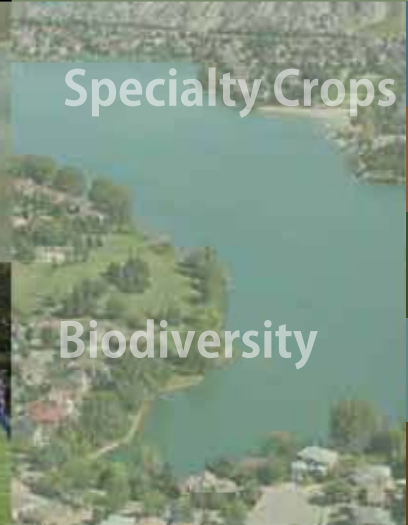


**S.E. YUNDT** LIMITED

# Outstanding

Agriculture



Specialty Crops



Biodiversity

# REHABILITATION & RECLAMATION SITES

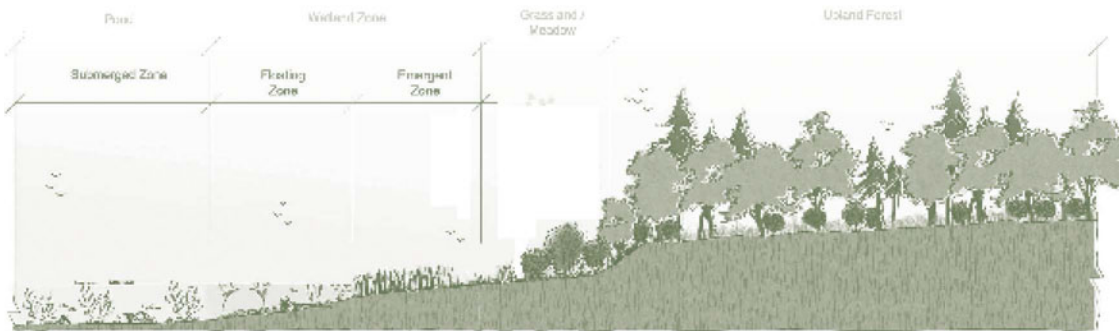
Recreation

Cultural Heritage





*Butchart Gardens, Victoria BC*



*This brochure has been prepared with the intent of showing excellent examples of rehabilitated pit and quarry sites. It is intended to increase the understanding of the public about reclamation and rehabilitation by companies after aggregate extraction in both local and international settings.*

**S.E. YUNDT** LIMITED

In Association With



2010



# What is Rehabilitation?

Rehabilitation, in the case of stone, sand and gravel, is the treatment of land after aggregate extraction so that the use or condition of the land:

- is restored to its former use or condition, or
- is changed to another use or condition that is or will be compatible with the use of the adjacent land.

The site plans for aggregate operations outline the specific requirements for rehabilitation. The Ontario Provincial Standards under the Aggregate Resources Act set out the minimum rehabilitation requirements, but most companies achieve higher quality rehabilitation to blend with the surrounding landscape and encourage biodiversity. This is a commitment to excellent land stewardship.

With good planning, as aggregate is removed areas can be progressively rehabilitated. Planned stripping and replacement of overburden, subsoil and topsoil allow the establishment of vegetation as restoration moves forward following extraction.

During final rehabilitation, all equipment, stockpiles and buildings are removed and there may be additional tree planting and other vegetation requirements to finish the complete rehabilitation of the site.

Reclamation is used for non-extractive sites, i.e., reclaiming a wasteland, disturbed lands, brown field sites after industrial use or flooded land so it can be cultivated or become a productive land use.



# Exceptional & Successful Rehabilitation



*Photo 1.* The Eden Project,  
Bodelva, Cornwall, England.

A botanic educational garden and scientific institute created in a 160 year old exhausted china clay or kaolin quarry. The site is now a spectacular educational garden with unique rehabilitation and over a million visitors per year while employing 450 people. It was constructed below the water table. It is the local economy engine for this area of Cornwall.



*Photos 2 & 3.*  
The Royal Botanical Gardens (RBG),  
Hamilton, Ontario.

The RBG created an extraordinary rock garden in an abandoned gravel pit situated on the Niagara Escarpment. In 1929, work began to create the picturesque sunken rock garden. The RBG is reputed worldwide for its first-class horticultural collection and natural lands. In 1976 it received the first ever Ontario Stone, Sand and Gravel Association (OSSGA) Bronze Plaque award for restoration of a gravel pit to a world recognized garden.



*Photos 4 & 5.* Parr Lake North Park & Parr Lake South Park,  
Brampton, Ontario.

These appealing lakes were former gravel pits and are now surrounded by recreational and residential lands, woodlands and trails. They are situated north and south of Vodden Street between Highway 410 and Dixie Road. The landscaping and design provides critical open space in a dense urban landscape as seen in these September 2009 aerial photographs.



# Outstanding REHABILITATION & RECLAMATION SITES



*Photo 4*



*Photo 5*

*Photo 6. Professor's Lake,  
Brampton, Ontario.*

The lake was extracted for sand and gravel by several aggregate companies for fifty years. The 26 hectare lake is surrounded by residential, recreational lands, beaches and water sports. The spring fed lake is used extensively for sailing, windsurfing, fishing, canoeing and kayaking. Several triathlons have been hosted at Professor's Lake, including the Canadian National Triathlon Championships in 2006. In 1989, Professor's Lake was awarded the OSSGA prestigious Bronze Plaque.



*Photo 6*



*Photo 7.* Eagle's Nest Golf Course, Maple, Ontario.

The course is located at 10000 Dufferin Street at Major Mackenzie Drive and was developed in a depleted sand and gravel pit. The award winning course was designed by Doug Carrick and contains a lake and a Heliport. The site is surrounded by residential and commercial developments, an Environmentally Sensitive Area and the former Maple landfill. This aerial photograph taken in September 2009 shows the valuable open green space in the urban environment.

*Photo 8.* The Cotswold Water Park, Fairford & Ashton Keynes, England.

The Cotswold Water Park is 40 square miles in size and has 1000 hectares of open water. It is part of the Upper Thames catchment on the Wiltshire/Gloucestershire border. For 50 years sand and gravel has been extracted from the area thus creating the park and extraction continues today at the rate of 2 million tonnes per year. The park has 150 lakes used for a variety of purposes, which include fishing, wetlands, beaches and swimming, canoeing, sailing, water skiing and windsurfing. The lands are also used for trails, picnics, country parks, nature reserves and golf. The park accomodates 20,000 residents and has over ½ a million visitors a year. Efforts are continuing to increase and improve biodiversity and nature conservation. The park has won many awards and is an example of outstanding restoration.



# Impressive Agricultural Rehabilitation – Field Crops

*Photo 9.* Huntsmans Quarries Ltd. The Cotswolds, Gloucestershire, England.

This area is undergoing progressive rehabilitation. After limestone is extracted the land is partially filled with quarry waste. The subsoil and topsoil are then carefully placed over the land and it is rehabilitated to agriculture. In August 2009 a crop of barley was harvested from these rehabilitated fields. Huntsmans has operated in the Cotswold Hills for over 70 years. The typical crops for this area are wheat, barley and grasses.

This site is located in one of the most ecologically sensitive portions of England, an area of outstanding natural beauty. Huntmans is also including biodiversity enhancements and restoring natural heritage amenities in its rehabilitation works at this site, including habitat creation and protection for rare plant species such as the Cotswold Pennywort and rare reptile species such as the Great Crested Newt.

*Photos 10, 11.* Capital Paving Inc. Pit #2, Township of Puslinch, Ontario.

Capital's Pit #2 is located on County Road #34 and is an excellent example of sand and gravel extraction as an interim land use and progressive rehabilitation to agriculture. The end use includes treed areas, hay and pasture for horses, and an equestrian operation. Before extraction the soil exhibited low fertility, droughtiness and stoniness. After shaping the land, the subsoil and topsoil were replaced and seeded with a mixture of alfalfa, timothy, brome grass and clover and the yield is increasing each year. In 2003, the OSSGA presented Capital with the Outstanding Achievement in Property Rehabilitation Award for this site.

*Photo 9*



*Photo 10*



*Photo 11*







Photo 12

*Photo 12.* Capital Paving Inc. Guelph Dolime Limited Site, Township of Puslinch, Ontario.

Capital leased these lands on Forestell Road from Guelph Dolime Limited and extracted the sand and gravel above the water table, then rehabilitated the lands back to agriculture. Taken in September 2009, this photograph shows an excellent crop being cut. After it dries, it will be harvested.

*Photo 13.* Lafarge Canada Inc. Guelph Pit, Township of Puslinch, Ontario.

This rehabilitated sand and gravel pit is located off Whitelaw Road south of Highway #24 in the NW corner of the Township of Puslinch. Lafarge rehabilitated the land and a tenant farmer, Cowden Knowes Farm, has grown corn on the land in 2009 as indicated in this photograph.

This site is located near the Speed River and, in addition to the agricultural uses, ponds and open areas have been created that supplement habitat along the river and support a wide range of bird species.

*Photo 14.* Lafarge Canada Inc. East Paris Pit, Paris, Ontario.

This rehabilitated sand and gravel pit is located on Green Lane Road, north of

Highway #5 in Paris in the Township of South Dumfries. A corn crop is shown being harvested but wheat and soybeans have also been grown, producing high yielding crops annually. In 2008, Lafarge received an OSSGA Bronze Plaque award for the whole Green Lane Property, including the agricultural rehabilitation and reforested areas, lakes used by migratory waterfowl and Green Lane Park. In 1999, Lafarge donated the land to the County of Brant for the Green Lane Park used for baseball and soccer. The area is locally called “Lafarge Fields”.



Photo 13





# Outstanding REHABILITATION & RECLAMATION SITES

*Photo 14*



*Photo 15.* Preston Sand and Gravel Co. Ltd. Croft Holm Pit, Township of Puslinch, Ontario.

The Croft Holm Pit is located off County Road #34. The extraction of sand and gravel was completed in 2009 and now the final rehabilitation is being accomplished. After the land was shaped, the subsoil and topsoil were replaced. Due to stoniness a stone picker was used twice over the rehabilitated lands. The first crop was oats and barley as a crop cover with hay. After a few years of building up soil organic matter the site will be suitable for a wide range of common field crops.

*Photo 15*



*Photo 16.* Preston Sand and Gravel Co. Ltd. Phillips Martini Pit, Township of Puslinch, Ontario.

The Phillips Martini Pit is between Laird and Forestell Roads west of County Road #32. Once extraction was complete in part of the property, the subsoil and topsoil were replaced and graded. Interim crops of hay and barley were planted and now corn is growing on these lands only a few years later.

*Photo 16*



# Excellent Specialty Crops



Photo 17

*Photo 17.* Lafarge Canada Inc. Fonthill Pit, Fonthill Ontario.

Sand and Gravel has been extracted from this pit located on Hwy. #20, 5 km from Fonthill, for many years. Progressive rehabilitation began in the early 1980s, and has been progressing successfully ever since. After extraction, tender fruit specialty crops have been planted. Research was required to rehabilitate the site so it would be capable of supporting sensitive fruit crops including peaches, cherries and pears. The critical factors considered during the rehabilitation planning were air drainage, soil texture and structure, compaction, water drainage, soil depth and stoniness. As new areas are stripped for extraction, overburden and topsoil are transported and deposited directly on the rehabilitated areas to avoid storage of these sensitive materials and preserve important structure and nutrients. The lands are first planted in rye grass and clover for stability, erosion prevention and added nutrients. This is then mowed, chisel ploughed, disked, cultivated and fertilized. These rehabilitated lands have been producing excellent yields of tender fruits for many years. In 2009, the OSSGA gave Lafarge an Award of Excellence for the site.



# Outstanding REHABILITATION & RECLAMATION SITES

*Photo 18.* Vineland Quarries and Crushed Stone Ltd., Town of Lincoln, Ontario.

The Vineland Quarry is located in the Town of Lincoln, north of Vineland. The final land use is for cash crops and vineyards. In the 1980s the side slopes were rehabilitated using cover crops and cattle pastured the lands. In 1999, the vineyards were started using paper mills biosolids as a soil amendment. Grapes were first harvested in 2002. In 2005, the OSSGA gave Vineland an Award of Excellence. The side slopes are graded to 2 – 3 % and contoured, the land is tile drained and planted with special vegetation to enrich the soil. In 2002, the Niagara Escarpment Commission gave Vineland the Achievement Award for the innovative land rehabilitation to vineyards.

*Photo 18*





Photo 19

# Significant Rehabilitation to Biodiversity

*Photo 19. Kelso Quarry Park, Conservation Halton, Milton Ontario.*

The former Milton Limestone Quarry in Milton supplied the GTA with quality stone for forty years. In 2001, extraction was finished. The site is situated in both the Niagara Escarpment and the Greenbelt areas and therefore total rehabilitation of the site has significant public value. Barrick Gold Corp., the former owner, donated the lands to Conservation Halton. The quarry was progressively rehabilitated from the 1970s, with the east cliff sloped and planted with grasses and thousands of native trees. The rehabilitation plan included a five metre deep lake on the quarry floor for public recreation. This site will be linked to Kelso-Glen Eden Conservation Area.

*Photos 20, 21. Holcim Canada Inc. Milton Quarry, Milton, Ontario.*

Holcim, formerly Dufferin Aggregates, has been working for many years on landform simulation and biodiversity at the Milton Quarry. The final landscape includes extensive naturalized waterbodies and wetlands with irregular

shorelines, islands, wooded upland margins and slopes, open space and cliff faces. A corner of the rehabilitated area is now accessible from a side trail off the main Bruce Trail. This outstanding rehabilitation has been recognized with many awards, including the NSSGA and the OSSGA Award of Excellence.

*Photo 22. St. Marys Cement/CBM Aggregates, McMillan Pit, Township of Puslinch, Ontario.*

Extraction commenced in the McMillan Pit in the late 1980s and was completed in 2004. The pit underwent progressive rehabilitation during the extraction phases and final rehabilitation was completed in 2007. A large pond of 28 hectares was created, surrounded by woodlands in the north and southwest edges. Rehabilitation consists of landshaping, wetland and shoreline creation, as well as seeding and tree planting. Wildlife is plentiful on the site including deer, snakes, birds, fish and turtles. The property is a showpiece of successful progressive and final rehabilitation.



Photo 20



Photo 21



# Outstanding REHABILITATION & RECLAMATION SITES



Photo 22

*Photos 23 & 24.* Kerncliff Park, City of Burlington, Ontario.

Kerncliff Park is located on Kerns Road in Burlington, directly adjacent to the Niagara Escarpment and the Bruce Trail. Stone was extracted from the site by several companies over the years but it was abandoned in the 1960s. The site then started to naturalize in a positive way. Burlington wanted to upgrade the site to a park so they started to more aggressively rehabilitate the site by joining with several partners including Conservation Halton, the Management of Abandoned Aggregate Properties Program (MAAP), the OSSGA and the Bruce Trail Association. The site features cliff faces, wetlands, vegetated faces, a diversity of plants, a boardwalk over the wetlands, a trail system and tall grass prairie. Kerncliff Park is Burlington's ecological gateway to the Niagara Escarpment. In 2005, the OSSGA awarded Kerncliff Park a Bronze Plaque.



Photo 23



Photo 24



# Other Examples of Reclaimed Lands & Water Management



*Photo 25*

*Photo 25. The Netherland Polders, the Netherlands.*

Polders (reclaimed land) turn a natural landscape into a cultural landscape. Polders have been used for centuries to create and maintain productive agricultural lands below the water table. Polders are enclosed in dykes and work with pump systems that regulate water levels. The Dutch have a long history of reclamation of marshes and fenland, resulting in over 3000 polders constructed since the 11 century.

*Photo 26. The Holland Marsh, south of Bradford, Ontario.*

The Holland Marsh consists of over 2800 hectares of low-lying reclaimed land in the Schomberg River Valley. The fertile black soil was exposed when the marsh was drained between 1925 and 1930. Dykes 28 km long and over 2 metres deep were constructed to divert the Schomberg branch of the Holland River around the exterior of the marsh on both sides and drain the marsh for agricultural use. Pumps control the water table within the dykes. The skilled farmers use a cooperative to manage the marsh and grow a variety of vegetables and flowers. The main crops are carrots, onions and celery.

While many of the examples discussed above include significant water management measures, land reclamation and water management strategies are not restricted to aggregate rehabilitation. Valuable lessons have been learned from land reclamation efforts at non-extraction sites and applied to the rehabilitation of aggregate sites. Two important examples follow.



*Photo 26*



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## OTHER EXCELLENT REHABILITATED SITES

Snyder Flats, Bloomingdale, ON  
Queen Elizabeth Gardens, Vancouver, BC  
Penrith Lakes, Penrith, Australia  
Dorney Lake, Dorney, England

Brampton, ON --- Richvale Park, Donnelly Park, Major Oaks Park,  
Bramalea Ltd. Community Park, Norton Place Park

Toronto, ON --- Ramsden Park, Smythe Park, Blantyre Park, Bickford Ravine & High School,  
Christie Pits (Willowvale Park), Coronation Park

OSSGA Bronze Plaque Sites, Ontario --- East Park Gardens, London  
Erindale College, University of Toronto, Mississauga  
Orchard View Golf Course, Leamington  
Peninsula Lakes Golf Club, Fonthill  
Lakeland Estates, Ottawa  
Hagersville Ball Park, Hagersville  
Oaks Golf Course, London  
University of Guelph, Arboretum, Guelph  
Don Valley Brick Works Park, Toronto

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