of stumps. No clear cutting within 100 feet of delineated wetlands selective harvest areas; only trees designated by blue paint will be harvested. Tree tops will be left for woody debris habitat. Jim Paquin seconded this motion. No discussion held. All in favor. The motion passes unanimously.

2. 021120A Richard Regis, 35 South Main Street, Map 41, Lot 57, PC Zone-Regrade lot and top with crushed stone surface.

Paul Terwilliger, PC Survey, represents the application. The property is located at the corner of South Main and Proulx Street. Mr. Regis would like to cover the lot with crush stone surface. They are proposing putting a stone berm between the wetland area along the area of the crushed stone so the run-off would be filtered. Mr. Terwilliger reviews the plan with Commission Members. The property in the Commercial Zone, the applicant would like to make it more marketable. Mr. Oliverson asked where the water flow is going at the present time. Mr. Terwilliger reviews water flow on the site plan. Discussion ensued. Commission Members unanimously agree this can be a duly authorized approval.

A motion was made by Jim Paquin to receive application 021120A Richard Regis, 35 South Main Street, Map 41, Lot 57, PC Zone-Regrade lot and top with crushed stone surface and make said application duly authorized. Richard Oliverson seconds the motion. No discussion held. All in favor. The motion passes unanimously.

3. 021120B Vachon Brooklyn, LLC, 512 Providence Road, Map 41, Lot 13A/14, PC Zone; Construction of (2) 16-foot wide access driveways to access proposed new vehicle storage lots. Drive to the larger of the two proposed parking areas will be in an area historically used for an agricultural crossing.

Ms. Washburn asked Members to review the plan to determine if this is a significant activity. The applicant assumes the application require will a public hearing. Discussion ensued. Commission members all concur that this is a significant activity.

A motion was made by Richard Oliverson to receive application 021120B and schedule a public hearing on March 10, 2020, at 6:00 p.m., 69 South Main Street, Brooklyn, CT. George Sipila seconds this motion. No discussion held. All in favor. The motion passes unanimously.

Communications:

1. Review of 2020-2021 IWWC Budget. Members reviewed the budget and unanimously agreed it shall remain the same.

2. Wetlands Agent Monthly Report. Reviewed.

Ms. Washburn stated she had a resident come in today questioning the spreading of liquid manure by Fairview Farms near the river.

Adjourn: A motion was made by Jim Paquin to adjourn the meeting at 9 p.m. Richard Oliverson seconded this motion. No discussion held. All in favor. The motion passes unanimously.


Audrey Cross-Lussier, Recording Secretary

Summary of Hydrologic Recharge to Kettle Wetland System
 Rawson Materials
 Potvin Property
 Maynard Road

Water Source	Existing Conditions (gpy)	75' setback (gpy)	Change (%)	125' setback (gpy)	Change (%)
Direct Precipitation on Wetland	1,285,000.00	1,285,000.00	0.0%	1,285,000.00	0.0%
Surface Runoff to Wetland	110,789.00	68,429.00	38.2%	84,721.00	23.5%
Infiltrated Precipitation	9,564,713.00	9,479,991.00	0.9%	9,509,318.00	0.6%
TOTAL RECHARGE	10,960,502.00	10,833,420.00	1.2%	10,879,039.00	0.7%

Note: Quantities taken from February 6, 2020 Hydrogeologic Assessment of Isolated Kettle Wetlands by GZA GeoEnvironmental



Known for excellence.
Built on trust.

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

95 Glastonbury Boulevard
3rd Floor
Glastonbury, CT 06033
T: 860.286.8900
F: 860.633.5699
www.gza.com

February 11, 2020
File No. 05.05.0046588.00

Ms. Margaret Washburn
ZEO/WEO/Blight Enforcement Officer
Town of Brooklyn
69 South Main Street
Brooklyn, CT 06234

Re: Revised Report
Hydrogeologic Assessment of Isolated Kettle Wetlands
Potvin Family Trust Property
Maynard Road, Brooklyn, CT

Dear Ms. Washburn:

GZA GeoEnvironmental Inc. (GZA) is pleased to present this letter report to the Town of Brooklyn Connecticut (Town) of our hydrogeologic connectivity evaluation of two kettle wetlands and the adjacent groundwater flow field located in the southeastern portion of the Potvin Family Trust's 29.99-acre property (Potvin Property), near the Brooklyn/Canterbury town boundaries. This report was prepared to address concerns by the Town of potential impacts of the proposed Sand and Gravel (S&G) mining operations on the local and regional groundwater hydrology of these kettle wetlands. Our work included a review of available documents and other existing information, supplemented by the performance of a limited subsurface investigation program to obtain additional hydrogeologic data pertaining to the interaction between the surface water of kettle wetlands and the surrounding groundwater. This report is subject to the limitations presented in Appendix A.

Please note that this version of GZA's report supersedes a prior version submitted to the Town on January 29, 2020 and addresses certain technical questions raised by Provost & Rovero, Inc. (P&R) on behalf of the S&G mining permit applicant.

BACKGROUND AND OBJECTIVES

The Town of Brooklyn requested GZA to assess the potential impacts of a proposal to excavate approximately 1.2 million cubic yards of S&G from the Potvin Property by Strategic Commercial Realty, Inc., dba Rawson Materials, (Rawson). In general, Rawson proposes to excavate S&G from the site to an elevation of approximately 137 feet. Two kettle wetlands, identified herein as the Upper and Lower Kettles, are located on the Potvin Property, south of the proposed limits of the excavation. In addition, a third topographic depression with a bottom elevation of approximately 137 feet, is located approximately 175 feet west of the Upper Kettle wetland and referred to herein in as the "Western Basin." Rawson proposes to excavate S&G to within 75-feet of the flagged delineated wetland boundary of the Upper Kettle wetland. The Quinebaug River is located approximately 100 feet east of the Potvin Property and flows in a generally north to south direction.



As part of pre-application site engineering work, Rawson retained P&R to perform a total of five (5) soil borings at the site (designated B-1 through B-5) and to complete boring B-4 as a groundwater monitoring well (MW). Rawson's proposed excavation plans are presented in a plan set prepared by P&R, dated October 2, 2019.

The primary objective of GZA's evaluation was to identify potential adverse impacts of the proposed mining activities to the hydraulic regime of two kettle wetlands and secondary objective was to assess large scale impacts to the Quinebaug River. If potential impacts were identified, the Town requested GZA to make general recommendations to Rawson's proposed excavation approach.

GZA understands the Town's concerns were initially raised by the findings of an Eastern Connecticut Environmental Review Team (ERT) report prepared in February 2007 in response to an earlier S&G mining proposal for the Potvin Property. The ERT report indicated: "there still remains the question of hydraulic connection between the upland recharge area and the base flow for the wetland. This undetermined water regime keeps the wetland in his current balance state." The ERT report further speculated that "the infiltration of precipitation through the neighboring sands keeps the wetland wet."

To address the concern related to the hydraulic connection between the upland recharge area and the wetland "base flow" within the ERT report, the objectives of GZA's investigation were to evaluate:

- Groundwater elevations and flow directions proximate to the kettle wetland.
- Vertical hydraulic gradients within the wetland and the relative interconnectivity between the wetland and the groundwater flow regime; and
- Approximate contribution of infiltrated precipitation recharge to the wetland.

Our general project approach and scope of work was developed following an initial pre-bid site walk on November 5, 2019 with Ms. Jana Robinson of the Town of Brooklyn, Mr. David Held of P&R on behalf Rawson, and Ms. Robin Casioppo and Mr. Richard Desrosiers of GZA. Based the observations and general discussions during the site visit, GZA proposed a plan to assess the hydraulic connectivity of the kettle wetlands and the surrounding groundwater using, to the extent feasible, hand-installed water level monitoring instruments, such as small-diameter piezometers. The potential need for additional drilled monitoring wells was recognized if insufficient data could be obtained with the hand-installed instruments. For the purpose of this report the Northern Kettle wetland is referred to as the Upper Kettle wetland and the Southern Kettle wetland is referred to as the Lower Kettle wetland.

In addition to the groundwater assessment, the Town also requested GZA to evaluate the wetland vegetation and shallow soil conditions within the Upper Kettle wetland. The findings of our assessments, in aggregate, are presented below.

GZA's field activities included:

- On December 6, 2019, GZA performed a wetland vegetation and soil survey assessment. This work included advancing four preliminary hand augured soil borings adjacent to the Upper Kettle wetland to evaluate subsurface soil conditions.
- On January 7, 2020, GZA installed three drilled monitoring wells in the vicinity of the Upper and Lower Kettle wetlands, three hand-installed piezometers at the edge of the Upper Kettle wetland, and a staff



gauge in the northern portion of the Lower Kettle wetland to measure groundwater and surface water levels. A surveyed reference point was established at each monitoring point to establish an elevation relative to the existing project datum established by P&R at MW-4/B-4.

- On January 9, 2020, GZA measured the depth to groundwater in each monitoring well and piezometer and measured the surface water elevations adjacent to each piezometer. During the same trip, we also conducted slug tests in monitoring wells GZ-1 and GZ-2 to evaluate the hydraulic conductivity of the subsurface soils. The groundwater and surface water measurements were used to assess horizontal and vertical hydraulic gradients and inferred groundwater flow directions.

The pertinent findings of the investigation are presented below:

1.0 Soils and Wetland Vegetation Observations

On December 6, 2019, GZA performed a limited wetland vegetation and soils assessment of the Upper Kettle wetland. Four hand-augured soil borings were completed around the Upper Kettle wetland. SB-1 was located between the Upper and Lower Kettle wetlands, SB-2 and SB-3 were around the edge of the Upper Kettle wetland and SB-4 was completed in the topographical low point located west of the Upper Kettle wetland. The locations of the soil borings are shown on Figure 1. A summary of the soil conditions encountered in these borings is provided in Table 1.0 below and the boring logs are provided in Appendix B.

Table 1.0 Shallow Soil Descriptions			
SB-1	SB-2	SB-3	SB-4
0 to 12" - organic silty sand, little gravel, 12 to 24" - fine to medium sand, some silt, little gravel, 24" - gravel refusal	0 to 36" - peat/organic silt, 36 to 38" - sandy loam, 38 to 40" - fine to medium sand, 40" gravel/rock refusal	0 to 24" - peat/organic silt, 24 to 38" - sandy loam, 38 to 40" - fine to medium sand, 40" gravel/rock refusal	0 to 32" - organic silt, 32 to 36" - fine sand, little silt, 36" gravel/rock refusal

Note: All depths are inches below grade.

In general, these soil borings show a shallow organic silt layer, underlain by a fine to medium sand. Hand augur refusal was encountered in each boring at 24 to 40 inches below grade. The soil profile along the edge of the kettle was completely saturated with pore water. Ponded frozen surface water was observed at ground surface.

The observed wetland associated with the Upper Kettle wetland was comprised of a palustrine scrub-shrub wetland. Dominant vegetation within the kettle consisted of red maple and highbush blueberry. Vegetation observed along the kettle edge/toe of slope consisted predominantly of wetland species including sweet pepperbush, maleberry, winterberry, and cinnamon fern. Due to the frozen conditions of the kettle, GZA was unable to observe and note the presence of submerged and/or aquatic vegetation. A change in the hydrologic regime directly upgradient of the wetlands' toe of slope was indicated by a noticeable vegetation change. Plant species observed growing along the kettle slopes consisted predominantly of upland species including mountain laurel, white pine, American beech, white oak, and greenbriar.

The topography within the Upper Kettle is hummocky with deep (up to 2 feet) pockets of standing water. Frozen standing water was observed throughout the P&R flagged delineated wetland boundaries of the Upper Kettle. Based on observed water marks on vegetation and that there is a low point between the Upper and Lower Kettle, the current water level appears to be typical. Based on the limited site visit, GZA was not able to determine



whether the Upper Kettle is ephemeral or if it holds standing water throughout the year, as both red maple and highbush blueberry are adaptable to varying levels of soil saturation. The kettle exhibits characteristics favorable to obligate vernal pool species, including the absence of an inlet and/or outlet, pockets of standing water with submerged woody vegetation, shrub sub-canopy cover, and surrounding contiguous forest.

To the west of the steep sloped Upper Kettle is a low-lying depression. Vegetation consists mainly of a mix of upland and facultative plant species including white oak, glossy buckthorn, black birch, yellow birch, wild grape, blackberry, bracken fern, hay-scented fern, wrinkle-leaved goldenrod, and tall goldenrod.

1.1. Supplemental Monitoring Well Installations

Three additional drilled groundwater monitoring wells, designated GZ-1, GZ-2, and GZ-3, were installed to supplement the four soil borings advanced on December 6, 2019 along with the existing monitoring well B-4/MW-4, previously installed by P&R. The monitoring well locations are shown on Figure 1 and were generally located in low points due to physical site accessibility limitations as well as to avoid drilling through the thick sand and gravel overburden in order to encounter groundwater.

- GZ-1 was installed approximately 130-feet west of the Upper Kettle wetland, near SB-4. GZ-1 was used to measure groundwater elevation upgradient of the Upper Kettle.
- GZ-2 was installed between the Upper and Lower Kettle wetlands, near SB-1. GZ-2 was used to measure groundwater elevation between the kettles.
- GZ-3 was installed approximately 225-feet east of the Upper Kettle and approximately 100-feet east from the lower kettle to measure groundwater downgradient of the Upper/Lower Kettle wetlands and upgradient of the Quinebaug River.

These wells were installed by Cisco Geotechnical (Cisco) under subcontract to GZA, using a GeoProbe® 6620DT direct push drilling rig. The soil borings were advanced to 15 feet below grade (fbg) and soil samples were collected continuously in 5-foot intervals using a 2.25-inch diameter stainless steel macro-core sampler with an acetate sleeves pushed into the subsurface soil. Upon completion of the soil borings, Cisco advanced a 3.25-inch diameter stainless steel casing with a disposable tip, to install the monitoring wells. The monitoring wells were constructed with a 10-foot long well screen connected to a solid riser pipe, extending 2 to 3 feet above grade. The wells were backfilled with clean filter sand.

The final monitoring well completion depths were 15 feet at GZ-1, 13 feet at GZ-2, and 17 feet at GZ-3. The final depth at each location was selected to target that the well screens would be installed across the groundwater table based upon observations during the drilling work.

Subsurface Soil Conditions

Each subsurface soil sample was described using a modified Burmister soil classification system and recorded on the soil boring logs provided in Appendix B. A general summary of the soil encountered is provided below in Table 2.0. Consistent with the hand-augured borings advanced near the wetlands, a coarse gravel unit was encountered beneath a silt and fine sand in each drilled boring.



Table 2.0 Monitoring Well Soil Descriptions

GZ-1 (grade 136.70 ft)	GZ-2 (grade 137.0)	GZ-3 (grade 137.60)
Black peat/organic silt (elev. 136.7 to 133.8 ft) Silt, little fine sand (elev. 133.8 to 131.6 ft) black peat/organic silt (elev. 131.6 to 131.1 ft) fine to coarse sand and gravel (elev. 131.1 to 121.7 ft)	topsoil (elev. 137.0 to 136.90 ft) silt and fine sand (elev. 136.9 to 130.3ft) fine to coarse sand and gravel (elev. 130.30 to 122.00 ft)	topsoil (elev. 137.6 to 137.4 ft) silt and fine sand (elev. 137.4 to 133.80 ft) fine sand, little silt (elev. 133.80 to 130.8 ft) fine to coarse sand and gravel (elev. 130.8 to 122.60 ft)

Note: All elevations presented herein are approximate only and referenced to the existing project datum established by P&R (See below).

These data collected from GZ-1 through 3 were compared to the data from P&R B-5 located approximately 190 feet northwest of the kettle wetland. At B-5, soil samples were logged every 10-feet and recorded a general soil profile comprised of fine to coarse sand, some gravel, trace silt from the ground surface to an elevation of approximately 143± feet, underlain by a fine to coarse sand, some gravel, little silt to an elevation of approximately 132± feet. The soil boring descriptions at GZ-1 through GZ-3 report a greater percentage of silt, at corresponding depths, than B-5.

At each of the three GZ borings, soil mottling was observed. Soil mottles (described as changes in soil color, typically orange hues) provide a line of evidence of metallic precipitates indicating potential seasonal high groundwater conditions. The highest elevation of mottles observed in each soil boring were as follows:

- GZ-1, mottles were observed at 6.4 ftbg (elevation 130.3 ft) within the fine to coarse sand and gravel unit.
- GZ-2, mottles were observed at 5.0 ftbg (elevation 132.0 ft) within the silt and fine sand unit.
- GZ-3, mottles were observed 5.5 ftbg (elevation 132.1 ft) within the fine sand, little silt unit.

Piezometer Installations

In addition to the three newly drilled monitoring wells, three small-diameter piezometers, designated P-1, P-2, and P-3, were installed by hand at locations along the east, west, and southern shores of the Upper Kettle wetland, as shown on Figure 1. P-1 was installed adjacent to SB-2 and P-2 was installed near SB-3. The soil encountered at these piezometers is summarized in Table 3.0, below.

Table 3.0 Piezometer Soil Description

P-1 (grade elev. = 130.5 ft)	P-2 (grade elev. = 130.57 ft)	P-3 (grade elev. = 130.57 ft)
Black organic silt/peat (elev. 130.5 to 128.4 ft) Sandy loam (elev. 128.4 to 128.2 ft) Fine to medium sand (elev. 128.2 to 127.9 ft) Gravel refusal at elev. 127.9 ft	Black organic silt/peat (elev. 130.5 to 129.0 ft) Sandy loam (elev. 129.0 to 128.4 ft) Fine to medium sand (elev. 128.4 to 128.1 ft) Gravel refusal at elev. 128.1 ft	Black organic silt/peat (elev. 130.5 to 129.3 ft) Sandy loam (elev. 129.3 to 128.3 ft) Fine to medium sand (elev. 128.3 to 128.0 ft) Gravel refusal at elev. 128.0 ft

Note: all elevations provided above are approximate only and referenced to the existing project datum established by P&R (See below).

The piezometers were installed in hand augured borings to depth where refusal (on gravel) was encountered: approximately 30-inches below grade. These piezometers were constructed using 1-inch diameter PVC well



screens 1-foot or less in length, corresponding to the thickness of the sand unit underlying the organic silt/peat unit. The screens were connected to solid PVC riser pipe. The screens were wrapped with filter fabric to limit the organic silt/peat from clogging the well screen. Once installed, a sand pack was installed around and just above the well screen and a bentonite seal was placed above the sand pack to the ground surface grade.

The purpose of these piezometers was to quantify the relative difference in water levels between the surface water and the underlying groundwater. Changes in water levels would reflect changes in the vertical hydraulic gradient which can be used to assess if the surface water in the kettle wetland was being recharged by groundwater or if the surface water in the kettle wetland was discharging to the underlying groundwater flow regime.

Monitoring well elevation survey

P&R provided surveyed reference elevations for each of the monitoring wells, piezometers, and surface water levels. We understand all elevations were referenced to the existing project datum established by P&R.

Groundwater Elevation Measurements

On January 9, 2020, GZA measured the depth to groundwater in all available monitoring wells and piezometers at the site, as well as the surface water levels adjacent to each of the piezometers. Groundwater measurements are summarized in Table 4.0 below. The January 9th water level measurements were used to prepare the interpreted groundwater contour and flow direction map shown on Figure 2.

Table 4.0 Groundwater and Surface Water Elevations on January 9, 2020					
Location ID	Reference Elevation (ft)	Ground Surface Elevation (ft)	Depth to Water Level (ft)	Surface Water Elevation (ft)	Groundwater Elevation (ft)
GZ-1	139.46	136.70	10.47	---	128.99
GZ-2	139.09	137.00	10.73	---	128.36
GZ-3	140.3	137.60	13.16	---	127.14
MW-4/B-4	200.7	198.60	73.24	---	127.46
P-1 (GW)	134.08	---	3.59	---	130.49
P-1 (SW)	134.08	---	3.67	130.41	---
P-2 (GW)	134.13	---	3.61	---	130.52
P-2 (SW)	134.13	---	3.52	130.61	---
P-3 (GW)	134.77	---	4.50	---	130.27
P-3 (SW)	134.77	---	4.24	130.50	---

Notes: All elevations are approximate only and referenced to the existing project datum established by P&R (See below).

GW = groundwater measured inside the piezometer.

SW= surface water measured outside the piezometer casing; and

"---" not applicable

All measurements were recorded on January 9, 2020 using an electronic water level reader.

Reference Elevation = Top of PVC riser pipe.

In addition to the groundwater measurements made on January 9, 2020, P&R measured groundwater levels in B-4/MW-4 on February 7, 2018, March 30, 2018 and November 18, 2019. The groundwater elevations were reported at 129.30, 128.65 and 125.83 feet. These groundwater elevations indicate the seasonal variations in



groundwater elevations at MW-4 were 1.84 feet higher and 1.63 feet lower than the measurement recorded on January 9, 2020. Thus, the total groundwater level flux documented by this limited data set is 3.47 feet.

Hydraulic Conductivity Testing

To assess the hydraulic conductivity of the saturated soils, slug tests were completed within screened portion of the GZ wells corresponding to the fine to coarse sand and gravel unit below the silt/fine sand unit. GZA conducted rising-head slug tests in wells GZ-1 and GZ-2 by removing a volume of water within these wells and measuring the rate of recovery of the groundwater levels within the well. Prior to removing the volume of water, GZA installed an automatic recording pressure transducer just above the bottom of the well to record changes in water levels prior to, and during, the slug test. The transducer was set to record water levels at a frequency of 4 readings per second.

Once the transducer was in place, a solid three-foot rod was lowered into the well, as a slug, to displace the groundwater. Once water levels in the well re-equilibrated, the slug was removed from the well resulting in the instantaneous lowering of the water level in the well. Upon removal of the slug, the groundwater reentered through the well screen (i.e., “rising head” slug test) and transient measurements were recorded by the pressure transducer. Once the water level recovered to near-steady state conditions (approximately 90% of the static groundwater level), the test was stopped. For data quality purposes, the test was then repeated, and a second round of measurements were recorded.

The recorded pressure transducer data was downloaded to a computer using a Win-Situ 5 software. These data were then uploaded into an AQTESOLV software to estimate the hydraulic conductivity of the saturated portion of the aquifer near the screened intervals using the Bower Rice analytical method. The resultant values are an average representation of the hydraulic conductivity of the soils across the well screen.

The average of the calculated software hydraulic conductivity values were 32.7 feet per day at well GZ-1 and 18.8 feet per day at well GZ-2. These values are consistent with typical fine to coarse sand glacial outwash deposits.

2.0 Drainage Basin Analysis

To assess the impact from the proposed S&G operation on the potential recharge to the Upper Kettle wetland, GZA analyzed 1) the Upper and Lower Kettle wetland drainage basins and 2) and the Western Basin. Thus, our evaluation included a total of three (3) topographic depressions (i.e., Upper Kettle, Lower Kettle, and the Western Basin). To assess the recharge potential from these drainage basins, GZA used the P8 Urban Catchment Model Version 3.5, developed by William W. Walker, Jr., Ph.D. and Jeffrey D. Walker, Ph.D. for US EPA to estimate the total annual watershed inflow, in gallons per year (gpy), to each of the three basins. The P8 model simulates the generation, transport, and treatment of stormwater runoff using continuous water-balance and mass-balance calculations driven by hourly precipitation time series.

The P8 Model evaluates the kettle wetland and the western basin each as a “pond” device with a weir outflow. GZA assumed that the Upper and Lower Kettle wetlands are hydraulically connected, so they were modeled as a single “pond” with a surface area equal to the sum of the two individual wetlands. Each “pond” received inflow from the watershed, as defined by the local topography, and reported as acres per basin. These calculations considered the type of soil and ground cover. GZA has modeled two conditions:



1. An existing condition that considers a runoff curve number (CN) value of 25 corresponding with Hydrologic Soil Group Type A (sand and gravels) and land use of “Woods, good”; and
2. A post excavation condition considered a runoff curve number (CN) value of 39 corresponding with Hydrologic Soil Group Type A (sand and gravels) and land use of “grass” and maintains a CN value of 25 in the undisturbed areas. Under this condition, the slope excavations will be seeded and maintained. Multiple post excavation scenarios were modeled which considered excavation setbacks of 75-, 125- and 175- feet from the flagged delineated wetland boundary of the Upper Kettle wetland. The western basin was modeled separate from the Upper and Lower Kettle wetlands.

The model applies anticipated hourly precipitation to the watershed. GZA used the total annual precipitation of 47.3 inches recorded at Bradley International Airport for 2009 (represents average annual precipitation) as the input parameter for our analysis

The model account for precipitation recharging the “pond”, and not the volume of precipitation falling directly on the “ponds”. Rather, it accounts for only the amount of precipitation that will runoff or infiltrate through the soil. Based upon the referenced total annual precipitation and that the Upper Kettle wetland is approximately 1- acre in size, the estimated recharge falling directly on the Upper Kettle wetland has been estimated at approximately 1,285,000 gallons per year..

The calculated areas of the existing drainage basin and for the various excavation setback options are presented in Table 5.0 and are shown on Figure 3. We understand that these setback options are being considered by the Town. Specifically, the 75-foot excavation setback option is proposed by the applicant. Whereas, the existing Inland Wetland Commission (IWWC) regulations provide for a setback of 125 feet and the Brooklyn IWWC regulations for a water course provide for a setback of 175-feet.

Table 5.0 Contributing Drainage Basin Area (Acres)		
Setback distances to wetlands	Combined Upper & Lower Kettle wetlands	Western Basin
Existing conditions	7.53	4.36
75-foot setback (proposed by applicant)	4.64	2.45
125-foot setback (IWWC Regulations)	5.61	2.88
175-foot setback (IWWC Regulations)	6.56	3.32

To estimate the total volume of precipitation that could fall within these basins, GZA calculated the annual precipitation volume based upon the drainage basin area times the input parameter of 47.3 inches of precipitation/year and converted to gallons per year (gpy) for the existing conditions scenario plus the 75-, 125- and 175- foot setbacks scenarios.

Under existing conditions, the total precipitation will either runoff to the interconnected Upper/Lower Kettle wetland basins and the adjacent Western Basin or it will infiltrate into and through the underlying soil to the groundwater flow regime¹. Table 6.0 summarizes the anticipated total annual precipitation to each the basins under existing conditions.

¹ This simplified analysis assumes that evapotranspiration losses are negligible.



Table 6.0 Total Annual Precipitation per Basin (gpy) – Existing Conditions		
Setback distances	Combined Upper & Lower Kettle Wetlands	Western Basin
Existing Conditions	9,675,502	5,602,283

Under proposed excavation plan, the total precipitation will either runoff to the south towards the Upper Kettle wetland or to the north towards the low point within the proposed excavation. The remaining precipitation will infiltrate either through the existing forest or through the seeded grassed slopes, proposed as part of the site reclamation. Table 7.0A presents a summary of the amount of runoff to the Upper and Lower Kettle basins under existing conditions, as well as the 75-, 125-, and 175-foot setback scenarios. Table 7.0B presents a summary of the amount of runoff run off to the Western Basin under existing conditions as well as the three setback scenarios.

Table 7.0A Annual Runoff to Upper/Lower Kettle Wetland Basin Existing and Post-Excavation Conditions		
Setback Distances	Undisturbed Condition Areas (gpy)	Post-Excavation Scenario (gpy)
Existing Conditions	110,789	0
75-foot setback (proposed by applicant)	68,429	127,082
125-foot setback (IWWC Regulations)	84,721	81,463
175-foot setback (IWWC Regulations)	97,755	45,620

Table 7.0A Annual Runoff to Western Basin Existing and Post-Excavation Conditions		
Setback Distance	Undisturbed Condition Areas (gpy)	Post-Excavation Condition Areas (gpy)
Existing Conditions	65,170	0
75-foot setback (proposed by applicant)	35,844	84,721
125-foot setback (IWWC Regulations)	42,361	65,170
175-foot setback (IWWC Regulations)	48,878	45,619

The amount of precipitation that does not runoff will infiltrate through the soil to the underlying groundwater. Table 8.0A presents a summary of the amount of infiltration to the Upper and Lower Basins under existing conditions and each of the three set-back scenarios. Table 8.0B presents a summary of the amount of infiltration to the Western Basin under existing conditions and each of the three setback scenarios.



Table 8.0A Annual Infiltration to Upper/Lower Kettle Wetland Basin Existing and Post Excavation Conditions		
Setback distances	Undisturbed Condition Areas (gpy)	Post-Excavation condition Areas (gpy)
Existing Conditions	9,564,713	0
75-foot setback (proposed by applicant)	5,893,634	3,586,357
125-foot setback (IWWC Regulations)	7,123,721	2,385,597
175-foot setback (IWWC Regulations)	8,331,368	1,200,759

Table 8.0B Annual Infiltration to Western Basin Under Existing and Post-Excavation Conditions		
Setback distances	Undisturbed Condition Areas (gpy)	Post-Excavation Condition Areas (gpy)
Existing Conditions	5,537,113	0
75-foot setback (proposed by applicant)	3,112,228	2,369,490
125-foot setback (IWWC Regulations)	3,658,230	1,836,522
175-foot setback (IWWC Regulations)	4,217,081	1,290,705

3.0 Data Assessment

3.1. Geologic Conditions

The soils beneath the property are comprised of deep thicknesses of sand and gravel deposits near the Quinebaug River and the kettle wetlands. Soil boring B-1 completed by P&R suggest shallower shallow sand and gravel deposits near Maynard Road where refusal was reported less than 10 feet. Based on the subsurface conditions encountered near the Upper Kettle wetland (B-5 completed by P&R and supplement borings GZ-1, -2 and -3), the subsurface soil conditions near the Upper Kettle wetlands consist of:

- At B-5, coarse sand and gravel underlain by fine to coarse sand, some gravel and a trace of silt was encountered from elevation 192± to 143± feet. This unit was underlain by a fine to coarse sand, some gravel, little silt to elevation 132± feet. Refusal at 132± feet
- At GZ-1, -2 and -3, underlying the surficial topsoil/organic silt/peat is a silt and fine sand unit extending to an elevation of approximately 131± feet. This silt and fine sand unit is underlain by fine to coarse sand and gravel, little silt to elevation 122± feet (completion of boring).
- At P-1, P-2 and P-3, underlying the organic silt/peat is a sandy loam extending to an elevation of 128.0± feet where hand auger refusal was encountered on gravel.

P&R completed soil boring B-4/MW-4, located in the northeastern corner of the property. The subsurface conditions reported at this location consists of fine to coarse sand, gravel and cobbles from approximately elevation 200± to 178± feet. This unit was underlain by fine to coarse sand, trace silt to elevation 169± feet, a fine to medium sand, little silt to elevation 165± feet and a fine sand, little silt to elevation 155± feet. A fine sand



and silt unit was observed from elevation 155± to elevation 129± feet which is underlain by a fine to coarse sand, little silt and gravel to elevation 113± feet.

Based on the available subsurface information, GZA prepared two geologic cross sections depicting the subsurface soil stratigraphy in the north-south and east-west directions. The locations and general alignments of these profiles are shown on Figure 1. The north-south profile (designated A-A') is shown on Figure 4, and the east-west cross section (designated B-B') is shown on Figure 5.

In aggregate, the soil descriptions near the kettles describe a general decreasing soil grain size distribution to an elevation of approximately 131± feet where coarser-grained deposits were observed. These data indicate that the base of the Upper Kettle wetland is located at approximately the same elevation as the top of the silt and fine sand deposit and underlain by a fine to coarse sand and gravel, little silt unit extending to an elevation of approximately 122± feet (extent of borings).

These geologic conditions would permit precipitation to infiltrate vertically downward rapidly through the more permeable upper coarse-grained prior to encountering the less permeable finer-grained soil, reducing the vertical infiltration rate and enhancing the lateral migration and the potential for seepage into the Upper Kettle wetland is located. These fine-grained soil along with the organic silt/peat present within the upper wetland result in the retention of water in the low-lying area and the formation of the kettle wetland. The soil beneath the Upper Kettle wetland were reported as coarse-grained where groundwater was observed. The retention of water in the Upper Kettle wetland likely contributes to a perched or mounded condition imposed on the underlying groundwater as the water in the Upper Kettle wetland slowly recharges groundwater.

3.2. Vertical Gradient within Kettle Wetland

GZA installed three piezometers along the edge of the kettle wetland. The purpose of these piezometers was to evaluate if the surface water in the Upper Kettle wetland was being recharged either from groundwater resulting in an upward vertical groundwater flow gradient or if the surface water in the kettle wetland is leaking to the underlying groundwater resulting in a downward vertical groundwater flow gradient. Based on a comparison of the elevation of the water levels within the piezometers and the elevation of the surface water adjacent to it, an inference of the likely direction and magnitude of the vertical hydraulic gradient can be made, as summarized in Table 9.0 below.

Table 9.0 Kettle Wetland Vertical Gradients			
Well ID	Surface Water Elevation	Groundwater Elevation	Vertical Gradient
P-1 (GW)		130.49	Upward
P-1 (SW)	130.41	---	
P-2 (GW)		130.52	Downward
P-2 (SW)	130.61	---	
P-3 (GW)		130.27	Downward
P-3 (SW)	130.50	---	

Note: All water elevation measurements were recorded on January 9, 2020.

As shown, there is a slight upward vertical (P-1) gradient closest to the Lower Kettle wetland and a slight vertically downwards gradients (P-2 and P-3) recorded at the piezometers along the central/northern shores of the Upper Kettle wetland. Overall, these data suggest that the wetland is likely leaking surface water to the



underlying groundwater flow regime. Furthermore, the data from the piezometers, combined with the groundwater level elevations measured in the monitoring wells, suggest that the base of the kettles are likely perched (mounded) above the regional groundwater flow field and that groundwater is not flowing into the Upper Kettle wetland but that the surface water in the Upper Kettle wetland is recharging the groundwater.

3.3. Groundwater

Groundwater Flow Directions

As noted above, a synoptic round of groundwater level elevations was recorded on January 9, 2020 (Table 4.0). Because groundwater levels are not static, they rise, and fall in response to precipitation events such as rainfall and snow melt, etc.. Typically, the maximum annual groundwater levels are usually observed in the late spring and decrease during the summer months because of evapotranspiration, the depletion of stored water, and groundwater discharge to the Quinebaug River.

To assess groundwater flow directions and gradients in the vicinity of the kettles, the available groundwater level data was used to create the water table contour and inferred flow direction map shown on Figure 2. As shown, our interpretation of the limited data available, indicates that the overall direction of groundwater flow at the site is in an easterly direction towards the Quinebaug River. However, the effects of leakage from the Upper Kettle wetlands likely results in a slight mound in the vicinity of the wetland. This mounding effect results in radial horizontal flow directions from the wetland to the regional flow regime. This interpretation is consistent with the likely hydraulically isolated functional nature of these kettle wetlands.

Groundwater Seepage Velocity

Using the hydraulic conductivity values presented in Section 1.1, GZA calculated the seepage velocity for groundwater within the fine to coarse sand and gravel screened in monitoring wells. Seepage velocity is a function of the hydraulic conductivity (K) multiplied by the groundwater gradient divided by the effective porosity of the soil. For this estimate, GZA used the average K of 25.75 feet per day, an estimated hydraulic gradient of 0.015 feet and an effective porosity of 0.25. The resultant seepage velocity was calculated to be approximately 0.75 feet per day or approximately 263 feet per year. In other words, a water molecule present upgradient of the kettle wetland would theoretically move approximately 263 feet per year within the fine to coarse sand and gravel unit located beneath the Kettle wetland.

However, groundwater would likely flow slower in the silt and fine sand unit in which the kettle wetland is located. Therefore, groundwater flow in this unit could be significantly slower. Additional data would be required to quantify this range.

Groundwater Mottling

As the water table rises and falls, weathering can occur resulting in the precipitation of oxidized metals within soil horizon at or near the high seasonal water level. Typically, in these types of environments, the color is orange in nature reflecting the presence of reduced iron. These discolored soils are referred to as mottles. Table 10.0 shows the difference between the observed groundwater elevations and the elevation of mottles observed in the subsurface soil samples.



Table 10.0 Observed Mottling Elevations

Monitoring Well location	Grade Elevation (feet)	Mottling Elevation (feet)	Groundwater Elevation (feet)	Mottling above Groundwater (feet)
GZ-1	136.70	130.30 ¹	128.99	1.31 ¹
GZ-2	137.00	132.00	128.36	3.64
GZ-3	137.60	132.10	127.14	4.96

Note: All water elevation measurements were recorded on January 9, 2020.

- ¹ Soil boring SB-4 located near GZ-1, identified limited mottling evidence of iron streaking/discoloration between 32 to 36 inches below grade within the organic silt or correspond to an elevation of 134.0 to 133.7 feet or an average of 4.86 feet above groundwater.

3.4. Seasonal High Groundwater Conditions

To estimate the seasonal high groundwater level, GZA used the method presented in U. S. Geological Survey Open File Report (80-1205) entitled *Probable High Ground-Water Levels in Massachusetts* by Mr. Michael H. Frimpter, often referred to as the “Frimpter model.” This model uses a comparison with existing USGS monitoring wells installed in various geologic depositional deposits and bedrock to calculate the historical high-water levels. The data input parameters include seasonal high-water levels in a referenced USGS monitoring well, the current water level in the reference well and the corresponding groundwater levels at the site to predict a seasonal high groundwater levels in the target well.

The model considers various probabilities for the range in groundwater levels that would be equal to or would exceed a range in groundwater levels. For the purposes of this calculation, GZA calculated the range for which groundwater would be exceeded at 10-, 20-, 30-, 40- and 50- percent probability then used an average of these values for our analysis.

For the purposes of these calculations, GZA selected USGS reference well number 414240072033201 CT-SC 22 Scotland located approximately 15 miles southwesterly from the site in Scotland, Connecticut (Figure 6). This well is the closest available reference well to the site and constructed in a similar sand and gravel aquifer. The calculation provides for an adjustment factor to be added to the observed groundwater levels recorded at the site. The selected input parameters and calculations are provided in Attachment C and the results are summarized in Table 11.0 below.

Table 11.0 Estimated Season High Groundwater (SHGW) Elevations

Well ID	Grade Elevation	Observed Groundwater Elevation	Average SHGW Elevation	SHGW Predicted 50% of the Time
GZ-1	136.70	128.99	134.56	133.64
GZ-2	137.99	128.36	133.93	133.01
GZ-3	137.60	127.14	132.71	131.79
MW-4	198.60	127.46	133.03	132.11

The predicted seasonal high groundwater elevations indicated that the seasonal high groundwater levels can be expected to exist within the silt and fine sand unit. These predictions are consistent but slightly greater than the elevation of observed mottling in the soil profile (Table 10.0) at elevations 130.30 to 133.1 feet. In addition, the predicted seasonal high groundwater (GZ-1 and GZ-2) are just above the spill way (elevation 132± feet) between the Upper and Lower Kettles. Therefore, given that the Upper Kettle wetland likely functions as a relatively “constant head” condition, the groundwater and surface water levels proximate to it would likely remain at an elevation of approximately 132± feet year-round.



Because the Upper Kettle wetland acts to recharge the surrounding groundwater (seasonally), the calculated values at wells GZ-1 and GZ-2 would be artificially high. The average seasonal high groundwater elevation was estimated at 132.7 to 133.03 (GZ-3/MW-4), whereas, assuming a probability that the seasonal high groundwater would be exceeded 50 percent of the time, the estimated seasonal high groundwater was calculated at 131.79 to 132.11 (GZ-3/MW-4). No mottles were reported at B-4/MW-4 whereas, mottles were reported at elevation 132.10 at GZ-3.

3.5. Drainage Basin Recharge

As discussed above, the Upper Kettle wetland is either seasonally recharged by groundwater, surface runoff or through precipitation infiltration the subsurface soil. The January 9, 2020 groundwater data suggests that the surface water within the Upper Kettle wetland is mounded over the measured depth to groundwater which was present within the fine to coarse sand and gravel beneath the silt and fine sand unit which the Upper Kettle wetland is located.

The natural conditions surrounding the Upper Kettle wetland are comprised of a mature forest, brush, groundcover and leaf mat. These condition lend themselves to a reduction in the rate of runoff and an increase in amount of water infiltration into the underlying vadose zone soil. Because the underlying soil are comprised of coarse sand and gravel (soil description from B-5), the rate of infiltration will likely be rapid through these porous soil.

Under the proposed excavation plan, a portion of the existing vegetation will be removed during the resulting in changes to the runoff and infiltration characteristic of the ground cover. Thus, the amount of the runoff and infiltration will be altered based on the excavation setback distance to the edge of the flagged wetlands. Changes under the post-excavation conditions will include:

- The amount of runoff will increase under the post-excavation conditions due to the removing of the mature forest. The forest will be replaced with grass as part of the reclamation of the slopes. Over time, the grass may be replaced naturally with other vegetation; however, for these calculations, we assumed that grass will be the predominant vegetation cover.
- The amount of infiltration will decrease as runoff increases. However, because of the underlying subsurface sand and gravel conditions, the decrease in runoff volume is insignificant in comparison to the volume of infiltration.
- The amount of precipitation falling on the Upper Kettle wetland will not change.



The percentage change in runoff is shown on Table 12A and 12B.

Table 12.0A Percentage Change in Runoff to Upper/Lower Kettle Wetland Basin Existing and Post-Excavation Conditions				
Setback Distances	Undisturbed Condition Areas (gpy)	Post-Excavation Condition Areas (GPY)	Total Runoff (GPY)	Percent Change (%)
Existing Conditions	110,789	0	110,789	0
75-foot setback (proposed by applicant)	68,429	127,082	195,511	76.5
125-foot setback (IWWC Regulations)	84,721	81,463	166,184	50.0
175-foot setback (IWWC Regulations)	97,755	45,620	143,375	29.5

Table 12.0B Percentage Change in Runoff to Western Basin Existing and Post-Excavation Conditions				
Setback Distance	Undisturbed Condition Areas (gpy)	Post-Excavation Condition Areas (gpy)	Total Runoff (GPY)	Percent Change (%)
Existing Conditions	65,170	0	65,170	0
75-foot setback (proposed by applicant)	35,844	84,721	120,565	85
125-foot setback (IWWC Regulations)	42,361	65,170	107,531	65
175-foot setback (IWWC Regulations)	48,878	45,619	94,497	45

The estimated increase in runoff reflects the post-excavation conditions from the existing to the propose conditions within the kettle wetland basins would range from 32,586- (175-foot setback) to 84,722- (75-foot setback) gallons per year. The estimated increase in runoff in the Western Basin would range from 29,327 (175-foot setback) to 55,395 (75-foot setback) gallons per year. In comparison to precipitation falling directly on the Upper Kettle wetland has been estimated at 1,285,000 gallons per year.

The percent change in infiltration is shown on Tables 13A and 13B.

Table 13.0A Percentage Change in Infiltration to Upper/Lower Kettle Wetland Basin Existing and Post-Excavation Conditions				
Setback distances	Undisturbed Condition Areas (gpy)	Proposed condition Areas (gpy)	Total Infiltration (GPY)	Percent Change (%)
Existing Conditions	9,564,713	0	9,564,713	0
75-foot setback (proposed by applicant)	5,893,634	3,586,357	9,479,991	0.9
125-foot setback (IWWC Regulations)	7,123,721	2,385,597	9,509,318	0.6
175-foot setback (IWWC Regulations)	8,331,368	1,200,759	9,532,127	0.3



Table 13.0B
Percentage Change in Infiltration to Western Basin
Under Existing and Post-Excavation Conditions

Setback distances	Undisturbed Condition Areas (gpy)	Proposed Condition Areas (gpy)	Total Infiltration (GPY)	Percent Change (%)
Existing Conditions	5,537,113	0	5,537,113	0
75-foot setback (proposed by applicant)	3,112,228	2,369,490	5,481,718	1.0
125-foot setback (IWWC Regulations)	3,658,230	1,836,522	5,494,752	0.8
175-foot setback (IWWC Regulations)	4,217,081	1,290,705	5,507,786	0.5

The estimated decrease in infiltration within the Kettle Wetland Basins and the Western Basin under the three setback scenarios are less than or equal to one percent. In our opinion the water levels in the Upper and Lower Kettle wetlands are maintained by a combination of groundwater recharge and precipitation.

The measured groundwater was below the elevation of the Upper and Lower Kettle wetlands. In addition, the seasonal high groundwater (calculations and mottles) would indicate that groundwater may recharge the Upper and Lower Kettle wetlands only periodically during wet periods. Runoff alone, (based upon calculations) would not result in the volume of surface water observed in the Upper Kettle wetland. Recharge from precipitation that falls on the wetland and infiltrates through the subsurface soil appear to be a major contributor in maintaining recharge to the Upper and Lower Kettle wetlands.

As precipitation infiltrates through the upper permeable well drained upper sand and gravel it will encounter a lower permeable silt and fine sand deposits. These lower permeable silt and fine sand slow the vertical infiltration rate, permitting the Upper Kettle wetland to maintain its annual wet conditions even when groundwater levels are lower than the Upper Kettle wetland. Changes to these conditions will influence the amount of recharge to the Upper Kettle wetland.

In addition, recharge from runoff and infiltration in the upgradient western basin likely influence the Upper and Lower Kettle wetlands. At GZ-1, a 0.5-foot organic silt/peat unit was measured at an elevation 131.6 to 131.1 feet. This depth is consistent with the measured thickness of organic silt/peat in the Upper Kettle wetland 130.5 to 128.4 at P-1. Therefore, because the western basin is located upgradient of the Upper Kettle wetland and there is organic silt/peat deposits at the same elevations as the Upper Kettle wetland, recharge to the western basin may also contribute to the recharge Upper Kettle wetland.

Conclusions

In summary, the Upper Kettle wetland, located in the southeastern portion of the Potvin property, is a low-lying area at an approximate elevation of 132 feet. The Upper Kettle wetland is horizontally positioned within a silt and fine sand depositional unit. The silt and fine sand unit is overlain by sand and gravel to grade and underlain by a fine to coarse sand and gravel unit where the local groundwater table was observed. The permeability of the silt and fine sand unit is likely lower than the overlying and underlying coarser grained soil units. The silt and fine sand unit is expected to slow the vertical rate of infiltration of precipitation permitting the Upper Kettle to maintain its wetland characteristics. However, the silt and fine sand unit does not inhibit vertical flow to the groundwater.

The regional groundwater flow direction is likely in an easterly flow direction towards the Quinebaug River. However, near the Upper Kettle wetland, the silt and fine sand and other low permeable organic sediments permit surface water to be retained within the Upper Kettle wetland, resulting in a perched or mounded groundwater condition. This mounded condition, likely results in radial flow (Figure 2) around the Upper and



Lower Kettle wetlands. Piezometer water level readings show a downwards vertical hydraulic gradients indicating surface water recharges the underlying groundwater. Additional surface water and groundwater instrumentation would be required to further delineate and quantify this mounding condition.

The groundwater measurements made on January 9, 2020 together with reference data from an USGS off-site well, were used to predict the seasonal high groundwater elevations. The average seasonal high groundwater elevation was estimated at 133.03 (MW-4) to 132.71 (GZ-3). Assuming a probability that the seasonal high groundwater would be exceeded 50 percent of the time, the estimated seasonal high groundwater was calculated at 132.11 (MW-4) to 131.79 (GZ-3). Because of the limited data, GZA recommends that the more conservative average seasonal high groundwater elevations calculated for GZ-3 (132.71 feet) be used for vertical off sets to groundwater for the proposed S&G excavation. GZ-3 and MW-4 are both located along the eastern property boundary and hydraulically downgradient of the proposed sand and gravel operations. The actual maximum excavation depths should be adjusted corresponding to the inferred groundwater elevation contours.

The predicted seasonal high groundwater elevation (132.71 feet at GZ-3) suggests that under certain seasonal conditions, groundwater could recharge the Upper Kettle wetland (grade elevation of 132 feet). The observed soil mottles at elevation 132.10 at GZ-3 are consistent with this conclusion. Measurements made by P&R at MW-4 indicate that historic groundwater elevations were at least 1.63 feet lower than the observation made on January 9, 2020.

GZA evaluated the amount of precipitation likely to fall in both the Upper and Lower Kettle wetland basins to assess potential non-seasonal groundwater recharge to the Upper Kettle wetland. The amount of runoff within the Upper and Lower Kettle wetland basins would account for some recharge to the Upper Kettle wetland; however, due to the maturity of the surrounding forest and the associated presence of macropores, most of the precipitation can be expected to infiltrate through the subsurface soils. As the precipitation infiltrates through the more permeable coarse sand and gravel it will likely be retarded by the underlying lower permeable silt and fine sand layer potentially resulting in lateral migration along this unit. The Upper Kettle wetland is geologically situated within these silt and fine sand which likely permits some of the infiltration from precipitation to recharge the Upper Kettle wetland.

The predominant recharge to the Upper Kettle wetland is likely from infiltration of precipitation through the subsurface soil. Other factors influencing recharge to the upper kettle wetland including: 1) direct precipitation falling on the Upper Kettle wetland, 2) direct groundwater contributions during short seasonally wet periods; 3) limited overland flow/runoff within the Upper and Lower Kettle drainage basin; and 4) precipitation recharge (runoff and infiltration) within the upgradient western basin.

Recommendations

Based upon our assessment, GZA recommends that the Town consider the following in its review of the proposed sand and gravel application:

- To limit reduction of infiltration of precipitation recharge to the Upper Kettle wetland, GZA recommends that the IWWC consider applying the 125-foot excavation setback from the wetland boundary for the project. This is consistent with the IWWC setback to wetlands regulations
- Should the IWWC consider a lesser setback, GZA recommends that the steep vegetated slopes surrounding the Upper Kettle wetland be maintained, preserving the mature forest to maximize the runoff and infiltration to the Upper Kettle wetland (i.e. rainfall and snowpack).



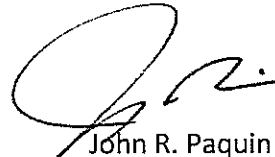
- Consistent with P&R's existing proposed excavation plan, the applicant should maintain proper erosion control measures to protect the Upper Kettle wetland.
- The limited network of groundwater monitoring wells within the limits of the proposed S&G excavation area, limits the extent in which the seasonal high groundwater can be estimated. Rawson may wish to install additional monitoring wells proximate to the excavation to allow for adequate groundwater level monitoring to document seasonal fluctuations and to maximize the depth and volume of the excavation.

We hope this information is consistent with your needs and expectations. We will be pleased to discuss our findings and recommendations during the next Town meeting on February 11, 2020. We thank you for this opportunity to serve the Town and Rawson.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.


Richard J. Desrosiers, P.G., LEP
Associate Principal


John R. Paquin
Associate Principal
Consultant/Reviewer

Attachments:

TABLES: (within text)

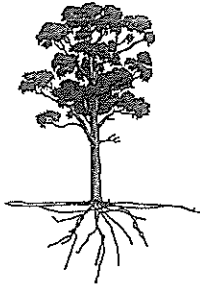
Table 1.0	Shallow Soil Descriptions
Table 2.0	Monitoring Well Soil Descriptions
Table 3.0	Piezometer Soil Descriptions
Table 4.0	Groundwater and Surface Water Elevation on January 9, 2020
Table 5.0	Contributing Drainage Basin Area (Acres)
Table 6.0	Total Annual Precipitation per Basin (gpy)
Table 7.0	Annual Runoff per Basin
Table 8.0	Annual Infiltration per Basin
Table 9.0	Kettle Wetland Vertical Gradients
Table 10.0	Observed Mottling Elevations
Table 11.0	Estimated Season High Groundwater (SHGW) Elevations
Table 12A	Percentage Change in Runoff to Upper/Lower Kettle Wetland Basin
Table 12B	Percentage Change in Runoff to Western Basin
Table 13A	Percentage Change in infiltration to Upper/Lower Kettle Wetland Basin
Table 13B	percentage Change in Infiltration to Western Basin

FIGURES:

Figure 1.0	Boring/Monitoring Well Locations/Cross Section Reference
Figure 2.0	January 9, 2020 Groundwater Contour
Figure 3.0	Existing Condition Drainage Basin
Figure 4.0	North-South Cross Section (A-A')
Figure 5.0	East-West Cross Section (B-B')
Figure 6.0	USGS reference Well

APPENDICES

Appendix A	Limitations
Appendix B	Soil Boring Logs
Appendix C	Predicted Seasonal High Gradients



Joseph R. Theroux

~ Certified Forester/ Soil Scientist ~

Phone 860-428-7992 ~ Fax 860-376-6842

P.O. Box 32, Voluntown, CT. 06384

Forestry Services ~ Environmental Impact Assessments
Wetland Delineations and Permitting ~ E&S/Site Monitoring
Wetland Function & Value Assessments

02/10/20

Provost & Rovero, Inc.
57 East Main St.
P.O. Box 191
Plainfield, CT. 06374

Attn: Mr. David Held

Re: Wetland function/value and impact assessment report for proposed gravel removal operation, Strategic Commercial Realty Inc., land N/F the Potvin Family Trust, Maynard Road, Brooklyn, Connecticut.

Dear Mr. Held,

At your request, I have reviewed the site plans entitled: "PROPOSED GRAVEL EXCAVATION, MAYNARD ROAD, BROOKLYN CONNECTICUT. APPLICANT: STRATEGIC COMMERCIAL REALTY, INC., D/B/A RAWSON MATERIALS, 6 KENNEDY DRIVE, PUTNAM, CT. 06260, dated 10/2/19, (revised 2/10/20) and the above referenced property for the purposes of assessing the wetland functions and values and potential impacts to the inland wetlands and watercourses in proximity to the proposed gravel removal operation.

The wetland function and value assessment was conducted on 11/11/19. In addition, I have received the hydrogeologic assessment of the site, and in particular, the recharge of the kettle wetland in the southeasterly corner of the site and a second off-site kettle, prepared by GZA Environmental, Inc. dated February 6th, 2020.

Existing Conditions

The property is 29.99 acres in size and is located on the south side of Maynard Road in Brooklyn, CT. The southern property boundary lies on the Canterbury town line.

The majority of the upland portions of the parcel are vegetated in the overstory with a mix of white pine and mixed hardwoods in the sawtimber and polewood size classes. These species include red, white and scarlet oaks, red maple and black birch. The understory is comprised of polewood and saplings in these species as well as shrub species such as

mountain laurel, ironwood, Japanese barberry and highbush blueberry. Herbaceous vegetation includes black raspberries, greenbrier and wild grapevines, and numerous species of ferns, wildflowers and grasses.

The majority of the upland areas were recently harvested of all merchantable timber and polewood firewood.

Upland Review Areas

The 125 foot upland review area around the delineated scrub-shrub wetland in the southeast portion of the property is heavily vegetated. The steep slopes are vegetated in the overstory with white pine, scarlet and white oaks, birch and red maples. The densely vegetated understory is comprised of saplings in these species with beech and cherry as well. Shrub species found included sweet pepperbush, mountain laurel, highbush blueberry, multiflora rose and Japanese barberry. Vines such as wild grapes and round leaf greenbrier were found.

Herbaceous vegetation was sparse, due to heavy competition and light exclusion from the overstory and dense shrub species. Only moss, various species of mushrooms, princess pine, black raspberry and cinnamon ferns were found in some areas.

Wetlands

A palustrine scrub-shrub wetland was delineated in the southeast portion of the property. (See wetland delineation report). This wetland has formed in a kettle hole and is connected to an adjacent kettle hole on the adjacent State of Connecticut property by a narrow channel. The wetland was inundated on the date of the assessment, (11/11/19).

This wetland has formed due to the presence of a perched or seasonal ground water table that provides the hydrology to allow it to remain inundated for the majority of the year.

The hydrogeological investigation performed by GZA indicates that the hydrology of the kettle wetland is primarily maintained by two sources: (i) direct precipitation to the kettle, and (ii) infiltration of precipitation which flows through the stratified drift deposits to the kettle.

Both the GZA report and investigations performed by Provost & Rovero, Inc. confirm the sources of hydrology for this wetland.

The wetland is vegetated around its perimeter with scarlet and white oaks, red maple and white pine in the sawtimber size classes with a few pole wood sized red maples in the center of the wetland.

The majority of this wetland is densely vegetated with typical wetland shrub species such as highbush blueberry, speckled alder, sweet pepperbush, maleberry, winterberry and spicebush.

Herbaceous vegetation included sphagnum moss, cinnamon fern, sedges, rushes and misc. grasses.

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

Due to the time of year, no amphibians or reptiles were observed although this wetland undoubtedly serves as habitat for numerous species. It is my opinion that it may possibly serve as vernal habitat.

As far as a fish population is concerned, it is doubtful that one exists as there are no significantly sized, open, deep water areas capable of sustaining a breeding fish population.

In addition to this wetland, the floodplain soils associated with the Quinnebaug River on the adjacent Tilcon property were also delineated. (See delineation report).

Although the alluvial soils in this area are considered as regulated wetland soils, this area would appear as typical forested uplands adjacent to the river.

The overstory is vegetated with large red maple, white ash, sugar maple red & white oaks, and sycamore in the sawtimber size classes.

The sparse understory is vegetated with sugar & red maple, ash, and ironwood polewood and saplings. Shrubs included Japanese barberry, multiflora rose, and winged euonymus. Vines such as bittersweet, wild grapes and round leaf greenbrier were also found. Ground vegetation was also sparse. Plants found included: wild violets, black raspberry, goldenrod and misc. grasses.

Wetland Functions and Values

The scrub-shrub wetland and the Quinnebaug River/floodplain wetlands were inspected to determine wetland functions and values utilizing the Army Corps. Of Engineers methodology as outlined in "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 4 wetland values include: recreational value, educational/scientific value, uniqueness/heritage value and threatened/endangered species habitat.

For each wetland function or value to be determined, 2 to 31 different considerations/or qualifiers are considered as rationale to apply or eliminate that specific function or value.

Scrub-shrub wetland functions:

The following is a list of the wetland functions exhibited by this wetland and their descriptions:

Ground water recharge and discharge: Recharge function is likely due to the perched water table being trapped and slowly infiltrating during dry season. This is a primary function of this wetland.

Sediment/toxicant retention: herbaceous vegetation, shrubs and flat topography in the wetlands can effectively trap sediments from surface flows from steep slopes/adjacent topography, although there are no current sources of sediments/toxicants present upslope nor any downgradient resources to be protected, (watercourses). So this wetland has little opportunity to provide this function.

Nutrient removal/retention: herbaceous and shrub vegetation in the wetlands can effectively trap and utilize potential nutrients before reaching watercourses. Nitrogen fixing bacteria in wetland soils also trap nitrogen. Although with no current sources of nutrients present, this wetland has little opportunity to provide this function.

Production export: numerous tree, shrub and herbaceous plant species in the wetlands provide food, berries and seeds for wildlife. Amphibians provide food for birds and mammals.

Sediment and 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 wetlands. Although with no currents or shoreline waves, this wetland has little opportunity to provide this function.

Wildlife habitat: Numerous amphibians, reptile, mammal, and bird species inhabit this wetland. The wetland and upland riparian zones adjacent to the wetland serve as wildlife habitat, potential vernal habitat and potential threatened/endangered species habitat. Wildlife habitat is another primary function of this wetland.

This wetland did not exhibit the wetland functions of fish habitat or floodflow alteration due to the lack of significant habitat areas capable of sustaining fish populations and due to the wetlands position on the landscape, surrounding excessively well drained sand and gravel deposits and lack of potential flood flow sources.

Scrub-shrub Wetland Values

The following wetland values were exhibited by this wetland:

Educational/scientific value: this wetland potentially contains threatened/endangered species, it is relatively undisturbed, is considered as valuable wildlife habitat, and as a kettle hole, it is a unique geologic feature. Although with no public access on this property, this wetland has little opportunity to provide this value.

Uniqueness/heritage value: this wetland serves an important role in the ecological system of the area, it is a typical wetland class for the area, it is located in a unique geological feature, and it potentially serves as habitat for threatened/endangered species.

Visual/aesthetic value: Kettle hole and wetland is visible from multiple viewing locations, wetland contains a diversity of vegetation that turn vibrant colors during different seasons, it is considered valuable wildlife habitat, not disturbed and is absent of trash and debris.

Threatened/endangered species habitat: the eastern portion of the property appears to be shown within the state and federal listed species shaded area on the natural diversity database map, the Natural diversity database files indicate that the state threatened purple martin (*Progne subis*), the eastern spadefoot toad (*Scaphiopus holbrooki*), and the blue spotted salamander (*Ambystoma laterale*) occur within the general vicinity of the property and the Quinnebaug river valley.

Quinnebaug River/floodplain functions:

The following is a list of the wetland functions exhibited by this watercourse and their descriptions:

Ground water recharge and discharge: recharge function exhibited due to private/public wells occurring downstream, the river is a perennial watercourse, and gravel & sandy soils being present in and adjacent to the river. This is a primary function of this wetland.

Floodflow alteration: the Quinnebaug River floodplain areas exhibit flood storage potential due to flat topography, valuable properties, structures and resources are located in and adjacent to the floodplain.

Fish and shellfish habitat: the Quinnebaug River is a perennial watercourse that serves as habitat to numerous fish and shellfish species.

Sediment/toxicant retention: the floodplain is associated with a perennial watercourse, fine grained mineral/organic soils are present, herbaceous vegetation, shrubs and flat topography in the floodplain can effectively trap sediments from surface flows from steep slopes/adjacent topography. As there are no current sources of sediments/toxicants present upslope, the floodplain has little opportunity to provide this function. This function is only exhibited by the floodplain, the river itself has no retention function.

Nutrient removal/retention: herbaceous and shrub vegetation in the floodplain can effectively trap and utilize potential nutrients before reaching watercourses. Nitrogen fixing bacteria in wetland soils also trap nitrogen. Although with no current sources of nutrients present, the floodplain has little opportunity to provide this function. This function is only exhibited by the floodplain, the river itself has no removal/retention function.

Production export: numerous tree, shrub and herbaceous plant species in the floodplain provide food, berries and seeds for wildlife. Aquatic invertebrates, shellfish, insects, reptiles, amphibians, fish, bird and mammal species are part of the food chain associated with the Quinnebaug River.

Sediment and shoreline stabilization: Roots from herbaceous grasses and plants, shrub species and trees bind and stabilize soils which helps prevent erosion along the riverbanks.

Wildlife habitat: Numerous amphibians, fish, reptile, mammal, and bird species inhabit the Quinnebaug River and its floodplains. The floodplain and upland riparian zones serve as wildlife habitat and possibly threatened/endangered species habitat. Wildlife habitat is another primary function of this wetland.

Quinnebaug River/floodplain Values

The following wetland values were exhibited by the river and floodplain:

Recreational value: active/passive opportunities such as hiking, boating, fishing and hunting exist, and there is a high visual/aesthetic quality to this potential recreational site. Although with no public access on this property, the river and floodplain has little opportunity to provide this value.

Educational/scientific value: the river and floodplain potentially contain threatened & endangered species, the floodplain is relatively undisturbed, is considered as valuable wildlife habitat, and there is a diversity of wetland classes present. Although with no public access on this property, the river and floodplain has little opportunity to provide this value.

Uniqueness/heritage value: the river and floodplain serve an important role in the ecological system of the area, they exhibit typical wetland classes for the area, and they potentially serve as habitat for threatened/endangered species.

Visual/aesthetic value: the river and floodplain are visible from multiple viewing locations, the floodplain contains a diversity of vegetation that turn vibrant colors during different seasons, it is considered valuable wildlife habitat, not disturbed and is absent of trash and debris.

Threatened/endangered species habitat: the eastern portion of the property appears to be shown within the state and federal listed species shaded area on the natural diversity database map, the Natural diversity database files indicate that the state threatened purple martin (*Progne subis*), the eastern spadefoot toad (*Scaphiopus holbrooki*), and the blue spotted salamander (*Ambystoma laterale*) occur within the general vicinity of the property and the Quinnebaug river valley.

Potential wetland impacts

The project plans and site were reviewed to assess the potential impacts to the wetlands from the proposed gravel removal operation.

On this parcel, a gravel removal operation is proposed to remove 1,205,000 cubic yards of gravel in 5 phases, covering 20.3 acres of the 29.99 acre site.

The initial land clearing, topsoil & subsoil stripping and excavation in phases 3 and 4 are proposed within 75 feet from the wetlands.

No direct impacts are proposed, there is no filling or excavation activity proposed within the wetlands.

The current site plan requires that a "down cutting" methodology be utilized to conduct the entire excavation operation. This methodology will eliminate disturbance on exterior slopes of the site, particularly adjacent to the kettle wetland and the Quinnebaug River floodplain to insure that no erosion or sediment generated during the excavation operation could impact the wetland.

E&S Measures:

The submitted project plans did not originally show any proposed E&S measures around the perimeter of the excavation, except for around the topsoil stockpiles. The most likely reason for this is that the excavation is proposed from the backside of the newly excavated slope. By using this method, the slope is undercut, allowing the materials to fall into the excavated areas as the work progresses towards the wetlands, preventing sediments from migrating downslope towards the wetlands.

It was my recommendation however, that there should be an E&S control plan for the initial land clearing/topsoil-subsoil removal operation. It is during this phase where the most likely opportunity will occur for erosion and sedimentation. The slopes adjacent to the wetland are steep, and the excavation and grading are proposed within 75 feet of the wetlands.

Along the clearing limits adjacent to the wetland, I recommended either super silt fencing or silt fencing backed by staked hay bales should be proposed and implemented. This silt fencing will also prevent reptiles and amphibians from entering the excavation areas.

Inside of the perimeter E&S measures, an excavated trench should be dug to catch sediments and storm water during the stripping of the topsoil and subsoil phase. This trench should be left in place and be stabilized with seed and mulch hay as described in the restoration notes on sheet 10 of 13 of the project plans.

I also recommended that E&S inspections be conducted on a frequent basis during the land clearing and top/subsoil stripping phases, and prior to significant storm events.

All of these recommendations have been adopted by the applicant and its development team and are incorporated into the site development plan as now constituted.

Potential short term impacts:

The potential short term impacts associated with the land clearing, top & subsoil stripping and gravel removals would be limited to sediment discharges during significant storm events.

Provided that the recommended E&S measures/inspections and perimeter trench are correctly implemented and maintained throughout the project timeframe, the excavation within 75 feet of the wetlands will not significantly impact the wetlands or their existing functions due to erosion and sedimentation. Once the top and subsoils are removed, the

well-drained, sandy/gravelly base will allow for good infiltration of storm water runoff until the excavation is complete.

The quick and permanent establishment of vegetation in the disturbed areas is crucial to the prevention of erosion. To minimize the potential for these impacts, E&S control measures have been incorporated into the project plans on sheet 10 of 13.

Potential long term impacts:

Wetland hydrology

The GZA report confirms the fact that the kettle wetland exhibits a perched or "mounded" water table. Based upon an analysis of the GZA report prepared by Provost & Rovero Inc., there is only a minimal impact on the recharge of the kettle wetland that will occur as a result of the proposed excavation. A potential 1.2% loss of recharge will not have a significant or adverse impact on this resource.

The hydrogeologic report confirms that that this wetland will continue to maintain the hydrology for it to exhibit the wetland functions and values which presently exist both during the excavation and thereafter, provided that the erosion and sedimentation control plan designed by the project engineer is implemented and properly maintained through the duration of the project and the applicant utilizes the "down cutting" methodology for the excavation specified by the site plans.

Adjacent upland wildlife habitat

Potential long term impacts to the upland habitat from the excavation project would include the loss of approx. 50 feet of the 125 foot URA serving as riparian zones and upland wildlife habitat adjacent to the wetlands, as these areas currently serve as upland habitat. This intrusion will force wildlife into the vegetated corridor in and around the wetlands during the excavation. However, because this vegetated wildlife corridor is not proposed to be cleared and still exists in widths of 75 feet or more, the wetlands and adjacent riparian zone will still provide for wetland function and wildlife habitat during the active excavation phase of the project. Once excavation is completed and the site is loamed and seeded in accordance with the closure/reclamation plan, early successional growth will occur and these temporarily disturbed areas will again provide habitat.

It should also be noted that no excavation is proposed around approximately 50% of the circumference of the kettle wetland. Therefore, during and subsequent to the completion of the excavation operation, the kettle wetland will continue to provide significant habitat and breeding opportunities if obligate vernal pool species are present.

To help protect the upland riparian zone, I would recommend the placement of permanent signage along the proposed clearing limits indicating the wetland boundary proximity or "wetland buffer" to help prevent future encroachments. Signs should be placed at the limits of excavation shown on the site plan on existing trees, metal or pressure treated posts at eye level, spaced approx. 25 feet apart.

In summary, the design of the excavation operation implements features intended to minimize or eliminate potential impacts to the wetlands such as storm water runoff, significant loss of wetland habitat, loss of recharge and erosion and sedimentation associated with excavation activities.

I feel these measures are adequate to protect the wetlands provided that the proposed 75 foot upland review area is maintained as depicted on the site plan and the recommended erosion and sedimentation control features are implemented and maintained throughout the excavation and reclamation timeframe.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'J. R. Theroux', with a stylized, cursive script.

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

Mark Curreri
316 Hartford Road
Brooklyn, CT 06234

January 13, 2020

To: The Town of Brooklyn Wetland Commission

Herein, Ye Kim Timber Management includes Megan Ye, owner. David Gokey, holder of a Forestry License and Guy, Project Manager.

The purpose of this letter is to bring the Commission up to date regarding Ye Kim Timber Management, Appell Road, adjacent wetland, and the property at 316 Hartford Road.

On March 22nd 2019 Ye Kim Timber Management Showed up on the Curreri property unannounced and without permission They began to excavate the existing Appel Rd for ¾ of a mile 6 to 10 inches deep in some locations and damaged my property with unauthorized vehicle traffic through my land.

This action was totally unnecessary because appell Rd had most recently been used by C L&P for High tension wire installation through the Curreri property and Hull forestry products had done a previous harvest operation several years back. All the logging travelled Appell Rd.

I was never asked to sign and application for timber harvest as an owner. And Ye Kim used my property without permission causing, as I'll describe as serious and costly damage. But for them to profit.

I have submitted a photo album showing the conditions of Appell Road as they existed from March 26, 2019 through January 13, 2020.

The photos show that large puddles have overrun the side of Appell Road into Curreri's back yard. Recently, the water from rain and snow melt began to infiltrate the Curreri's basement. On January 5, 2020, Ye Kim hired an excavator operator to repair Appell Road. I spoke to the operator and described to him how the road had originally pitched water towards the wetlands.

Despite this attempt to repair Appell Road, conditions still exist that cause the large puddle to accumulate and the overflow has no other course to run except over the banking and down to the Curreri's garage and house and possibly into the basement. In the second week of

December, 2019, the rain and snow melt caused water to enter our basement. An event that hadn't occurred since 1982 when Appel Rd and The Curreri's property had been properly graded specifically concerning water runoff.

Further west on Appell Road, another puddle formed, again with no way to drain, and crosses over the entire road about 30 feet long making this area difficult to cross.

On January 2, 2020, Ye Kim's heavy machine operators chose to cross wetland areas on the Curreri property, where they had no business or permission to cross. With this action, they crushed a 4 inch pipe and a wooden bridge culvert, which serviced the flow of a natural spring. This caused water to flood into areas not previously affected by the spring. This damage was viewed by Chairman, Jeff Arends and Margaret Washburn. Provided are pictures of this most recent damage and pictures of a rubber mat used to cover the broken 10 inch cement culvert previously broken by Ye Kim in March 2019. The rubber mat patch has been buried and now is not visible.

My first request of the Commission is to use its authority to have repairs made to the wooden bridge and restore the 4 inch pipe to proper drainage elevation to allow water to flow as it did before Ye Kim damaged this area..

The Curreri property, consisting of 22.7 acres, was appraised in March of 2019, prior to the action taken by Ye Kim to Appel Rd and the adjacent wetlands.

The access and usability of Appell Road factored greatly in the value and use of the rear portion of our property. The conditions left by Ye Kim, if not corrected, will make portions of my property inaccessible during wet periods, and cause water damage to the Curreri's garage, house foundations and basement.

I do not believe Ye Kim is capable of making the repairs needed to correct the road and water runoff. They should, however, be held responsible for costs to me to make my property as it was prior to March 26, 2019 (concerning the 4 inch pipe, the wooden culvert bridge, damaged by Ye Kim at a spring water crossing; and a 10 inch cement culvert). This agreement was signed and submitted to the Commission, which allowed Ye Kim to restart work to the Wolcheski property.

Ye Kim did several wood operations adjacent to my property and profited at my expense. The damage to the road and subsequent flooding areas, has affected my property value. They cut the road grade to save the expense of raising a power wire to Paul Harrington home. They also tried to save transportation costs by traversing through my wetland and damaging the watercourse, so they could retrieve a wooden mat that they placed over a cement pipe that they previously broke.

These repairs should not be made at my expense.

So to close:

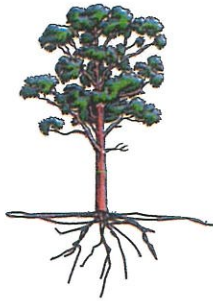
1. I would like Ye Kim to be responsible for described repairs through fines, or made to pay the cost
2. A moratorium to be made on future work done by Ye Kim, Members of or subsidiaries. Under your jurisdiction, until contracts to me and to other property owners are satisfied.
3. In the future, Property owners adjacent to or with a right of way should be notified prior to commencement of work with a signed agreement, to save stress and misunderstandings.
4. And moving forward, an insurance bond to be in place for property owners not part of the wood operations, who have right of ways through their land, which would protect them from damage and neglect by the contractor.

Your input and help would be greatly appreciated.

Sincerely,


Mark Currier

860-377-1742



Joseph R. Theroux

~ Certified Forester/ Soil Scientist ~

Phone 860-428-7992 ~ Fax 860-376-6821

P.O. Box 32, Voluntown, CT. 06384

Forestry Services ~ Environmental Impact Assessments
Wetland Delineations and Permitting ~ Site/E&S Monitoring
Wetland function & value assessments

RECEIVED

FEB - 4 2020

1/28/20

Town of Brooklyn
Inland Wetlands and Watercourses Commission
4 Wolf Den Rd.
P.O. Box 356
Brooklyn, CT. 06234

Dear Commissioners:

A selective timber harvest, final harvest/clearcut is planned on the FCR Realty LLC property located off Day Street.

As this activity will only require the harvesting of some trees in and adjacent to the wetlands, and the location of main/secondary skid trails within the upland review areas to facilitate access to portions of the property, (no wetland or stream crossings needed), and could be deemed as a regulated activity, I am notifying you of this proposed activity. I am requesting a declaratory ruling that it falls under the definition of a permitted use as of right under the agricultural exemption in Section 4 of your regulations. I am providing you with the following information so you can make that determination.

The silvicultural plan for the selective timber harvest areas, (designated in orange on the attached cutting plan), is to remove over mature, poorly formed, diseased trees and inferior species to promote the growth of the valuable crop trees and regeneration, and to enhance the wildlife habitat within and adjacent to the wetlands and potential vernal pools on the property. In this small area, the trees are marked for removal and the removals do not exceed 25% of the basal area of the stand, which is mostly white pine. Trees marked for removal were carefully picked so as to not open the canopy adjacent the pools excessively. The post-harvest conditions will allow more light to the sparsely vegetated understory adjacent to the pools allowing suppressed saplings, shrubs and herbaceous vegetation to grow and provide better cover and habitat. Residual tree tops will be slashed, crushed and left in place for woody debris cover and habitat as well.

In the final harvest/clearcut areas, (designated in red on the attached cutting plan), all merchantable trees, polewood and firewood trees will be harvested. Remaining non-merchantable trees, tree tops and slash will be chipped. No clearcutting will occur within

100 feet of any of the delineated wetlands. Due to the lack of steep or moderate slopes adjacent to the wetlands, and the distance of the harvesting from the wetlands, I see little or no potential for erosion or sedimentation impacts.

This operation is planned for spring/summer 2020. Timing of the operation is planned for optimum ground conditions to reduce the chances of sedimentation/erosion. The timeframe of the operation should not exceed 1 to 2 months. If conditions such as excessive rainfall occur, the harvest will have to be postponed until favorable conditions prevail. This would extend the timeframe of the operation until drier ground conditions prevail in summer 2020.

Although there is an existing, deeded vehicular access to the property for the existing permitted gravel removal operation through an adjacent property, in the interests of avoiding conflict and at the suggestion from your Inland Wetlands Agent, truck access to Day Street will be proposed through the Weaver property to the north of the FCR Realty LLC property. The existing gravel roadbed runs through both properties to Day Street. (See cutting plan for details.)

Although not required within the scope of your regulations, attached is a letter from Mr. Weaver granting access through his property. In addition, a portion of a letter from Eversource Energy is attached stating that no permission from Eversource Energy is required for FCR Realty to use their own property for access. This document was supplied by the Attorney representing FCR Realty LLC.

No wetland/stream crossings, or wetland disturbance will occur in the use of this access.

Erosion and Sedimentation Control

Primary skid trails will be located outside 100-foot buffer zones/filter strips on all inland wetlands and streams when possible and are oriented along/around slopes to reduce erosion. At the completion of the operation water bars will be installed on portions of main skid trails with significant slopes.

Due to the timing of the operation and well drained gravelly soil conditions, impacts on main skid trails will be minimal. If during the operation conditions such as excessive rainfall, erosion, or rutting occur, the harvest will be shut down until favorable conditions prevail.

Timber to be harvested

Approximately 200,000 to 250,000 board feet of timber will be harvested. Primary species include: White pine, red, black, white and scarlet oak, and red maple. Diameters that will be harvested range from 12 inches dbh to 36 inches dbh. (Not including marked saplings and cull trees). This is both a selective thinning removing approx. 25% of the timber growing in the selective harvest areas, focusing on overmature timber, diseased, poorly formed trees and inferior species. In the clearcut/final harvest areas all merchantable timber will be harvested.

Harvesting Equipment

The primary pieces of equipment that will be utilized to harvest the timber will be a feller-buncher, log forwarder and/or grapple skidder. The advantage of using a feller-buncher to fell and bunch the trees is that the buncher has the ability to hold, cut and direct the tree before it falls. This allows a high degree of control of where the tree is allowed to fall. Thus the condition of the residual stand is much better than ordinary directional felling with a chainsaw. In many cases the whole tree can be cut, picked up and turned 180 degrees or carried to a favorable location for felling. This is invaluable for trees adjacent to wetlands, in sensitive or steep areas or along property lines.

The use of a log forwarder is beneficial due to the fact that it exerts far less ground pressure and disturbance than a typical skidder.

Timber harvest BMP's

The following is a brief description of the BMP's and guidelines that will be followed during the course of the timber harvest. I will address them pertaining to the site-specific areas of the property that will be harvested.

Upland areas:

Timber will be harvested along the following guidelines: stumps will be cut low when possible, trees will be directionally felled with a feller buncher or chainsaw and skidded to avoid damage to residual stands, and firewood portions of tops will be removed or chipped to decrease residual slash.

After the timber is harvested in the selective cut areas the remaining treetops and slash not utilized as firewood will be lopped and crushed to a height of approx. three to four feet. Skid trails will be designed to run along contours not against them (see cutting plan), while trails with un-avoidable slopes will have water control structures installed.

Landing areas at completion of harvest will be left clear of any refuse, graded, and seeded.

Steep slopes: in areas on the property where there are slopes steeper than 10% where timber will be harvested, the skid trails are oriented at the base and tops of the slopes to avoid disturbance on the slope itself.

Buffer zones/filter strips: Timber will be harvested in these areas and on the edges of the wetland areas on the property according to CT. D.E.P. BMP's. Less than one quarter of the basal area will be removed in these areas.

The following guidelines will be followed: no main skid trails will be constructed in these areas unless necessary, trees will be felled out of the wetland areas when possible, residual tree tops will be removed from wetlands a minimum of 25 feet, if a tree does fall in it will be removed via cabling, tops will be slashed, any disturbance that might cause erosion or sedimentation will be stabilized, seeded and mulched.

Wetlands: no timber is marked within the significant wetlands on the property. Some over mature timber on the edges of the wetland boundaries will be removed to avoid future blow downs as many of these trees have excessively large tops and are very susceptible to blow down.

Aesthetics

As far as aesthetics are concerned the owner of the property and myself established the following guidelines:

No harvest buffers will be left along property lines where adjacent residences were located.

Residual treetops not removed to be lopped to 3 to 4 feet in height

Care to be exercised in protecting residual stands and regeneration during harvest.

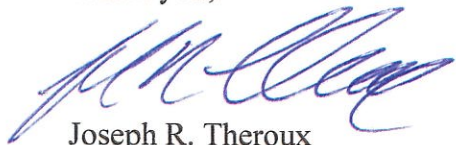
Repair ruts in primary trails greater than 12 inches in depth..

In conclusion, please find attached to this notification:

- Site/cutting plan at a scale of 1 inch = 200 feet.
- Topographic map of harvest area
- Overall site/access route map
- Timber harvest notification form

If you require further information concerning the timber harvest operation or the cutting plan and schedule, please feel free to contact me on my cell, 860-428-7992.

Thank you,



Joseph R. Theroux
Certified Forester/Soil Scientist
Certified Wetlands Agent
Forester Cert. #F000028

I Jeff Weaver give permission to pass and repossess on
My property on Day St. Brooklyn Ct. to Fred
Green and FCR Reality.

Jeffrey Weaver : owner
10/31/19

Eversource Energy
Attn: Mr. Michael Green
October 17, 2018
Page 2

The only improvement proposed within the limit of the common driveway located within the limit of the Eversource Easement will be the driveway itself.

A representative of Eversource Energy has provided to our client a document entitled "Permitted Use Application for Activities within a Utility Corridor" and has requested that this application be completed and filed with Eversource Energy together with a payment in the amount of \$1,500.00 for review and subsequent action. Based upon our review of the enclosed Easement and Ratification and Confirmation of the Easement, it is our opinion that permission from Eversource Energy is not required in order to enable the siting of the common driveway within the limits of the Eversource Easement. We base this conclusion upon the following:

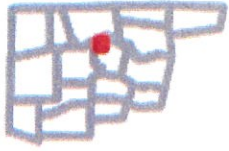
1. In 1918, when the original rights were acquired by The Shore Line Electric Railway Company from Edward J. Caffrey, compensation was paid to Mr. Caffrey for the rights acquired. Those rights are simply stated in the easement document itself. The rights acquired are described as follows:

"The perpetual right and easement to construct, replace, repair, maintain, operate and patrol, for the transmission of high and low voltage electric current and for telephone use, a single and double line of towers or poles, or both, which lines may be erected at the same or different times, with wire cables and ground wires strung upon and from the same, and all necessary foundations, anchors, guys, braces, insulators, equipment and appurtenances...together with the right to trim and cut at any time and from time to time, without further payment therefor, trees and brush along said lines."

2. The law in Connecticut with respect to easements is clear. The use of an easement must be reasonable and as little burdensome to the servient estate as the nature of the easement and the purpose will permit. All rights inherent in the ownership of land, which will not impair the purpose for which the easement was created, are reserved.



Neccog GIS site



Legend

- Town
- Parcels

— ACCESS TO DAY STREET

Notes

Enter Map Description



1: 18,056

0.6 Miles



This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION