

LANDSCAPES NORTH

NEWSLETTER

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INSIDE THIS ISSUE:

Retaining Walls 1

Message from Jay 1

Featured Project 4
Knowledge Garden, Prince George Public Library

Featured Plants 5

Rainwater Harvesting 6

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RETAINING WALLS

by Jay Lazzarin

In many landscape projects, we as designers are faced with the need to construct retaining walls for a variety of reasons including erosion control; development of additional useable space; tree root system protection; and development of raised planting beds, etc.

What makes retaining walls so challenging is their required strength to carry lateral earth pressure. This is created by more than just the weight of soil. Water behind the wall causes building of hydrostatic pressure. In most instances, retaining walls up to 4'-0" height do not require detailed engineered design. However, with all walls above this height, we retain a structural engineer to review our design and specify what measures are necessary to ensure the wall(s) do not fail and/or lean. In most municipalities, engineered drawings would be required for retaining walls over 4'-0".

There are a variety of materials that can be utilized to construct retaining walls. Each material has its pro's and con's. A few of the most popular materials and retaining wall systems are as follows:

Dry Stone Retaining Walls

People have been building dry stone walls for centuries, as witnessed in Great Britain and Ireland, where dry stone walls of colonial times are still in existence.

Dry stone works is a viable alternative for lower height walls up to 4'-0" height where the regional vernacular has an abundance of "flattish" surfaced rock. Depending on the projected height of the wall, design consideration of various aspects such as "wall batter/slope", good drainage behind the rocks and size of rocks are important.

This type of retaining wall is relatively inexpensive alternative for low height walls, if a local supply of suitable rocks is available.

Message from Jay Lazzarin



It is with great pride that we enter our 30th year of offering landscape architectural services to North Central BC.

Being located in Prince George this entire period, we have seen great strides in the use of more sustainable landscape materials and products; clients with higher expectations; more stringent municipal / provincial guidelines; sustainable and energy wise landscapes; the development of specialized landscapes such as therapeutic gardens; green roof gardens; winter city landscapes; use of water and ornamental lights in the landscape; and the development and preservation of cultural and historic landscapes.

We look forward to the many challenges and opportunities that the next few years will bring.

Most importantly, we thank you, our client, for having the opportunity to assist you with your landscape needs over this period of time. In many instances you are repeat customers, whom we have grown to form strong relationships and friendships. We look forward to serving you again in the near future.

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Dry Boulder walls

This kind of wall depends on the very height of the boulder itself for stability, and often referred to as a "gravity wall". In this type of construction, large



Dry Boulder Walls at the Cancer Centre for the North, Prince George, BC

boulders in excess of 3ft. diameter, are selected and set in place with heavy equipment to minimize the size of voids between the rocks. Treatment of the voids between the boulders is important. Water c/w soil could erode between the rocks or weeds could grow. In most projects we attempt to install suitable perennials, shrubs and groundcover that will enhance the appearance of the wall. Constructed properly, boulder retaining walls can be installed to large heights and are one of the most cost effective wall systems. If boulders are locally available, these wall systems can be built for as little as \$15.00 per square foot, (i.e. measured boulder face).



'Allan Block' Precast Concrete Wall

Precast Concrete Block

In the past 25 years, precast concrete block retaining walls have become the most popular type of material, due to their wide availability and ease to work with. Over the years the block has evolved from a simple grey coloured, rectangular unit to more elaborate,

colourful faces. Blocks are now available in more irregular in sizes to provide a variable surface that is more imitative of real stone

For walls higher than 4ft., clean gravel backfill c/w geogrid netting is recommended to provide structural stability. Precast concrete block walls can reach heights in excess of 30ft., however engineering is highly recommended for walls in excess of 4ft. The cost to supply and install this type of wall in Prince George is approximately \$40.00 per square foot, depending on type of blocks, height, and project scale/overall square footage.

Poured-in-Place Concrete

One of the most expensive, (if not the most expensive, retaining wall system), poured-in-place concrete walls require a large amount of labour to build the necessary forms and install steel r-bars. In northern climates, a proper footing is required that extends below frost depth, (approximately 4'-0" to 6'-0"), to ensure the wall does not crack as a result of frost ground movement.

Poured-in -place walls can look very attractive, particularly if they are used in projects, where the adjacent building(s) are constructed with similar techniques. The concrete face does not have to be smooth, as a variety of forms are available, (or can be constructed), to develop unique textures or surface patterns.

As with other wall systems a free draining granular backfill will assist in minimizing static water pressure behind the wall and potential of cracking due to frost. Poured-in-place walls in northern BC can exceed \$70.00 per square foot, with curved walls requiring more labour and expertise.

Gabion Walls

Gabion is an ancient system of wall construction. It consists of wire cages filled with rock or other suitable stone or material. Gabion walls are experiencing a comeback as a "green" alternative that can utilize crushed recycled materials such as slag glass.

Gabions are very popular as retaining walls in association with water-

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ways. The gabion wall holds banks and soil layers with a single, somewhat flexible mass of great weight. Unlike concrete which is a solid structure, a gabion retaining wall can move with the earth, retaining its integrity despite the ravages of frost or fast moving water.

Another advantage is the porous structure through which runoff can travel, mitigating the need for porous backfill behind the wall. Over time soil particles work their way into the gaps between the stones developing an area that can support plant life. Alternatively, gabions can be designed with ornamental plants to create a living wall.

Gabion walls can be supplied and installed for as little as \$15 per square foot, (based on face area.)

Wood Retaining Walls

In the right setting, a timber retaining wall blends into a landscape more naturally than most other materials. If well built with proper structural support and preservatives, these types of wall can last in excess of 20 to 25 years.

Proper drainage behind a wood wall will reduce earth pressure, buildup of excess moisture and extend the lifespan of wood members. The cost to construct wood retaining walls, greater than 4ft. height, is approximately \$40-\$50 per square foot (based on face area.)

Bio-Engineered Walls

Bio-engineered walls are constructed utilizing permeable, geotextile earth-filled bags that are secured together with flex plating and geogrid netting, which is installed into the backfill. Utilizing mechanically stabilized earth (MSE), these walls can be constructed to large heights. As a relatively inexpensive wall system, (approximately \$20-\$25/sq. ft.), this wall system is easy to install with the potential for a variety of vegetated surfaces including hydroseeded grass mixes, root cuttings and shrubs. The "green" wall blends in well with its natural surroundings and is very popular as a "sustainable green wall system".

As with most other wall systems, it is recommended that all walls greater than 4'-0" height, be engineer designed. (See page 1 for photo of completed green wall system.)



A variety of rocks are used to create interesting patterns on this gabion wall



Terraced Planters and stairs using wood timbers



Bio-engineered walls are created using earth-filled bags

Featured project

KNOWLEDGE GARDEN

Client: Prince George Public Library

Contractor: Richbar Nursery Ltd.

Landscape Architect: Jay Lazzarin

Completed: (Phase I) June 2014

Landscape Value: \$189,850.00



Commencing in the spring of 2012, we worked with the Prince George Public Library staff in the development of a 900 m² (9,700 sq. ft.) garden that provides the opportunity for local residents to read, learn and discover in a welcoming, aesthetically pleasing outdoor space.

The primary goals of the project included:

- providing a large enough space for holding children's programs and storytelling activities,
- a quiet, calm retreat for library and Civic Centre users to read, reflect, and enjoy a coffee/lunch break,
- developing an attractive outdoor space for photography during wedding receptions, graduations and other celebration events hosted by the Civic Centre,
- a Children's seasonal garden providing the opportunity for youngsters to develop gardening skills.



Added benefits of developing this space include (i) enhanced security and public safety in a former unclaimed area used for undesirable activities and (ii) an attractive, all season visually appealing space viewed from the library interior.

Future work planned for the garden which will enhance its "spirit and liveliness" include (i) a painted half circle shaped mural mounted on the Civic Centre wall, above the performance stage, (ii) whimsical art and sculptures strategically located throughout the garden, (iii) entry sign c/w donor recognition, and (iv) ornamental lighting.

This one of a kind Knowledge Garden is a welcome addition to the City's downtown park system providing a multitude of recreational opportunities.

FEATURED PLANT—SHRUBS WITH EDIBLE FRUIT

There are many reasons for growing edible shrubs within your garden. Besides the shrubs listed below (for zone 3 or colder), there are numerous perennials and trees which also produce edible fruit. Visit your local garden centre to learn about more varieties

Saskatoon Berry (*Amelanchier alnifolia*)

Max. height: 12 feet (3.5 m)

Preferred growth conditions: sun to shade, average moisture, wide range of pH levels, tolerates poor soils;

Common uses: Fresh berries are consumed as juice or in dressings and sauces as well as added to yogurt, cereal or other food you like. You can also use these berries as a substitute to blueberries and raspberries in baking. For long term storage, they can be canned, frozen or processed for jams or jellies.



Blueberry (*Vaccinium angustifolium*)

Max. height: 24 inches (0.6 m)

Preferred growth conditions: partial shade to full shade, well-drained, light-textured acidic soils;

Common uses: Blueberries can be eaten as is, processed for pie filling, jams and jellies, or added to alcoholic beverages. Teas are made with dried blueberries.

Gooseberry (*Ribes hirtellum*, *R. grossularia*/*R. uvacrispa*)

Max. height: 3 feet (1 m)

Preferred growth conditions: full sunlight to partial shade, cool and moist environments, wide range of pH levels;

Common uses: same as Currant below.



Huckleberry (*Vaccinium membranaceum*)

Max. height: 3 feet (1 m)

Preferred growth conditions: partial shade, moist conditions, acidic soils;

Common uses: Huckleberries can be eaten fresh but processed berries are usually sweeter and have a more pleasant taste. They are a desired ingredient for various baking recipes, jams and syrups. Dried leaves will make an aromatic tea.



Currants: red, white, pink currants (*Ribes rubrum*, *R. petraeum*, *R. sativum*).

Black currants (*R. nigrum* and *R. ussuriense*)

Max. height: 3 - 7 feet (1 - 2 m)

Preferred growth conditions: partial shade, average moisture, clay soils with wide range of pH levels.

Common uses: Both gooseberry and currant can be consumed raw or in a form of juices or compotes, used in bakery, canned and processed to jams in jellies by themselves or in combination with other fruit. Blackcurrant leaves are used for flavor in pickling and preparation of liquors.



American cranberry (*Viburnum trilobum* or *Viburnum opulus* var. *americanum*)

Max. height: 3 feet (1 m)

Preferred growth conditions: full sun to partial shade, average moisture, wide range of soil types and pH levels.

Common uses: Berries make an excellent ingredient for preservatives. They can also be canned and used as a seasoning for meat dishes.



Why and How to Harvest Rainwater

Why? In an average household, a large portion of rainwater turns into surface runoff that is drained through the subsurface drainage systems and ends up in the nearby natural water bodies. Harvested rainwater has the potential to be successfully reused for various needs such as watering of garden plants, and washing and cleaning around the house and garden. Re-using of rainwater allows for the saving of significant amounts of tap water which is a limited resource in today's overpopulated world. Moreover, rainwater harvesting is a cost-efficient practice that will reduce your utilities bill in the summer. It has been extensively promoted in Southern British Columbia where various municipalities offer a rainwater harvesting incentive program to the local property owners.



How? Rainwater harvesting requires installation of specific equipment called rainwater harvesting system (RWH). This can be as simple as a 25 gallon barrel installed at the base of a downspout, to larger water storage tanks installed in the basement of the house or buried below ground in your yard. More complex RWH include gutters and downspouts, catchment systems, water diverters, water storage tanks and a water distribution system. Since water will be gathered from the roof surface, make sure that roof surface materials are free of toxic components such as lead or asbestos. If rainwater is intended to be for indoor household needs such as cleaning and washing and even drinking, a disinfection device and a set of water filters should be built into the RWH. Maintenance will include bi-annual inspection of tank and gutter for cracks and breaks as well as cleaning and removal of clogs, dirt and debris.



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