

Town of East Hampton

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Department of Energy & Environmental Protection
Lake Pocotopaug Watershed Water Quality Improvements

Project # - 2020-52

Project Manager - Jeremy Hall



Town of
EAST HAMPTON
Connecticut

Department of Energy & Environmental Protection:

The above noted grant project focused on remediation efforts from 5 locations considered moderate to high priority locations as identified in the towns 319 9-point watershed plan. These locations are Clark Hill, Mott Hill, Mohican Trail (Wangonk North and South), Old Marlborough Road and Sears Park.

For the past decade Lake Pocotopaug, a fresh water 500-acre lake located in the heart of East Hampton has been experiencing seasonal algae blooms during the months of July, August and September each year. As part of an ongoing effort the town partnered with North East Aquatics Research to develop a 9-point plan to help fix the lakes watershed area to reduce or eliminate the amount of nutrient loading within the watershed. Following the 9-point watershed plan the town submitted and received a grant to start low impact development projects around the lake. The first grant was received in the amount of \$99,025.00. this grant allowed for funding of an engineer to design LID projects (**Task #a**) within the watershed and implement construction to 5 site locations consisting of Clark Hill, Mott Hill, Mohican Trail (Wangonk South and North Beach), Old Marlborough Road and Sears Park

Each location presented its own set of environmental problems pertaining to storm water management, here is a break down of the problems at each location and the solution for each site.

The Following projects pertain to (**Task #b**):

Clark Hill runs east of the lake and is perpendicular to Lake drive. Its topography grade is significant and as a result dumps large amounts of storm water during each storm directly in the lake and surrounding storm drains. The process of LID for lower Clark Hill was to take the water from the street and funnel it through a vegetative swale directly into a bioretention system located on town property adjacent to the road. The soils were tested and as a result the determination was made that infiltration at this location would be suitable to develop a small detention pond this project would include an overflow pipe if the water accumulates too quickly due to rapid storm water discharge off Clark hill or a 50 year storm. The overflow pipe would discharge from the basin on the far end to allow for some infiltration and would discharge into a lower storm drain further down the property line prior to being discharged into the lake.

Mott Hill is located on the North end of the lake and discharges most of its storm water into a side brook (Hales Brook) the first largest contributor to lake Pocotopaug. The discharge of storm water coming off Mott Hill is rapid as the grade is extensive. The plan to alleviate some of this flow to a shallow wet swale has been constructed on the west side of the road. The soils were not conducive for infiltration therefore we created a wet swale with a series of check dams to discharge nutrients before entering the storm drain.

Mohican Trail (Wangonk North and South Beach) is located on the West side of the lake and is prone to significant nutrient loading as a result of catch basin discharge from route 66 and its topography grades. Within this area there are two beach locations one of which is on the North end where we

installed a large rip rap swale on the North side of the beach to allow for nutrient settlement. The storm water discharge is a result of steep grades from Mohican Trail and Seminole Trail. Additionally, a paver system was installed to control nutrient penetration.

Sears Park is the largest body of land owned by the town of East Hampton that sits directly on the lake front. With roughly 5 acres of land where the topography of the land collects water from North Main Street and the upper tennis and basketball courts then sheet flows across the upper parking lot in a north east flow then directly into Lake Pocotopaug. Sears Park is considered a high priority on the 9-point watershed plan, the park received two bio-retention basins on the upper East side to catch the flow off of the tennis courts and upper parking lot and one in the center of the park to catch the flow from the upper lot and North Main Street. Each basin was built to hold 3 feet of storm water with an overflow pipe set at 36" above ground that discharged additional storm water as needed into the rain garden on the south east side of the park. Both basins were designed for a 20-year storm and held up to that test when we received 4.5" of rainfall in 2.5 hours a few weeks ago. Additionally, Sears park was regraded at the boat launch and a Bod Pave porous paver system was installed to trap water and infiltrate it into the soils before reaching the lake. Beneath the paver system sits 12" of process material to allow for additional infiltration.

(Task # c): Engineered plans to create a level spreader system following a low level detention pond that redirects the flow of water into an already established wetlands on town owned property. The storm water will be diverted to the wetland and a set of three 30 foot length 12' in diameter filter boxes was installed to filter out nutrients from the run off prior to it reaching the lake.

The remediation efforts that took place this spring and summer took months to develop, the town partnered with **Steven D. Trinkaus, PE Trinkaus Engineering, LLC**. Steven is a well-respected Low Impact Development engineer throughout the country and has done seminars abroad as it pertains to LID. Steve was the designer of these systems and continues to be an Interquel part of the 9-point plan for Lake Pocotopaug. **North East Aquatic Research (NEAR)** represents the town as the Limnologist and provides monthly sampling of lake water to test for turbidity, dissolved oxygen, clarity, nutrient loading, temperature and cyanobacteria. NEAR is also credited with the creation of the 9-point watershed plan that is the basis for how we determine what projects to complete and at what priority level they are identified at, they keep up with the everchanging watershed to ensure we are current with the necessary projects we establish. The town appointed **Conservation Lake Commission** has been involved in the process of acquiring the town a Limnologist and identifying ways to help make the lake healthy again. Their task is to be the liaison to the **Town Council** and to identify a budget for annual Lake improvement projects to continue improving our watershed and in lake treatment. The Lake Commission and Town Council are invested in supporting the town financially with future projects. In addition to the grant funding from the state the Town continues to invest upwards of \$100,000 a year to go toward the health of the lake, these projects include work on town roads, in lake treatment and educating the public on safe practices in the watershed.

The results of these projects have proven successful in the short term, you can view the TP and TN levels indicated on the GRTS forms with this final report. Additionally, we have received one large storm on August 24th that accumulated 4.5" of heavy rainfall in a 2.5-hour time frame, this is the equivalent of a 15 year storm. Each of the above LID projects held up to this amount of rainfall and quickly infiltrated into the ground. We will continue to monitor these locations during an active rainfall to gain more insight into the success of these projects.

The last year has presented itself with great success as it pertains to LID work around the watershed. We have completed 20 projects at 12 locations throughout town that will help with remediation at these locations. **(Task #d)** As we look forward to the next year we have 8 sites we will be looking to expand on and develop new LID measures three of these sites are high priority sites on the 9 point watershed plan which includes, Christopher Brook, West Point and Old Marlborough rd. The other 5 sites feed the tributaries of Hales Brook, Fawn Brook and Christopher Brook.

Currently, we are in the design phase and working with private land owners to acquire easements from several properties. Conversations have already started, and verbal consents have been given to start the formalized easement process. This will likely continue into the spring months as we prepare to start constructing during the summer months of 2021. These projects will be funded from the next phase 319 grant awarded to the town and the capital budget from the town.

(Task #e): The Planning and Zoning Commission recently amended their protection zone regulations to help maximize water pollution prevention and ensure enforcement authorities were identified by creating and adopting a town wide Low impact Development plan of action. You can view here the new regulation which starts on page 23 of the document. These plans were attained through several open forum meetings that were attended by members of the Lake Commission, Inland Wetlands Watercourse Agency and our LID engineer and Limnologist.

https://www.easthamptonct.gov/sites/g/files/vyhlif3066/f/uploads/01-15-2020_regulation.pdf

(Task #f): See attached GRTS sheet.

The finished product of these projects have seen a tremendous improvement in a small amount of time. Although we can not contribute 100% of the success of Lake Pocotopaug not shutting down this past summer as a result of high Cyanobacteria counts and visible algae blooms, we do know the projects completed helped reduce the phosphorus loading at these locations. Although we do not have calculated numbers to show the correlation between the two, we feel both in lake treatment and watershed treatment have helped us control blooms this year.

These projects presented us with many challenges throughout the course of the spring and summer months. Sears Park was most definitely our largest challenge, during construction we unearthed electrical conduit, sewer pipes and an old abandoned well. Changing the topography was most certainly a struggle as we took out 3' in some areas of material. Pertaining to the bio retention systems we had to overcome a one-day storm that dropped 2" of rainfall on us and washed out the lower basin

and part of the upper basin prior to seed germination. Mohican Trail presented us with a problem with paver design and needed to be slightly modified to fit the area around the catch basin and discharge to the storm drain nearby. In the end the projects were completed, and additional LID measures were established to help reinforce the initial plan.

Town of East Hampton



Figure 1 Bio retention system #1 Sears Park after 4.5" rain storm



Figure 2 bioretention system #1 Sears Park



Figure 3 bio retention system #1 Sears Park



Figure 4 paver system at boat launch



Figure 5 underdrain for bioretention system #2 at Sears Park



Figure 6 bioretention system #2 at Sears park during 4.5" rain storm



Figure 7 bioretention system #2 at Sears park



Figure 8 paver system at North end Mohegan (Wangonk)



Figure 9 bioretention system #2 at Sears Park following 4.5" rainfall



Figure 10 Vegetative swale on Clark hill leading to bioretention system



Figure 11 Bioretention system on Clark Hill (pre seed)



Figure12 Overflow discharge to storm drain on Clark Hill



Figure 13 Underground discharge pipes on Clark Hill

