Jane Clifford – Lake Iroquois

Lake Wise Evaluation
Date: August 15th 2023

Lake Wise Evaluator: Casey Spencer, WNRCD
Report completed by Adelaide Dumm, WNRCD

Address: 56 Dimick Road, Hinesburg, VT
Permanent Address: 6147 Vt Route 116, Starksboro, VT,

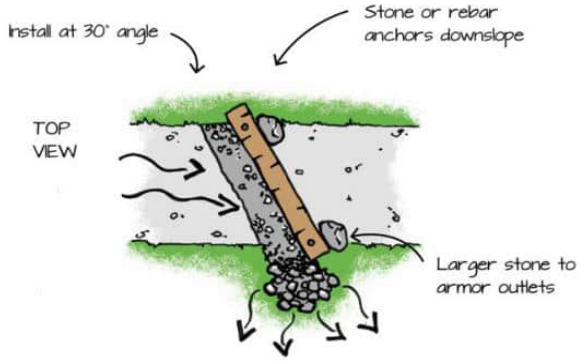
Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in the Structures & Septic and Recreational sections of the assessment, but there are improvements that can be made in the Driveway and Shorefront and Lake Access sections. Homeowners need to have best management practices (BMPs) in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management. You will receive a certificate of recognition for the sections which passed and this report details the BMPs you can implement to receive a Lake Wise award in the future.

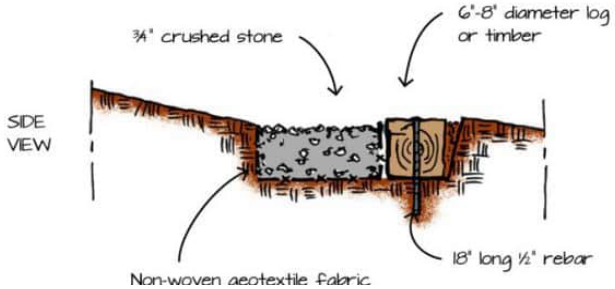
Driveway Area: The driveway section did not pass in the Lake Wise assessment section, and there are improvements that can be made. The driveway and parking areas are slightly defined and excessive in size. There are signs of erosion on the driveway and parking area due to frequent use resulting in stormwater runoff that is more channelized than sheet flow. Some of the runoff is directed to a stable vegetated buffer or BMP, but adding green stormwater infrastructure (GSI) would help to better manage runoff.

Adding a water bar will divert stormwater to a more stable vegetated area. Additionally, you could plant shrubs or trees to help absorb some of that water. We encourage you to fix the channelized erosion on the shoulder of the driveway and incorporate perennial vegetation.

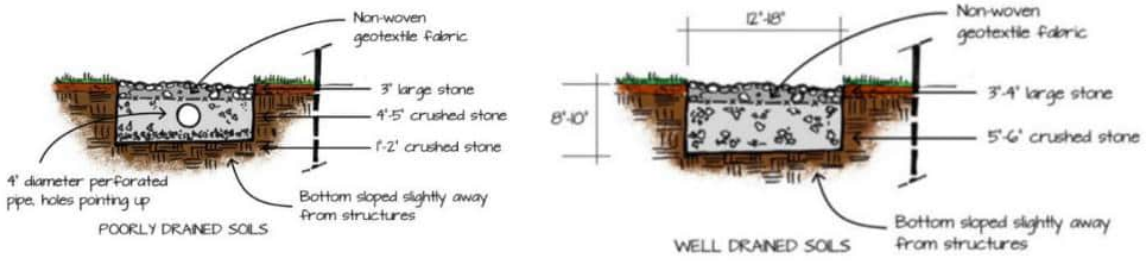
Water Bars:

Water bars intercept water flowing down unpaved paths or driveways and redirect it to stable, vegetated areas. This helps mitigate erosion, prevents sediment from reaching waterways, and slows and infiltrates stormwater. You can read more about water bars in the VT Guide for Stormwater Management on Page 24.



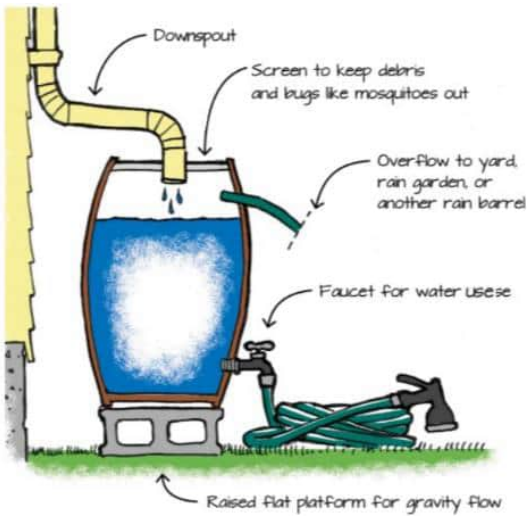


Structures and Septic Systems: Your property passed the criteria for the Structures and Septic section of the Lake Wise evaluation, but again there are a few best management practices that can be made for lake stewardship. The septic system shows no evidence of failure, and you maintain the system regularly. BMPs are critical to maintaining a healthy lake ecosystem. The drainage system around the house is a good BMP for roof drips. The addition of an infiltration trench around the home will increase the water holding capacity and slow down runoff during heavy rain events. Consider adding gutters and rain barrels to keep runoff on site. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. Overall, the impervious surface of the developed area was less than 20% of the total area of the property.



Infiltration trenches are shallow, stone lined channels that capture water from impervious surfaces (likeroof tops) and infiltrate it into the ground. In less well drained soils an Infiltration Trench is outfitted with a pipe to convey water that risks pooling. More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.

Rain Barrels are relatively easy to install, help retain water on your property, and give you a great resource for gardening. A barrel can come in many shapes and sizes and attach directly to the gutter downspout or be filled with a rain chain. Keeping your barrel covered stops mosquitos from reproducing in it. Check the barrel before a big storm comes to make sure it can handle the water coming its way.
Rain barrels can be purchased new from local hardware stores or online vendors, or you can build one yourself. Visit www.rethinkrunoff.org to download detailed instructions for a DIY project.



For more information see the VT Guide to Storm Water Management for Homeowners and Small Business-
es—page 18

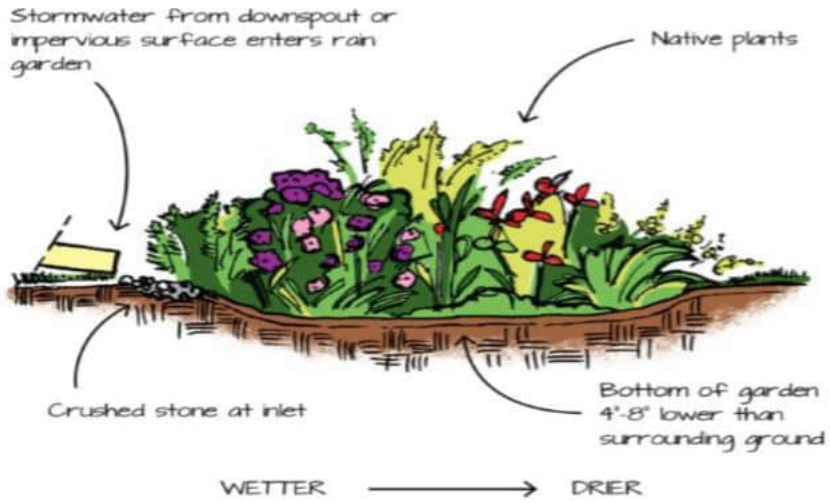
Recreation Area: There was little to no signs of erosion in the recreation area. Some of the stormwater flows through an effective buffer, including the existing vegetation on the property. However, the grass lawns that make up most of the recreation area do not slow down stormwater as it moves over the property. All of the recreation areas are defined and limited in space, but the lawn makes up 20 % of the recreation area. All gardens are mulched, planted with native vegetation and show no signs of no runoff. An improvement would be to minimize this lawn space by creating low mow zones or no mow zone and adding in more dynamic structural vegetation that will slow down and absorb runoff and create wildlife habitat. Paths on the property are limited, defined, and not showing erosion or direct runoff into the lake.

Recommendations for improvement include creating low mow or no mow zones, especially near the septic mound, and adding more perennial plants on site to absorb stormwater runoff. We disused adding birch trees along the lake edge during the Lake Wise assessment.

You could consider adding a native clover mix to the grassy area. Grass has relatively short root system and a clover mix may slow down stormwater as it moves in a sheet flow across the recreation area.

The grass lawn is a great example of a potential low-mow zone, especially on this steep slope that can be challenging to mow. Letting the grass grow above 3” can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

During the assessment we discussed extending the perennial gardens down to the lakes edge. This may be a good opportunity to incorporate a rain garden into the landscape. Rain Gardens capture and slow water that runs off parking lots, driveways, and walkways. They use native plants to slow and filter water. Ultimately water is either infiltrated into the ground or is absorbed by the plants and release back into the atmosphere. Plants used in rain gardens should be both drought resistant and able to handle prolonged periods of submersion in water.



Shorefront and Lake Access: It is important to have a well-established vegetative buffer along the lake shoreline to slow down, spread out and stormwater as it moves across the property. The currently buffer covers only 15ft but covers 50% of the shore and is composed of three tiers of vegetation on average and but most of the duff layer is still intact. The vegetation along the shoreline is made up of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. We encourage you to reduce the amount of grass that leads down to the lake and adopt a low mow zone. Planting trees, like birches, will contribute to holding soil in place and creating a stable shoreland area. The cattails are great wildlife habitat continue to let them grow and expand! Maintaining a native buffer along the lake shore through planting native species you will be able to create a more natural lake shoreline and maintain the ecological health of Lake Iroquois.

A few small changes on the property will help in the sections that you did not pass for the Lake Wise award. The recommendations are designs to help improve your overall score and contribute to a more lake friendly property!

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Kim Conant – Lake Iroquois

Lake Wise Evaluation
Date: October 5th 2022
Re-evaluated July 7th, 2023

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Remy Crettol, WNRCD District Manager
Re-evaluated by Casey Spencer, WNRCD
and Report written by Adelaide Dumm, WNRCD

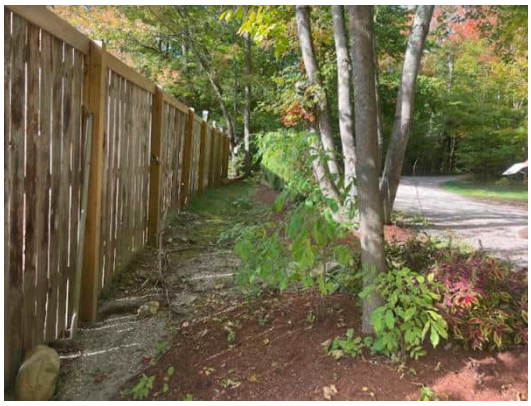
Address: 746 Beebe Lane Williston, VT 05495
Permanent Address: Same

Overall Results: When your property was originally evaluated in October 2022 there were improvements that could be made to meet the Lake Wise award standards. You passed in Structures & Septic section of the assessment, but there was work to be done in the Driveway, Recreation Area and Shoreland sections. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. Over the course of one year, you made several improvements and we are pleased to announce that your property has met the Lake Wise awards standards, congratulations! This report includes a few more suggestions to improve stormwater management on your property.

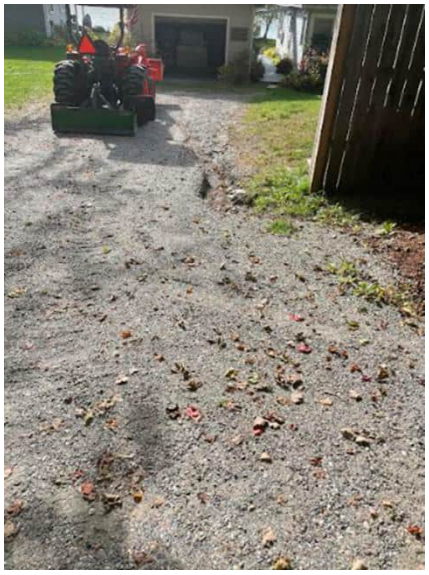
Driveway Area: The driveway and parking areas are well defined and well maintained but are still somewhat excessive in size. Decreasing the size of the driveway or parking areas and increasing the amount of vegetation or green space on the property would improve filtration of stormwater before it enters the lake. We still recommend adding a rain garden or more established vegetation buffer along the driveway. This is an approach that will help filter stormwater as it moves across the driveway and parking area. There were severe signs of erosion on the driveway and parking area in2022, and stormwater was more channelized than a sheet flow across this area.

You dug a gravel lined trench to divert the water into a more stable vegetated, mitigating the area of erosion. Nice job! You could still add a vegetated swale behind the existing row of shrubs at the front of the property. The shoulders and ditches showed signs of erosion in 2022, and although there was still some erosion in 2023 it was significantly less than last year. Adding a gravel lined trench to divert water or adding more perennial plants on the bank of the driveway will stabilize surfaces and prevent erosion down the driveway slope. We recommend you minimize the shared driveway area- post construction, but the driveway is improved significantly from the first visit. The following page shows before and after photos from 2022 to 2023.

2022



2022

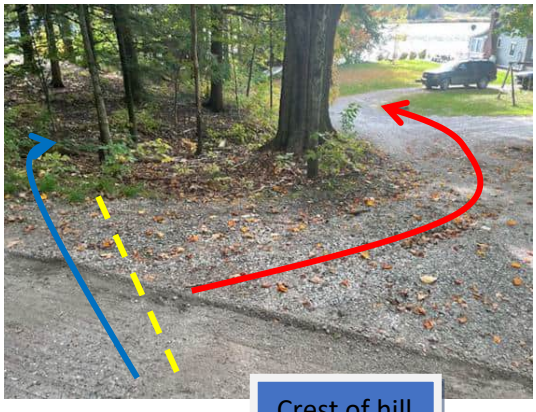


2022

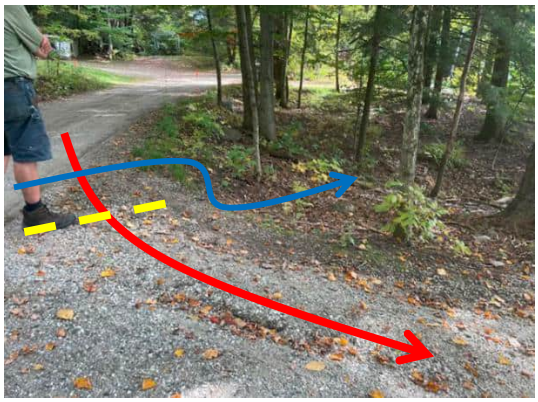
2023

2023

Adding a gravel lined trench to divert stormwater at the crest of the slope has helped to direct stormwater runoff to the wooded areas on the side of the driveway and has mitigated the erosion on the driveway.



2022



2022

2023

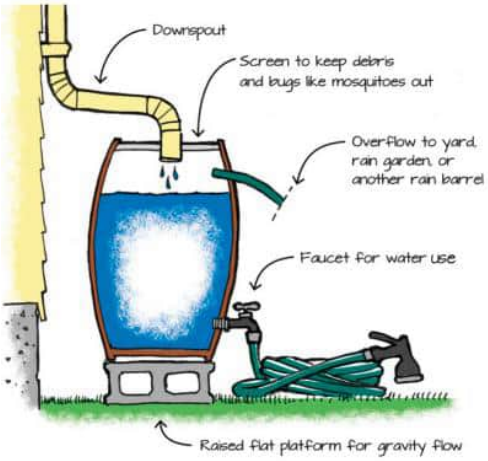
Structures and Septic Systems: Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. While the septic system is older, there is no evidence of failure, and you maintain the system regularly. The tank is sited more than 50 feet away from the water and the leach field is free of woody vegetation that could cause any damage to the system.

The foundation of your home shows little sign of erosion from roof runoff. You could add more shrubbery and gardens around the home that would act as water filtration and sponges to soak up stormwater. I suggest adding a rain barrel to the downspout and using the harvested rainwater to water your flower beds. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. You could also add a dry well or infiltration trench around the home to increase water folding capacity as it runs off the impervious surfaces (roof of the house, decks/patio, garage roof, etc.) before making its way to the lake. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property. Good job!

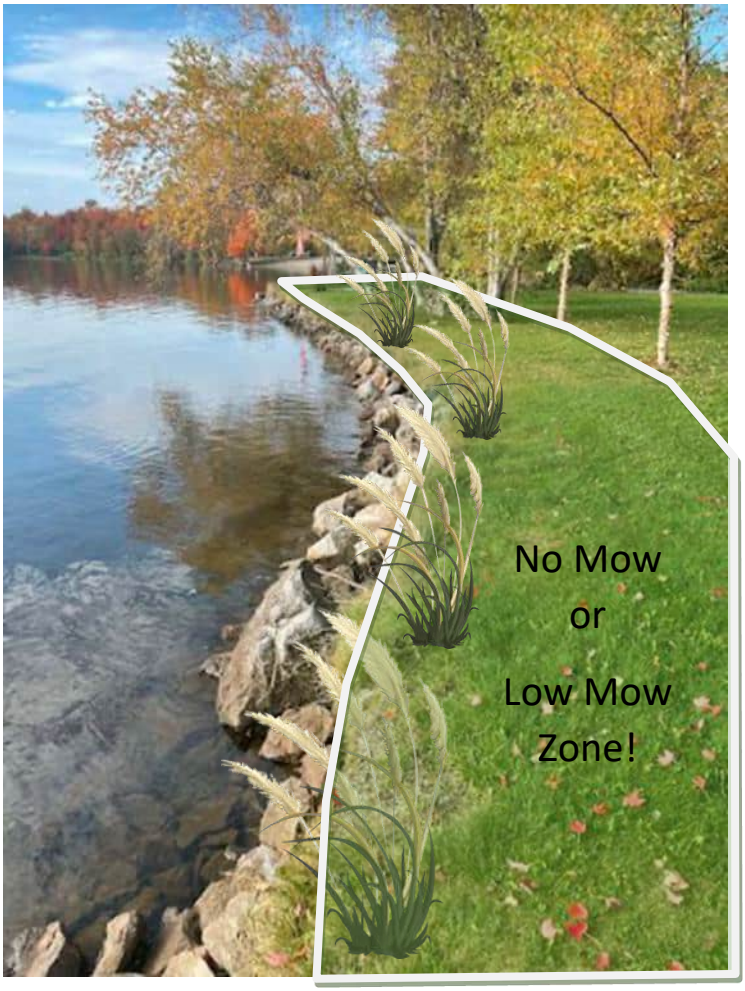
2023

2023

2023



Recreation Area: The recreation area is a section where you made great improvements on your property by installing best management practices to achieve the Lake Wise award. There are little to no signs of erosion in the recreation area and you've decreased the large grass from 40% to 20-30% of the property. This area is well defined but is still not as limited in size as we'd like to see; grass has relatively short root systems and has a minimal impact on slowing down, spreading out, or helping stormwater sink into the ground before entering the lake. We recommended you adopt a no mow zone or low mow zone and you've done this. Great job! You've improved your Lake Wise assessment score by doing less! Continue to reduce lawn size by placing gardens and vegetation throughout the property The birch trees are a huge improvement. Consider planting a rain garden between two houses where water was collecting.



Shorefront and Lake Access: The ideal shoreline has a naturally vegetated buffer, with multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. The vegetation along the shoreline at your property used to grass down to the water with few maple and birch trees, but you've added gardens, perennial grasses and more trees. Way to go! You've done a nice job of adding perennial garden

beds and tall grasses which will buffer stormwater runoff from your lawn. We recommend you also allow the native vegetation to fill in areas will contribute to soil stability. Establishing a permanent low /no mow zone along the shoreline the area will allow for natural re-vegetated in a few years.

The retaining wall is still contributing to severe shoreline erosion, as wave energy pushes against the wall it is diverted to the left and right of the barrier and causes erosion on either side. A living shoreline is the best option for a healthy lake ecosystem. After vegetation has been removed, shorelines erode. Homeowners often install hard structures to protect their property. However, these walls create many problems including:

- **Wave flanking:** When waves hit the walls, the energy is deflected sideways, causing more concentrated and intensive erosion down shore.
- **Lakebed scouring:** Wave energy is also deflected downwards, scooping out sediments on the lake bottom. This can severely compromise vital shallow water habitat as well as the structural integrity of the wall.
- **Wildlife barriers:** Vertical walls break the interface between the lake and shore and cause barriers for wildlife to reach the shore to feed, nest, and rest, such as turtles laying eggs on shore.

"Eroding banks were often stabilized by constructing sea walls and other hardscape techniques. However, now we know that clearing shoreland vegetation and hard armoring the shoreline degrades the lake system, including its water quality, aquatic and terrestrial habitat, and overall resiliency.

The once conventional shoreland practices are rapidly being replaced with a suite of lake-friendly shoreland Best Management Practices including bioengineering techniques for lake-friendly development. Bioengineering techniques are restorative practices for stabilizing shorelands while offering multiple clean water and wildlife benefits. Bioengineering practices increase the resilience of our lake ecosystems in the face of climate change, filter and clean upland runoff before it reaches the lake, and provide critical wildlife habitat." Vermont Bio-engineering Manual, page 3.

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Kim Conant – Lake Iroquois

Lake Wise Evaluation
Date: October 5th 2022

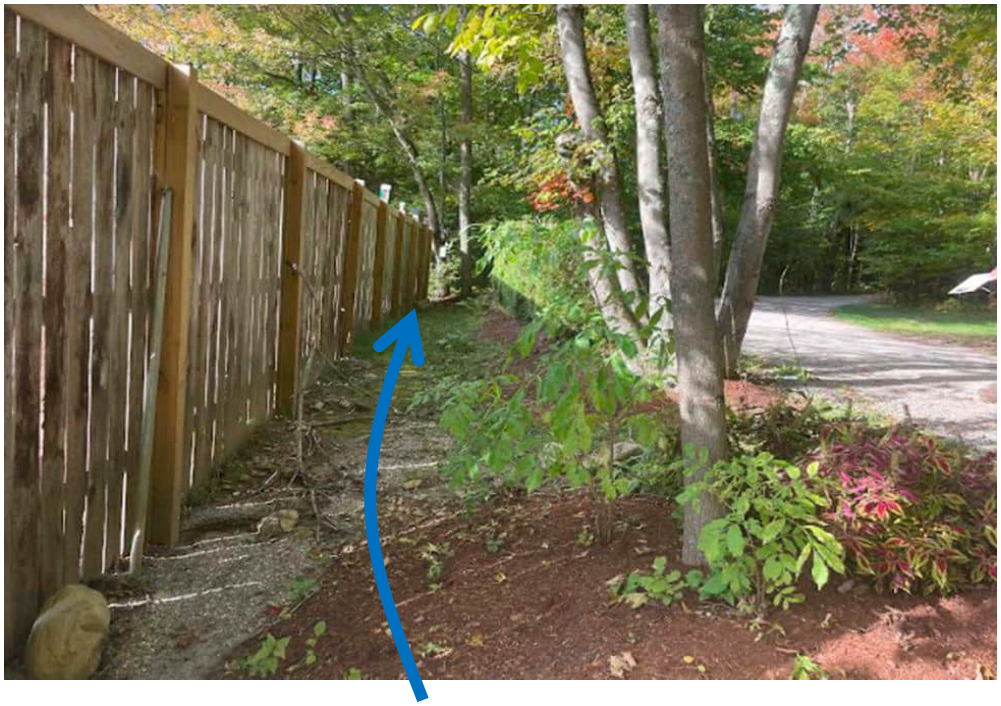
Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Remy Crettol, WNRCD District Manager

Address: 746 Beebe Lane Williston, VT 05495
Permanent Address: Same

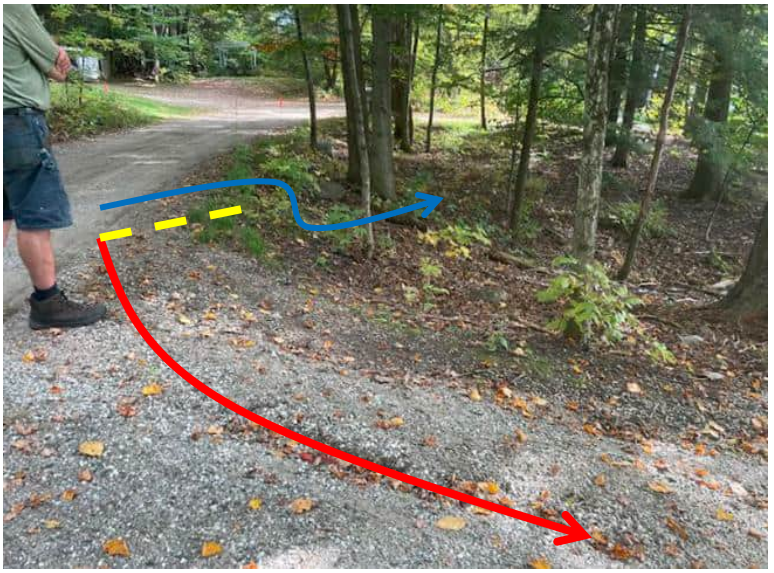
Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in Structures & Septic section of the assessment, but there are improvements that can be made in the Driveway, Recreation Area and Shoreland sections. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed.

Driveway Area: The driveway and parking areas are well defined and well maintained but are somewhat excessive in size. Decreasing the size of the driveway or parking areas and increasing the amount of vegetation or green space on the property would improve filtration of stormwater before it enters the lake. Adding a rain garden or more established vegetation buffer along the driveway is another approach that will help filter stormwater as it moves across the driveway and parking area. There are severe signs of erosion on the driveway and parking area, as indicated in the red circles. Stormwater is more channelized than a sheet flow across this area.

Digging gravel lined trenches to divert the water into a more stable vegetated area before it reaches this area of erosion is one solution. Adding a vegetated swale behind the existing row of shrubs at the front of the property with a French drain or other diversion system would also move water way from this area prone to erosion on the driveway. The shoulders and ditches show moderate signs of erosion. Adding a gravel lined trench to divert water or adding more perennial plants on the bank of the driveway will stabilize surfaces and prevent erosion down the driveway slope, instead directing to a more stable area in the woods.

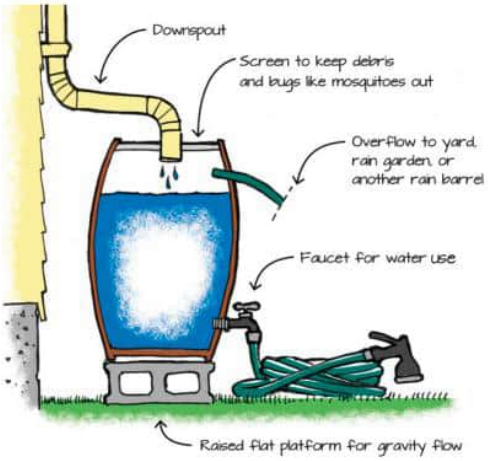


Adding a gravel lined trench to divert stormwater at the crest of the slope will direct it to the wooded areas on the side of the driveway and will help in mitigating the erosion you are seeing in this area.



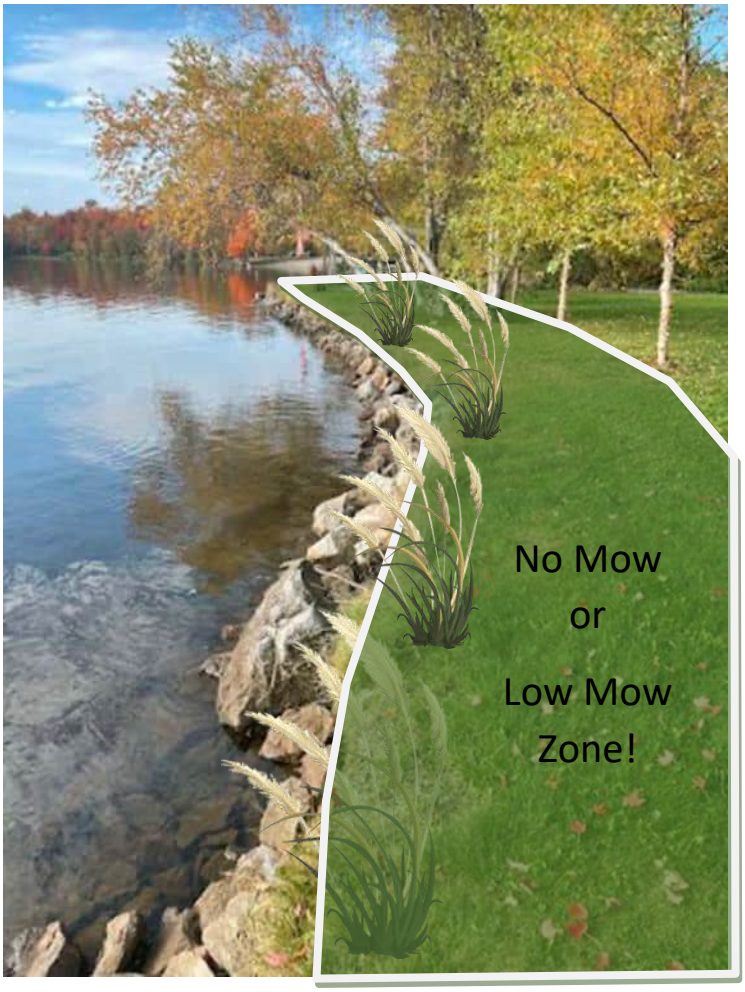
<u>Structures and Septic Systems:</u> Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. While the septic system is older, there is no evidence of failure, and you maintain the system regularly. The tank is sited more than 50 feet away from the water and the leach field is free of woody vegetation that could cause any damage to the system.

The house shows little signs of erosion from roof drips and erosion. Yu could add more shrubbery and gardens around the home that would act as water filtration and sponges to soak up stormwater. I suggest adding a rain barrel to the downspout and using the harvested rainwater to water your flower beds. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. You could also add a dry well or infiltration trench around the home to increase water folding capacity as it runs off the impervious surfaces (roof of the house, decks/patio, garage roof, etc.) before making its way to the lake. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property. Good job!



Recreation Area: The recreation area is a section where you would enhance your property through best management practices to achieve the Lake Wise award. There are minimal signs of erosion in the recreation area and mainly consists of a large grass lawn right up to the lake shoreline. This area is well defined but is not limited in space- more than 40% of the property is grass. Grass has relatively short root systems and has a minimal impact on slowing down, spreading out, or helping stormwater sink into the ground before entering the lake. An easy best management practice you could adopt a no mow zone, or low mow zone! Improve your Lake Wise assessment score by doing less!

The patch of grass in the side yard is a great example of a potential no mow or low mow zone with a minimum of approximately 15 ft buffer on the lake shore. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.



Shorefront and Lake Access: The ideal shoreline has a naturally vegetated buffer, with multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. The vegetation along the shoreline at your property is mostly grass down to the water and there are a few maple and birch trees, but the yard is very manicured. Allowing the native vegetation to fill in areas will contribute to soil stability. You could also add in some plants like tall perennial grasses, sedges, or native shrubs if there is adequate soil depth, but if you choose to no mow along the shoreline the area will be naturally re-vegetated in a few years.

The retaining wall is contributing to severe shoreline erosion, as wave energy pushes against the wall it is diverted to the left and right of the barrier and causes erosion on either side. A living shoreline is the best option for a healthy lake ecosystem. After vegetation has been removed, shorelines erode. Homeowners often install hard structures to protect their property. However, these walls create many problems including:

- **Wave flanking:** When waves hit the walls, the energy is deflected sideways, causing more concentrated and intensive erosion down shore.
- **Lakebed scouring:** Wave energy is also deflected downwards, scooping out sediments on the lake bottom. This can severely compromise vital shallow water habitat as well as the structural integrity of the wall.
- **Wildlife barriers:** Vertical walls break the interface between the lake and shore and cause barriers for wildlife to reach the shore to feed, nest, and rest, such as turtles laying eggs on shore.

"Eroding banks were often stabilized by constructing sea walls and other hardscape techniques. However, now we know that clearing shoreland vegetation and hard armoring the shoreline degrades the lake system, including its water quality, aquatic and terrestrial habitat, and overall resiliency.

The once conventional shoreland practices are rapidly being replaced with a suite of lake-friendly shoreland Best Management Practices including bioengineering techniques for lake-friendly development. Bioengineering techniques are restorative practices for stabilizing shorelands while offering multiple clean water and wildlife benefits. Bioengineering practices increase the resilience of our lake ecosystems in the face of climate change, filter and clean upland runoff before it reaches the lake, and provide critical wildlife habitat."

Vermont Bio-engineering Manual, page 3.

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Remy Crettol at Remy@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Thomas Hall – Lake Iroquois

Lake Wise Evaluation
Date: September 1st, 2023

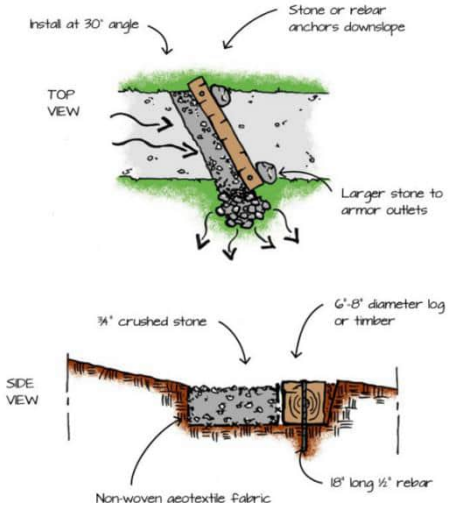
Lake Wise Evaluator: Casey Spencer, WNRCD
Report completed by Adelaide Dumm, WNRCD

Address: 1140 Beebe Ln, Williston, VT, 05495
Permanent Address: 71 E Redrock Drive unit 104, Burlington, VT, 05401

Overall Results: Your property passed in all four Lake Wise assessment sections! Driveway, Structures & Septic, Recreation Area and Shoreland all passed. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed. Congratulations!

Driveway Area: The driveway and parking areas are mostly defined, but the size of the driveway and parking area is somewhat excessive. The driveway and parking surfaces as well as the driveway shoulder and ditch areas are all stable and show little to no signs of erosion. The stormwater runoff is entirely sheet flow and any channelized runoff is directed to a stable vegetated buffer or BMP.

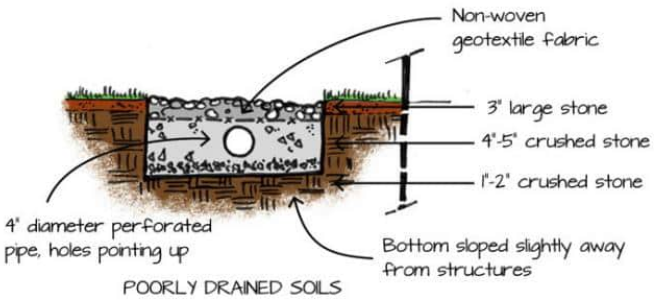
There were some issues on the private road, but not on your driveway. There is significant channelized erosion down the hill, we suggest adding water bars to divert stormwater to a more stable vegetated area. Additionally, you could plant shrubs or trees to help absorb some of that water.

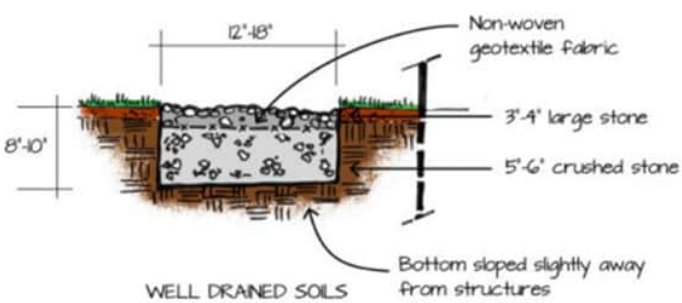


Water bars intercept water flowing down unpaved paths or driveways and redirect it to stable, vegetated areas. This helps mitigate erosion, prevents sediment from reaching waterways, and slows and infiltrates stormwater. You can read more about water bars in the VT Guide for Stormwater Management on Page 24.

Structures and Septic Systems: Your property passed the criteria for the Structures and Septic section of the Lake Wise evaluation, but again there are a few best management practices that can be made for lake stewardship. The septic system shows no evidence of failure, and you maintain the system regularly. The stones around the foundation of the house are a good BMP for roof runoff. A more effective stormwater best management practice would be to establish an infiltration trench, and expand it around the perimeter of the entire house. This will mitigate soil erosion in this area. You could also add shade tolerant plants like ferns, as this vegetation would absorb stormwater runoff and look aesthetically pleasing. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. Overall, the impervious surface of the developed area was about than 25-30% of the total area of the property, so BMPs are critical to maintaining a healthy lake ecosystem. By expanding the existing infiltration trench all the way around the home will increase the water holding capacity and slow down runoff during heavy rain events.

Infiltration trench:





Recreation Area: There are moderate signs of erosion in the recreation area. Although, most of the stormwater flows through an effective buffer, including the existing vegetation on the property. The grass lawn makes up only 20% of the recreation area, which is good as grass does not effectively slow down stormwater as it moves over the property. The recreation areas are defined and limited in space. All gardens are mulched, planted with native vegetation and show no signs of runoff. An improvement would be to minimize this lawn space by creating low mow zones or no mow zone and adding in more dynamic structural vegetation, including trees and shrubs, that will slow down and absorb runoff and create wildlife habitat. Most paths on the property are limited, defined, and not showing erosion or direct runoff into the lake. We encourage you to install a rain garden to improve the pooling in front of house, as this will aid in stormwater infiltration. There is some soil compaction occurring on site, you could minimize your path and patio to a defined sitting area to reduce this. You could also punch holes in the lawn with a pitch fork to improve stormwater infiltration. In general, we recommend creating fewer defined paths and using them to reduce erosion problems in recreation area.

You could consider adding a native clover mix to the grassy area. Grass has relatively short root system and a clover mix may slow down stormwater as it moves in a sheet flow across the recreation area.

Letting the grass grow above 3” can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: It is important to have a well-established vegetative buffer along the lake shoreline to slow down, spread out and stormwater as it moves across the property. The currently buffer is about 30-40ft, covers 50% of the shore, and is composed of four tiers of vegetation on average. The vegetation along the shoreline is made up of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. By seeding with native ground cover around the path and maintaining a native buffer along the lake shore through planting native species you will be able to create a more natural lake shoreline and maintain the ecological health of Lake Iroquois. We encourage you to improve the dock area to redirect water towards vegetation. You've noticed that the shoreline is slowly eroding due to wake boats and weather, but there are best management practices you can do to prevent the erosion and improve the shoreline and lake health.

A few small changes on the property will help in the sections that you did not pass for the Lake Wise award. The recommendations are designs to help improve your overall score and contribute to a more lake friendly property!

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Roger Jones – Lake Iroquois

Lake Wise Evaluation
Date: October 5th 2022

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Remy Crettol, WNRCD District Manager

Address: 277 Dimick Rd, Hinesburg, VT 05461
Permanent Address: Po Box 187 Arlington, VT 05250

Overall Results: Your property passed in all four Lake Wise Assessment Sections! Driveway, Structures & Septic, Recreation Area and Shoreland all passed. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed. Congratulations!

Driveway Area: The driveway and parking areas are well defined and suitable in size of the structure, especially with many families visiting throughout the season. There are no signs of erosion on the driveway and parking area, all surfaces are stable. Most of the stormwater moves as sheet flow. The recent re-grading and addition of crushed stone helps infiltrate water and allows excess to move as a sheet flow to the stable vegetated banks on the side. The shoulders and ditches show minimal signs of erosion. Most of the stormwater from the road surface is directed to an effective vegetated buffer in the woods.

Structures and Septic Systems: Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. While the septic system is older, there is no evidence of failure, and you maintain the system regularly. The tank and pump station are sited far from the water. There is some woody vegetation within 10' of the leach field, I recommend clearing some of this vegetation to mitigate the threat of roots to the system. Additionally, pet waste has lot of phosphorus in it, be sure to pick up any pet waste and dispose of it properly to keep the lake clear and safe for all to use now and into the future.

The house has shown signs of erosion from roof drips. I suggest adding a rain barrel to the downspout on the front porch and using the harvested rainwater to water your flower beds. An added benefit would be to add an infiltration trench along the foundation of the home, it looks like there was one at some point in time, but it likely needs to be repaired and filled back in with stone. This will allow for infiltration of the stormwater runoff and reduce erosion around the foundation of the house. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information.

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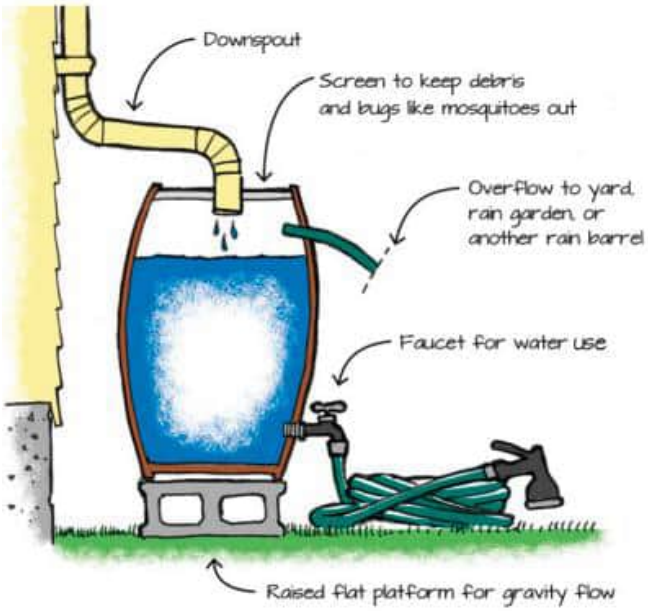
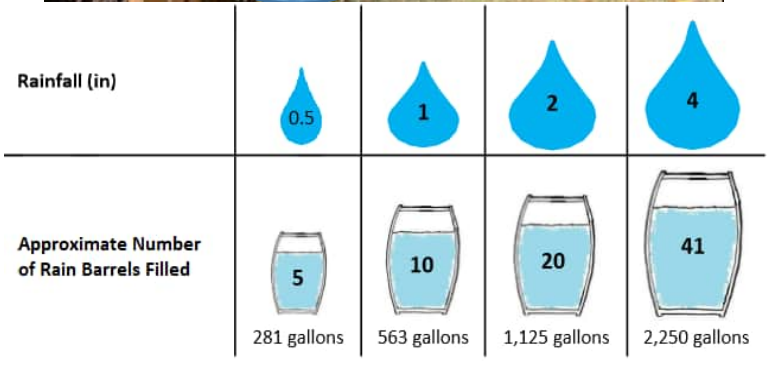
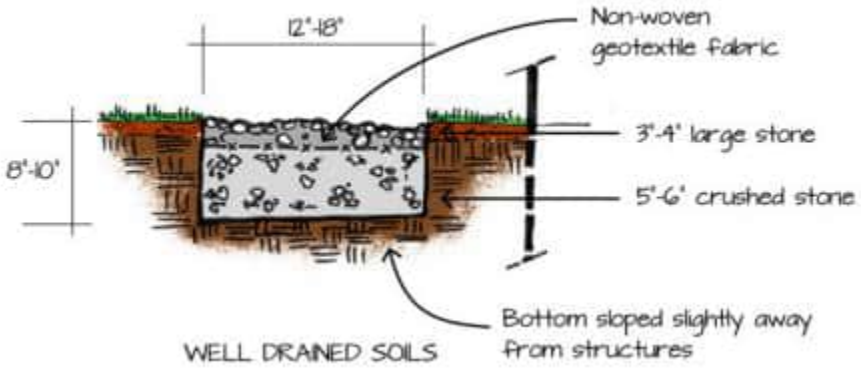




Rain Barrels are relatively easy to install, help retain water on your property, and give you a great resource for gardening. A barrel can come in many shapes and sizes and attach directly to the gutter downspout or be filled with a rain chain. Keeping your barrel covered stops mosquitos from reproducing in it. Be sure to use the water between rainstorms to make sure it can handle the water coming its way. The WNRCD has instructions for building your own if you are interested in a do-it-yourself project.

By expanding the existing infiltration trench all the way around the home will increase the water holding capacity and slow down runoff during heavy rain events.

More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.



There was little to no erosion was seen around the front of the home, and it appears most of the stormwater is absorbed by the vegetation around the property before making its way to the lake. Overall, the impervious surface of the developed area was less than 20% of the total area of the property. Good job!

Recreation Area: The recreation area is a section where your property scored very high due to the limited size. The recreation area is well defined and limited in space, and paths show no signs of erosion and do not convey runoff directly into the lake. There are minimal signs of erosion in the recreation area, and the rose bushes and flower gardens are serving as an effective vegetated buffer, a good example of a best management practice. You could add more vegetation like seasonal grasses to increase the buffering capacity in this area. Overall, this area looks good and serves as a good place for family to gather at the camp, though is not excessive in size.

The patch of grass in the recreation area is a great example of a potential low-mow zone. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground before to runs down to the beach area and into the lake. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: The shoreline has a naturally vegetated buffer, with an average width of approximately 40-50ft. Additionally, there are multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. This also creates a more dynamic and aesthetically pleasing view of the lake as he trees frame the view, but do not obstruct it! The vegetation along the shoreline is composed of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. The small foot paths allow for stormwater to move across the land in a sheet flow into vegetated areas and follow the natural topography of the lakeshore area. Allowing the native vegetation to continue to fill in areas of exposed soil will contribute to soil stability. There is some shoreline erosion and undercutting occurring, you could also add in some plants if there is adequate soil depth, but it looks like the area will be naturally re-vegetated in a few years.

If shoreline bank undercutting persists, consider taking a bioengineered approach to fix the problem. The Vermont Bioengineering manual is a useful guide for landowners and resources professionals.

Regrade and slope back, install erosion control blanket, fiber log, & rock toe.

Build encapsulated soil lifts over rock base & toe, plant native woody species.

Leave & patch with erosion control blankets, fiber logs, & stone toe. Plant live stakes.

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Remy Crettol at Remy@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Randy Kay– Lake Iroquois

Lake Wise Evaluation
Date: August 4th, 2023

Lake Wise Evaluator: Casey Spencer, WNRCD
Report prepared by Adelaide Dumm, WNRCD

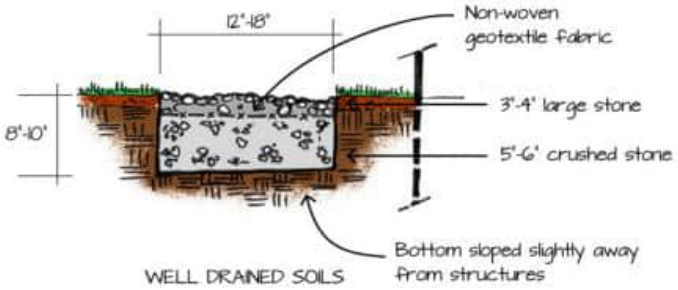
Address: 129 Wood Run, Hinesburg, VT, 05461
Permanent Address: 28 Old Cross Rd, South Burlington, VT, 05403

Overall Results: Your property passed in all four Lake Wise Assessment Sections! Driveway, Structures & Septic, Recreation Area and Shoreland all passed. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed. Congratulations!

Driveway Area: The driveway and parking areas are well defined and minimal in size. There are no signs of erosion on the driveway and parking area, all surfaces are stable. Most of the stormwater moves as sheet flow. The grading and addition of crushed stone helps infiltrate water and allows excess to move as a sheet flow to the stable vegetated banks on the side. The shoulders and ditches show minimal signs of erosion. Most of the stormwater from the road surface is directed to an effective vegetated buffer in the woods. Recommendations to this area include the addition of water bars diverting water to the woods before entering the grass area.

Structures and Septic Systems: Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. There is no evidence of septic system failure, and it is maintained regularly. There was a little pet waste on the property, pet waste has lot of phosphorus in it, be sure to pick up any waste and dispose of it properly to keep the lake clear and safe for all to use now and into the future.

All of the rooftop runoff enters the lake through infiltration or BMPs that are designed to reduce direct runoff. The land around the house shows no signs of erosion from roof drips due to the infiltration trench along the foundation. The infiltration trench you have installed allows for stormwater runoff to be retained on site and reduces erosion around the foundation of the house. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information.



By expanding the existing infiltration trench all the way around the home will increase the water holding capacity and slow down runoff during heavy rain events.

More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.

There was little to no erosion seen around the home, and it appears most of the stormwater is absorbed by the vegetation around the property before making its way to the lake. Overall, the impervious surface of the developed area was only 25-30% of the total area of the property. Good job!

Recreation Area: The recreation area is well defined and limited in space, and paths show no signs of erosion and do not convey runoff directly into the lake. There are minimal signs of erosion in the recreation area. You could add more vegetation to increase the buffering capacity in this area. Overall, this area looks good and serves as a good place for family to gather at the camp, though is not excessive in size. One recommendation is to increase no mow or low mow zones to filter stormwater runoff as it travels down to the lake. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground before to runs down to the beach area and into the lake. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: The shoreline has a naturally vegetated buffer, with an average width of approximately 15-20ft. Additionally, there are multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. This also creates a more dynamic and aesthetically pleasing view of the lake as he trees frame the view, but do not obstruct it! The vegetation along the shoreline is composed of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. The small foot paths allow for stormwater to move across the land in a sheet flow into vegetated areas and follow the natural topography of the lakeshore area. Allowing the native vegetation to continue to fill in areas of exposed soil will contribute to soil stability. There is some shoreline erosion and undercutting occurring, you could also add in some plants if there is adequate soil depth, but it looks like the area will be naturally re-vegetated in a few years.





Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Stacy and Rodney Putnum

Lake Iroquois

Lake Wise Evaluation
Date: May 18th 2023

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Casey Spencer, WNRCD District Manager

Address: 332 Pine Shore Drive, Hinesburg VT
Permanent Address: Same

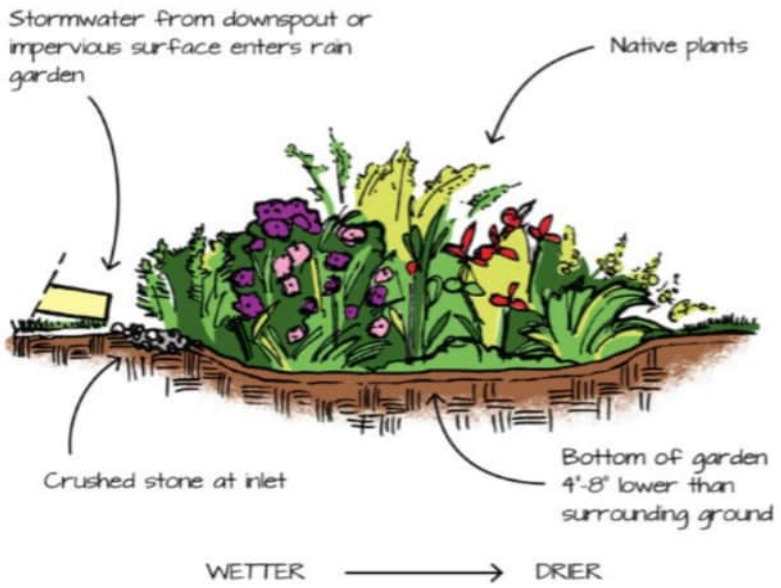
Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in Driveway and Structures & Septic sections of the assessment, but there are improvements that can be made in the Recreation Area and Shoreland sections. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed.

Driveway Area: Your property passed in the driveway area section of the Lake Wise assessment. The driveway and parking areas are mostly defined and well maintained but are somewhat excessive in size. Decreasing the size of the driveway or parking areas and increasing the amount of vegetation or green space on the property would improve filtration of stormwater before it enters the lake. It is good that you are directing some of the stormwater off the driveway and into the lawn, but grass has a relatively short root system and doesn't do much to slow down stormwater. Adding a rain garden or more established vegetation buffer along the driveway is another approach that will help filter stormwater as it moves across the driveway and parking area.

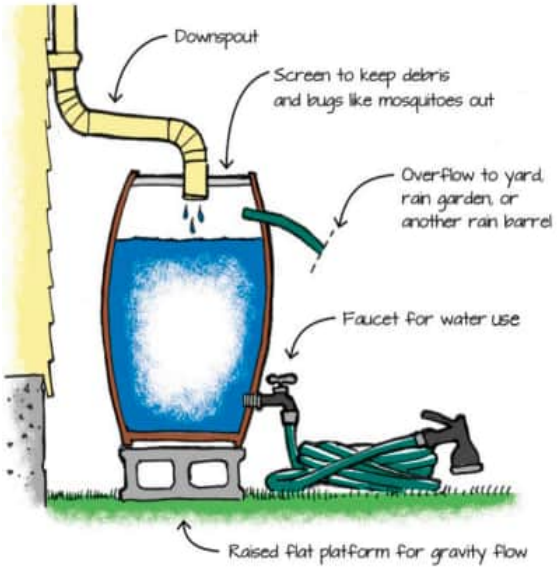
Digging gravel lined trenches along the road edge to divert the water into a more stable vegetated area, like the gardens at the top of the lawn, before it reaches the driveway is one solution to preventing erosion along the roadway and the top of your driveway. Adding a gravel lined trench to divert water or adding more perennial plants on the bank of the driveway will stabilize surfaces and prevent erosion down the driveway slope.

Rain Gardens capture and slow water that runs off parking lots, driveways, and walkways. They use native plants to slow and filter water. Ultimately water is either infiltrated into the ground or is absorbed by the plants and release back into the atmosphere. Plants used in rain gardens should be both drought resistant and able to handle prolonged periods of submersion in water.

You could add a rain garden in your yard where water from the drive way is diverted to, so that it is being absorbed by vegetation instead of running across the lawn and into the brook.



Structures and Septic Systems: Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. While the septic system is older (2007), there is no evidence of failure, and you maintain the system regularly and the system is more than 50 feet away from the water. We encourage you to disconnect your downspout and add a rain barrel. The other downspout could be directed to the cedars at the edge of the lawn as they will absorb water much more than the grass in the lawn will. Additionally, adding more vegetation at the lower garden at the base of the deck to absorb water coming off the deck and from the downspout that is buried in the garden.



The house shows little signs of erosion from roof drips and erosion. You could add more shrubbery and gardens around the home that would act as water filtration and sponges to soak up stormwater. I suggest adding a rain barrel to the downspout and using the harvested rainwater to water your flower beds. See the Vermont Guide to Stormwater Management for

Homeowners and Small Business Owners for more information. You could also add a dry well or infiltration trench around the home to increase water folding capacity as it runs off the impervious surfaces (roof of the house, decks/patio, garage roof, etc.) before making its way to the lake. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property. Good job!

Recreation Area: The recreation area is a section where you would enhance your property through best management practices to achieve the Lake Wise award. There are minimal signs of erosion in the recreation area and mainly consists of a large grass lawn right up to the lake shoreline. This area is well defined but is not limited in space, 30-40% of the property is grass. Grass has relatively short root systems and has a minimal impact on slowing down, spreading out, or helping stormwater sink into the ground before entering the lake. An easy best management practice you could adopt a no mow zone, or low mow zone especially in the upper parcel! Improve your Lake Wise assessment score by doing less!

The patch of grass in the side yard and the back parcel across the road is a great example of a potential no mow or low mow zones with a minimum of approximately 15 ft buffer on the lake shore. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: The ideal shoreline has a naturally vegetated buffer, with multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. The vegetation along the shoreline at your property is mostly grass down to the water. Allowing the native vegetation to fill in areas will contribute to soil stability. You could also add in some plants like tall perennial grasses, sedges, or native shrubs if there is adequate soil depth, but if you choose to no mow along the shoreline the area will be naturally re-vegetated in a few years.

	Well Drained Soils	Wet or Moist Soils	Shallow, Rocky Soils	Tolerant of Varying Soils
Tall Trees	Sugar maple Black cherry American beech Red oak Paper birch	Red maple Swamp white oak Hemlock Cedar Black willow	Red spruce White pine Black cherry Balsam fir Eastern red cedar White oak Burr oak	Yellow birch Red maple Sugar maple Eastern red cedar Oaks
Shrubs	Highbush cranberry Serviceberry Highbush blueberry Hobble bush* Alternative leaf dogwood	Nannyberry Winterberry Highbush cranberry Witch hazel Silky dogwood Elderberry Sweetgale Black chokeberry Willows	Witch hazel Serviceberry Lowbush blueberries Sweet fern Low grow fragrant sumac Meadowsweet (white spirea) Snowberry	Highbush cranberry Nannyberry Gray dogwood Sweet fern Arrowwood Snowberry Maple leaf viburnum
Perennials	Foxglove beardtongue New England aster Blue flag Iris Big bluestem Columbine Christmas fern Lady fern Appalachian sedge Pennsylvania sedge	Cardinal flower Blue flag iris Cinnamon fern Turtlehead Joe pye weed Swamp milkweed Boneset	All asters Sarsaparilla Wild bergamot (wild bee balm) Little blue stem Christmas fern Common yarrow	Partridgeberry* Canadian mayflower* New England aster Sarsaparilla Blue flag iris Cinnamon fern Big bluestem Little bluestem Wild bergamot (wild bee balm)

* requires shade

The retaining walls contribute to shoreline erosion, as wave energy pushes against the wall it is diverted to the left and right of the barrier and causes erosion on either side. A living shoreline is the best option for a healthy lake ecosystem. After vegetation has been removed, shorelines erode. Homeowners often install hard structures to protect their property. However, these walls create many problems including:

■ **Wave flanking:** When waves hit the walls, the energy is deflected sideways, causing more concentrated and intensive erosion down shore.

■ **Lakebed scouring:** Wave energy is also deflected downwards, scooping out sediments on the lake bottom. This can severely compromise vital shallow water habitat as well as the structural integrity of the wall.

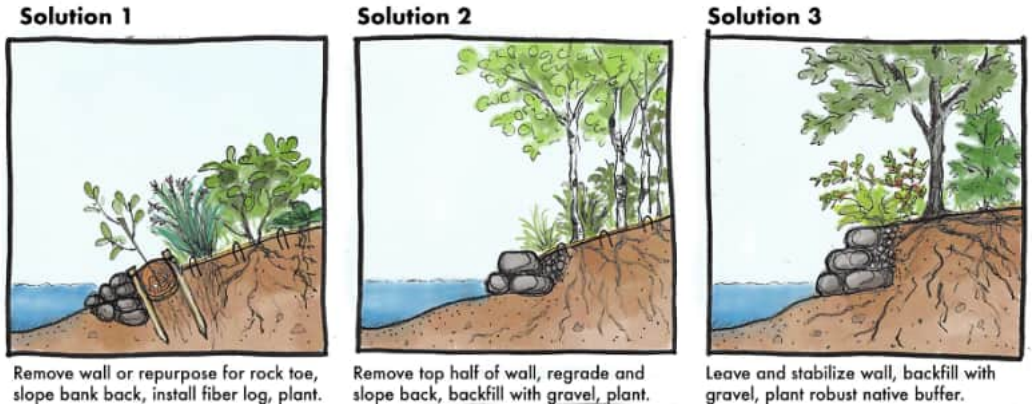
■ **Wildlife barriers:** Vertical walls break the interface between the lake and shore and cause barriers for wildlife to reach the shore to feed, nest, and rest, such as turtles laying eggs on shore.

"Eroding banks were often stabilized by constructing sea walls and other hardscape techniques. However, now we know that clearing shoreland vegetation and hard armoring the shoreline degrades the lake system, including its water quality, aquatic and terrestrial habitat, and overall resiliency.

The once conventional shoreland practices are rapidly being replaced with a suite of lake-friendly shoreland Best Management Practices including bioengineering techniques for lake-friendly development. Bioengineering techniques are restorative practices for stabilizing shorelands while offering multiple clean water and wildlife benefits. Bioengineering practices increase the resilience of our lake ecosystems in the face of climate change, filter and clean upland runoff before it reaches the lake, and provide critical wildlife habitat."

Vermont Bio-engineering Manual, page 3.

As part of the Lake Iroquois and Patrick Brook Watershed Action Plan, WNRCD and our partners are scoping potential DEC Clean Water projects for prioritization and proposal. This may be a good candidate! Be sure to acquire any necessary permitting, to determine which permits you may need visit DEC Permit Navigator tool and review the Vermont Bioengineering manual to review options for retaining wall mitigations, below are a few options.



Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Casey Spencer at Casey@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Additional Resources:

Be sure to acquire any necessary permitting, to determine which permits you may need visit DEC Permit Navigator tool: https://permitnavigator.my.vermont.gov/s/

The Vermont Shoreland Protection Act Summary: https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/Shoreland/ShorelandProtectionActSummary_2272017.pdf

Vermont Bio-engineering Manual:https://dec.vermont.gov/content/vermont-bioengineering-manual

Sharing the Edge, a guide for lake shore property owners in Vermont: https://dec.vermont.gov/content/sharing-edge-guide-lakeshore-property-owners-vermont

VT Guide to Stormwater Management— A document with great information about managing stormwater at home: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-06-14%20VT_Guide_to_Stormwater_for_Homeowners.pdf

Lake Iroquois Association- Lake Shore Property Owners Manual: https://www.lakeiroquois.org/fileadmin/files/Shoreline_Health/Property_Owners_Manual_07.25.22.pdf

Agency of Natural Resources Atlas– Free online mapping software to explore the natural resources around your home: https://anrmaps.vermont.gov/websites/anra5/

Vermont Department of Environmental Conservation Stormwater—Information about green stormwater infrastructure: http://dec.vermont.gov/watershed/cwi/green-infrastructure

The Vermont Rain Garden Manual: Gardening to Absorb the Storm—A guide to building your own rain garden with emphasis on using plants that are native to Vermont: http://winooskinrcd.org/wp-content/uploads/VTRainGardenManual.pdf

Better Backroads Manual—A guide to managing dirt and gravel roads that can be useful if you have a long driveway: https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf

Household Septic Maintenance Factsheet — WNRCD: http://winooskinrcd.org/wp-content/uploads/managing-HH-septic-factsheet.pdf

Winooski Natural Resources Conservation District —Find other ways to get involved at our website www.winooskinrcd.org

Mark and Michelle Reid

Lake Iroquois

Lake Wise Evaluation
Date: May 18th 2023

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Casey Spencer, WNRCD District Manager

Address: 310 Pine Shore Drive Hinesburg, VT
Permanent Address: Same

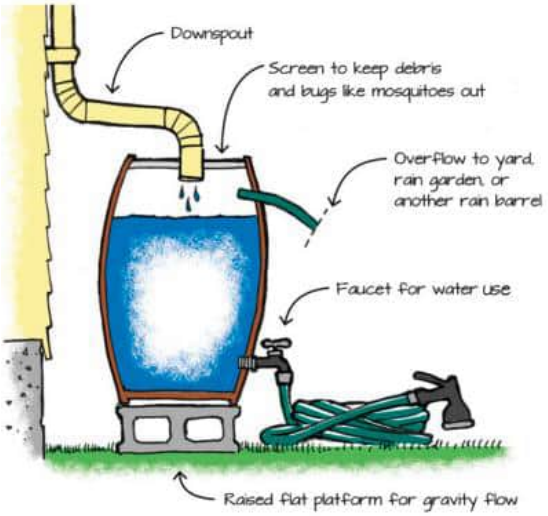
Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in the Driveway, Structures & Septic section of the assessment, but there are improvements that can be made in the Recreation Area and Shoreland sections. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed.

Driveway Area: Your property passed in the driveway and parking area section. They are mostly defined and well maintained but are slightly excessive in size. Decreasing the size of the driveway or parking areas and increasing the amount of vegetation or green space on the property would improve filtration of stormwater before it enters the lake. Adding a rain garden or more established vegetated swale along the bottom or sides of the driveway is another approach that will help filter stormwater as it moves across the driveway and parking area. There are severe signs of erosion on the bottom driveway and parking area, as indicated in the red circles. Stormwater is more channelized than a sheet flow across this area.

Be sure to keep this culvert cleared out so that is remains functional. The gravel lined trench is an effective way of capturing and slowing down stormwater as it moves off the road surface.

The gravel lined trenches that are near the top of the driveway have the potential to divert the water into a more stable vegetated area. We recommend partnering with your neighbor, Lisa Thompson, and adding a vegetated filter berms to direct stormwater to the large bushes she has on her property if she is amenable to this practice. From the conversation we had during our visit she sounds like she is! Another solution could be to add more perennial plants on the bank of the driveway as they will stabilize surfaces and prevent erosion down the driveway slope. The shoulders and ditches show minimal signs of erosion. The gravel lined trench at the front of the property with the French drainage system below in the yard is a good best management practice for stormwater! These gravel lined trench to divert stormwater at the crest of the slope and direct runoff from the road to areas on the side of the driveway/top of your yard and help in mitigating the erosion you are seeing in this area.

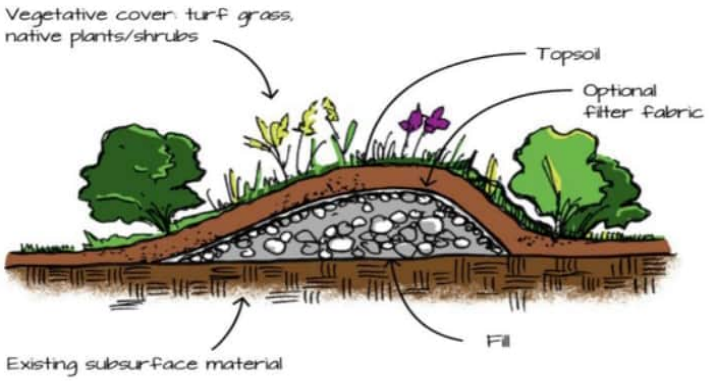
<u>Structures and Septic Systems:</u> Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. There is no evidence of septic system failure, and you maintain the system regularly. The tank is sited more than 50 feet away from the water and the leach field is free of woody vegetation that could cause any damage to the system.



The house shows little signs of erosion from roof drips and erosion. You could add more shrubbery and gardens around the home that would act as water filtration and sponges to soak up stormwater. I suggest adding a rain barrel to the downspout and using the harvested rainwater to water your flower beds. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. The infiltration trench around the home is great at increasing stormwater folding capacity as it runs off the impervious surfaces before making its way to the lake. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property. Good job!

You could plant some vegetation in front of this drain so that the stormwater rom the roof is absorbed before it goes into the lake.

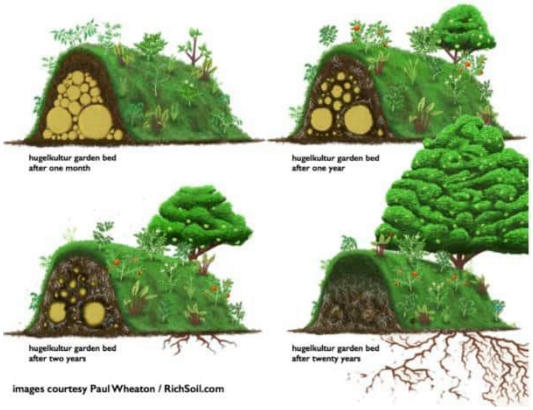
Recreation Area: The recreation area is a section where you would enhance your property through best management practices to achieve the Lake Wise award. There are minimal signs of erosion in the recreation area and mainly consists of a large grass lawn right up to the lake shoreline. This area is well defined but is not limited in space- more than 40% of the property is grass. Grass has relatively short root systems and has a minimal impact on slowing down, spreading out, or helping stormwater sink into the ground before entering the lake. An easy best management practice you could adopt a no mow zone, or low mow zone! Improve your Lake Wise assessment score by doing less!



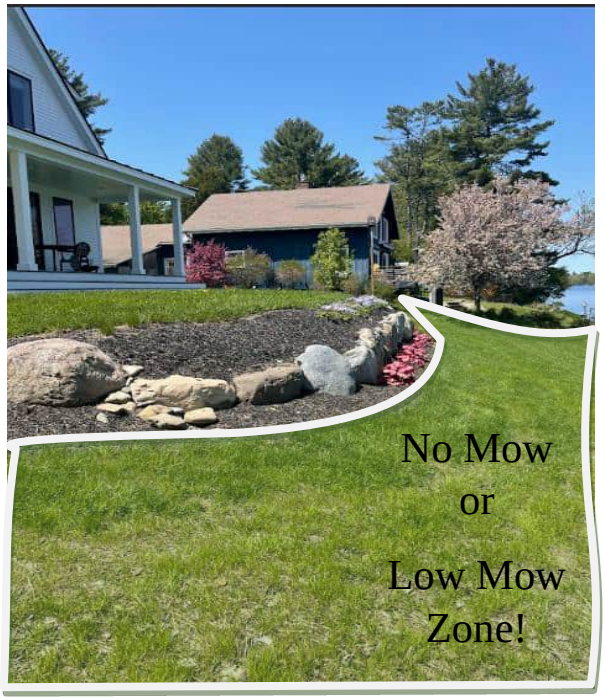
VT Guide to Storm Water Management for Homeowners and Small Businesses—page 26

Filter berms capture and slow water that runs off parking lots, driveways, and walkways. Their interior is filled with stable, well drained material that absorbs and slows stormwater runoff. Vegetation on the outside of the berm provides more structure and helps further slow stormwater. You could use these in a terraced fashion to both slow down runoff as it makes it way down your grass lawn and divert it to a more table area to be absorbed by plants in Lisa's yard.

Hügelkultur a common permaculture practice is an innovative way to create these filter berms, these mounded beds are a horticultural technique where a mound constructed from decaying wood debris and other compostable biomass plant materials is later planted as a raised bed. By incorporating these in terraced fashion you can slow down stormwater and divert it to a more stable vegetated area.



The natural topography of the landscape has been maintained and enhanced as you created the berm off the back deck overlooking the lake. This acts as a speed lump in your lawn as water flows over the landscape, and adding vegetation will help absorb stormwater as it moves across the landscape! By partnering with your neighbor Lisa and adding vegetated filter berms to direct water to a more stable area to be absorbed before it enters the lake will help improve your recreation area score. The French drainage system in the yard at the front of the house is an effective Best Management Practice (BMP) for that stormwater from the road runs through as it makes it way down the watershed and into the lake.



The patch of grass in the front/side yard is a great example of a potential no mow or low mow zone with a minimum of approximately 15 ft buffer on the lake shore. Letting the grass grow above 3” can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: The ideal shoreline has a naturally vegetated buffer, with multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. The vegetation along the shoreline at your property is mostly grass down to the water and there are a few garden beds that are planted with perennial flowers, but the yard is very manicured. Allowing the native vegetation to fill in areas will contribute to soil stability. You could also add in some plants like tall perennial grasses, sedges, or native shrubs along the waterfront if there is adequate soil depth, but if you choose to no mow along the shoreline the area may become naturally re-vegetated in a few years.

Retaining walls contribute to shoreline erosion, as wave energy pushes against the wall it is diverted to the left and right of the barrier and causes erosion on either side. A living shoreline is the best option for a healthy lake ecosystem. After vegetation has been removed, shorelines erode. Homeowners often install hard structures to protect their property. However, these walls create many problems including:

■ **Wave flanking:** When waves hit the walls, the energy is deflected sideways, causing more concentrated and intensive erosion down shore.

■ **Lakebed scouring:** Wave energy is also deflected downwards, scooping out sediments on the lake bottom. This can severely compromise vital shallow water habitat as well as the structural integrity of the wall.

■ **Wildlife barriers:** Vertical walls break the interface between the lake and shore and cause barriers for wildlife to reach the shore to feed, nest, and rest, such as turtles laying eggs on shore.

Prioritize making improvements to this side first as the other side of the retaining wall is in better condition than this side.

As part of the Lake Iroquois and Patrick Brook Watershed Action Plan, WNRCD and our partners are scoping potential DEC Clean Water projects for prioritization and proposal. This may be a good candidate!

"Eroding banks were often stabilized by constructing sea walls and other hardscape techniques. However, now we know that clearing shoreland vegetation and hard armoring the shoreline degrades the lake system, including its water quality, aquatic and terrestrial habitat, and overall resiliency.

The once conventional shoreland practices are rapidly being replaced with a suite of lake-friendly shoreland Best Management Practices including bioengineering techniques for lake-friendly development. Bioengineering techniques are restorative practices for stabilizing shorelands while offering multiple clean water and wildlife benefits. Bioengineering practices increase the resilience of our lake ecosystems in the face of climate change, filter and clean upland runoff before it reaches the lake, and provide critical wildlife habitat." Vermont Bio-engineering Manual, page 3.

Additional Resources:

Be sure to acquire any necessary permitting, to determine which permits you may need visit DEC Permit Navigator tool: https://permitnavigator.my.vermont.gov/s/

The Vermont Shoreland Protection Act Summary: https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/Shoreland/ShorelandProtectionActSummary_2272017.pdf

Vermont Bio-engineering Manual:https://dec.vermont.gov/content/vermont-bioengineering-manual

Sharing the Edge, a guide for lake shore property owners in Vermont: https://dec.vermont.gov/content/sharing-edge-guide-lakeshore-property-owners-vermont

VT Guide to Stormwater Management— A document with great information about managing stormwater at home: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-06-14%20VT_Guide_to_Stormwater_for_Homeowners.pdf

Lake Iroquois Association- Lake Shore Property Owners Manual: https://www.lakeiroquois.org/fileadmin/files/Shoreline_Health/Property_Owners_Manual_07.25.22.pdf

Agency of Natural Resources Atlas– Free online mapping software to explore the natural resources around your home: https://anrmaps.vermont.gov/websites/anra5/

Vermont Department of Environmental Conservation Stormwater—Information about green stormwater infrastructure: http://dec.vermont.gov/watershed/cwi/green-infrastructure

The Vermont Rain Garden Manual: Gardening to Absorb the Storm—A guide to building your own rain garden with emphasis on using plants that are native to Vermont: http://winooskinrcd.org/wp-content/uploads/VTRainGardenManual.pdf

Better Backroads Manual—A guide to managing dirt and gravel roads that can be useful if you have a long driveway: https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf

Household Septic Maintenance Factsheet — WNRCD: http://winooskinrcd.org/wp-content/uploads/managing-HH-septic-factsheet.pdf

Winooski Natural Resources Conservation District —Find other ways to get involved at our website www.winooskinrcd.org

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Casey Spencer at Casey@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at

Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Katherine Riley – Lake Iroquois

Lake Wise Evaluation
Date: October 5th 2022

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Remy Crettol, WNRCD District Manager

Address: 452 Southwest Shore Road Hinesburg, VT 05461
Permanent Address: Same

Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in Driveway and Structures & Septic sections of the assessment, but there are improvements that can be made in the Recreation and Shoreland sections. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed.

<u>Driveway Area:</u> The driveway section passed for the Lake Wise Award section, but this was by a very thin margin and there are still improvements that can be made. We have included recommendations within this report. The driveway and parking areas are well defined and suitable in size. There are minimal signs of erosion on the driveway and parking area, all surfaces are stable. Most of the stormwater moves as sheet flow. The shoulders and ditches do not show signs of erosion. The stormwater from the road surface is directed to an effective vegetated buffer in the woods.

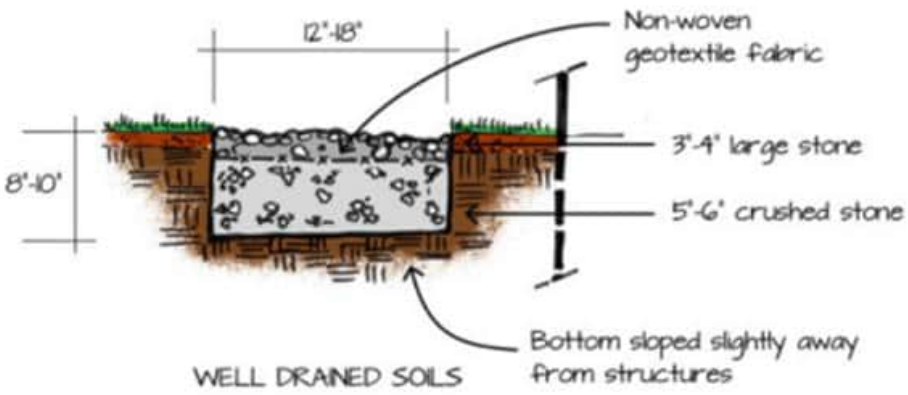
Adding a water bar above the stone walkway to the home will divert stormwater to a more stable vegetated area of the yard. Additionally, you could plant some shrubs or trees, we chatted about a red osier dogwood, to help absorb some of that water.

Structures and Septic Systems: Your property passed the criteria for the Structures and Septic section of the Lake Wise evaluation, but again there are a few best management practices that can be made for lake stewardship. While the septic system is older, there is no evidence of failure, and you maintain the system regularly. I do recommend you continue to have someone come out to clear the vegetation (large woody vegetation: trees and shrubs) growing on the leach field to prevent damage to the system on the future.

The roof drips from the house and garage enters the lake through infiltration trenches, an effective stormwater best management practice. I recommend expanding the infiltration trenches to the other sides of the structures. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. Overall, the impervious surface of the developed area was about than 25-30% of the total area of the property, so BMPs are critical to maintaining a healthy lake ecosystem.

By expanding the existing infiltration trench all the way around the home will increase the water holding capacity and slow down runoff during heavy rain events. An infiltration trench will increase the water holding capacity and slow down runoff during heavy rain events

The steppingstones are a good way to define the pathway and prevent erosion, but the mulched areas with little vegetation have the potential to get washed out during heavy rains or spring snow melt. Add more vegetation to fill in mulched areas to improve this section.



You could expand the infiltration trench or add more vegetation to the lake facing side of the home. This will help absorb storm water runoff before it enters the lake, a rain garden or shrubs might be a good choice for this spot.

Recreation Area: There are minimal signs of erosion in the recreation area. Some of the stormwater flows through an effective buffer, including the existing vegetation on the property. However, the grass lawns that make up most of the recreation area do not slow down stormwater as it moves over the property. The recreation area is somewhat defined and limited in space, but the lawn makes up 30-40 % of the recreation area. An improvement would be to minimize this lawn space by adding in more dynamic structural vegetation that will slow down and absorb runoff and create wildlife habitat. The main path from the driveway to the home is the main established path on the property and are signs of erosion from the driveway indicating that runoff is occurring. Other pathways are limited like the steppingstones, and no not convey show signs of erosion or convey runoff directly to the lake.

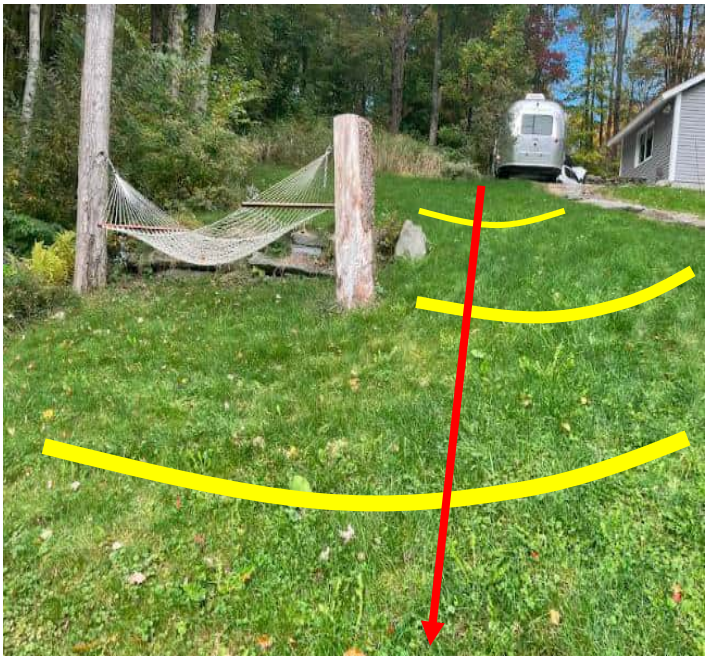
The garden beds that are planted with shrubs and native perennials are holding soil in place and slowing down stormwater as it moves over the property.

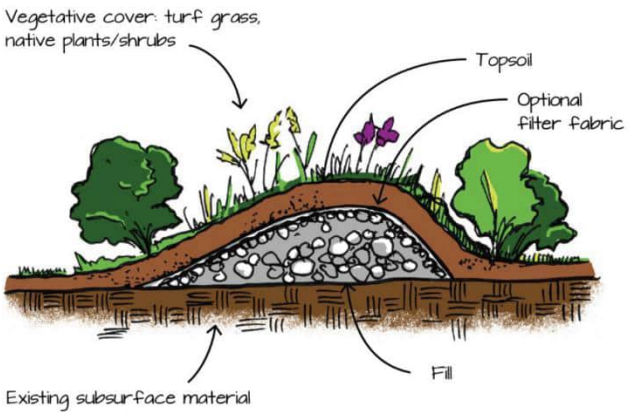
In a heavy rain the mulch will run off on this steep of a slope and deliver nutrients to the lake. Adding more vegetation in this are will help fill in the garden bed and prevent future runoff.

You could consider adding a native clover mix to the grassy area. Grass has relatively short root system and a clover mix may slow down stormwater as it moves in a sheet flow across the recreation area.

The grass lawn is a great example of a potential low-mow zone, especially on this steep slope that can be challenging to mow. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Adding a series of filter berms is another excellent option to slow down, spread out, and allow stormwater to sink in. A berm is a mound of earth with gradually sloping sides between areas of similar elevation. Composing the inner portion of the berm with stable, well-drained fill or sand enables this feature to redirect and retain flow while slowing, filtering, and infiltrating stormwater runoff. See the Vt Guide to stormwater management guide for more details, page 26.





The firepit is well defined, and the wood reinforced boarder helps to divert water to the grassy area on the side which prevents the small stones from washing into the lake. The back side of the firepit area, closest to the lake, does show some signs of erosion and by planting along the edge you would be establishing a buffer for the lake and creating some privacy. Tall grasses or sedges would be a good option! You could also ass plants atop the rock file, which would increase aesthetics and function as wildlife habitat for pollinators. The Vermont wetland supply company has many native seed mixes that you could try along the shoreline.

<u>Shorefront and Lake Access:</u> It is important to have a well-established vegetative buffer along the lake shoreline to slow down, spread out and stormwater as it moves across the property. The currently buffer covers only 25% of the shore and is composed of just one or two tiers of vegetation. The vegetation along the shoreline is made up of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. By adding a native buffer along the lake shore through planting native species, participating in a no-mow zone or other creative ideas like linear rain garden along the shore you will be able to create a more natural lake shoreline and maintain the ecological health of Lake Iroquois.

A few small changes on the property will help in the sections that you did not pass for the Lake Wise award. The recommendations are designs to help improve your overall score and contribute to a more lake friendly property!

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Remy Crettol at Remy@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Chris Scott – Lake Iroquois

Lake Wise Evaluation
Date: August 8th 2023

Lake Wise Evaluator: Casey Spencer, WNRCD
Report completed by Adelaide Dumm, WNRCD

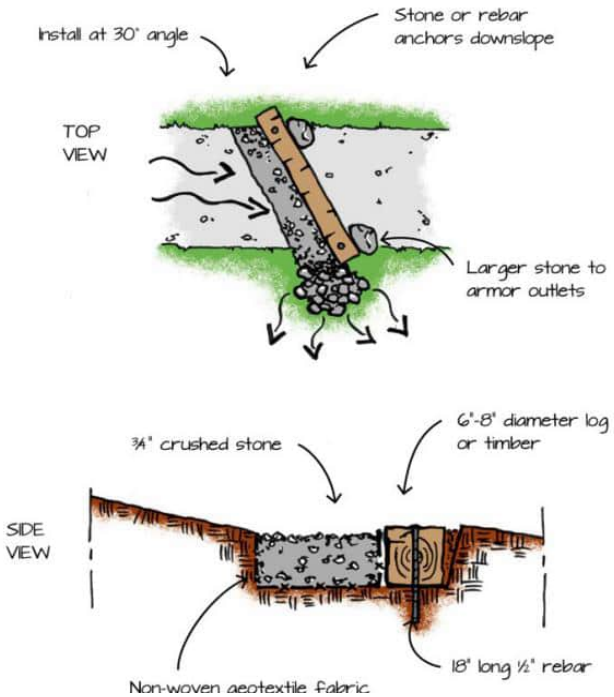
Address: 840 Beebe Ln, Williston, VT, 05495
Permanent Address: 76 Iroquois Ln, Williston, VT, 05495

Overall Results: There are improvements that can be made on your property to meet the Lake Wise award standards. You passed in the Structures & Septic, Recreational and Shoreland sections of the assessment, but there are improvements that can be made in the Driveway section. Homeowners need to have best management practices (BMPs) in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management. You will receive a certificate of recognition for the sections which passed and this report details the BMPs you can implement to receive a Lake Wise award in the future.

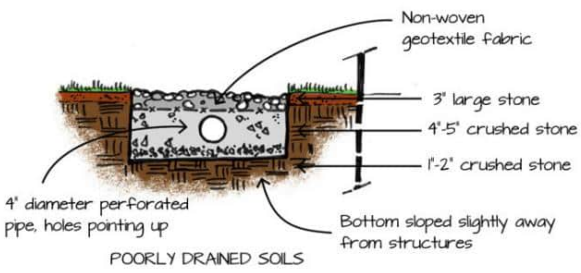
Driveway Area: The driveway section did not pass in the Lake Wise assessment section, and there are improvements that can be made. The driveway and parking areas are well defined and minimal in size, but there are signs of erosion on the driveway and parking area. Although the driveway and parking surfaces are not eroding and unstable, over 10% of the driveway shoulder and ditch areas are eroding and unstable. The stormwater runoff is more sheet flow than channelized in this area and some of the runoff is directed to a stable vegetated buffer or BMP.

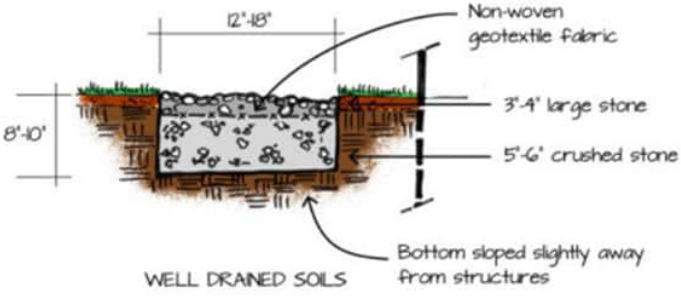
Adding a water bar will divert stormwater to a more stable vegetated area. Additionally, you could plant shrubs or trees to help absorb some of that water. We encourage you to fix the channelized erosion on the shoulder of the driveway and incorporate perennial vegetation at the top of driveway and continue to plant vegetation at bottom by septic system.

Water Bars:
Water bars intercept water flowing down unpaved paths or driveways and redirect it to stable, vegetated areas. This helps mitigate erosion, prevents sediment from reaching waterways, and slows and infiltrates stormwater. You can read more about water bars in the VT Guide for Stormwater Management on Page 24.



<u>Structures and Septic Systems:</u> Your property passed the criteria for the Structures and Septic section of the Lake Wise evaluation, but again there are a few best management practices that can be made for lake stewardship. The septic system shows no evidence of failure, and you maintain the system regularly. The infiltration trench around the structure is a good BMP for roof drips. A more effective stormwater best management practice would be to expand the stones as a walkway, to mitigate soil erosion in this area. You could also construct a retaining wall for the wooded bank that has exposed soil. The retain wall could be built out of stone and shade tolerant plants like ferns added to the top of the wall, as this vegetation would absorb stormwater runoff and look aesthetically pleasing. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property, so BMPs are critical to maintaining a healthy lake ecosystem. By expanding the existing infiltration trench all the way around the home will increase the water holding capacity and slow down runoff during heavy rain events.





Recreation Area: There are some significant signs of erosion in the recreation area. Some of the stormwater flows through an effective buffer, including the existing vegetation on the property. However, the grass lawns that make up most of the recreation area do not slow down stormwater as it moves over the property. All of the recreation areas are defined and limited in space, but the lawn makes up 20 % of the recreation area. All gardens are mulched, planted with native vegetation and show no signs of no runoff. An improvement would be to minimize this lawn space by creating low mow zones or no mow zone and adding in more dynamic structural vegetation that will slow down and absorb runoff and create wildlife habitat. The main path is a well-established stone path and are signs of erosion with exposed soil. Other paths on the property are limited, defined, and not showing erosion or direct runoff into the lake.

You could consider adding a native clover mix to the grassy area. Grass has relatively short root system and a clover mix may slow down stormwater as it moves in a sheet flow across the recreation area.

The grass lawn is a great example of a potential low-mow zone, especially on this steep slope that can be challenging to mow. Letting the grass grow above 3” can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

Shorefront and Lake Access: It is important to have a well-established vegetative buffer along the lake shoreline to slow down, spread out and stormwater as it moves across the property. The currently buffer covers only 15-20ft but covers 50% of the shore and is composed of five tiers of vegetation on average. The vegetation along the shoreline is made up of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area. By seeding with native ground cover around the path and maintaining a native buffer along the lake shore through planting native species you will be able to create a more natural lake shoreline and maintain the ecological health of Lake Iroquois.

A few small changes on the property will help in the sections that you did not pass for the Lake Wise award. The recommendations are designs to help improve your overall score and contribute to a more lake friendly property!

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Karen Villanti – Lake Iroquois

Lake Wise Evaluation
Date: October 6th 2022

Lake Wise Evaluator: Adelaide Dumm, WNRCD Conservation Specialist and Remy Crettol, WNRCD District Manager

Address: 1004 Beebe Lane Williston, VT
Permanent Address: 112 Primrose Lane Williston, VT

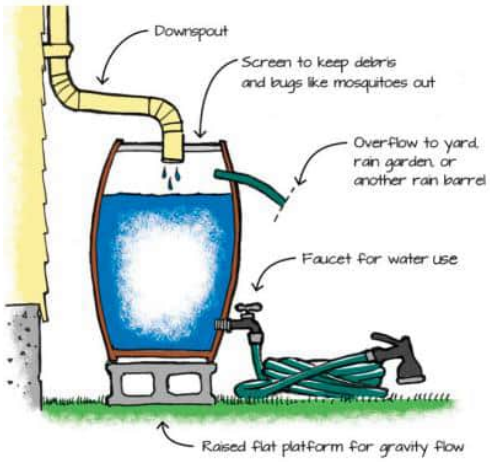
Overall Results: Your property passed in all four Lake Wise Assessment Sections! Driveway, Structures & Septic, Recreation Area and Shoreland all passed. Homeowners need to have best management practices in all four sections to promote lake-friendly living and achieve a Lake Wise award. This report includes suggestions to improve stormwater management in the sections that you passed. Congratulations!

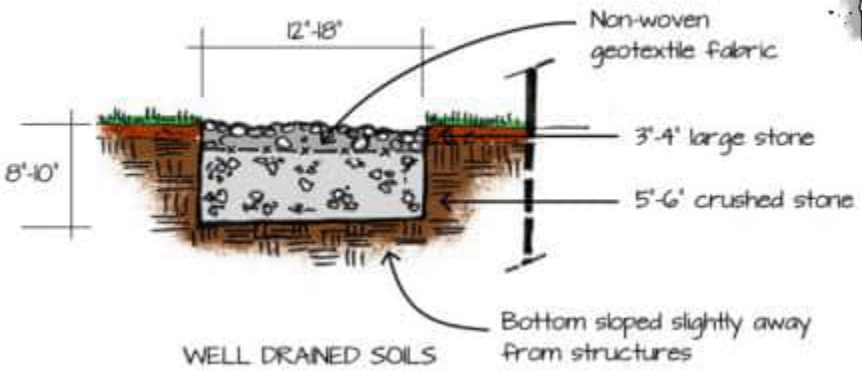
Driveway Area: The driveway and parking areas are well defined and suitable in size. There are no signs of erosion on the driveway and parking area, all surfaces are stable. Most of the stormwater moves as sheet flow. The shoulders and ditches show minimal signs of erosion. Adding stones and perennial plants on the bank of the driveway will stabilize surfaces and prevent erosion down the driveway slope. The stormwater from the road surface is directed to an effective vegetated buffer in the woods.

The patch of grass in the side yard is a great example of a potential low-mow zone. Letting the grass grow above 3" can help to slow stormwater that falls on your property, giving it more time to sink into the ground. Lawns can be compacted by everyday use and the weight of the lawn mower. This compaction limits the ability of the lawn to absorb water. By aerating the soil (punching holes through the surface material) you can give water an easier route into instead of across the lawn.

<u>Structures and Septic Systems:</u> Your property passed the criteria for the Structures and Septic portion of the Lake Wise Evaluation. While the septic system is older, there is no evidence of failure, and you maintain the system regularly. The tank is sited far from the water. I do recommend you have someone come out to determine exactly where the leach field and pipelines are.

The house has shown signs of erosion from roof drips and erosion along the steep bank leading down to the lake. I suggest adding gutters and rain barrel to the other downspout and using the harvested rainwater to water your flower beds. An alternative is to add an infiltration trench along the foundation of the home on the lakefront side. This will allow for infiltration of the stormwater runoff and reduce erosion along the banks. See the Vermont Guide to Stormwater Management for Homeowners and Small Business Owners for more information.





An infiltration trench will increase the water holding capacity and slow down runoff during heavy rain events

There was little to no erosion was seen around the front of the home, and it appears most of the stormwater is absorbed by the vegetation along the road. Overall, the impervious surface of the developed area was about than 20-25% of the total area of the property. Good job!

Recreation Area: The recreation area is a section where your property scored very high. The improvements you've made since purchasing the property has paid off! There are no signs of erosion in the recreation area, and the rock retaining wall with flower garden are serving as an effective vegetated buffer, a good example of a best management practice. The recreation area is well defined and limited in space, and paths show no signs of erosion and do not convey runoff directly into the lake. You could add some blueberry bushes, or other native vegetation along the slope to help stabilize soil on the downslope side of the retaining wall. Overall, this area looks good and serves as a good stormwater management example.

You could consider adding a native clover mix to the grassy area. Grass has relatively short root system and a clover mix may slow down stormwater as it moves in a sheet flow across the recreation area.

Shorefront and Lake Access: The shoreline has a naturally vegetated buffer, with an average width of approximately 30-40 ft. Additionally, there are multiple tiers of vegetation present including a tree canopy, shrubs, understory, ground cover and duff layer. It is important to have a well-established vegetative buffer to slow down, spread out and stormwater as it moves across the property. The vegetation along the shoreline is composed of native species, continue to be vigilant of invasive species and consider management if you see then begin to creep in from the surrounding area

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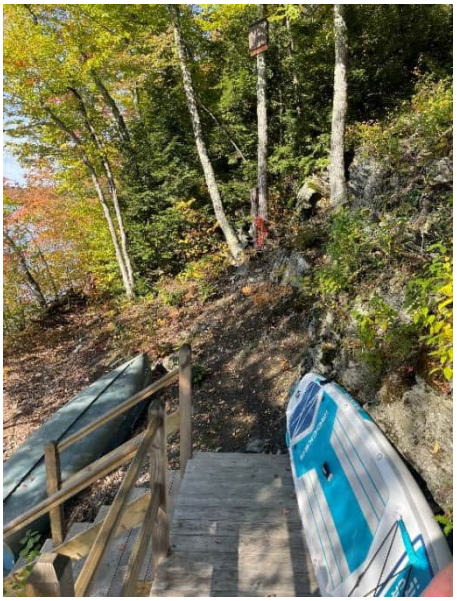


The wooden staircase is a great replacement over the old stone steps! These stairs allow for sheet flow runoff to vegetated areas and work with the natural topography of the lakeshore area. Allowing the native vegetation to continue to fill in areas of exposed soil will contribute to soil stability. You could also add in some plants if there is adequate soil depth, but it looks like the area will be naturally re-vegetated in a few years.

Thank you for being a part of the Lake Wise Program! If you have any questions about this report or the Lake Wise criteria, please contact Adelaide Dumm at Adelaide@winooskinrcd.org or Remy Crettol at Remy@winooskinrcd.org. Additional resources include Alison Marchione, the VTDEC Lake Shoreland Coordinator at Alison.Marchione@vermont.gov, or Matt Stromecki, the VTDEC Lake Wise Assistant at Matthew.Stromecki@vermont.gov. For further information see the Vermont Guide to Stormwater management for homeowners and small business owners or the Lake Shore Property Owner's Manual by the Lake Iroquois Association.

Vermont Agency of Natural Resources Lake Wise Program – Promoting Lake Friendly Practices

Storm Smart Assessment

Tim Hunt

5327 Oak Hill Road, St. George, Vermont

Thank you for your time and commitment to healthy land,

clean water, and a vibrant community!

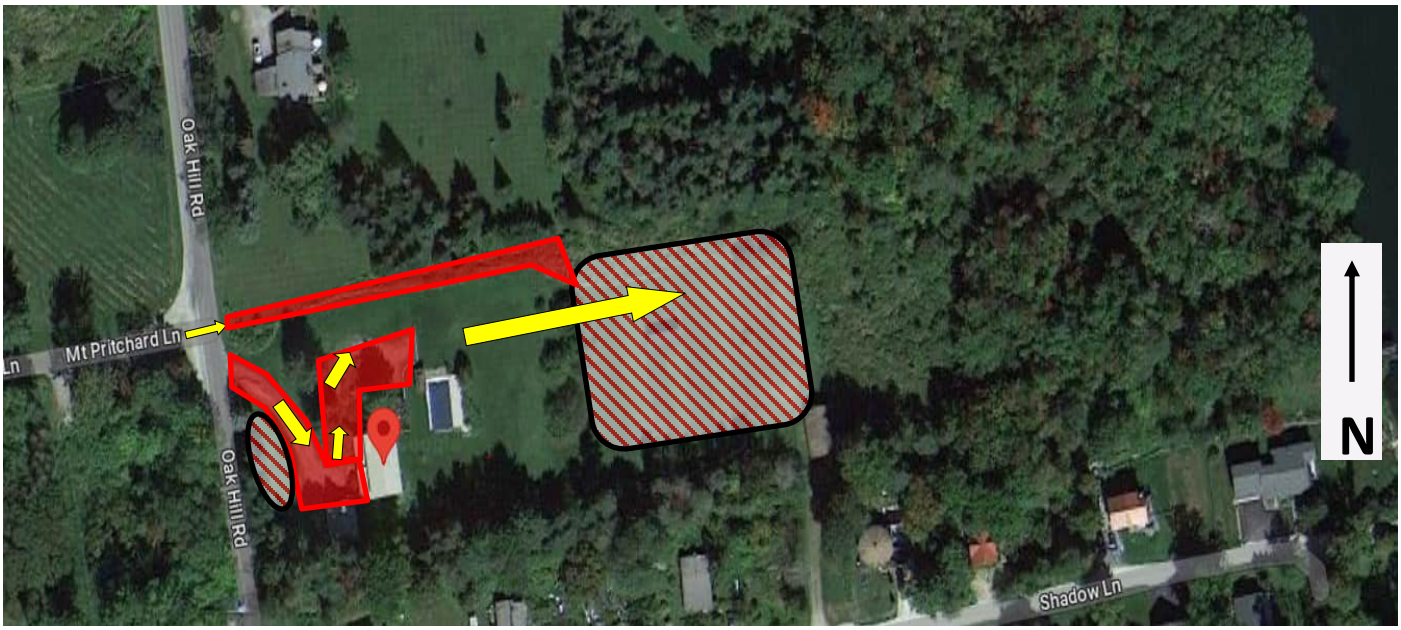
Contents

1. Summary of Visit

On May 15th 2023 the Winooski Natural Resources Conservation District (WNRCD) Conservation Specialist, Adelaide Dumm, visited Tim Hunt's property at 5327 Oak Hill Road in St. Georg, Vermont. The property is in the Lake Iroquois Patrick Brook Watershed, that drains to the LaPlatte River and eventually drains into Lake Champlain. The Stormwater runoff from the Mt. Pritchard Road flows onto Tim's property and has deposited a substantial amount of sediment into the drainage swale on his property and has caused erosion issues on its way into Lake Iroquois. The run-off occurring is of particular concern due to the close proximity to Lake Iroquois, this assessment was conducted as part of the Lake Iroquois Watershed Action Plan. There were a few storm smart solutions identified that can be implemented on the property. The property owner expressed interest in improving storm water management to prevent future soil erosion and seasonal flooding on the property. The stewardship of the land will contribute to the greater well-being of plants, animals and people downstream.

There are opportunities for improved stormwater management on this property which are outlined in more detail in the following pages. Tim recently regraded the driveway, which is a big improvement for directing water to a more stable buffer. Green Stormwater Infrastructure (GSI) solutions to the current runoff issues include installing a rain garden or drywell to capture water from the upper hillside along Oak Hill Road, planting shrubs in the steep section of lawn or adding rain barrels or infiltration trenches to manage stormwater flowing from the roofs of structures including the house and garage. Maintaining the drainage swale and increasing vegetation will also absorb and slow down runoff. By implementing the following BMPs on the property Tim will be able to keep Stormwater on site. Constructing a rain garden will help increase the water holding capacity on site by promoting the infiltration of storm water. Planting more perennials, like trees and shrubs, creating filter berms and establishing low mow zones is a low maintenance solution and will aid in decreasing the volume of Stormwater making its way into the lake. The maintenance and instillation of native plants along the sloped edges of the property will slow water down, allow for more soil infiltration, and increase water uptake by roots of perennial plants. Increasing the presence of native plants on site in the rain garden and incorporating vegetated "speed bumps" will also promote pollinators and create wildlife habitat. Overall, there are improvements to be made but the landowner is motivated and has already started on some of the projects mentioned.

Site Map– Areas of Concern

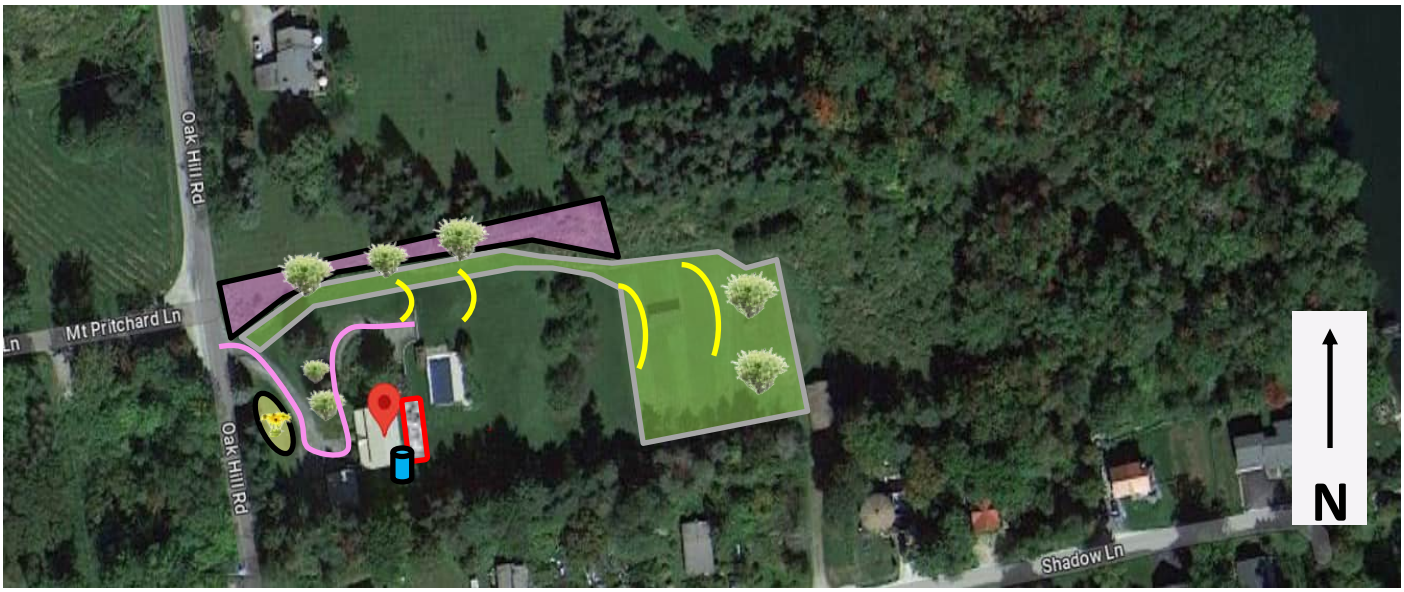


Area prone to seasonal flooding

Directional flow of water on the property

Area of erosion with bare soil exposed

Opportunity Map



Establish a vegetated swale with native perennial shrubs

Regrade /Maintain Driveway

Plant native perennials

Construct “speed bumps” or Filter Berms to slow down runoff from house and lawn

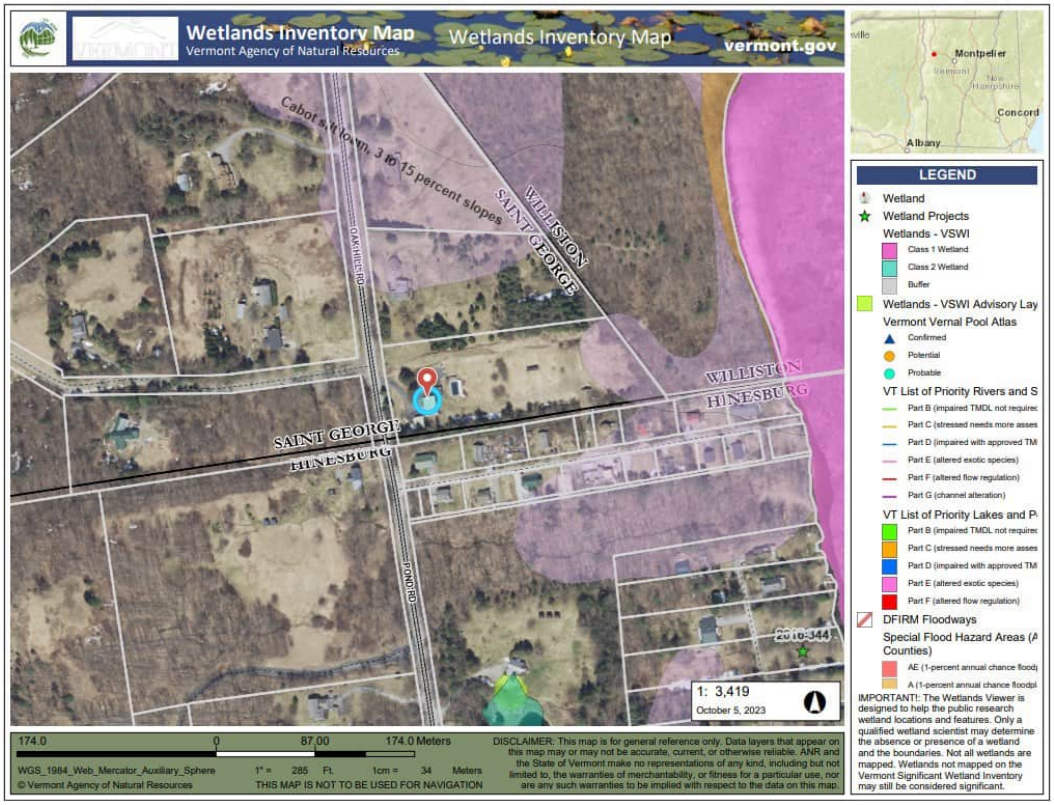
Install rain a barrel

Install rain garden or catchment area

Construct an infiltration infrastructure around foundation

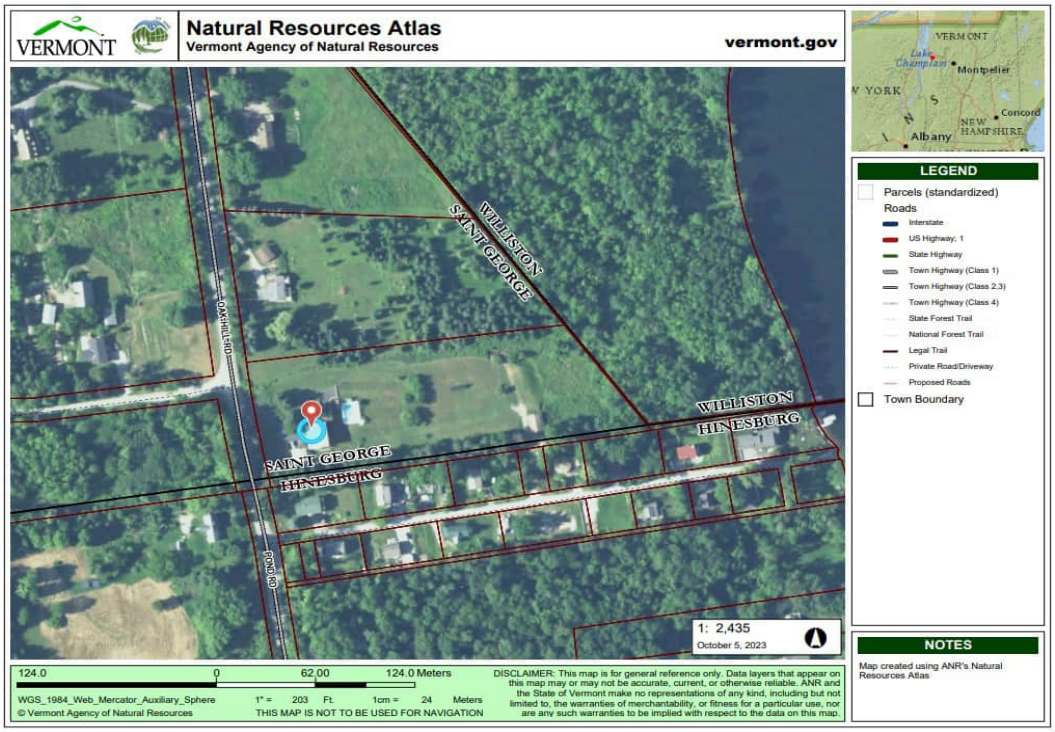
Establish “No Mow or Low Mow” zones

Property Maps Continued



As shown in the map above, there have been wetland features identified near your property. You can view this information with the VT DEC wetlands inventory map. Wetlands provide many ecosystem services, including water quality improvements through infiltration and nutrient filtration, flood resiliency, carbon sequestration, critical wildlife habitat and are aesthetically pleasing!

To learn more about wetlands in Vermont and permits/ regulations please visit the Vermont Department of Environmental Conservation Wetlands website, https://dec.vermont.gov/watershed/wetlands.



3. Recommendations and Maintenance

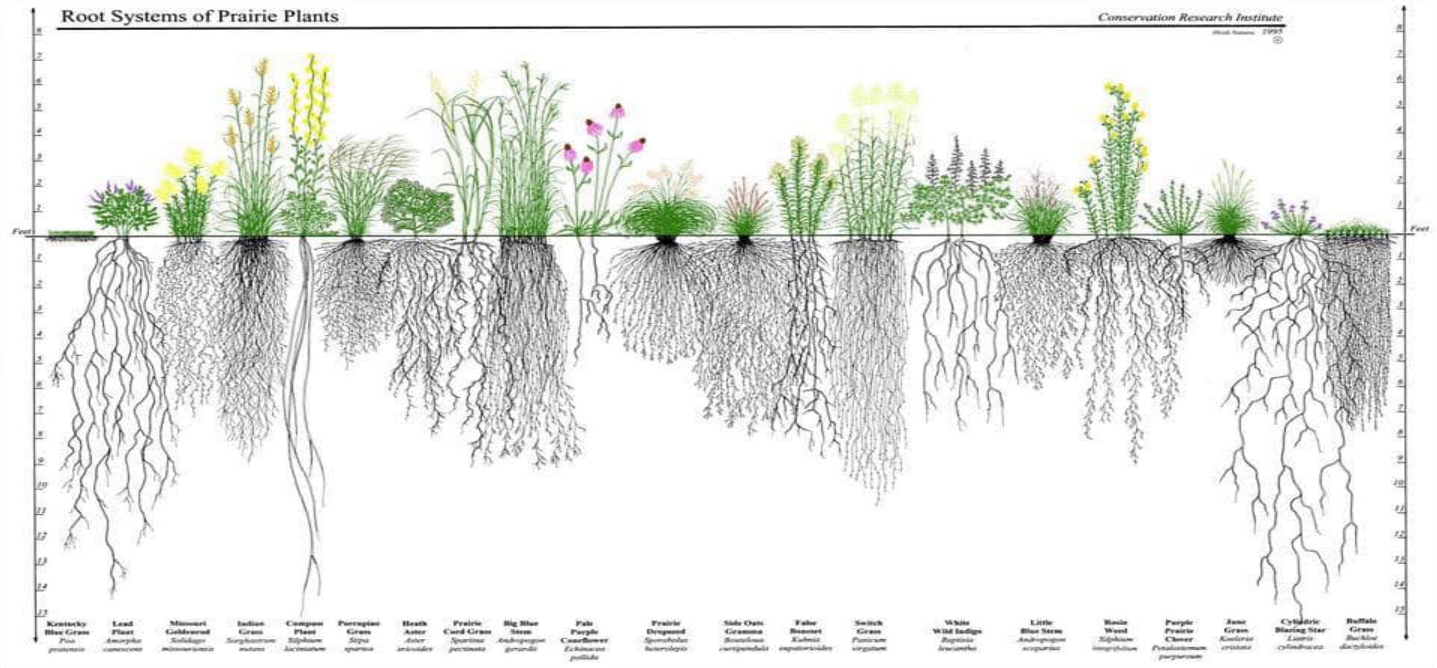
Green Stormwater Infrastructure (GSI) and Best Management Practices (BMP) are management methods that help stormwater runoff sink in, spread out, and slow down on your property, stopping erosion and keeping our streams clear. These recommendations for one time fixes and regular maintenance are steps you can take on your property to make your home Storm Smart.

Yard Area

The amount and size of plants in a yard has a direct impact on the amount of surface runoff during storms. Generally, plants that absorb rainfall well are deep-rooted perennials and woody shrubs and trees. When selecting plants it is important to choose "the right plant for the right place" by paying attention to each species' soil moisture and sun/shade requirements. Native plants are recommended since they are adapted to Vermont's climate, provide the appropriate food sources for birds and butterflies, and fit well aesthetically into the landscape.

Low Mow Zones and Native Plants

- In comparison to Kentucky Blue Grass most native plants have deeper more complex root systems that do a better job stabilizing soil and absorbing water. These plants are slower growing than many of their foreign counterparts and by letting whole areas of your lawn grow tall they can have a chance to establish themselves.
- Native plants can be sourced from a variety of businesses and organizations. Below is a brief list. Check this website to be sure that the species you select are not invasive to the region https://www.vtinvasives.org/
- Winooski NRCD Annual Tree Sale http://winooskinrcd.org/trees-and-trout-sale/
- Intervale Conservation Nursery https://www.intervale.org/intervale-conservation-nursery



Alliance for the Chesapeake Bay

Raise the Blade

By simply raising the setting of your lawnmower blade to 3" you can encourage deeper root growth and therefore better infiltration in the frequently-used areas of your lawn that you decide to keep. Visit lawntolake.com for more information about the benefits of this practice.

Yard Area continued

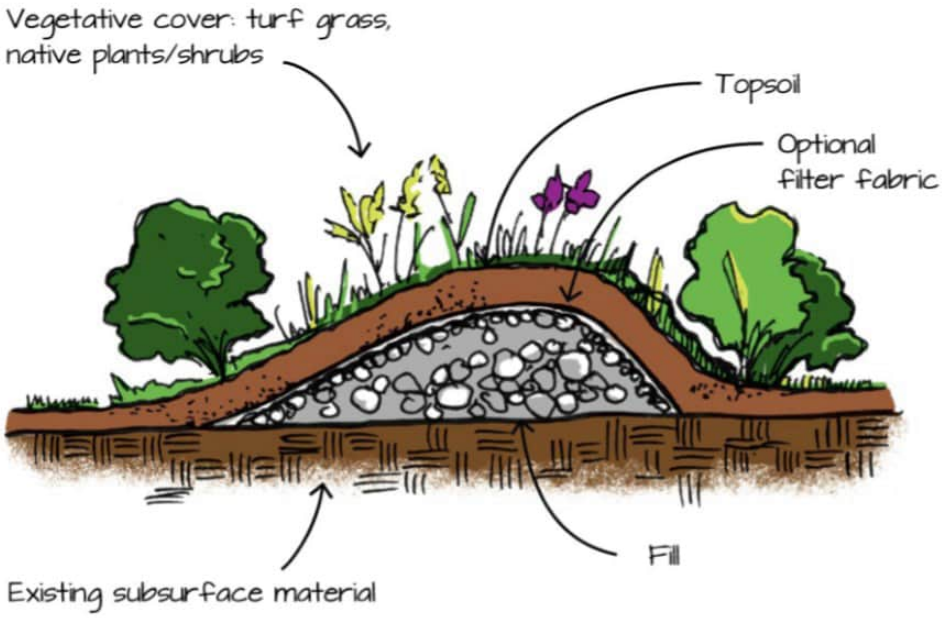
Create “road bumps” or terraces in the steepest areas with high erosion to slow the flow of water during rainstorms and help it infiltrate into the soil. These “road bumps” could be created by placing logs along contour lines to create a terraced effect or following design instructions for filter berms.

You could use the hügelkultur technique with all the invasive buckthorn you’re irradicating on the property!

https://www.almanac.com/what-hugelkultur-ultimate-raised-bed

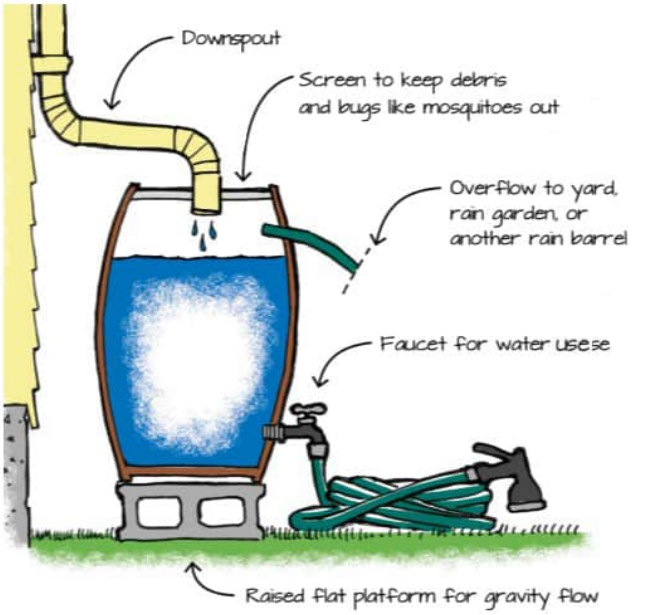
Consider constructing filter berms with all the buckthorn you’ve been removing!

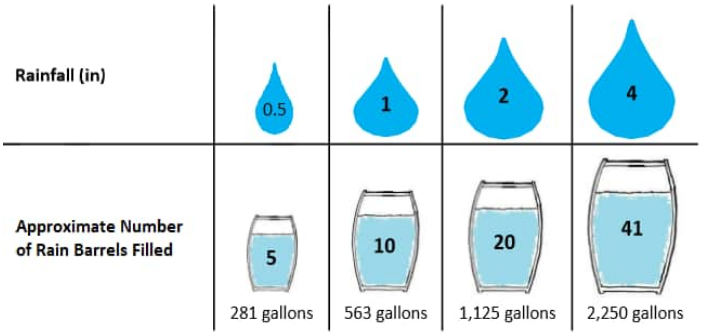
Filter berms capture and slow water that runs off parking lots, driveways, and walkways. Their interior is filled with stable, well drained material that absorbs and slows stormwater runoff. Vegetation on the outside of the berm provides more structure and helps further slow storm-water.



Rain Barrels

Rain Barrels are relatively easy to install, help retain water on your property, and give you a great resource for gardening. A barrel can come in many shapes and sizes and attach directly to the gutter downspout or be filled with a rain chain. Keeping your barrel covered stops mosquitos from reproducing in it. Check the barrel before a big storm comes to make sure it can handle the water coming its way.

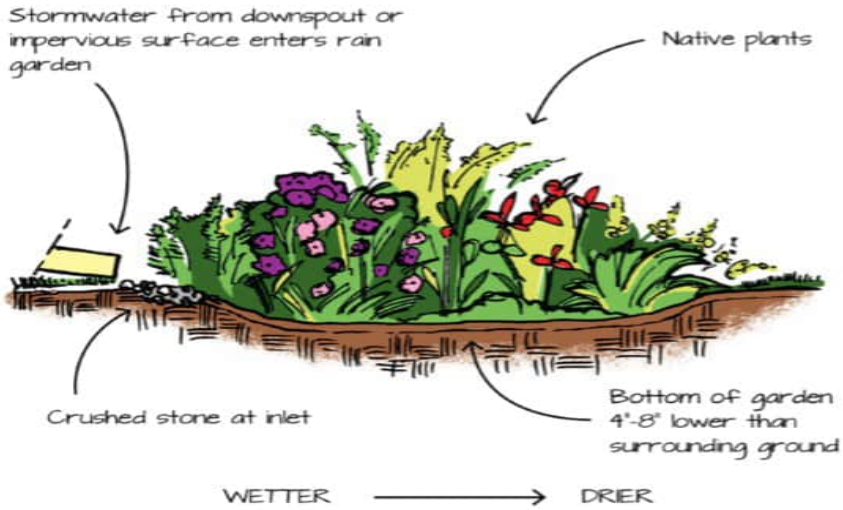




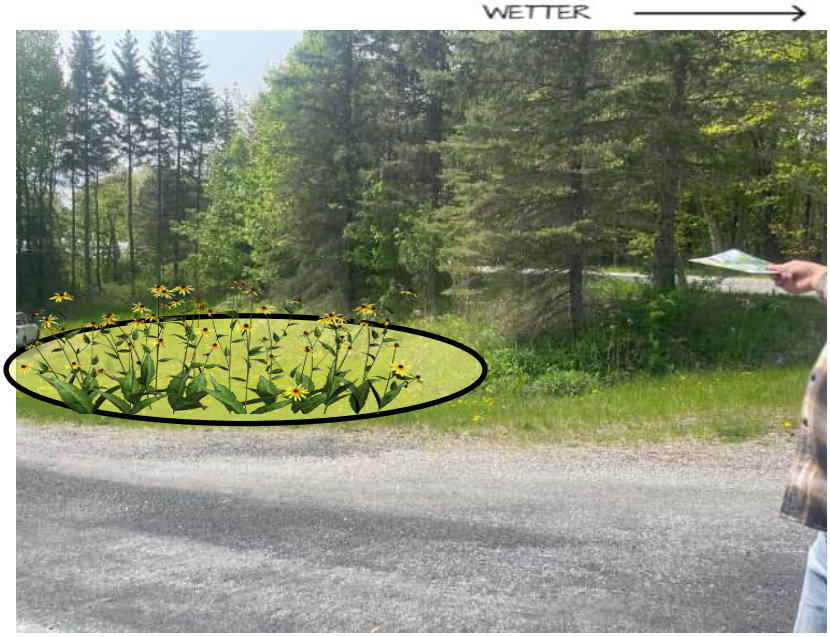
Rain barrels can be purchased new from local hardware stores or online vendors, or you can build one yourself. Visit http://rethinkrunoff.org/educational-resources/install-a-rain-barrel/ to download detailed instructions for a DIY project or check out our instructional video at https://www.youtube.com/watch?v=5zWy5MGR724&t=30s

For more information see the VT Guide to Storm Water Management for Homeowners and Small Businesses—page 18.

Rain Gardens capture and slow water that runs off parking lots, driveways, and walkways. They use native plants to slow and filter water. Ultimately water is either infiltrated into the ground or is absorbed by the plants and release back into the atmosphere. Plants used in rain gardens should be both drought resistant and able to handle prolonged periods of submersion in water.



VT Guide to Storm Water Management for Homeowners and Small Businesses—page 30



A significant amount of runoff flows through this point of your property before exiting through the storm drain. Capturing as much water as possible here could significantly impact the volume of water that ultimately moves down the watershed and into Lake Iroquois.

To build the rain garden, consult the VT Rain Garden Manual for specific instructions. Building a Rain Garden involves digging the garden to size, adding a layer of crushed stone at the bottom for improved infiltration. Next, add some additional soil and plant water-loving native species like: Blue flag iris, Black Eyed Susan, New England Aster, Milkweed, Coneflower, Daylilies, and Bee Balm (monarda).

Driveway

During the assessment the drive way was identified as an area on the property that can be improved to be more Storm Smart. It had some erosion from regular use and excessive runoff from Mt. Pritchard Rd. The historic July flooding prompted Tim to have the driveway regarded. Now that the driveway is properly crowned, water is diverted to the sides where it is absorbed by vegetation. Regrading the driveway was a great BMP to do as it now allows for more on site stormwater runoff infiltration. Planting native perennials along the edge of the drive way or establishing a low mow zone on the steep slope will also increase the water retention potential on site, as the vegetation will absorb excess runoff. More information on regrading a driveway can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses—page 42.

To prevent erosion, flowing water should be directed off driveway surfaces as quickly as possible. Properly graded driveways have a crown (high point) to do this. Crowns are generally located in the middle of the driveway, although a high point can be established on either side. See cross-sections below. Additionally, water bars can direct runoff away from driveways. See page 23 for water bar instructions. INSTRUCTIONS Grade your driveway based on one of the following cross-sections. Shaping is site-specific and any of these variations will direct flow off your driveway.

CROWNED DRIVEWAY
High point in the center

IN-SLOPED DRIVEWAY
High point on outside edge

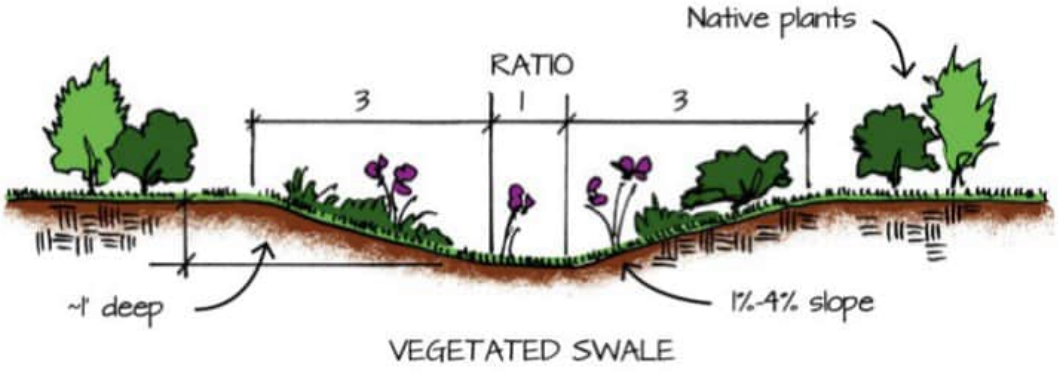
OUT-SLOPED DRIVEWAY
High point on inside edge

Vegetated Swale

Vegetated Swales are broad channels that slow, infiltrate, and direct water. They are often used in conjunction with check dams to improve their ability to slow water and capture sediment. Swales are a good choice for relatively flat parking areas or driveways and can be used to direct water towards more stable ground.

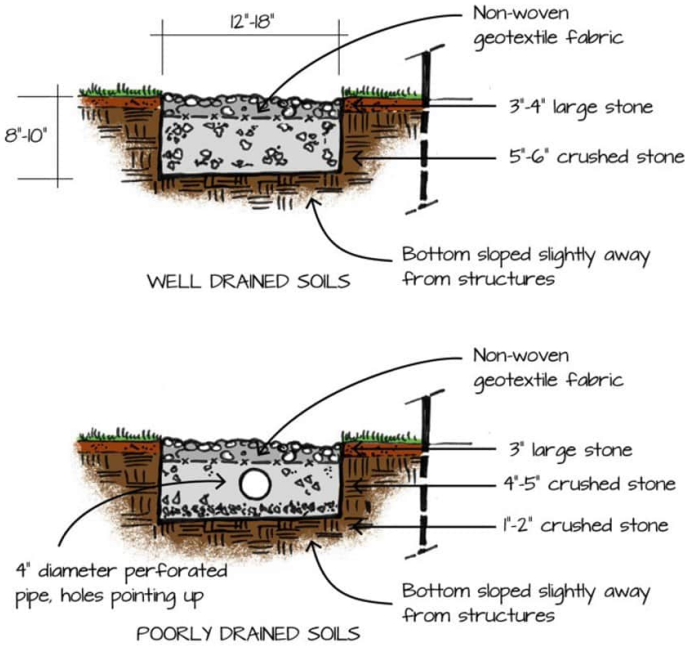
This channel has severe erosion occurring from the high volume of stormwater runoff coming down Mt. Pritchard Road. Planting a vegetated swale will contribute to slowing down, sinking, and spreading out run-off. The swale will also improve water quality as it moves though the watershed and down into Lake Iro-quois.

VT Guide to Storm Water Management for Homeowners and Small Businesses—page 28



Infiltration trench

Infiltration trenches are shallow, stone lined channels that capture water from impervious surfaces (like roof tops) and infiltrate it into the ground. In less well drained soils an Infiltration Trench is outfitted with a pipe to convey water that risks pooling. More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.



Invasive Species Removal

During the site visit we noticed the invasive species filling in along the wooded fence row. The species identified included Buckthorn and the invasive ground cover, bishops weed. Irradicating these species will make room for native ground cover and small pine saplings to grow. Keep up the good work of removal!

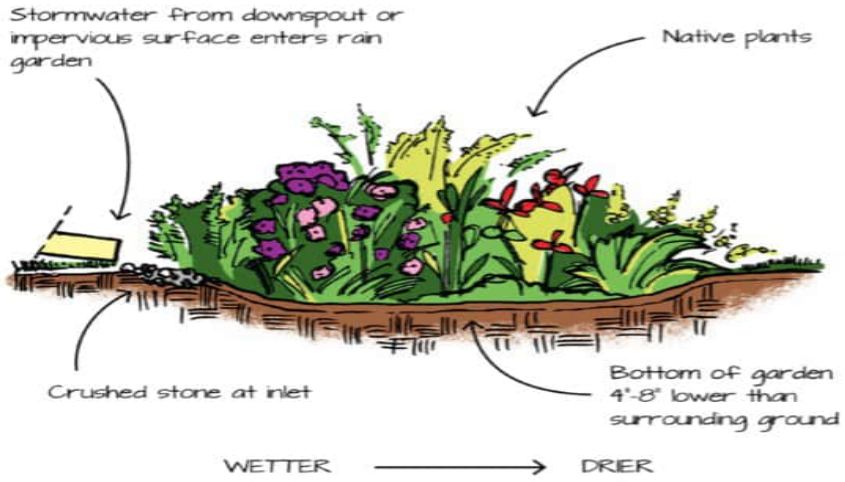
Consider planting a native shrub near end of the drainage pipes from the gutter system on the home. A native shrub will absorb some of the stormwater runoff being directed to the wooded fence row and decrease soil erosion in this area.

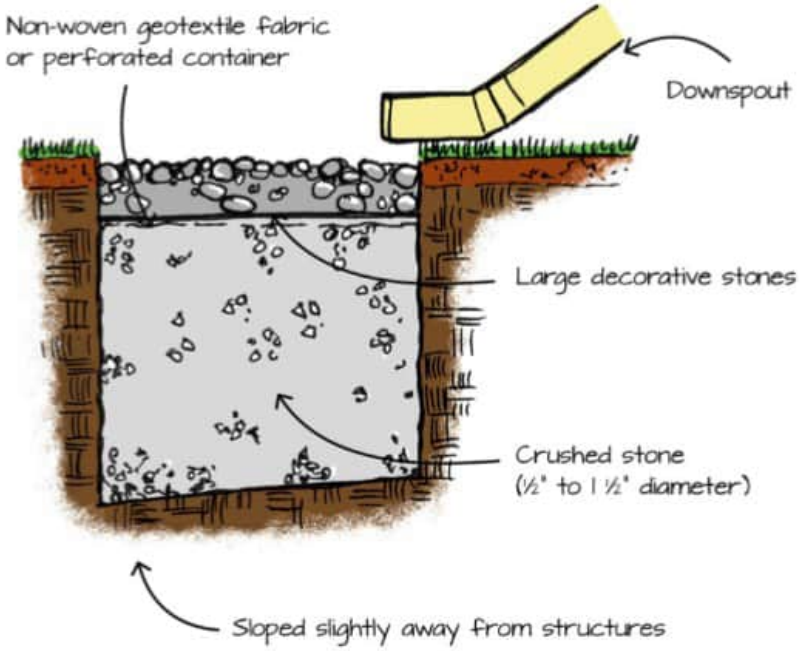
4. Construction Details

Being Storm Smart can save you time and money cleaning up after storms, help keep your downstream neighbors safe, protect fish and other aquatic life, and give us all more summer days of swimming in crystal clear water. These diagrams incorporated in the recommendation sections and more below can help you make being Storm Smart a reality.

Rain Garden

Rain Gardens capture and slow water that runs off parking lots, driveways, and walkways. They use native plants to slow and filter water. Ultimately water is either infiltrated into the ground or is absorbed by the plants and release back into the atmosphere. Plants used in rain gardens should be both drought resistant and able to handle prolonged periods of submersion in water.



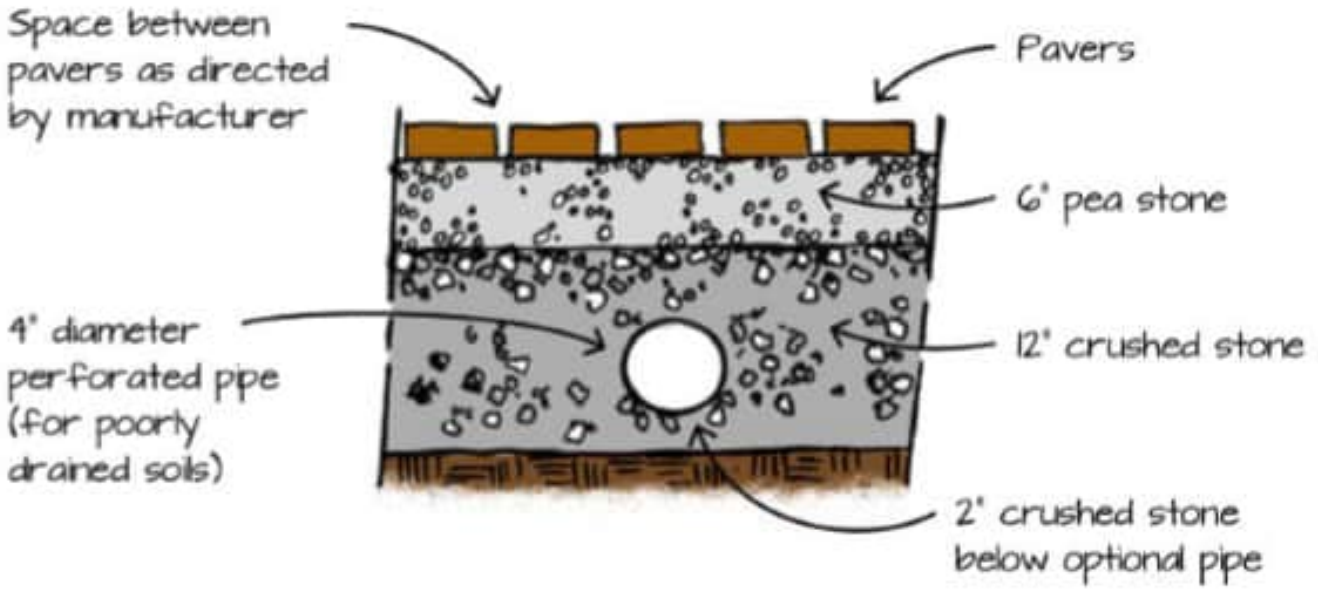


Dry Well

Dry wells are an effective way to infiltrate water from roofs or other concentrated areas so long as the soil is relatively well drained. The well is a hole dug out of the ground that is lined with geotextile fabric or holds a perforated container. Crushed stone slows and filters the water before it infiltrates into the ground water.

Permeable Pavers

Permeable pavers allow stormwater to be infiltrated into the ground through gaps between the pavers. This water then flows through crushed stone into the groundwater below. If the soil is not particularly well drained a perforated pipe can be installed that will direct water to a stable outlet downhill from the driveway.



VT Guide to Storm Water Management for Homeowners and Small Businesses—page 34

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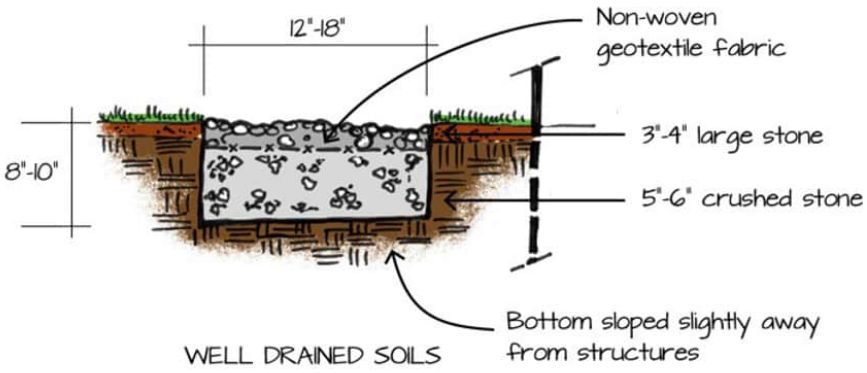
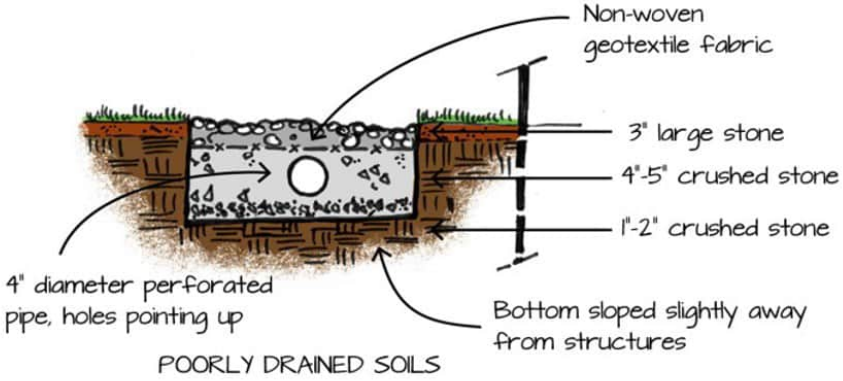
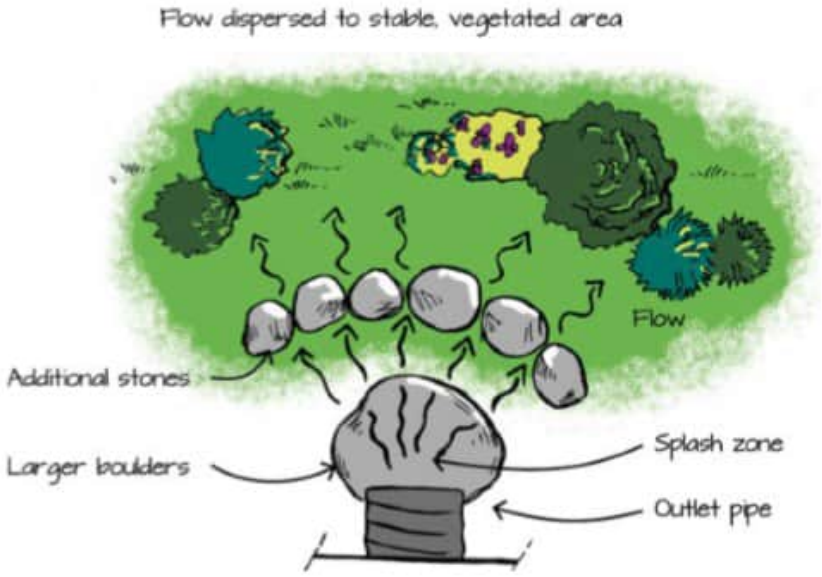




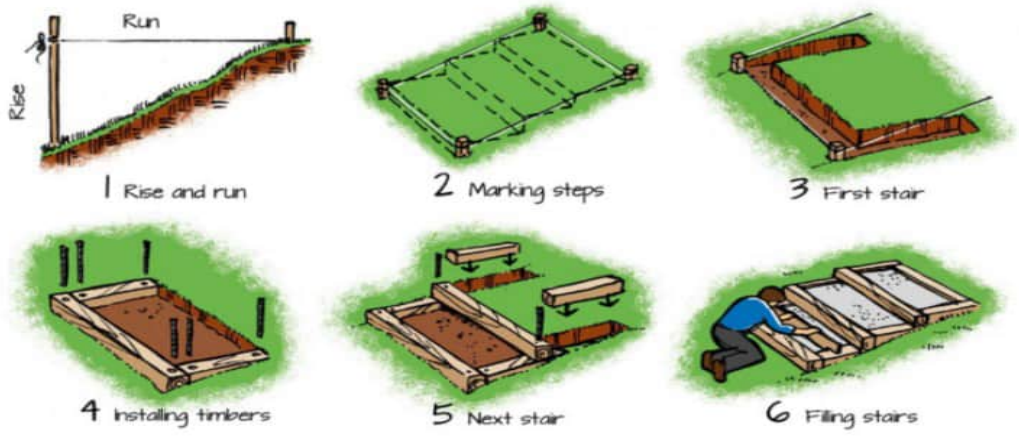
Energy Diffuser

Energy diffusers are made by placing a large rock or boulder under the outlet of a culvert or downspout. The rock provides a stable surface for flowing water to impact and lose energy before it continues down-hill. With less energy behind it the water is less likely to cause erosion that can destabilize the culvert.



Terraced Garden Beds or Infiltration Stairs

Terraced raised beds will provide space and adequate soil composition for gardening. In addition, there is an added benefit of reducing the surface area of the lawn which does not retain much surface water, due to grass having relatively short roots, and stabilizing the steep bank. For More information on infiltration stair see the VT Guide to Storm Water Management for Homeowners and Small Businesses on page 31.



5. Further Resources

VT Guide to Stormwater Management— A document with great information about managing stormwater at home

http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-06-14%20VT_Guide_to_Stormwater_for_Homeowners.pdf

Agency of Natural Resources Atlas– Free online mapping software to explore the natural resources around your home

http://anrmaps.vermont.gov/websites/anra5/

Vermont Department of Environmental Conservation Stormwater—Information about green stormwater infrastructure

http://dec.vermont.gov/watershed/cwi/green-infrastructure

The Vermont Rain Garden Manual: Gardening to Absorb the Storm—A guide to building your own rain garden with emphasis on using plants that are native to Vermont

http://winooskinrcd.org/wp-content/uploads/VTRainGardenManual.pdf

Better Backroads Manual—A guide to managing dirt and gravel roads that can be useful if you have a long driveway
https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf

Friends of the Winooski: Preventing Driveway Erosion—Strategies for managing dirt and gravel driveways
https://winooskiriver.org/uploads/files/Driveway_Road%20Maintenance.pdf

Household Septic Maintenance Factsheet — WNRCD

http://winooskinrcd.org/wp-content/uploads/managing-HH-septic-factsheet.pdf

Winooski Natural Resources Conservation District —Find other ways to get involved at our website

www.winooskinrcd.org

Rethink Runoff Stream Team

www.rethinkrunoff.org

6. Storm Smart Support

Thank you for being a good neighbor and working to make our watershed resilient. If you are interested in having a follow up assessment or would like some hands-on help installing or maintaining your Green Stormwater Infrastructure please get in touch. I am happy to schedule a time to help make your property Storm Smart.

If you want to spread the word please feel free to share my contact information with your neighbors or anyone else you think might be interested. If there are any questions I can be reached by email at Adelaide@winooskinrcd.org

Storm Smart Assessment

Laura and Joel Jackson

114 Hawk Lane, Hinesburg, Vermont

Thank you for your time and commitment to healthy land, clean water, and a vibrant community!

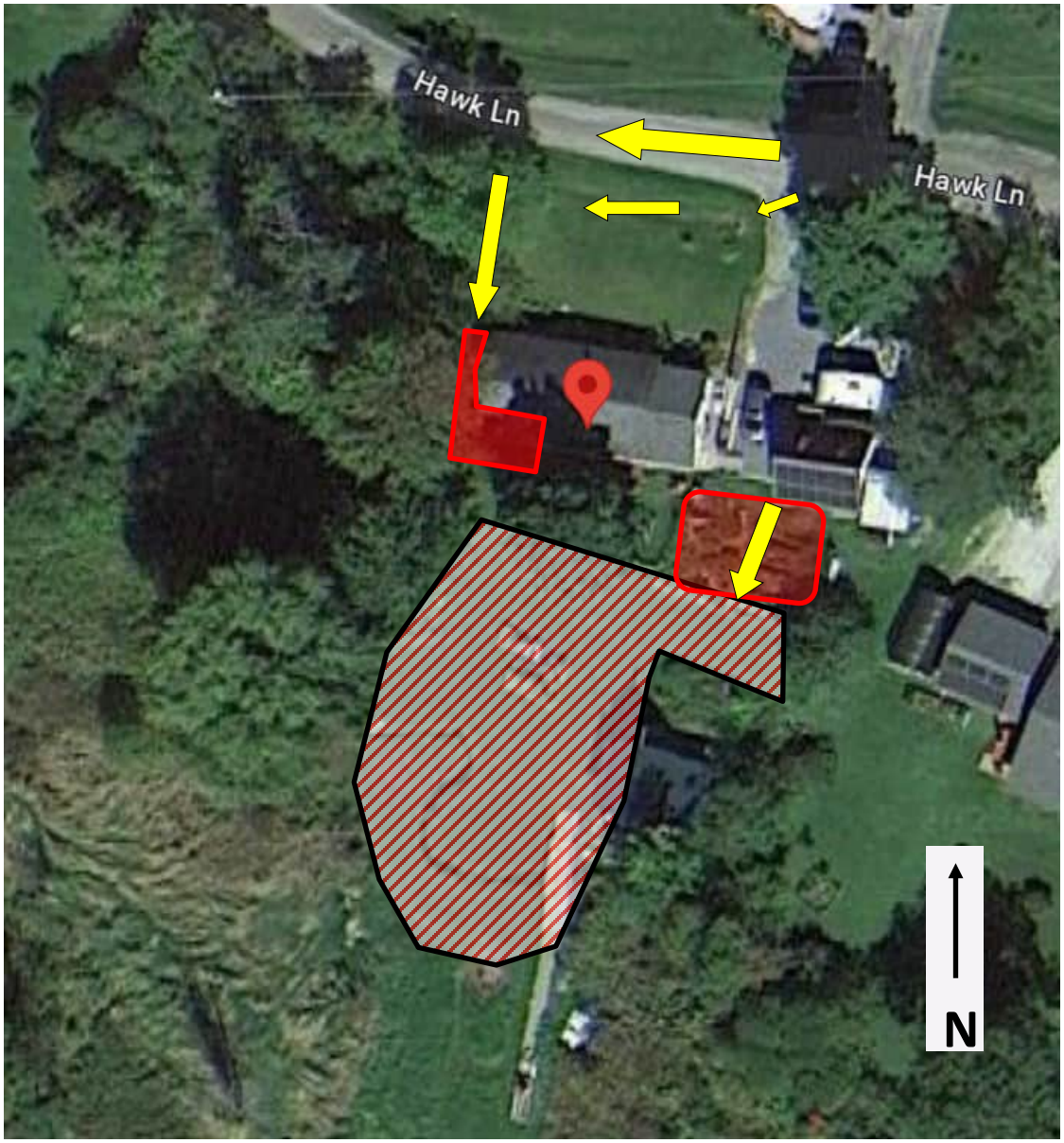
Contents

1. Summary of Visit

On May 10th, 2023 Adelaide Dumm, Winooski Natural Resources Conservation District (WNRCD) Conservation Specialist visited Laura and Joel Jackson's property at 114 Hawk Lane in Hinesburg, Vermont. The property is in the Lake Iroquois Patrick Brook Watershed. The Stormwater runoff from the Jackson's property flows into Patrick Brook, which flows to the LaPlatte River and eventually drains into Lake Champlain via the Shelburne Bay. The runoff occurring is of particular concern due to the close proximity to several smaller tributaries that connect to Patrick Brook, this assessment was conducted as part of the Lake Iroquois Watershed Action Plan. There were a few storm smart solutions identified that can be implemented on the property. The property owner expressed interest in improving storm water management to prevent future soil erosion and seasonal flooding on the property. The stewardship of the land will contribute to the greater well-being of plants, animals and people downstream.

Green Stormwater Infrastructure (GSI) solutions to the current runoff issues include maintaining the shoulder of the roadway with a vegetated swales and implementing BMPs in the yard and around the home to keep Stormwater on site. Maintaining the driveway an constructing a Rain Garden at the top of the culvert will help increase the water holding capacity on site by promoting the infiltration of storm water. Maintenance of the infiltration trench, the addition of a dry well and rain barrel, and potentially terraced garden beds would also assist with slowing down, spreading out and sinking Stormwater around the home. Installing terraced gardens on the hillside in the backyard, is a great strategy to minimize erosion on such a steep slope. Planting more perennials, like trees and shrubs, and establishing low mow zones around the stream in the backyard is a low maintenance solution and will aid in decreasing the volume of Stormwater making its way into Patrick Brook. The removal of the invasive Honeysuckle, and maintenance/ instillation of native plants along the sloped edges of the property will slow water down, allow for more soil infiltration, and increase water uptake by roots of perennial plants. Constructing filter berms would also help slow down runoff on the property. Increasing the presence of native plants on site in the rain garden and incorporating vegetated "speed bumps" will also promote pollinators and create wildlife habitat. Overall, there are improvements to be made but the landowner is motivated and has already started on some of the projects mentioned.

Site Map– Areas of Concern



Area prone to seasonal flooding

Flow of water on property

Area of erosion with bare soil exposed.

Opportunity Map

Remove invasive species, and establish a Vegetated swale with native perennial shrubs

Plant native vegetation along stream to create stable riparian buffer

Construct “speed bumps” or Filter Berms to slow down runoff from house and lawn

Add terraced raised beds/ infiltration stairs to reduce soil erosion

Extend gutters or add dry well under rain barrel

Install rain garden or catchment area

Maintain infiltration infrastructure around foundation

Establish “No Mow” zones

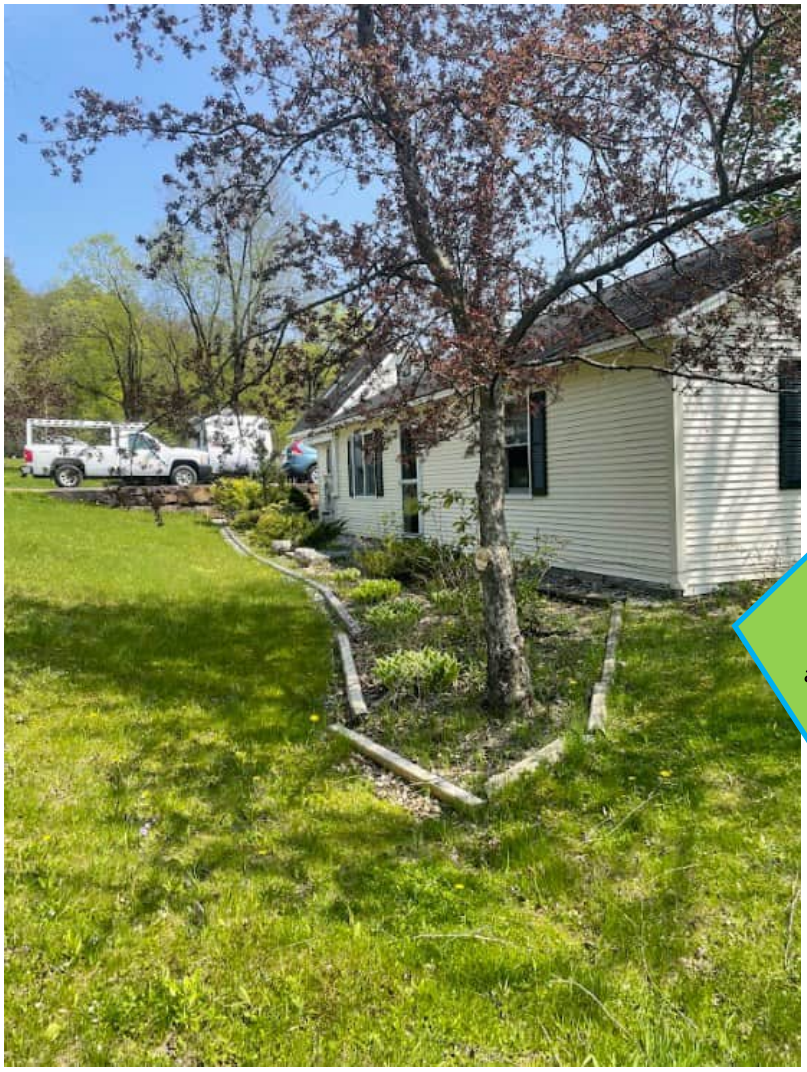
As shown in the map above, there is a wetland has been identified on your property. You can view this information at the VT DEC wetlands inventory map, and also with the VT DEC wetlands screening tool. A wetlands permitted project was identified in 2021, and Tina Heath at VT DEC Wetland Ecologist is the point of contact for this work. Wetlands provide many ecosystem services, including water quality improvements through infiltration and nutrient filtration, flood resiliency, carbon sequestration, critical wildlife habitat and are aesthetically pleasing!

To learn more about wetlands in Vermont and permits/ regulations please visit the Vermont Department of Environmental Conservation Wetlands website, https://dec.vermont.gov/watershed/wetlands.

3. Recommendations and Maintenance

Green Stormwater Infrastructure (GSI) and Best Management Practices (BMP) are management methods that help stormwater runoff sink in, spread out, and slow down on your property, stopping erosion and keeping our streams clear. These recommendations for one time fixes and regular maintenance are steps you can take on your property to make your home Storm Smart.

Yard Area



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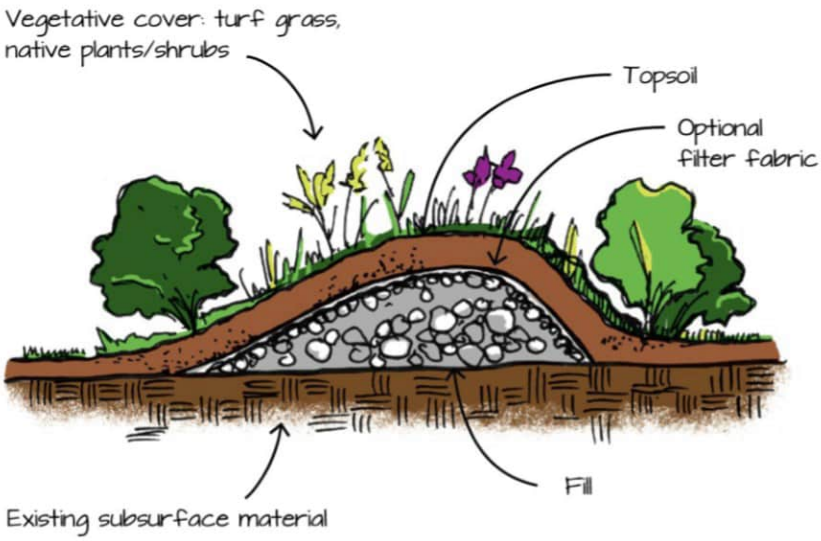
Yard Area continued

Create “road bumps” or terraces in the steepest areas with high erosion to slow the flow of water during rainstorms and help it infiltrate into the soil. These “road bumps” could be created by placing logs along contour lines to create a terraced effect or following design instructions for filter berms.

You could use the hügelkultur technique with all the invasives you’re irradicating on the property!

https://www.almanac.com/what-hugelkultur-ultimate-raised-bed

Filter berms capture and slow water that runs off parking lots, driveways, and walkways. Their interior is filled with stable, well drained material that absorbs and slows stormwater runoff. Vegetation on the outside of the berm provides more structure and helps further slow storm-water.



Low Mow Zones and Native Plants

- In comparison to Kentucky Blue Grass most native plants have deeper more complex root systems that do a better job stabilizing soil and absorbing water. These plants are slower growing than many of their foreign counterparts and by letting whole areas of your lawn grow tall they can have a chance to establish themselves.
- Native plants can be sourced from a variety of businesses and organizations. Below is a brief list. Check this website to be sure that the species you select are not invasive to the region https://www.vtinvasives.org/
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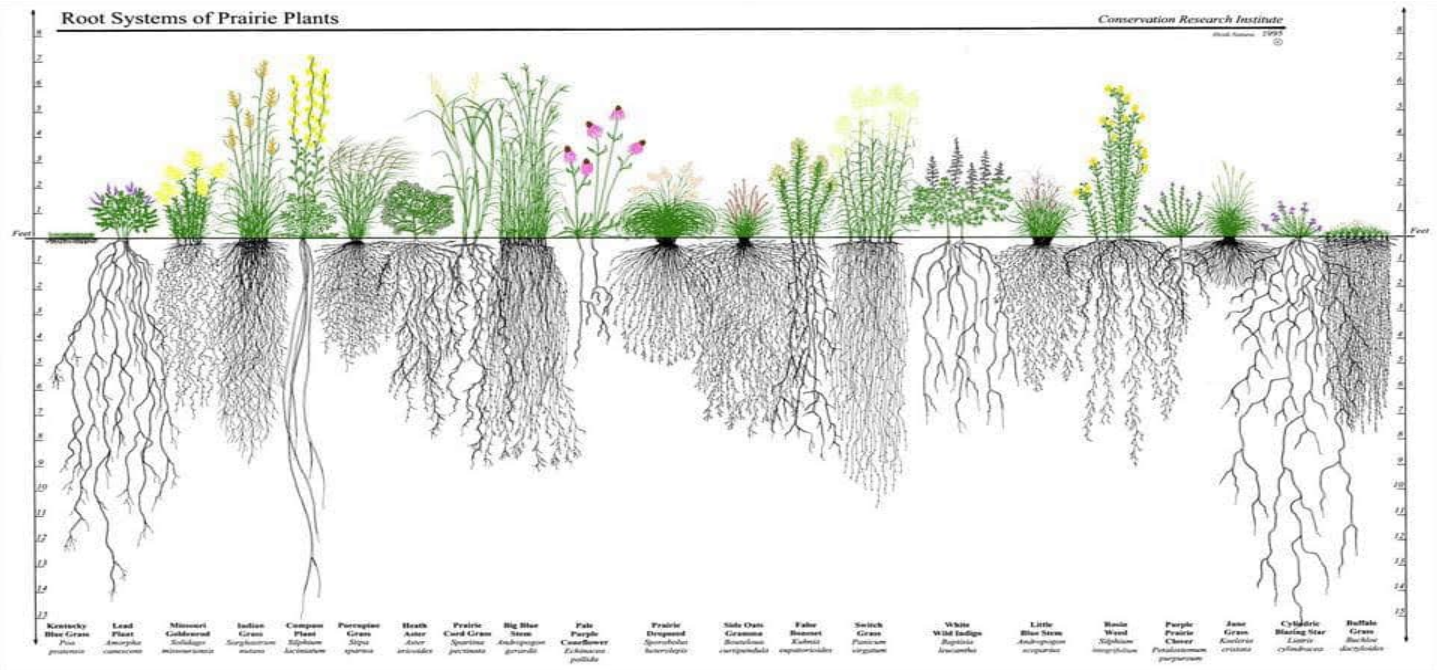


Alliance for the Chesapeake Bay

Raise the Blade

By simply raising the setting of your lawnmower blade to 3" you can encourage deeper root growth and therefore better infiltration in the frequently-used areas of your lawn that you decide to keep. Visit lawntolake.com for more information about the benefits of this practice.

Low Mow Zones and Creating a Riparian Buffer on the Stream

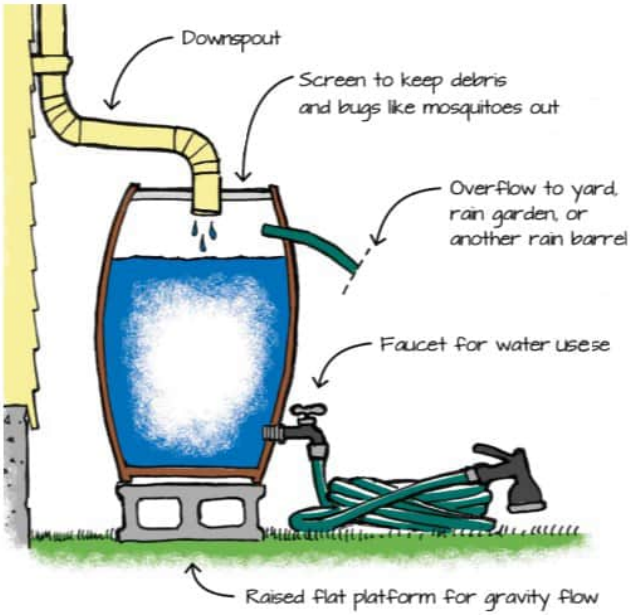
Establishing a low mow zone or no mow zone around the stream along with planting perennial plants will help to improve water quality and create wildlife habitat. Planting shrub willow, alders, dogwood trees and other native perennials that can withstand seasonal inundation will create a stable stream buffer and increase flood resiliency.

Rain Barrels

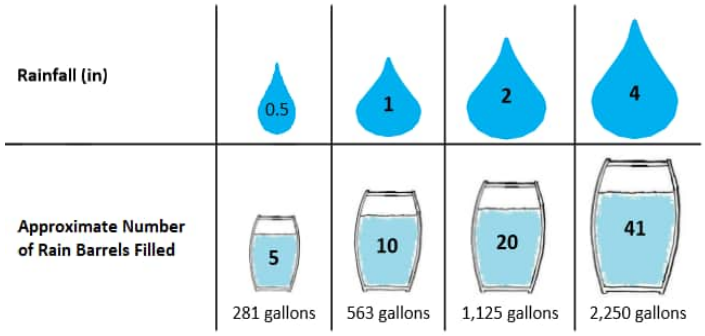
Rain Barrels are relatively easy to install, help retain water on your property, and give you a great resource for gardening. A barrel can come in many shapes and sizes and attach directly to the gutter downspout or be filled with a rain chain. Keeping your barrel covered stops mosquitos from reproducing in it. Check the barrel before a big storm comes to make sure it can handle the water coming its way.

Rain barrels can be purchased new from local hardware stores or online vendors, or you can build one yourself. Visit http://rethinkrunoff.org/educational-resources/install-a-rain-barrel/ to download detailed instructions for a DIY project or check out our instructional video at https://www.youtube.com/watch?v=5zWy5MGR724&t=30s

For more information see the VT Guide to Storm Water Management for Homeowners and Small Businesses—page 18.



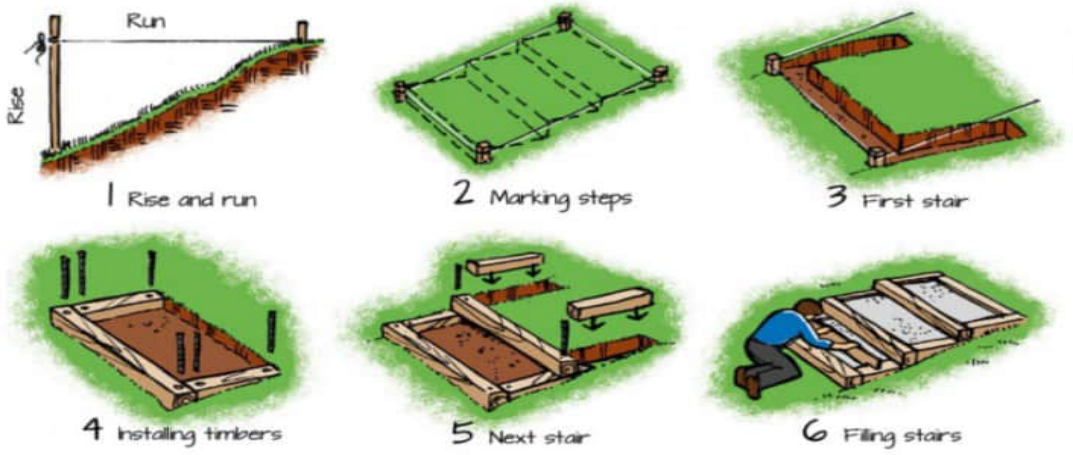
You could consider disconnecting your downspout and adding a rain barrel to prevent the soil erosion along foundation of the home. You already have a good infiltration trench system, maintaining it is key to preventing runoff!



Extend gutters or add dry well under rain barrel to catch the storm-water runoff sheeting off the solar panels.

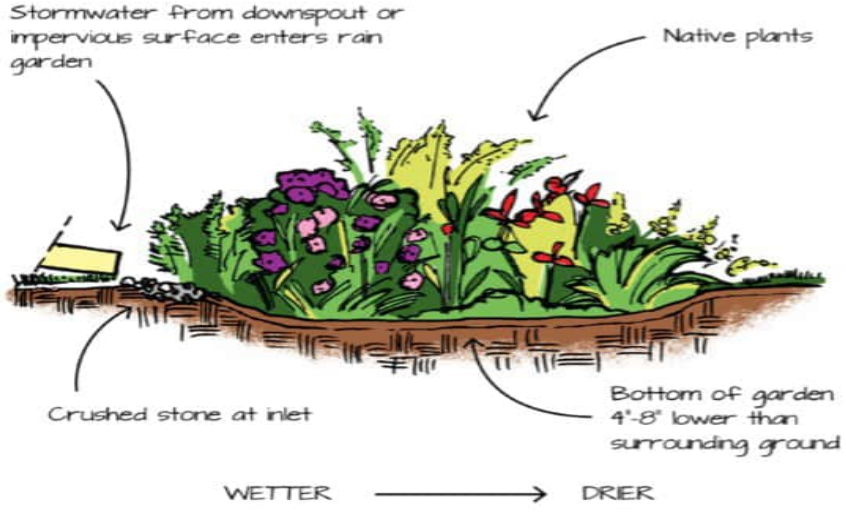
Yard Area Continued

Terraced raised beds will provide space and adequate soil composition for gardening. In addition, there is an added benefit of reducing the surface area of the lawn which does not retain much surface water, due to grass having relatively short roots, and stabilizing the steep bank. For More information on infiltration stair see the VT Guide to Storm Water Management for Homeowners and Small Businesses on page 31.



Rain Garden

Rain Gardens capture and slow water that runs off parking lots, driveways, and walkways. They use native plants to slow and filter water. Ultimately water is either infiltrated into the ground or is absorbed by the plants and release back into the atmosphere. Plants used in rain gardens should be both drought resistant and able to handle prolonged periods of submersion in water.



VT Guide to Storm Water Management for Homeowners and Small Businesses—page 30

Build a retention wall at the base of the vegetated area in your yard (uphill of the driveway) can stop water moving off the property and carrying debris into the culvert pipe. A significant amount of runoff flows through this point of your property before exiting, so capturing as much water as possible here could significantly impact the volume of water that ultimately moves down the watershed.

The wall could be constructed with wood, stone or brick. You could add a layer of crushed stone at the bottom for improved infiltration. Next, add some additional soil and plant water-loving native species like: Blue flag iris, Black Eyed Susan, New England Aster, Milkweed, Coneflower, Daylilies and Bee Balm (monarda).

Driveway

Clean out debris from culvert pipe so water can flow through as it moves off your property. Potentially build rain garden on the other end of culvert so minimize water moving through.

To prevent erosion, flowing water should be directed off driveway surfaces as quickly as possible. Properly graded driveways have a crown (high point) to do this. Crowns are generally located in the middle of the driveway, although a high point can be established on either side. See cross-sections below. Additionally, water bars can direct runoff away from driveways. See page 23 for water bar instructions. INSTRUCTIONS Grade your driveway based on one of the following cross-sections. Shaping is site-specific and any of these variations will direct flow off your driveway.

The drive way is an area on the property that can be improved to be more Storm Smart. It currently has some erosion from regular use. One way to improve this is to recrown the drive way so that water is diverted to the sides where it can be absorbed by vegetation. Regrading the driveway is a great option that would allow for more on site infiltration. Planting native perennials along the edge of the drive way or creating a vegetated swale will also increase the water retention potential on site, as the vegetation will absorb excess runoff. More information on regrading a driveway can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses—page 42.

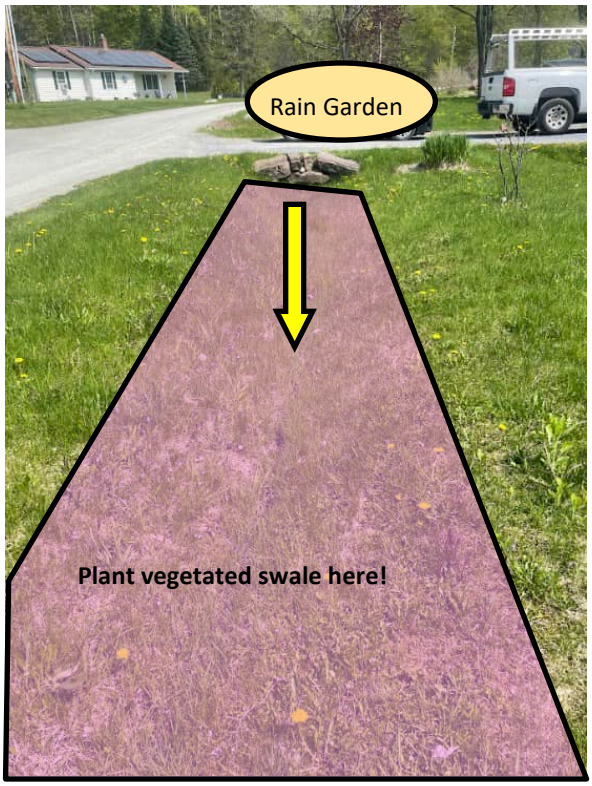
CROWNED DRIVEWAY
High point in the center

IN-SLOPED DRIVEWAY
High point on outside edge

OUT-SLOPED DRIVEWAY
High point on inside edge

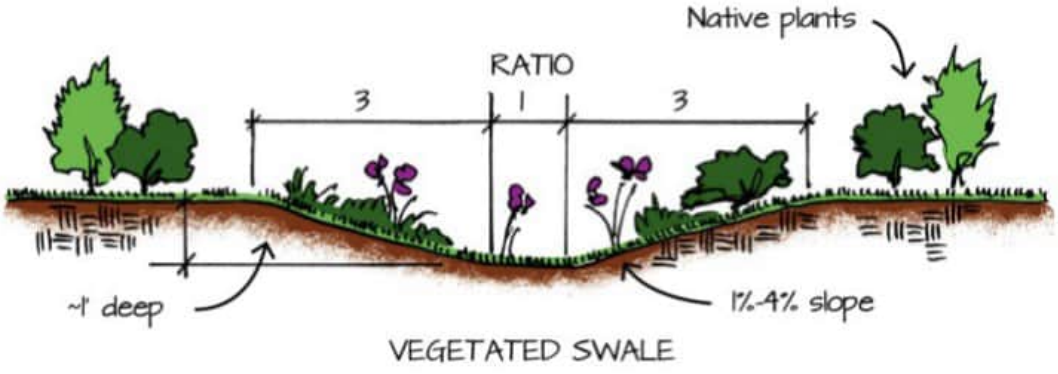
Vegetated Swale

Vegetated Swales are broad channels that slow, infiltrate, and direct water. They are often used in conjunction with check dams to improve their ability to slow water and capture sediment. Swales are a good choice for relatively flat parking areas or driveways and can be used to direct water towards more stable ground.



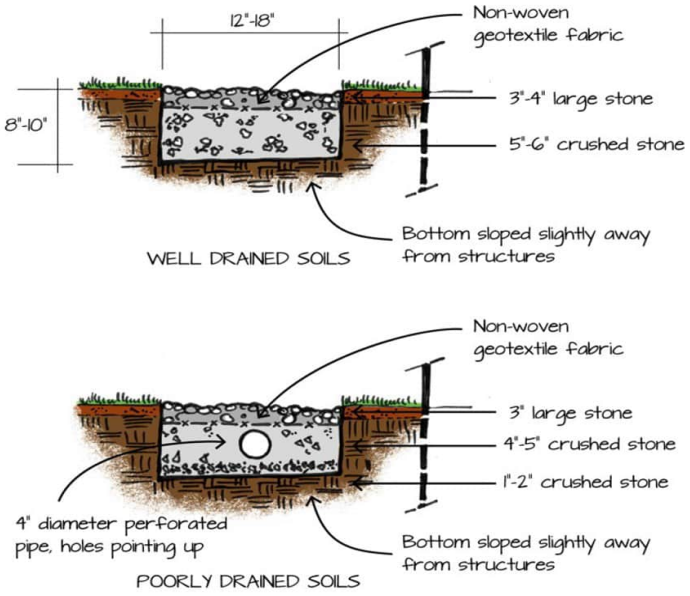
Good use of stone channel to divert stormwater to a more stable buffer!

VT Guide to Storm Water Management for Homeowners and Small Businesses—page 28

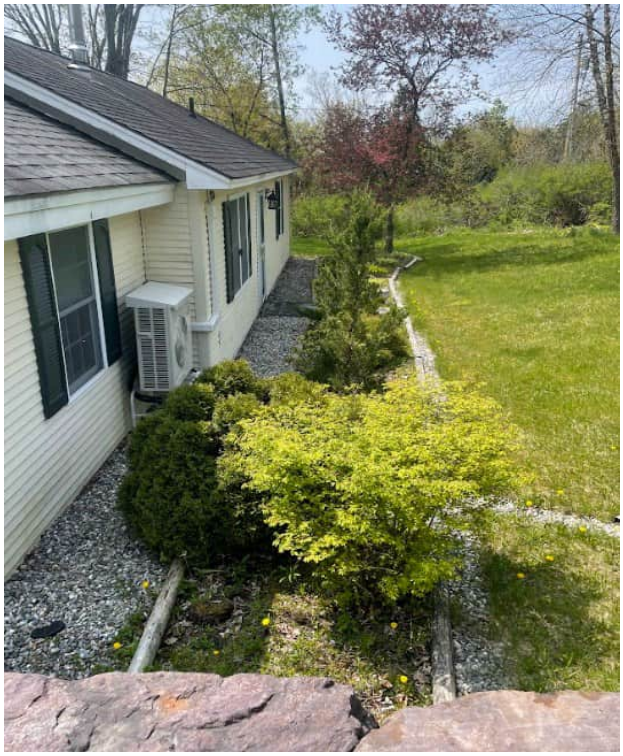


Infiltration trench

Infiltration trenches are shallow, stone lined channels that capture water from impervious surfaces (like roof tops) and infiltrate it into the ground. In less well drained soils an Infiltration Trench is outfitted with a pipe to convey water that risks pooling. More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.



The infiltration trench system at the front of the house looks great, consider wrapping it around the side of the house too where soil is eroded from roof runoff.

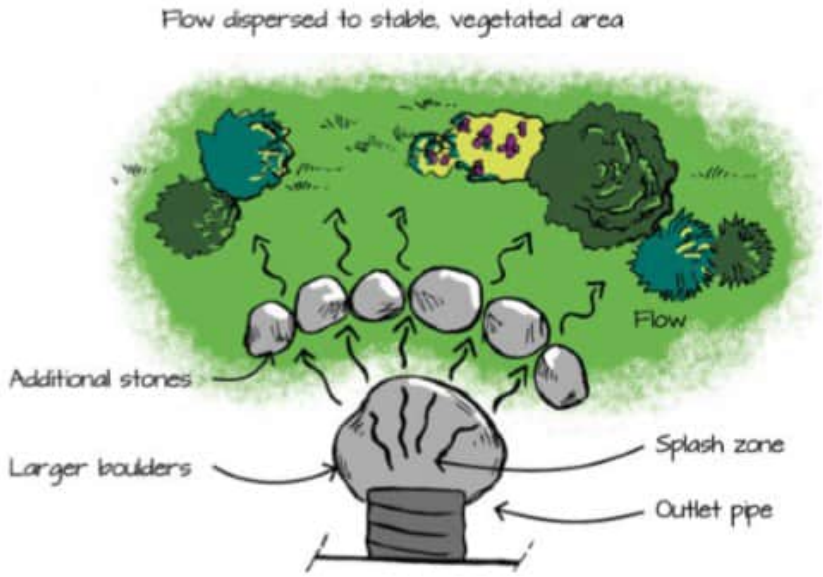


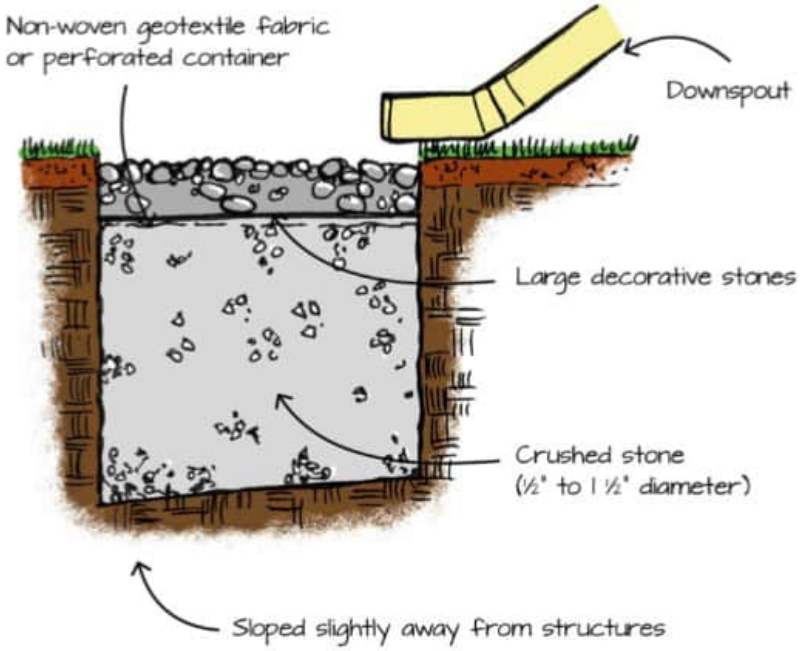
4. Construction Details

Being Storm Smart can save you time and money cleaning up after storms, help keep your downstream neighbors safe, protect fish and other aquatic life, and give us all more summer days of swimming in crystal clear water. These diagrams incorporated in the recommendation sections and more below can help you make being Storm Smart a reality.

Energy Diffuser

Energy diffusers are made by placing a large rock or boulder under the outlet of a culvert or downspout. The rock provides a stable surface for flowing water to impact and lose energy before it continues downhill. With less energy behind it the water is less likely to cause erosion that can destabilize the culvert.



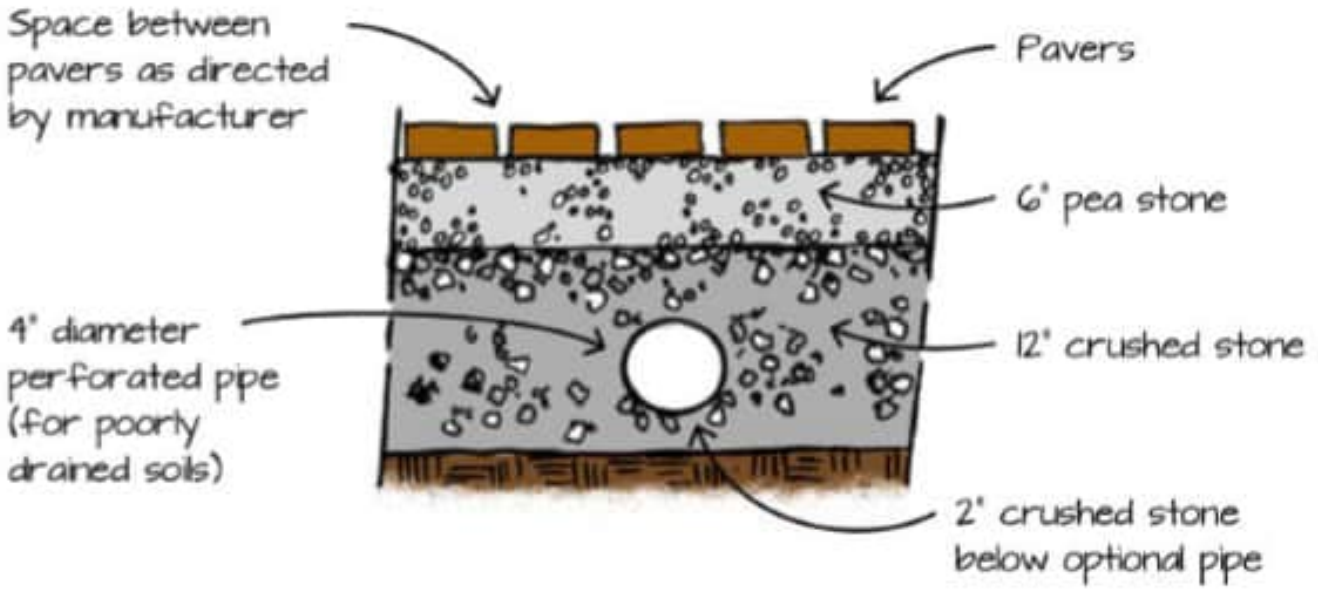


Dry Well

Dry wells are an effective way to infiltrate water from roofs or other concentrated areas so long as the soil is relatively well drained. The well is a hole dug out of the ground that is lined with geotextile fabric or holds a perforated container. Crushed stone slows and filters the water before it infiltrates into the ground water.

Permeable Pavers

Permeable pavers allow stormwater to be infiltrated into the ground through gaps between the pavers. This water then flows through crushed stone into the groundwater below. If the soil is not particularly well drained a perforated pipe can be installed that will direct water to a stable outlet downhill from the driveway.



VT Guide to Storm Water Management for Homeowners and Small Businesses—page 34

5. Further Resources

VT Guide to Stormwater Management— A document with great information about managing stormwater at home

http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-06-14%20VT_Guide_to_Stormwater_for_Homeowners.pdf

Agency of Natural Resources Atlas– Free online mapping software to explore the natural resources around your home

http://anrmaps.vermont.gov/websites/anra5/

Vermont Department of Environmental Conservation Stormwater—Information about green stormwater infrastructure

http://dec.vermont.gov/watershed/cwi/green-infrastructure

The Vermont Rain Garden Manual: Gardening to Absorb the Storm—A guide to building your own rain garden with emphasis on using plants that are native to Vermont

http://winooskinrcd.org/wp-content/uploads/VTRainGardenManual.pdf

Better Backroads Manual—A guide to managing dirt and gravel roads that can be useful if you have a long driveway
https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf

Friends of the Winooski: Preventing Driveway Erosion—Strategies for managing dirt and gravel driveways
https://winooskiriver.org/uploads/files/Driveway_Road%20Maintenance.pdf

Household Septic Maintenance Factsheet — WNRCD

http://winooskinrcd.org/wp-content/uploads/managing-HH-septic-factsheet.pdf

Winooski Natural Resources Conservation District —Find other ways to get involved at our website

www.winooskinrcd.org

Rethink Runoff Stream Team

www.rethinkrunoff.org

6. Storm Smart Support

Thank you for being a good neighbor and working to make our watershed resilient. If you are interested in having a follow up assessment or would like some hands-on help installing or maintaining your Green Stormwater Infrastructure please get in touch. I am happy to schedule a time to help make your property Storm Smart.

If you want to spread the word please feel free to share my contact information with your neighbors or anyone else you think might be interested. If there are any questions I can be reached by email at Adelaide@winooskinrcd.org

Storm Smart Assessment

Lisa Thompson

260 Pine Shore Drive Hinesburg VT 05461

Thank you for your time and commitment to healthy land, clean water, and a vibrant community!

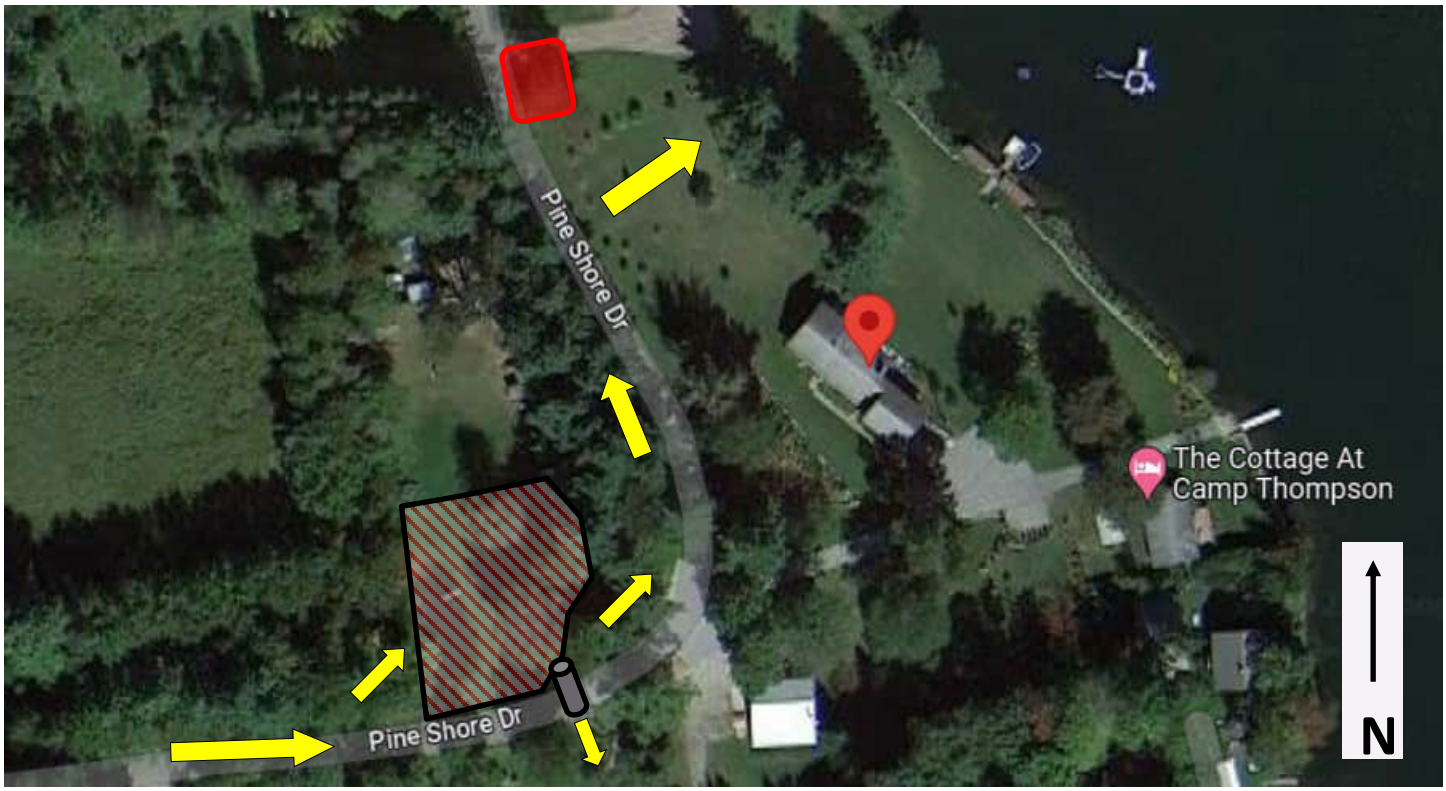
Contents

1. Summary of Visit

On May 18th 2023 Adelaide Dumm, Winooski Natural Resources Conservation District Conservation Specialist visited Lisa's property at 260 Pine Shore Drive in Hinesburg. The property is in the Lake Iroquois Patrick Brook Watershed, that drains to the LaPlatte River and eventually drains into Lake Champlain. The Stormwater runoff from the Pine Shore Drive flows onto Lisa's property and has deposited a substantial amount of sediment into the pond on her property and has caused erosion issues on its way into Lake Iroquois. The runoff occurring is of particular concern due to the close proximity to Lake Iroquois, this assessment was conducted as part of the Lake Iroquois Watershed Action Plan. There were a few storm smart solutions identified that can be implemented on the property. The property owner expressed interest in improving storm water management to prevent future soil erosion and seasonal flooding. The stewardship of the land will contribute to the greater well-being of plants, animals and people downstream.

Due to Lisa's existing Lake Wise Award we focused the Storm Smart Assessment on the upper portion of the property where she had concern about Stormwater runoff. Green Stormwater Infrastructure (GSI) solutions to the current runoff issues include maintaining the shoulders of the roadway with a vegetated swales and implementing BMPs on the field above her home to keep Stormwater on site. Planting a vegetation swale on her property along Pine Shore Drive will absorb and slow down runoff. Adding a series of check dams within the swale and constructing a rain garden in the field and before the water flows into the retention pond will help increase the water holding capacity on site by promoting the infiltration of storm water. Planting more perennials, like trees and shrubs, and establishing low mow zones is a low maintenance solution and will aid in decreasing the volume of Stormwater making its way down the road and into the lake. Working collaboratively with neighbors, Mark and Michelle Reid, to construct filter berms would also help direct runoff to a more stable vegetated area on her property. The maintenance and instillation of native plants along the sloped edges of the property will slow water down, allow for more soil infiltration, and increase water uptake by roots of perennial plants. Increasing the presence of native plants on site in the rain garden and incorporating vegetated "speed bumps" will also promote pollinators and create wildlife habitat. Overall, there are improvements to be made but the landowner is motivated and has already started on some of the projects mentioned.

Site Map– Areas of Concern



Area prone to seasonal flooding

Sloped lawn drains toward drive way

Area of erosion with bare soil exposed.

Opportunity Map

It was somewhat unclear who is responsible for road maintenance.

Coordinating with neighbors and or the town for maintenance may make it more feasible.

Establish a Vegetated swale with native perennial shrubs to stabilize slope by road side in vegetated swale

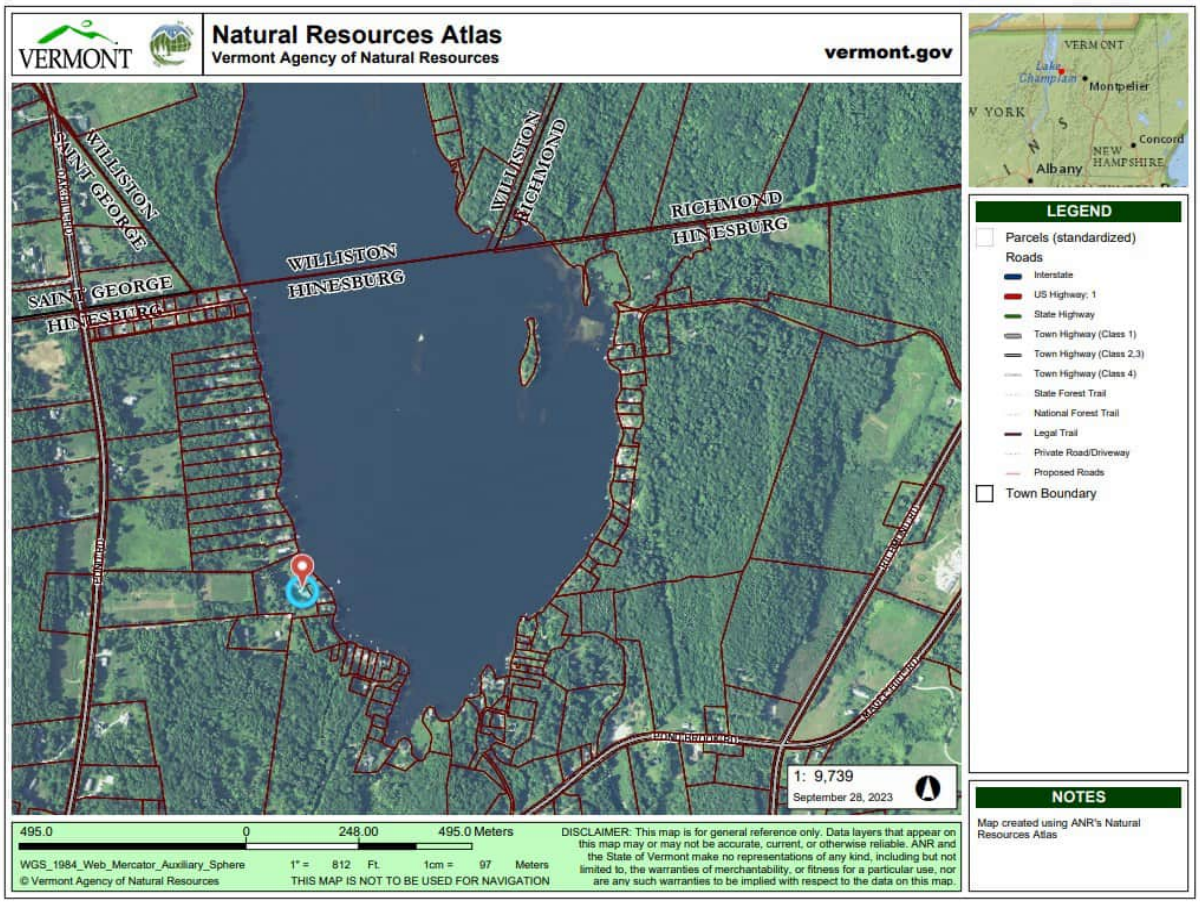
Plant native perennials around home to hold soil in place

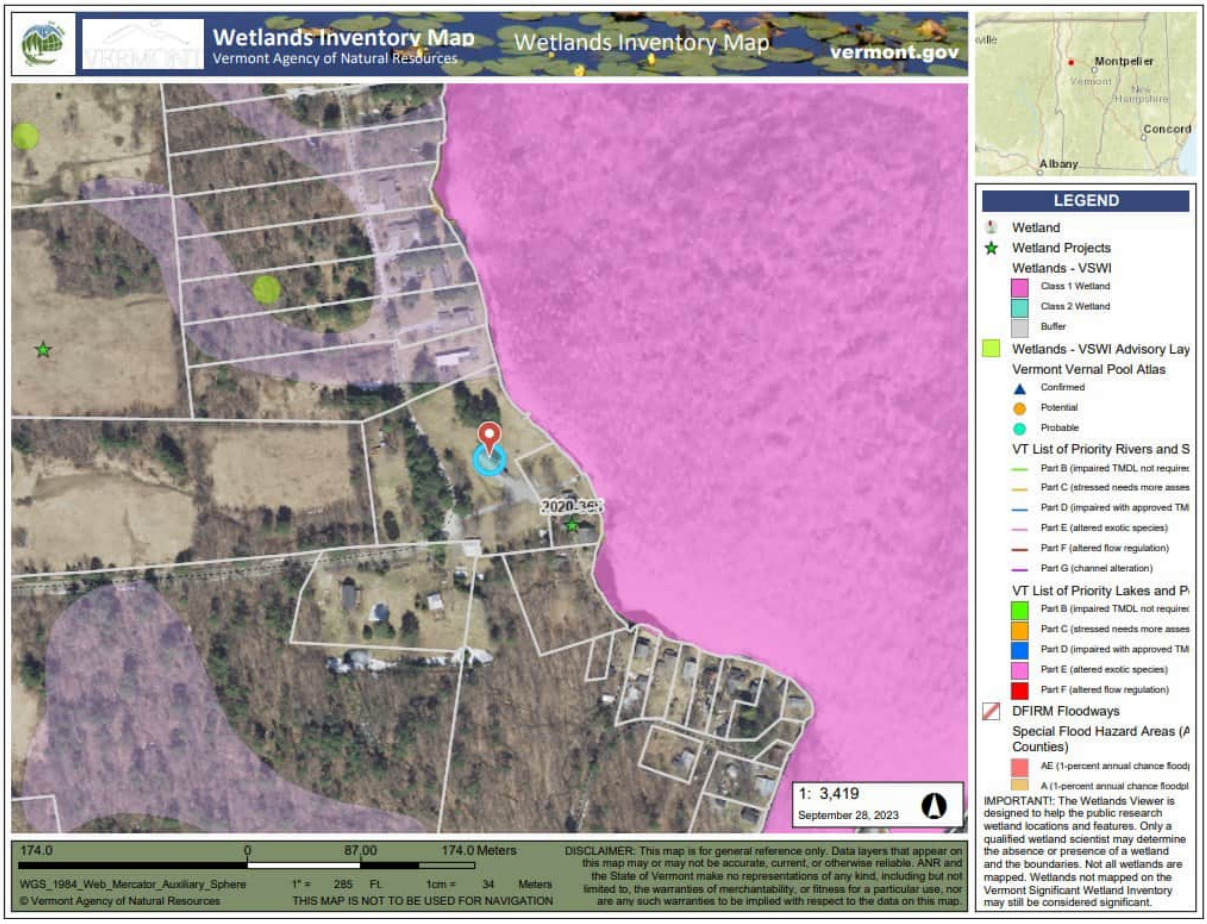
Construct “speed bumps” or Filter Berms to slow down runoff

Check Dams along swale

Install rain garden or catch-ment area in the grass field from swale to infiltrate storm-water

Establish “No Mow” zones


VERMONT
Natural Resources Atlas
Vermont Agency of Natural Resources
vermont.gov
WILLISTON
HINESBURG
SAINT GEORGE
HINESBURG
RICHMOND
HINESBURG
WILLISTON
RICHMOND
VERMONT
Lake Champlain
Montpelier
NEW YORK
Concord
NEW HAMPSHIRE
Albany
LEGEND
Parcels (standardized)
Roads
Interstate
US Highway; 1
State Highway
Town Highway (Class 1)
Town Highway (Class 2,3)
Town Highway (Class 4)
State Forest Trail
National Forest Trail
Legal Trail
Private Road/Driveway
Proposed Roads
Town Boundary
NOTES
Map created using ANR's Natural Resources Atlas
1: 9,739
September 28, 2023
495.0 0 248.00 495.0 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
1" = 812 Ft. 1cm = 97 Meters
© Vermont Agency of Natural Resources
THIS MAP IS NOT TO BE USED FOR NAVIGATION
DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.


Wetlands Inventory Map
Vermont Agency of Natural Resources
Wetlands Inventory Map
vermont.gov
Montpelier
Vermont
New Hampshire
Concord
Albany
LEGEND
Wetland
Wetland Projects
Wetlands - VSWI
Class 1 Wetland
Class 2 Wetland
Buffer
Wetlands - VSWI Advisory Lay
Vermont Vernal Pool Atlas
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VT List of Priority Rivers and S
Part B (impaired TMDL not require
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Part D (impaired with approved TM
Part E (altered exotic species)
Part F (altered flow regulation)
Part G (channel alteration)
VT List of Priority Lakes and P
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DFIRM Floodways
Special Flood Hazard Areas (A
Counties)
AE (1-percent annual chance flood
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IMPORTANT! The Wetlands Viewer is designed to help the public research wetland locations and features. Only a qualified wetland scientist may determine the absence or presence of a wetland and the boundaries. Not all wetlands are mapped. Wetlands not mapped on the Vermont Significant Wetland Inventory may still be considered significant.
1: 3,419
September 28, 2023
174.0 0 87.00 174.0 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
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© Vermont Agency of Natural Resources
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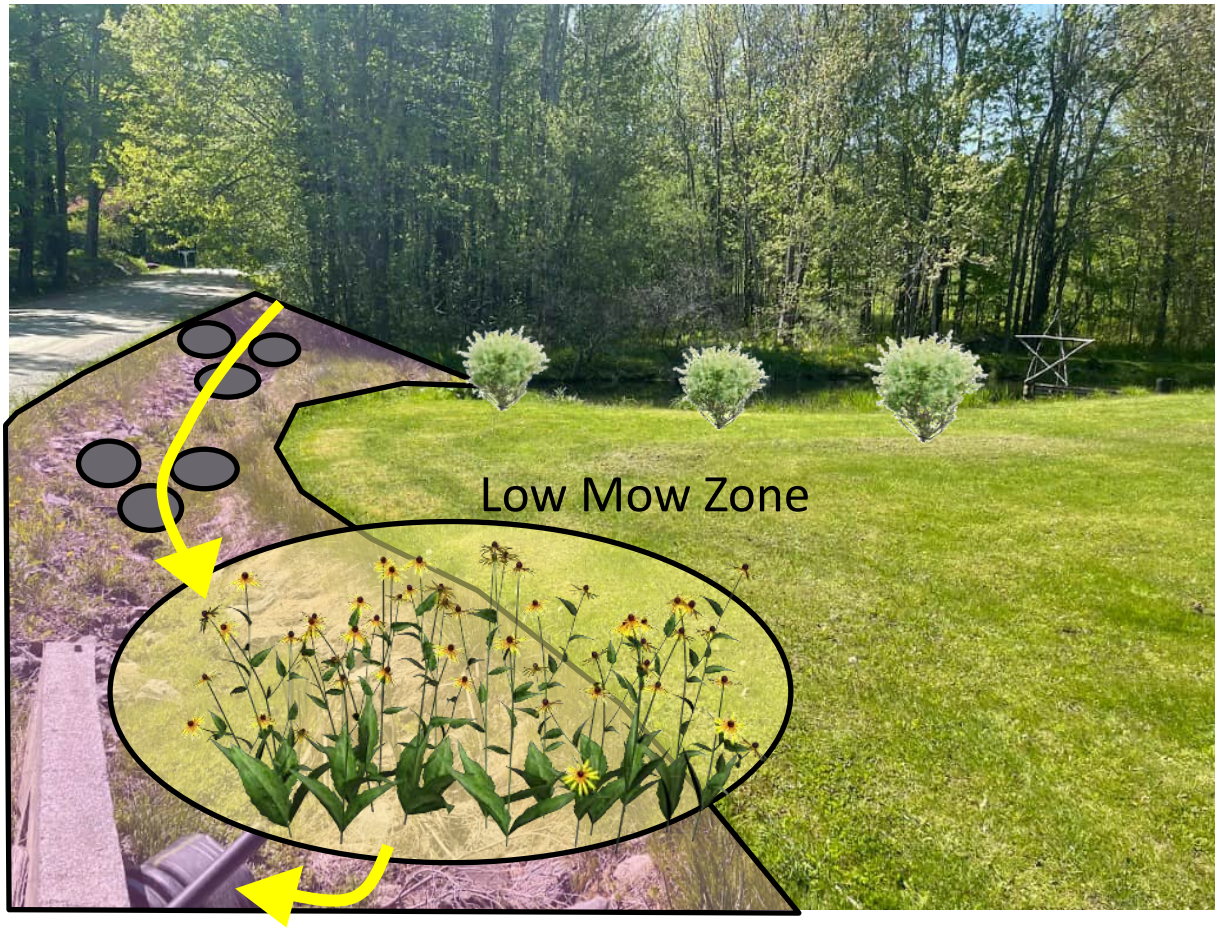
3. Recommendations and Maintenance

Green Stormwater Infrastructure (GSI) and Best Management Practices (BMP) are management methods that help stormwater runoff sink in, spread out, and slow down on your property, stopping erosion and keeping our streams clear. These recommendations for one time fixes and regular maintenance are steps you can take on your property to make your home Storm Smart.

Grass Field



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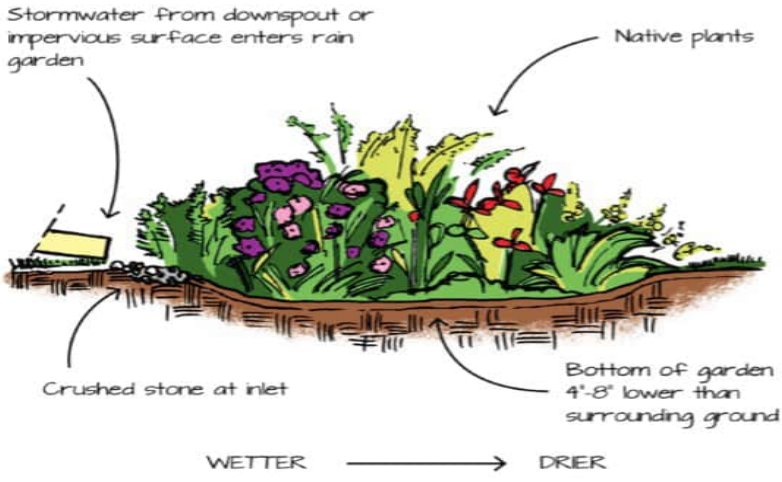

VT Guide to Storm Water Management for Homeowners and Small Businesses—page 30

Ponds on the property

The ponds on the property have received sediment deposited from Stormwater runoff. Increasing the vegetation around the pond will work in collaboration with the other GSI techniques mentioned to slow down, spread out, and sink in sediment laden Stormwater runoff before it hits the pond.

Lisa received grant funding and assistance to construct the retention pond to the right in an effort to mitigate some of the Stormwater runoff. It has become well established with native vegetation and is a home for wildlife.

Low Mow Zones and Native Plants

- In comparison to Kentucky Blue Grass most native plants have deeper more complex root systems that do a better job stabilizing soil and absorbing water. These plants are slower growing than many of their foreign counterparts and by letting whole areas of your lawn grow tall they can have a chance to establish themselves.
- Native plants can be sourced from a variety of businesses and organizations. Below is a brief list. Check this website to be sure that the species you select are not invasive to the region https://www.vtinvasives.org/
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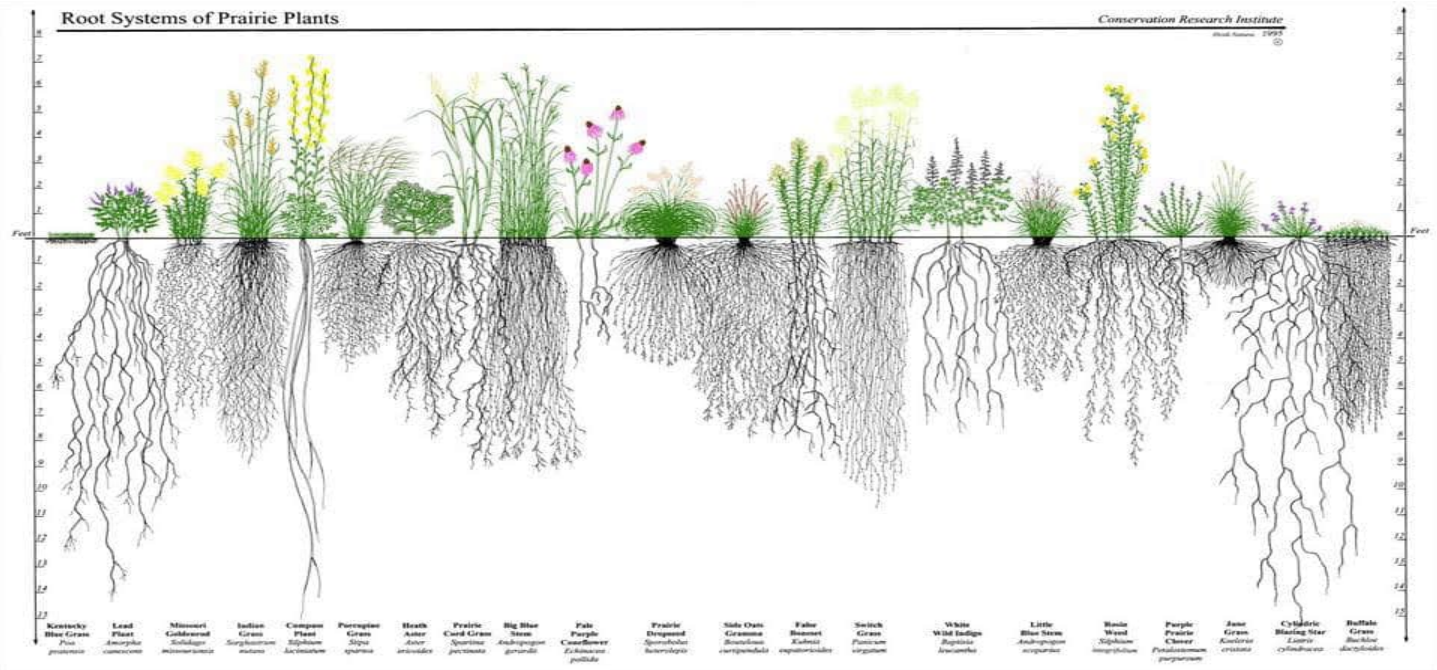

Alliance for the Chesapeake Bay

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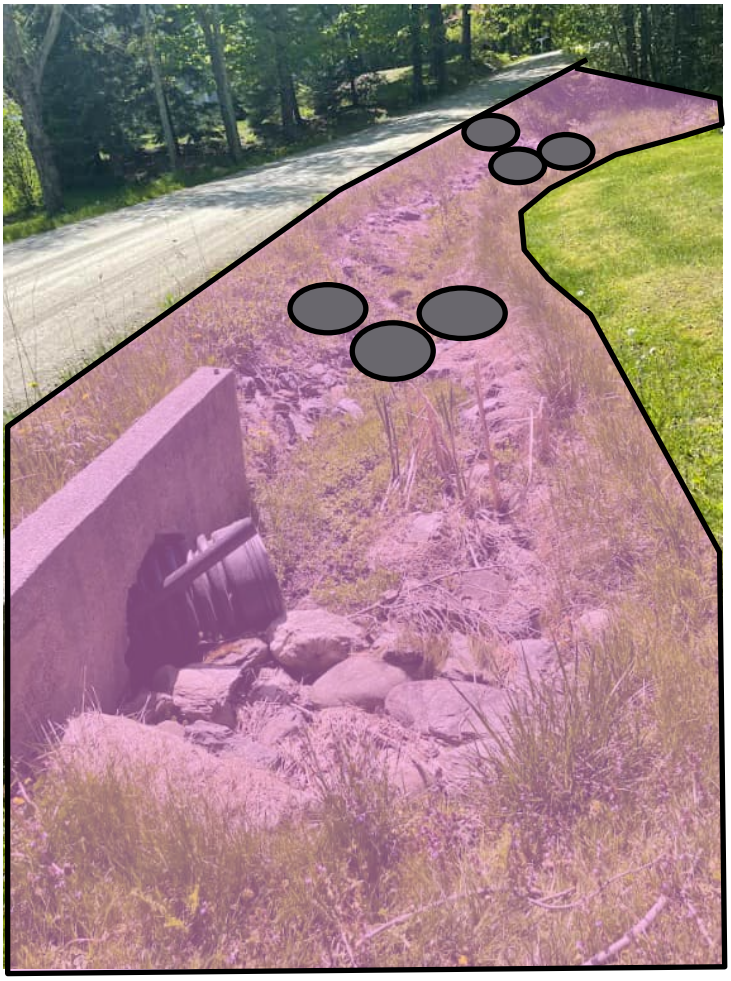
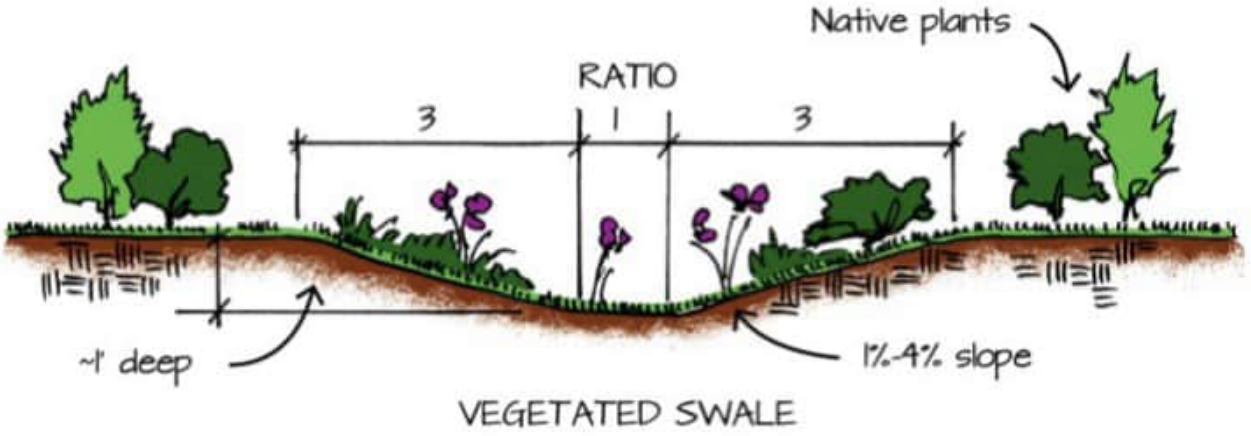
Vegetated Swale

Vegetated Swales are broad channels that slow, infiltrate, and direct water. They are often used in conjunction with check dams to improve their ability to slow water and capture sediment. Swales are a good choice for relatively flat parking areas or driveways and can be used to direct water towards more stable ground.

The amount and size of plants has a direct impact on the amount of surface runoff during storms. Generally, plants that absorb rainfall well are deep-rooted perennials and woody shrubs and trees. When selecting plants it is important to choose "the right plant for the right place" by paying attention to each species' soil moisture and sun/shade requirements. Native plants are recommended since they are adapted to Vermont's climate, provide the appropriate food sources for birds and butterflies, and fit well aesthetically into the landscape.





VEGETATED SWALE

The road side along Pine Shore Drive received a lot of stormwater runoff but it properly crowned and effectively directs water to the drainage swales along the side. The privately owned property along Pine Shore Drive is an area that can be improved to be more Storm Smart as it currently has some erosion. Planting native perennials along the edge of the road or creating a vegetated swale will increase the water retention potential on site, as the vegetation will absorb excess runoff. More information can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses—page 42.

Work Collaboratively with neighbors to reduce Stormwater runoff

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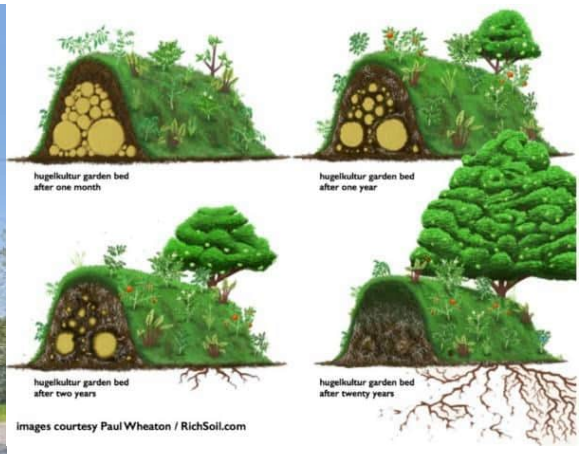
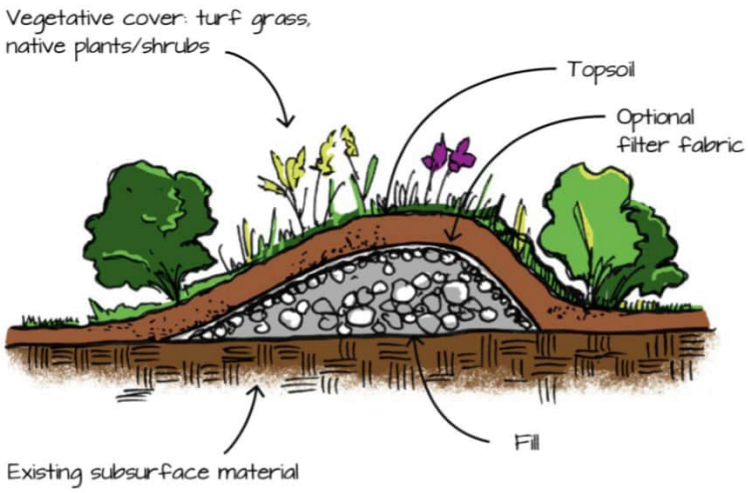


Filter Berms

Filter berms capture and slow water that runs off parking lots, driveways, and walkways. Their interior is filled with stable, well drained material that absorbs and slows stormwater runoff. Vegetation on the outside of the berm provides more structure and helps further slow stormwater.

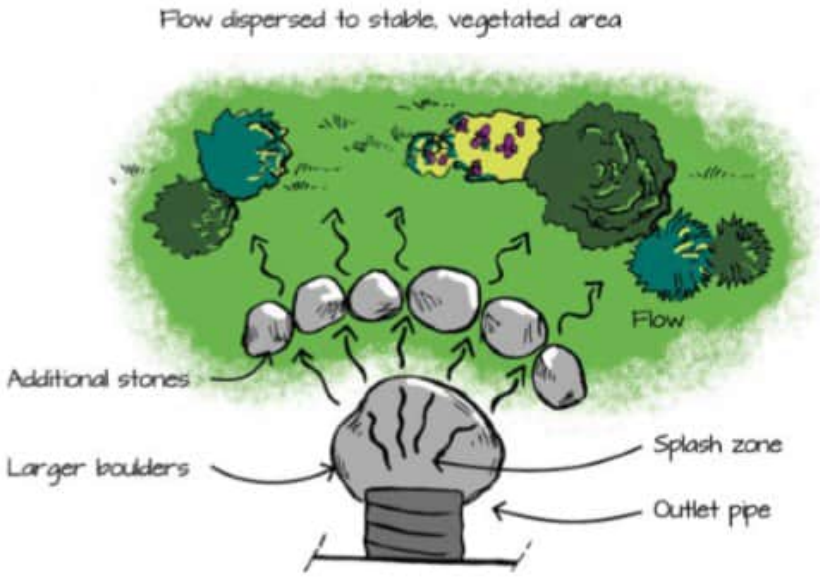


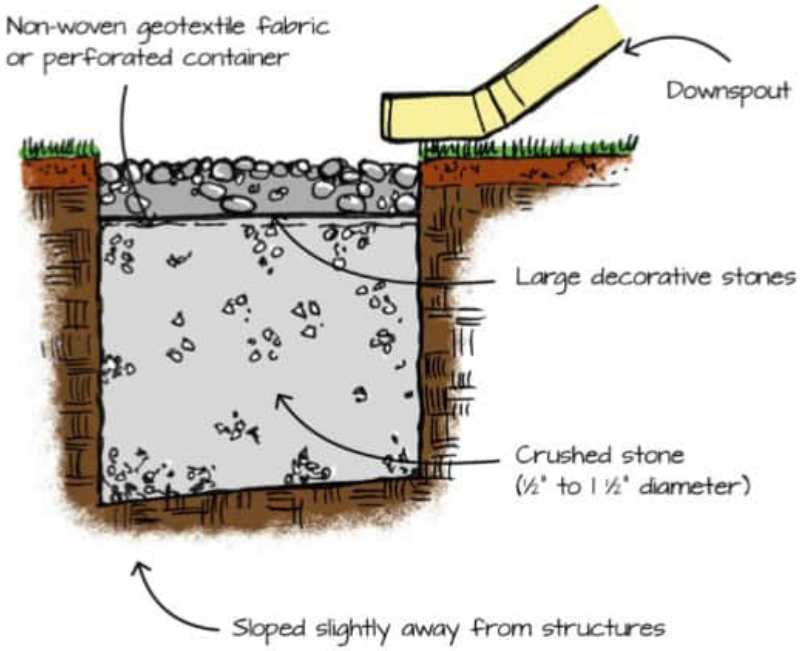
4. Construction Details

Being Storm Smart can save you time and money cleaning up after storms, help keep your downstream neighbors safe, protect fish and other aquatic life, and give us all more summer days of swimming in crystal clear water. These diagrams incorporated in the recommendation sections and more below can help you make being Storm Smart a reality.

Energy Diffuser

Energy diffusers are made by placing a large rock or boulder under the outlet of a culvert or downspout. The rock provides a stable surface for flowing water to impact and lose energy before it continues downhill. With less energy behind it the water is less likely to cause erosion that can destabilize the culvert.



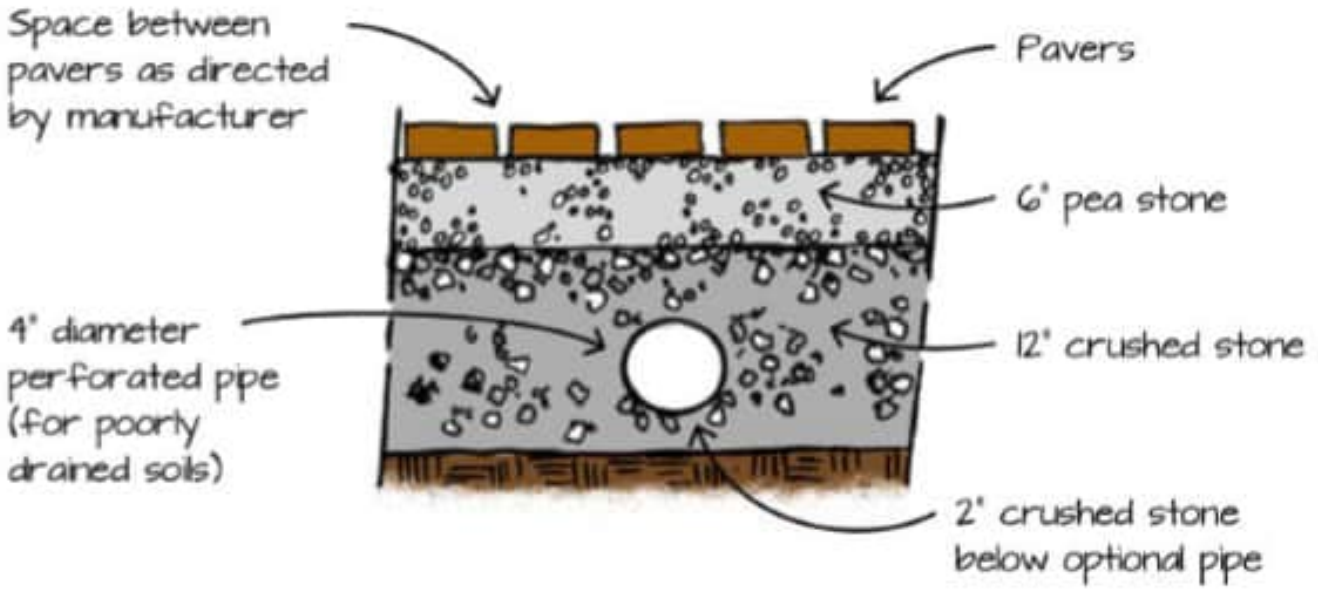


Dry Well

Dry wells are an effective way to infiltrate water from roofs or other concentrated areas so long as the soil is relatively well drained. The well is a hole dug out of the ground that is lined with geotextile fabric or holds a perforated container. Crushed stone slows and filters the water before it infiltrates into the ground water.

Permeable Pavers

Permeable pavers allow stormwater to be infiltrated into the ground through gaps between the pavers. This water then flows through crushed stone into the groundwater below. If the soil is not particularly well drained a perforated pipe can be installed that will direct water to a stable outlet downhill from the driveway.



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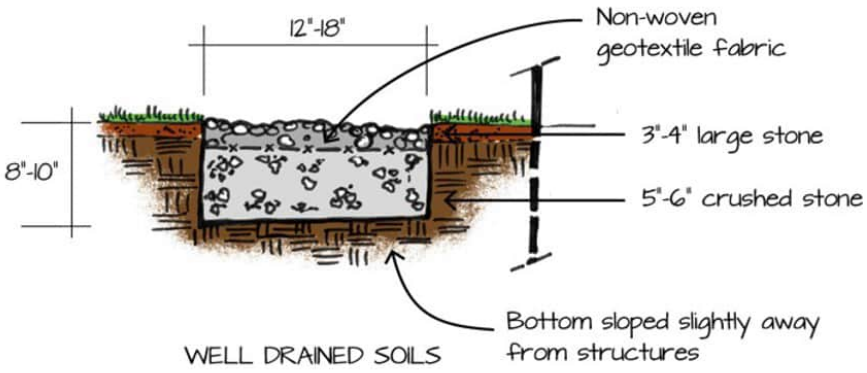
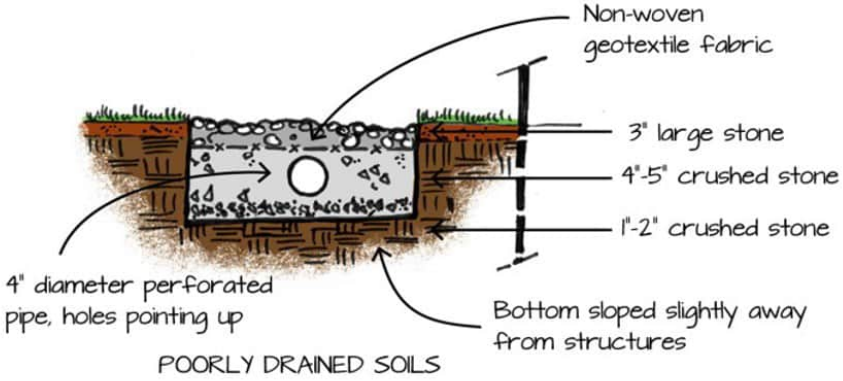
Infiltration trench

Infiltration trenches are shallow, stone lined channels that capture water from impervious surfaces (like roof tops) and infiltrate it into the ground. In less well drained soils an Infiltration Trench is outfitted with a pipe to convey water that risks pooling. More information on this can be found in the VT Guide to Storm Water Management for Homeowners and Small Businesses, listed in the Further Resources section on page 13.





5. Further Resources

VT Guide to Stormwater Management— A document with great information about managing stormwater at home

http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-06-14%20VT_Guide_to_Stormwater_for_Homeowners.pdf

Agency of Natural Resources Atlas– Free online mapping software to explore the natural resources around your home

http://anrmaps.vermont.gov/websites/anra5/

Vermont Department of Environmental Conservation Stormwater—Information about green stormwater infrastructure

http://dec.vermont.gov/watershed/cwi/green-infrastructure

The Vermont Rain Garden Manual: Gardening to Absorb the Storm—A guide to building your own rain garden with emphasis on using plants that are native to Vermont

http://winooskinrcd.org/wp-content/uploads/VTRainGardenManual.pdf

Better Backroads Manual—A guide to managing dirt and gravel roads that can be useful if you have a long driveway
https://vtrans.vermont.gov/sites/aot/files/highway/2009%20Better%20Backroads%20Manual.pdf

Friends of the Winooski: Preventing Driveway Erosion—Strategies for managing dirt and gravel driveways
https://winooskiriver.org/uploads/files/Driveway_Road%20Maintenance.pdf

Household Septic Maintenance Factsheet — WNRCD

http://winooskinrcd.org/wp-content/uploads/managing-HH-septic-factsheet.pdf

Winooski Natural Resources Conservation District —Find other ways to get involved at our website

www.winooskinrcd.org

Rethink Runoff Stream Team

www.rethinkrunoff.org

6. Storm Smart Support

Thank you for being a good neighbor and working to make our watershed resilient. If you are interested in having a follow up assessment or would like some hands-on help installing or maintaining your Green Stormwater Infrastructure please get in touch. I am happy to schedule a time to help make your property Storm Smart.

If you want to spread the word please feel free to share my contact information with your neighbors or anyone else you think might be interested. If there are any questions I can be reached by email at Adelaide@winooskinrcd.org