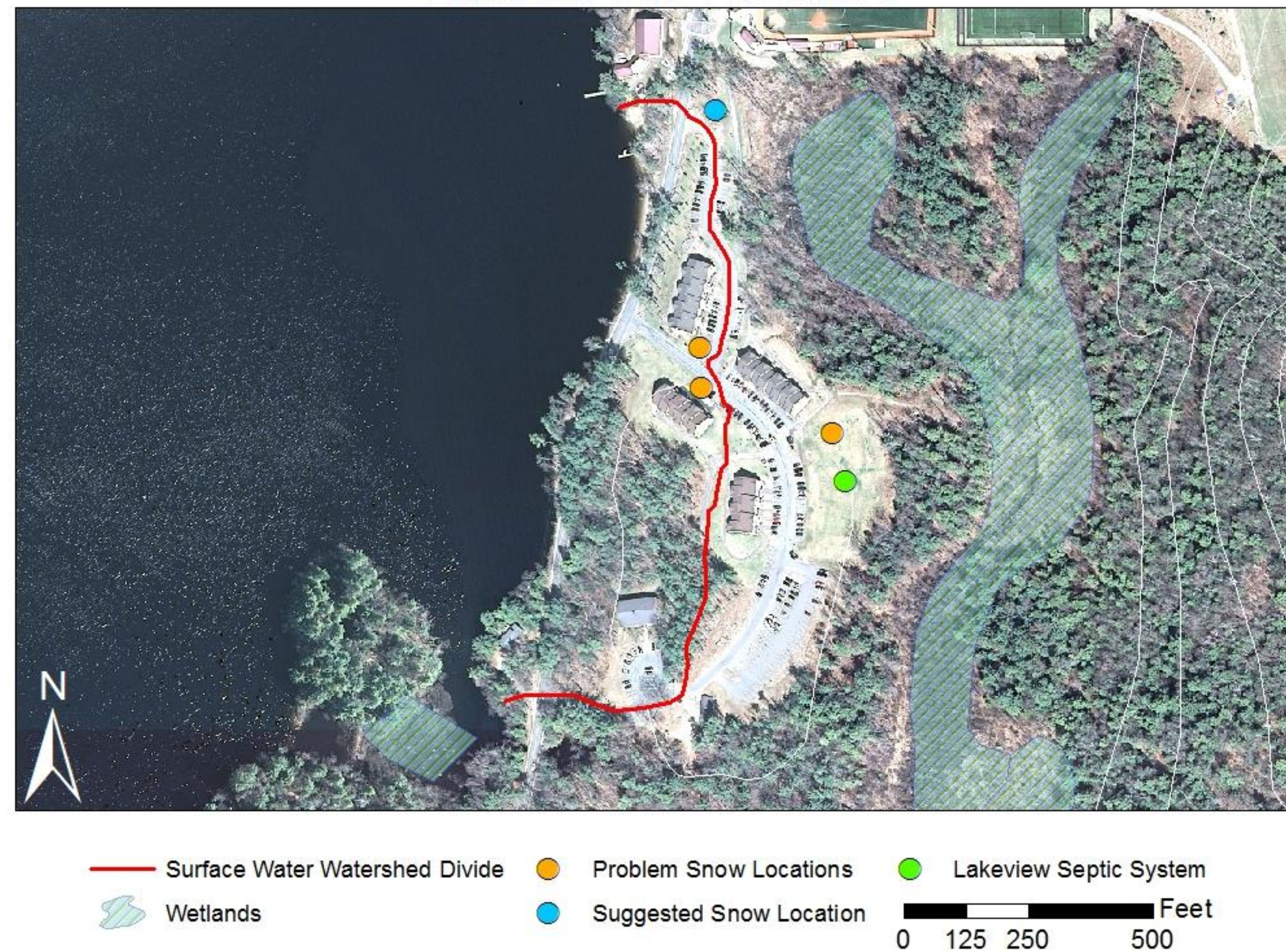


Introduction

The Lakeview sub-watershed is an area that poses a series of potential problems for the overall water quality of Pearly Pond. In this area, University Drive runs for several hundred feet alongside the pond, just feet away from the water body. The Lakeview Townhouses sit uphill from University Drive, making stormwater sheet flow and the pollutants it carries a threat to the pond's water quality. The area has been studied in detail, and several additional threats to the pond's water quality have been addressed. Potential solutions have been offered for each threat.

Area Map

Lakeview Sub-Watershed



Excessive Sediments and Snow Storage

- Salt and sand are left behind on roads in winter for traction and de-icing. When plowed, sediments and other pollutants (litter, oil, vehicle emissions) are plowed into piles for the duration of the winter.
- When melting occurs sediments are left behind. In two areas next to Buildings 1 and 4 snow is stored within feet of the road, allowing pollutants to wash away into the road and into Pearly Pond.
- It is recommended that snow be stored surrounded by 50 feet of vegetation. Preferable vegetation are native or adaptive plant species that die back annually.
- To prevent sediments from reaching the pond, snow storage piles should be surrounded by silt fencing and sediments should be removed from ground in spring.
- Snow should not be stored on top of septic system to avoid overwhelming system and to insure efficiency.

Best Management Practices for Surface Runoff

Surface runoff from the road is always a problem in areas where the road comes so close to the waterfront. Sediment and phosphorous are the biggest problems facing the lake, but buffers are not very effective in dealing with phosphorous. They are, however, very effective at dealing with sediment.

- Short buffers remove a very large amount of sediment. Only 20 feet of grass is required to stop 70 percent of sediment.
- There is simply not enough room here for larger buffers.
- Moving or regrading the road would be another good solution, though this can get expensive.
- A simple regrading of the road would be relatively cheap, if done at the same time as standard maintenance. This would tilt the road to push runoff into the existing ditches and pipes that already funnel the water straight to the pond. These pipes could then be fitted with sediment filtration grates
- Costs for repaving vary a bit, but cost somewhere between 4-8 dollars a square foot. Porous asphalt could be used for nearly the same cost.
- Shown below is the drainage ditch that collects the surface water and carries it under University Drive to Pearly Pond.



- The drainage ditches on one side of the road occurred naturally, but they could be widened to make an actual channel to funnel the water towards the pipes. In this case, adding in grates designed to filter sediment would only run another couple hundred dollars and would treat nearly all the problems caused by the runoff.

- One final, drastic and expensive option would be to move the road entirely. This would eliminate runoff and give room for a buffer, but would be around 100,000 dollars and would be a large undertaking. This solution is not recommended, but is presented as an option and cost comparison.

Canada Geese



- Canada geese use the campus and Lakeview sub-watershed as ideal breeding habitat. Geese prefer lawns where they can walk from water to grass without flying.
- Each goose produces 2-4 pounds of excrement daily, which contain harmful bacteria and add nutrients to the lake.
- Population control of geese takes time and persistence.
- Geese can be deterred by removing lawns and replacing with local plant species.
- Studies have shown certain grasses are undesirable to geese due to decreased nutrient content. One that could be planted in Rindge is zoysia grass, though it is unsightly in Winter.
- Other deterrents include predator decoys, amber lighting that agitates geese, or training dogs to scare geese away.
- Egg addling is another humane means of control.



Lakeview Septic System

- When functioning improperly septic systems can release pollutants into the watershed.
- Limiting the amount of water entering the septic tank is crucial as too much water can cause some of the solid waste to exit the tank, contaminating the ground around it.
- Limit what you put down the drains as certain products are not degradable by the bacteria contained within the system. Certain household chemicals can be toxic to the bacteria in the system, which could cause discharge of raw sewage into the leaching fields.
- Warning signs of failure of system: poor drainage of waste pipes, broken or deteriorated inlet or outlet baffles, leakage of raw or partially decomposed sewage.
- Runoff from septic tanks emits organic pollutants that cause eutrophication. Therefore testing for excess phosphorus and nitrogen could be useful in showing if a septic tank is causing a problem.

References

- Adams, Michele C. (2003). Porous Asphalt Pavement With Recharge Beds: 20 Years and Still Working.
 - Gilliam, J.W., D.L. Osmond and R.O. Evans (1997). Selected Agricultural Best Management Practices to Control Nitrogen in the Neuse River Basin. North Carolina Agricultural Research Service Technical Bulletin, 311. North Carolina State University, Raleigh, NC.
 - Massachusetts Department of Environmental Protection. (2001). Snow Disposal Guidance. Mass.Gov. Retrieved April 17, 2013, from <http://www.mass.gov/dep/water/laws/snowdisp.htm>
 - Washburn, B. E., & Seamans, T. W. (2012). Foraging Preferences of Canada Geese Among Turfgrasses: Implications for Reducing Human-Goose Conflicts. *Management and Conservation*, 76(3), 600-607
 - Weaver, William and Hagans, Danny (2009). Road Upgrading, Decommissioning and Maintenance - Estimating Costs on Small and Large Scales.
 - Westport Weston Health District. (2008) Septic System Information. Retrieved April 27, 2013, from <http://www.wvhd.org/septic.htm>
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 - www.awaywithgeese.com
 - <http://www.killingworthlake.co.uk/canada-goose>

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