

AGGREGATE



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What is Aggregate?

Crushed bedrock or gravel, boulders, sand, and till (sediment deposited beneath glaciers) are all different types of aggregate. In cities, most aggregate is used to make concrete. Aggregate is also used in the production of asphalt, and great quantities are needed to build roads, pipelines, airstrips, and building pads. Aggregate is also used in water filtration systems, and we spread it on roads in winter to provide traction.

Different types of aggregate have different engineering properties. Gravel is commonly crushed to give it sharper edges that help it lock together. Large rocks are used to prevent erosion along riverbanks and shorelines. In remote areas, particularly in permafrost and wet terrain, roadbeds are built using till dug from large borrow pits. Even these roads must often be covered with a thin layer of gravel because, when it is wet, the till can be too slippery to drive on.



Gravel pit, Rainbow Lake, Alberta

I.R. Smith, NRCan



Crushed gravel and a loonie coin

I.R. Smith, NRCan

Aggregate is the most abundant geological resource available, and it's just as well, because we use a lot of it. One kilometre of two-lane highway uses 18,500 tonnes! Since so much material is used in construction, it's not surprising that the greatest cost associated with aggregate is for transporting it. Suitable aggregate deposits are not found everywhere; searching for local aggregate resources is a very important task.



Gravel deposited by glacier, southeast Yukon

I.R. Smith, NRCan

Rivers of Gravel

Over time, as rivers cut down into the landscape, they leave behind large flat terraces, usually made up of sand and gravel. These terraces are often our main source of aggregate. Sand and gravel deposits left by ancient rivers flowing from the ice sheets that covered Canada during the last Ice Age (30,000–10,000 years ago) are another major aggregate source.

AGGREGATE

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I'll Take the Dry Road!

Deposits left by glaciers have characteristic shapes and appearances. Geologists can identify them using tools such as air photographs and satellite imagery. Once identified, they still need to be inspected on the ground to determine what types of sediment they contain.



Sharp-crested esker, northwestern Manitoba

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One very conspicuous glacial deposit commonly used as a source of aggregate is an esker. Eskers are long, narrow, snake-like ridges made up of sand and gravel formed by rivers flowing under the ice sheets. They can be anywhere from 100 metres to more than 100 kilometres long! Because they are made up of sand and gravel, they are usually firmer and drier than the surrounding countryside and for thousands of years have been used by people and animals to travel on—almost like roads.

DID YOU KNOW?

The ancient Greeks made a concrete-like substance by combining crushed rock, sand, and ash—some of the buildings constructed with this mixture remain standing today.

Roman roads were commonly built using crushed rock. Some of those roads are still being used.

World production of aggregate is over 17 billion tonnes per year.

Over half of Canada's aggregate production each year is used to build and repair roads.

At 17 tonnes per person, per year, Canada's consumption rate of aggregate is triple the average of European countries.

Canada's aggregate needs are large—over 500 million tonnes are used each year.



Gravel quarry, Nogath Road, British Columbia

I.R. Smith, NRCan