Columbia Lake
Watershed Protection
For the sake of the Lake !

HISTORY

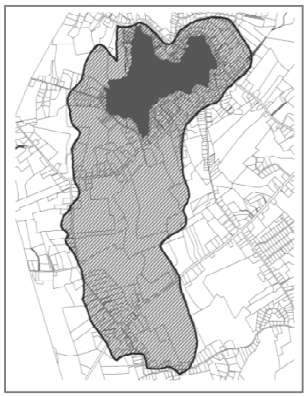
Originally created as a reservoir for a textile mill in 1865, Columbia Lake is now owned and maintained by the Town for the enjoyment of its residents. Because the Lake is a highly valued resource, the Town formed a Lake Management Advisory Committee to monitor quality of the water. In 1998, with the help of a limnologist (a specialist in the study of freshwater ponds and lakes) a comprehensive Lake Management Plan was developed.

PROTECTING COLUMBIA LAKE

The Plan is based on scientific research of Columbia Lake and existing impacts of land-use and water-use activities. The Plan is specific to Columbia Lake. It was developed by Columbia residents, aided by town land use department staff and experts in lake management.

One of the primary causes of degradation of water quality is eutrophication, a process caused by additional nutrients, primarily phosphorus, getting into the water. Eutrophication results in algae blooms and increased weed growth. Ultimately, eutrophication decreases water clarity and quality. Unlike rivers and streams, lakes are slow to recover from eutrophication.

How does phosphorus get into Columbia Lake? Most phosphorus is carried to the lake by stormwater after a rainfall or snowmelt. As the water flows across the ground it picks up phosphorus from organic and inorganic materials, fertilizer and soil particles. The phosphorus goes directly into the lake unless the water transporting it slows enough to seep into the soil, where phosphorus is naturally removed.



The shaded area of this map shows the watershed of Columbia Lake. A watershed is a bowl formed by higher terrain; any water falling within the bowl flows by gravity across land, through streams and groundwater, to the lowest point, in this case into Columbia Lake. All activity within the Columbia Lake watershed affects the health and water quality of the lake.

The Lake Management Plan recommended a nutrient allocation assessment approach be used in the watershed. As a result Columbia adopted new zoning regulations (Section 21.4) in 2003.

APPLICANTS FOR PERMITS

As part of an application for any land-use activity within the watershed, the phosphorus runoff must be calculated. The goal is to limit the phosphorus runoff to a level that Columbia Lake can support. The first step is to determine the area in square feet of the various surfaces (roofs, driveways, lawns, gardens) on your property and then enter the totals on the Nutrient Allocation Data Worksheet. Town staff will apply the formulas developed by the limnologist to calculate how much phosphorus is leaving your property in stormwater. If it exceeds the maximum allowed, you will need to use Best Management Practices (BMPs) to increase the infiltration of stormwater. Using BMPs will reduce the amount of phosphorus entering Columbia Lake and you will be helping to protect Columbia Lake's water quality.

Nutrient Allocation Data Worksheet
of Property Surface Types

Land Owner: _____

Address: _____

Assessor's Map / Parcel: _____/_____

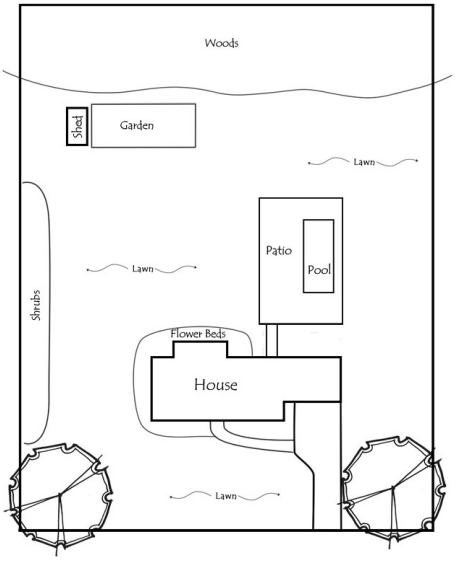
Lot Size: [ ] Square Feet

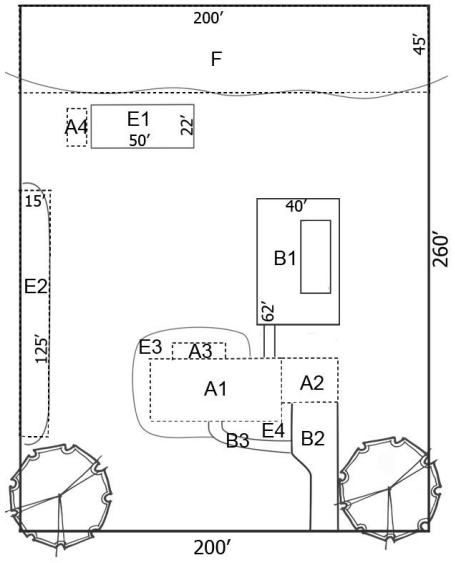
Please make a sketch of your property. Then measure the area of different surface types and enter the total of each type into the table below. Submit this page, and the sketch, to the Land Use Department.

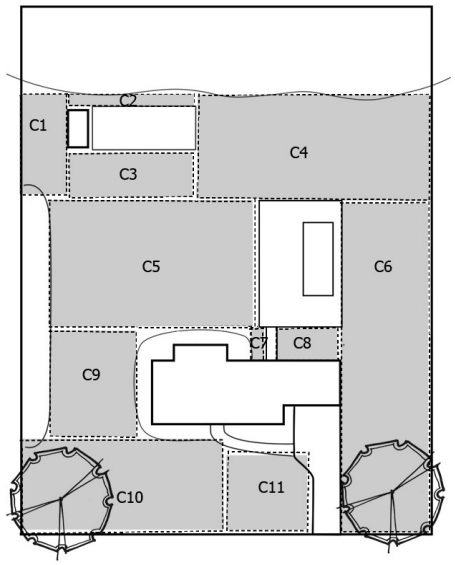
		Total Sq Ft	Include:
A	Total roof area	[ ]	roof area of house, garage, gazebo, porch, shed, etc *phosphorous factor 1.3*
B	Total paved surface area	[ ]	paved, concrete surfaces (driveway, walks, patio, swimming pools, solid decks) *phosphorous factor 1.5*
C	Total lawn area	[ ]	areas with lawn grass *phosphorous factor 1.0*
D	Total gravel area	[ ]	areas with a gravel surface (drives, walks, patio) *phosphorous factor 1.2*
E	Total garden area	[ ]	areas of vegetable gardens and un-mulched gardens *phosphorous factor 0.3*
F	Total woodlands & mulch	[ ]	areas of undisturbed woodlands and areas with 3" of mulch *phosphorous factor 0.1*
G	Total pond surfaces	[ ]	natural or man-made pond *phosphorous factor 0.2*
H	Total deck area	[ ]	if boards have gaps and there is gravel beneath, otherwise include with B paved surfaces. *phosphorous factor 1.2*
	Other	[ ]	describe _____
	Total	[ ]	Must equal the Lot Size

The phosphorous factor is based on the amount of phosphorous per acre that would flow annually off your property for each type of surface. The more pervious (porous) the surface, the more stormwater and phosphorous that can be absorbed into the ground limiting the phosphorous that would flow to Columbia Lake.

EXAMPLE OF MEASURING THE SURFACES OF A PROPERTY







The sketch to the left shows a property with a house, driveway, pool, patio, garden, flower beds and lawns. Each portion of a property has a type of surface and needs to be measured.

The next sketch shows how each surface is assigned a code, in this sketch, all other areas are lawn.

The last sketch shows the lawn divided into areas of rectangular shapes to make measuring easier.

Calculation for this Example Property

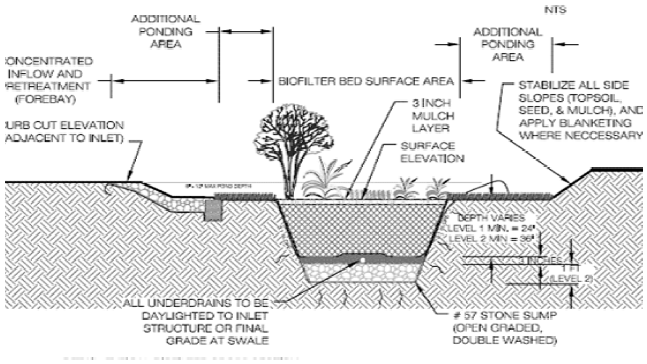
		length		width		area	
A-Roof	A1	65	x	30	=	1,950	
	A2	28	x	22	=	616	
	A3	26	x	8	=	208	
	A4	10	x	20	=	200	
						2,974	Total A
B-Paved	B1	62	x	40	=	2,480	
	B1a	15	x	5	=	75	
	B2	63	x	18	=	1,134	
	B3	42	x	5	=	210	
						3,899	Total B
C-Lawn	C1	20	x	50	=	1,000	
	C2	65	x	6	=	390	
	C3	70	x	25	=	1,750	
	C4	110	x	50	=	5,500	
	C5	105	x	63	=	6,615	
	C6	45	x	165	=	7,425	
	C7	8	x	18	=	144	
	C8	32	x	18	=	576	
	C9	44	x	58	=	2,552	
	C10	112	x	46	=	5,152	
	C11	45	x	40	=	1,800	
						32,904	Total C
D-Gravel	D	none	x		=		
E-Garden	E1	50	x	22	=	1,100	
	E2	125	x	15	=	1,875	
	E3	70	x	5	=	350	
	E4	20	x	6	=	120	
						3,445	Total E
F-Woods & 3” mulch	F	200	x	44	=	8,800	Total F
G-Pond	G	none	x		=		

EXAMPLES OF BEST MANAGEMENT PRACTICES (BMPS)

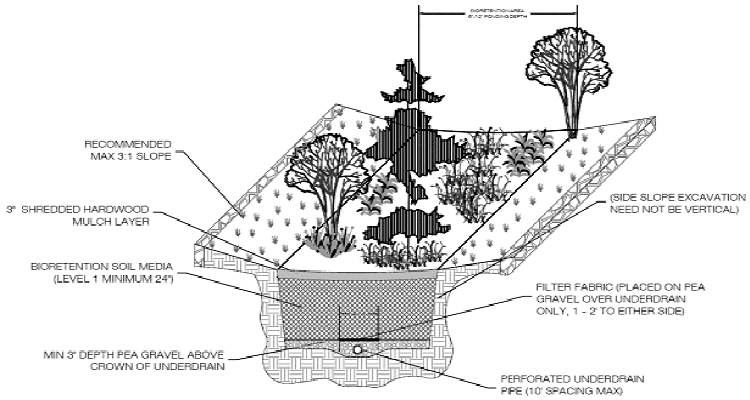
The phosphorus in stormwater can be reduced by using Best Management Practices (BMPs) to increase infiltration into the soil and the detention of stormwater before it reaches Columbia Lake. A few BMPs are listed below; each site is unique, you may need a professional engineer or landscape architect to assist you in finding the best solution for your property.

- CONVERSION TO NATIVE WOODLANDS

- RAIN GARDEN



- BIO-RETENTION AREA



- UNDERGROUND DETENTION (DRY WELL)