



### 'Large Scale Green Infrastructure'

Large scale green infrastructure is an engineering solution that utilizes traditional grey functions, (i.e.: pipes and drains) but allows for much of the stormwater to be captured and, through natural filtration, released back into the groundwater aquifers through wetlands, bioswales, and retention ponds.

- Buffalo Niagara Riverkeeper

### 4.2 Stormwater Management

The stormwater management for the project area presently flows directly over the top of the bedrock ledge at the Mill and flows to the creek below the Mill causing erosion of the bedrock and extreme sedimentation of the creek. The intention of the stormwater system for streetscape improvements on East Spring will focus on green infrastructure to the greatest extent possible.

The design concept is to utilize green infrastructure to reduce the stormwater impacts to the site and the creek. The rock depth on the site is deep enough to allow for water to be slowed and cleaned in raingardens before eventually out-falling to Ellicott Creek beyond the Mill. The extreme slope of E Spring Street is allowing the run-off to easily escape over the edge of the bedrock ledge where the Mill presently sits. To decrease the volume of water flowing over the edge of the rock ledge during large storm events, a series of rain gardens will be placed along the curb edge of E. Spring Street. These raised planters will be walled with storm water from the street edge entering through a curb inlet that will then direct the water to the planting medium. Wall inlets will allow sidewalk storm water to enter as well.

E. Spring has a significant slope and these planters will likely "step" down as they progress down the street.





## Picture Main Street, Williamsville, NY

The area in front of the Mill becomes shallower and allows for a lateral pipe to feed adjacent trees with stormwater from the raised planters on E. Spring. The trees can be planted in structural soil and fed with storm water from below. Excess water at the end of this treatment area will be connected to additional methods noted below.

The roadway presently has three drainage inlet structures that are presently clogged and not functioning. These lines would be cleaned and surface water would be able to drain to these structures. The outfall for these pipes can be directed to a series of terraced rain gardens as part of a bedrock wall stabilization effort. These terraced planters will slow and clean water coming from the drainage inlets and excess water from the raised planters along E. Spring before discharging in the creek area at the bottom of the mill building.

Water flowing from the parking areas will be captured through two main mechanisms. A set of raingardens will line the North and South sides of the roadway. Water flowing from the parking areas will be diverted to several rain gardens on the south side of the street. Any water that flows past these will be channeled to the rain gardens on the north side of the street. Additionally, water from the roadway will travel to the rain gardens on the north side. The rain gardens on the south will be planted with shrubs, perennials and grasses that will emphasize the pedestrian walk on that side of the roadway. These planters will be colorful and in keeping with the Village of Williamsville's intent for plantings in the Village Center. The rain gardens on the north side of the street will allow the feel of the Park to pull up onto the new sidewalk area, extending the view and feel of the park into the stormwater management system. These plantings will incorporate trees as well as shrubs and perennials.

Raingardens and green spaces on Rock Street will better define the pedestrian areas from the vehicular as well as provide the necessary stormwater management. From Rock to Cayuga Streets, raingardens along the north side of the road will be used for the stormwater management. These gardens can rely partially on infiltration as well as overflow piping into the existing stormwater system.

*"The Buffalo Niagara region is quickly becoming one of the nation's leaders in freshwater management, protection, and Great Lakes restoration."*

- Buffalo Niagara Riverkeeper





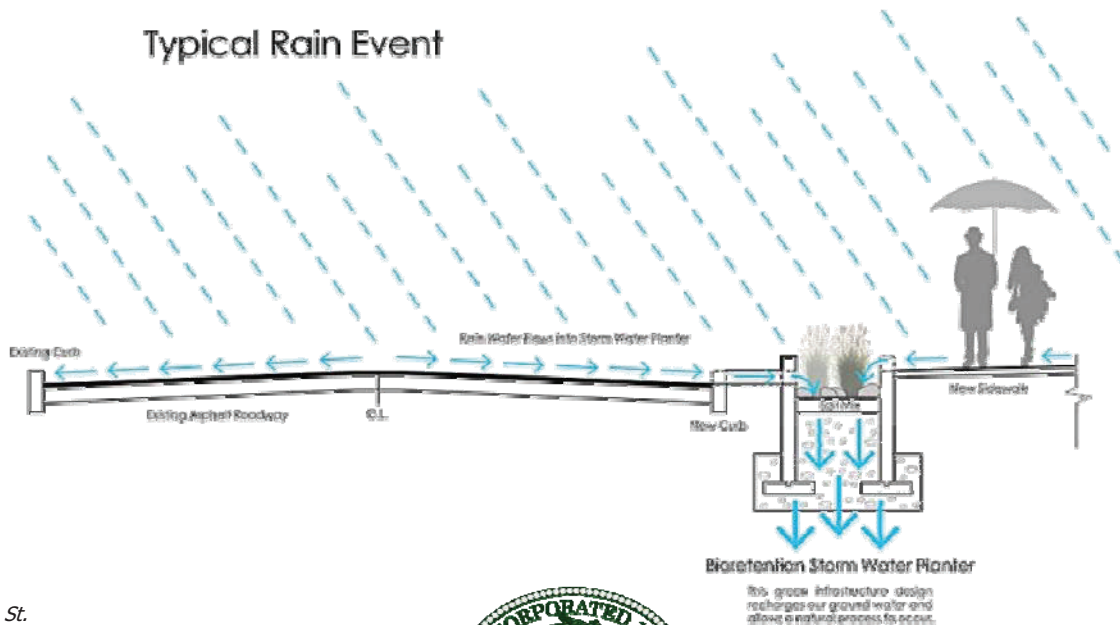


## Picture Main Street, Williamsville, NY

Costs have been reviewed and proportioned down to the ROW widths on East Spring Street and Rock Street. A higher cost was allocated for the East Spring Street (N-S Section) and (E-W-Section) to Rock Street closer to the Mill. A lower cost was allocated for Rock Street and East Spring Street (Rock to N. Cayuga). A separate cost was calculated for the Mill Plaza Area. All construction dollars are in 2013 dollars. A 20% Contingency was also applied. The total cost was calculated to be \$3,300,000.



### Typical Rain Event





# Picture Main Street, Williamsville, NY

EAST SPRING STREET PRELIMINARY ESTIMATE						3/26/2013
ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	ESTIMATED UNIT PRICE	COST	
	CONSTRUCTION DOCUMENTS (6%)	LS	1	\$180,000.00	\$180,000.00	
	CONSTRUCTION ADMINISTRATION (4%)	LS	1	\$120,000.00	\$120,000.00	
017100	MOBILIZATION AND DEMOBILIZATION (4%)	LS	1	\$110,000.00	\$110,000.00	
022100	SURVEY AND STAKEOUT	LS	1	\$8,000.00	\$8,000.00	
024116	DEMOLITION AND PATCHING	LS	1	\$40,000.00	\$40,000.00	
033000-1.2	EXPOSED AGGREGATE PIGMENTED CONCRETE SIDEWALK	SY	2500	\$100.00	\$250,000.00	
033000-1.2	EXPOSED AGGREGATE CONCRETE SIDEWALK	SY	1750	\$90.00	\$157,500.00	
033000-2	CONCRETE CURBING	LF	2200	\$55.00	\$121,000.00	
033000-3	HANDICAP ACCESSIBLE RAMP THROUGHOUT PROJECT AREA	LS	1	\$40,000.00	\$40,000.00	
129300-4.1	BENCH - TYPE 1	EA	8	\$2,000.00	\$16,000.00	
129300-4.2	BENCH - TYPE 2	EA	10	\$2,000.00	\$20,000.00	
129300-5	TRASH RECEPTACLES	EA	10	\$400.00	\$4,000.00	
129300-6	BIKE RACKS	EA	5	\$1,000.00	\$5,000.00	
260500	LIGHTING, CONDUITS, RECEPTACLES & CATENARY LIGHTING	LS	1	\$600,000.00	\$600,000.00	
261000	RELOCATING UTILITIES UNDERGROUND	LS	1	\$300,000.00	\$300,000.00	
312300-1	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY	5000	\$20.00	\$100,000.00	
312300-2	SUBBASE COURSE	CY	2800	\$40.00	\$112,000.00	
312300-2	ASPHALT PAVEMENT	TON	1500	\$100.00	\$150,000.00	
321400-3	CONCRETE PAVERS AT RAISED CROSSWALK ON CONCRETE BASE	SY	80	\$300.00	\$24,000.00	
328400-1	POTABLE/NON POTABLE IRRIGATION SYSTEM TBD	LS	1	\$50,000.00	\$50,000.00	
329113-2	CU SOIL MIX	CY	500	\$100.00	\$50,000.00	
329113-3	BIO RETENTION SOIL MIX	CY	800	\$50.00	\$40,000.00	
329300-1.1	TREES	EA	40	\$1,500.00	\$60,000.00	
329300-2.1	GROUND COVER	EA	3000	\$22.00	\$66,000.00	
329300-3.1	BULBS	EA	2500	\$1.00	\$2,500.00	
329300-4.1	SHRUBS	EA	150	\$150.00	\$22,500.00	
331219-1	HYDRANT REPLACEMENT	EA	2	\$4,000.00	\$8,000.00	
331219-2	WATERLINE STUB OUTS	EA	2	\$2,000.00	\$4,000.00	
334100-1.2	6" DIA. CPPP (UNDERDRAIN)	LF	2200	\$14.00	\$30,800.00	
334100-1.3	8" DIA. CPPP (UNDERDRAIN)	LF	75	\$16.00	\$1,200.00	
334100-1.4	10" DIA. CPPP (UNDERDRAIN)	LF	60	\$20.00	\$1,200.00	
334100-2	12" DIA. PERF. PVC PIPE	LF	500	\$44.00	\$22,000.00	
334100-3	EXISTING UTILITY PIPE REMOVAL	LF	200	\$20.00	\$4,000.00	
334100-4	8" DIA. SOLID PVC PIPING	LF	200	\$16.00	\$3,200.00	
334400-1.1	DRAINAGE INLETS	EA	11	\$2,200.00	\$24,200.00	
334400-1.2	TRENCH DRAINS	EA	10	\$1,000.00	\$10,000.00	
334400-2	MODIFY EXISTING UTILITY STRUCTURES	EA	4	\$800.00	\$3,200.00	
334400-3	ADJUST EXISTING CLEANOUTS	EA	3	\$250.00	\$750.00	
334400-4	UTILITY STRUCTURE REMOVALS	EA	6	\$1,200.00	\$7,200.00	
335000	OVERLOOK STRUCTURE / TERRACED RAIN GARDEN	LS	1	\$380,000.00	\$380,000.00	
336000	COMMUNITY BEAUTIFICATION ENHANCEMENT	LS	1	\$20,000.00	\$20,000.00	
340100	MAINTENANCE AND PROTECTION OF TRAFFIC	LS	1	\$50,000.00	\$50,000.00	
344000	SIGNS	EA	8	\$225.00	\$1,800.00	
203.18	CLEANING CLOSED DRAINAGE SYSTEMS	LF	200	\$15.00	\$3,000.00	
688.010000	WHITE REFLECTORIZED PAVEMENT MARKING STRIPES	LF	1500	\$4.00	\$6,000.00	
<b>PRELIMINARY ESTIMATE TOTAL</b>					<b>\$3,229,050.00</b>	

