Aggregates Build Ontario



ONTARIO STONE, SAND & GRAVEL ASSOCIATION





Exactly what is aggregate?

GETTING TO THE BOTTOM OF IT ALL

Aggregate is stone, sand and gravel. It's in the buildings where we live and work. It's in the roads and sidewalks we drive and walk on. It's used in water purification processes, and in the manufacture of everything from paper and paint to chewing gum and household cleansers.

When you think about it, aggregate is quite literally the foundation of our economy and society.

Aggregate is surface mined in pits and quarries across Ontario.

Quarries are large, naturally occurring deposits of rock – such as granite, limestone and sandstone – used in building materials. While the term "mining" is used to describe the process of rock extraction, quarries are actually located at the surface and rarely reach a depth greater than 100 feet.

Pits are located in areas where glaciers have left behind clean deposits of sand and stone. Sometimes the gravel is deeper than the groundwater table and once the gravel is extracted, leaves behind clean ponds and lakes.

Like petroleum deposits and other types of minerals, aggregates are only found in places where nature put them. Operations have to be located where the resource is – unlike other types of land uses such as industrial and residential areas, which have much more flexibility.



Photos: Stone, sand and gravel are extracted from quarries (above photos) and pits (bottom left), and processed for use in products that comprise the foundation of our society.







164 million tonnes – where does it all go?

VIRTUALLY EVERY JOB AND EVERY HOME IN ONTARIO RELIES ON STONE, SAND AND GRAVEL

On average, approximately 164 million tonnes of aggregate are used in Ontario each year. That's about 12 tonnes per person.

The vast majority of stone, sand and gravel produced in Ontario is used by the public sector – the municipal, provincial and federal governments – with infrastructure accounting for about 60 per cent of all aggregate consumption. This includes gravel, asphalt and concrete used in roads, highways, bridges, sidewalks, sanitary and storm sewers, watermains, railways and runways. Materials such as concrete and brick in residential buildings account for about 24 per cent of aggregate used in the province, with commercial and institutional buildings another 16 per cent.

It takes 18,000 tonnes of gravel to build one kilometre of highway and about 250 tonnes to build an average suburban home.

A small percentage of Ontario's aggregate production is used as agricultural lime, and in the manufacture of such products as glass and cat litter.

End Uses of Aggregate – Province of Ontario





THE IMPACT TO OUR ECONOMY

Ontario's aggregate industry contributes an estimated \$1.6 billion of GDP to the provincial economy, with aggregate producers employing more than 7,000 people – mostly in rural Ontario – and 34,000 indirectly. Aggregate products support Ontario's \$37-billion construction industry, which employs 292,000 people.

In addition to the business taxes paid by the aggregate operators, they also contribute nearly \$20 million in licence fees each year to provincial and municipal coffers.

Also, aggregate companies are typically very invested in the communities in which they operate – donating resources, staff time and funding to important community projects and charitable causes.



Photos: Aggregates sourced in Ontario are used for applications including services for commercial developments, asphalt road surfaces, bricks for housing developments, walking trails and building foundations.





Photos: Aggregates can only be extracted where sufficient amounts and qualities of it exist, and where mining is feasible and permitted. It makes sense from an economic and environmental perspective to source aggregate close to where it will be used, rather than trucking it long distances.

If not here, then where?

KEEPING IT CLOSE TO HOME

Aggregate can only be mined where it exists. Not all areas of the province have deposits of stone, sand and gravel, and many rural areas that do have it are protected lands.

Some potential sites do not have enough aggregate to justify the cost of setting up a fully operational pit or quarry. Other sites are lost to aggregate production because they are located underneath housing or commercial or industrial developments.

From an economic and environmental perspective, it makes sense to locate pits and quarries "close to market." Since more than half of the cost of aggregate is the cost of transportation, it's not feasible to move it long distances to where it will be used – primarily in the GTA and other parts of southern Ontario. Also, long distance travel contributes to greenhouse gas emissions, and added wear and tear on roads and highways in the province.

If every load of aggregate used in Ontario had to travel just one extra kilometre to reach its destination job site, an extra 2.5 million litres of fossil fuel would be consumed annually, and annual greenhouse gas emissions would increase by nearly 7,000 tonnes. Most aggregate companies understand that pits and quarries are not always welcome land uses, and work closely with nearby residents and businesses to mitigate the effects of their operations and to demonstrate good neighbour relations.

The aggregate industry – and the provincial economy – is now facing a major problem. Stone, sand and gravel are being used at a higher rate than can be supplied for the future. More aggregate production will be required to maintain and upgrade aging infrastructure, and to continue to grow Ontario's economy.







Protecting people and the environment

A HIGHLY REGULATED INDUSTRY

The aggregate industry is among the most highly regulated in Ontario, to ensure the protection of people and the natural environment. Among the more than 24 pieces of legislation that protect the environment and future resources are:

Aggregate Resources Act

- Ontario Planning Act and Provincial Policy Statement
- Niagara Escarpment Plan
- Oak Ridges Moraine Conservation Plan
- Greenbelt Plan
- Municipal Official Plans
- Ontario Endangered Species Act
- Regulations set out by the Ontario Ministry of the Environment and Climate Change

- Regulations set out by Fisheries and Oceans Canada
- Regulations under other provincial ministries, including Natural Resources and Forestry, Transportation and Labour

Aggregate producers themselves offer protections to the environment and to the communities surrounding them in efforts to be good corporate citizens.





Often, producers will go beyond what is required by law to protect wildlife – such as creating buffer zones near sensitive natural resource areas, working closely with their local conservation authorities on environmental management projects, and sponsoring environmental research and protection efforts.

Producers will also adapt their operations to mitigate impacts on their neighbours, such as implementing dust and noise control measures.

The Ontario Stone, Sand & Gravel Association's environmental stewardship efforts include representation on the Niagara Escarpment Commission and Ontario Biodiversity Council, and involvement in other projects to promote environmental sustainability.



Photos: Among the natural habitat that aggregate producers are required to protect are those of flora and fauna, including (from left) butternut trees, certain species of amphibians and reptiles, and areas the provincial government deems to be of significant natural and scientific interest.

Keeping it clean

SAFELY MANAGING WATER RESOURCES

Aggregate operators are primarily water managers, and not water consumers. Water is used to wash fine particles from the extracted gravel or stone, and is recycled. Quarries that extract aggregate from below the water table pump out the water to work on a dry floor. This water is usually released into nearby streams and/or recharged into the groundwater system, so that all the water stays in the local watershed. Some of the water is also used to spray on roads and stockpiles to minimize dust. Quarries that operate below the water table are required by law to mitigate impacts to nearby sensitive features – such as wells, streams and wetlands. These features can be maintained by pumping the water back into the groundwater system, and through ongoing groundwater monitoring.

No chemicals are involved in the extraction or processing of aggregate materials.

The topsoil, and other organic material removed from the rock surface before mining begins, is not sent to a landfill or used for other fill purposes. Instead, it is stored on-site and used in the rehabilitation of the pit or quarry site.

Another way the stone, sand and gravel industry is demonstrating respect for the environment is by promoting the use of recycled aggregates. Since aggregates are a non-renewable resource, the industry is working with government agencies to promote the re-use of concrete and asphalt removed from torn up roadways and demolished buildings. These aggregate products can be processed and re-used in new construction projects.





Photos: Water pumped from quarries is redirected into the local watershed (left). Water used to wash aggregates is first piped into settling ponds (top) to allow the sediments to sink to the bottom, before being pumped back into the surrounding environment. The OSSGA is strongly promoting the use of recycled aggregates – including asphalt and concrete (right) – for use in new construction projects.









Getting back to nature

PITS AND QUARRIES ARE A TEMPORARY LAND USE

Aggregate companies can't just leave a hole in the ground once their pit or quarry licence expires. Producers will either return the land to its original use or other uses appropriate to the surrounding area.

To obtain a licence, aggregate companies must have a rehabilitation plan for the end use of the operation and it must include a plan for progressive rehabilitation. This means that rehabilitation of a pit or quarry must occur while extraction is underway, as each section is mined out.

The end use of the pit or quarry must suit the regional landscape and the local community. It might be a woodlot, farmer's field, orchard or vineyard, recreation facility, housing development or a naturalized area for local wildlife habitat that is managed by a local conservation authority. Examples of rehabilitated pits and quarries include the Royal Botanical Gardens Rock Garden in Hamilton/ Burlington, Peninsula Lakes Golf Club in Fonthill, Evergreen Brick Works (formerly Don Valley Brick Works Park) in Toronto, St. Marys Swimming Quarry, the Wainfleet Wetlands Conservation Area, an agricultural field in Wellington County, and the Professor's Lake residential and recreation area in Brampton.

The rehabilitation practices of Ontario's aggregate producers have made the industry one of the largest creators of wetlands in the province. Photos: Among the examples of rehabilitated pits and quarries in Ontario are (at left) the Royal Botanical Gardens in Hamilton/ Burlington, the residential/ recreational Lakeland Estates in Nepean, and (below) the Peninsula Lakes Golf Club in Fonthill.





Useful links

The Hole Story www.theholestory.ca

Ontario Stone, Sand & Gravel Association www.ossga.com

The Ontario Aggregate Resources Corporation www.toarc.com

Aggregate Resources – Ontario Ministry of Natural Resources and Forestry www.ontario.ca/environment-and-energy/aggregate-resources

State of the Aggregate Resource in Ontario Study – Ontario Ministry of Natural Resources and Forestry www.ontario.ca/environment-and-energy/aggregate-resources-study

Aggregate Recycling Ontario www.aggregaterecyclingontario.ca



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