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**Urban Expansion and the Mineral Industries**  
**in the**  
**Toronto-Hamilton Area**

By  
**D. F. HEWITT**

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**Industrial Mineral Report No. 8**

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TORONTO

Printed and Published by Frank Fogg, Printer to the Queen's Most Excellent Majesty

1962

The Series  
Industrial Mineral Circulars  
has been re-named  
Industrial Mineral Reports

Publications of the Ontario Department of Mines are obtainable through the  
Publications Office, Department of Mines, Parliament Buildings,  
Toronto 2, Ontario, Canada.

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# Urban Expansion and the Mineral Industries in the Toronto-Hamilton Area

BY  
D. F. Hewitt

## INTRODUCTION

The rapid growth of municipalities in the Toronto-Hamilton area has created a need for planned development of land-use in the areas of urban expansion. In the best interests of the community, zoning regulations should take into account the need to assure the community of an adequate supply of essential mineral raw materials, particularly for the construction industry. It is prudent to preserve and ensure the utilization of those valuable mineral resources that may be present in areas to be zoned.

An informative article by H. B. Goldman (1959), published by the State of California Department of Natural Resources, deals with problems of urbanization and discusses many of the points mentioned here. Zoning is discussed by V. P. Ahearn (1958) in a booklet published in the U.S.A. by the National Sand and Gravel Association. The need for maintaining adequate sand and gravel supplies near urban areas is recognized in Great Britain, and is discussed in a report to the Ministry of Town and Country Planning (1957) by the Advisory Committee on Sand and Gravel.

## MINERALS IN THE URBAN ECONOMY

Building construction essential to urban expansion is dependent on the supply of several low-cost mineral commodities, which are used in very large tonnages annually. These include: sand, gravel, and crushed stone used for concrete aggregate, concrete blocks, and roads; clay and shale used in the manufacture of brick, tile, light-weight aggregate, and sewer pipe; building stone; portland cement; gypsum products such as plaster, lath, and wallboard; and lime for mortar and cement. Most of these essential raw materials for construction cannot generally be shipped economically for long distances, and in order to keep construction costs down, an economic source within easy reach of the urban area is desirable.

The 1960 production figures for the building material industries located within a radius of 60 miles from Toronto give some idea of the quantity and value of these commodities being shipped in to the Toronto-Hamilton area annually.

### PRODUCTION 1960, TORONTO-HAMILTON AREA

Commodity	Number of Producers	Quantity	Value
Sand and gravel	64	18,477,500 tons	\$14,781,552
Crushed stone	22	9,080,299 tons	9,707,023
Brick and tile	20	240 million brick	16,092,792
Building stone	12	104,944 tons	820,199
Portland cement	2	508,994 tons	7,858,159
Gypsum	2	355,603 tons	871,408
Lime	3	102,750 tons	2,024,689
Total Value			\$52,155,822

The values shown are based on the prices of these materials at the pit, quarry, or plant. Their cost at any job-site in Toronto is increased by the charges for trucking or freight from the source. Haulage costs of sand and gravel, for example, from the pit to the Toronto market, average about \$1.00 per ton. The annual haulage bill for sand and gravel shipped to the Toronto market would be therefore, in excess of \$18,000,000. Comparable figures hold true for crushed stone.

Zoning restrictions that drive sand and gravel producers 10 miles farther from Toronto cost the Toronto consumer an additional 3.5 cents per-ton-mile or 35 cents per ton for haulage. Where large tonnages are involved, this increase can be important.

The fact that transportation is a decisive factor in the costs of construction raw materials needed within municipalities should be borne in mind when municipal officials are considering the best interests of the municipality in regard to restriction of development of mineral raw materials in areas where they may be present.

## UTILIZATION OF MINERAL RESOURCES

Deposits of sand and gravel, stone, clay, and shale are available in certain restricted areas in the Toronto-Hamilton area. These materials are by no means easy to find, and in many cases are not of widespread occurrence. Because good-quality gravel, for example, is difficult to find near Toronto, it is necessary to transport concrete gravel from points as far distant as Paris and Brighton, with attendant increases in freight costs.

Mineral raw materials are a depleting asset. Because they are present in fixed localities, they must be exploited where they exist. Careful advanced planning can result in the wise use of land and the conservation and optimum utilization of mineral resources that may be present in an area. After deposits of sand, gravel, stone, or clay, are worked out, the land can be rehabilitated and put to other uses. However, failure to provide for the future utilization of a mineral deposit that may be present in an area may result in the deposit being submerged by urban expansion, and lost to the community.

In earlier years, as urban expansion encroached on mineral-producing land, other deposits of sand, gravel, clay, and stone could be found within easy reach of the city. Deposits were adequate for the needs of the times. This is no longer true. It is becoming increasingly difficult to find deposits of these minerals, since the readily available deposits have become depleted or are completely built-over.

Construction raw materials are being consumed at a greatly increased rate. Since 1950 the consumption of sand and gravel in Ontario has increased from 30,000,000 to 75,000,000 tons annually. In the same period, the consumption of crushed stone in Ontario has increased from 5,000,000 to 17,000,000 tons. This has necessitated the development of millions of tons of new reserves, and more distant sources must be tapped.

The effect of urban expansion on the mineral industry in the Toronto area is well shown. The old shoreline of glacial Lake Iroquois, which existed some 12,000 years ago, crosses Toronto from east to west, and the old shore cliff is marked by the Davenport Road and Avenue Road hills. In the eastern and western parts of the city, where the ancient shoreline crosses the present valleys of the Don and Humber rivers, extensive sand and gravel bars were built up. These sand and gravel deposits were worked in the early days and provided a readily accessible local source of coarse and fine aggregate for Toronto users. As the city expanded north to St. Clair Avenue, the gravel operators found themselves within the city limits and subject to city ordinances.

With this engulfment, land values and taxes increase. People building houses in the vicinity of pits possibly begin to complain about noise, dust, and

traffic; restrictive ordinances may be passed regarding hours of operation, dust control, haulage routes, load limits, etc. These problems, which faced producers in Toronto 40 years ago, are now spreading to the townships for 30 miles around the metropolitan area.

In Toronto itself, the gravels of the Iroquois beach are no longer being exploited, and the gravel bars are completely covered by buildings. The sites of old operations are rehabilitated; many sites of former gravel pits are now parks; housing developments have occupied the sites of others.

Clay deposits formerly worked for the manufacture of brick on Greenwood Avenue, Dawes Road, and in other localities, have suffered engulfment in the process of urban expansion and are no longer being worked.

## PURPOSE OF ZONING REGULATIONS

Carefully planned zoning regulations are essential to the proper development of the community. Protection of the welfare of the public is the primary consideration, and zoning should provide for the rational development of all the essential services needed in the community.

With regard to mineral resources, especially those needed by the construction industry, it is the duty of the municipal officials to arrange to have a survey made of mineral resources present within their jurisdiction, and to make adequate provision for the use of such resources for the future benefit of the community. All known sites of mineral deposits should be placed in zones reserved for their development, to ensure that such deposits are not lost by prior development of the land for other uses. Judicious planning of this type will allow such areas to be worked for minerals, and later rehabilitated to other uses. It should be appreciated that the mining industries are tied to those areas where nature has placed the minerals. The types of mineral deposits discussed in this report normally occupy a relatively small surface area in any locality. Consequently, the area of land that will need to be set aside and zoned for mineral development will possibly be only a very small proportion of the total area of any municipality. However, the nature and distribution of such mineral resources must be ascertained prior to evolving satisfactory zoning regulations.

When zoning regulations make provision for the wise development of natural resources, they should also ensure that certain performance standards are met by the producers. Control of noise, dust, dirt, and traffic, and requirements as to set-back from roads, appearance of the plant, screen planting, safety, and land rehabilitation, should be dealt with in the zoning regulations. However, the regulations should not contain unreasonable, arbitrary, or unnecessary restrictions.



The above photo, taken in 1946, shows the location of gravel pits on Scarlett Road, Toronto.

The lower photo, taken in 1962, shows the same area now occupied by subdivisions. The former locations of the gravel pits are outlined in white in the lower photo.



## **MINERAL RESOURCES OF THE TORONTO-HAMILTON AREA**

### **Sand and Gravel**

The map, on page 5, gives the locations of sand and gravel producers in the Toronto-Hamilton area and shows their relation to some features of the surficial geology.

Good-quality sand and gravel suitable for concrete aggregate is difficult to find in the Toronto-Hamilton area. The principal sand and gravel production comes from the Clarkson, Milton, Brampton, Caledon, Maple, Stouffville, West Hill, and Pickering areas. Because some of this material is not of suitable quality for concrete, gravel for concrete aggregate is shipped in to Toronto from Paris, Guelph, Durham, Dranoel, and Brighton at a rail freight cost of \$1.30 per ton.

There is very little sand and gravel in the Hamilton area, and aggregate is shipped from the Brantford and Paris areas.

### **YORK COUNTY Metropolitan Toronto**

As indicated on the map, the abandoned shoreline of glacial Lake Iroquois crosses Metropolitan Toronto. At the present time there are four sand and gravel operations in the West Hill area of Scarborough township in or near these ancient shoreline deposits; these are J. Blake Sand and Gravel, J. B. Regan, Miller Paving Company, Crawford Sand and Gravel, Baxter Sand and Gravel, and Highland Creek Sand and Gravel. These are the only operations in Metropolitan Toronto. In 1918, when the last survey (Ledoux 1918) of sand and gravel producers was carried out, there were 19 producers in the area.

### **Vaughan Township**

The Oak Ridges kame moraine, which extends southward into the northeast corner of Vaughan township, is an important source of sand and a minor source of gravel in the Maple area. Producers include Superior Sand, Gravel and Supplies Limited, Ontario Sand and Gravel, Pinewood Aggregates, J. Chefero Sand and Gravel, Avondale Sand and Gravel, DeSante Sand and Gravel, and Aero Sand and Gravel.

A glacial outwash deposit of sand on the west bank of the Humber river, on highway No. 27 south of Kleinburg, is operated by Monarch Sand and Gravel.

### **King Township**

Two small sand and gravel pits are operated in King township: York Sand and Gravel, and Spragge's pit. They are associated with the Oak Ridges kame moraine.

### **East Gwillimbury Township**

Sand and gravel pits are operated in lots 28 and 29, concession VI, and lots 12 and 13, concession VII, in East Gwillimbury township.

### **Whitchurch Township**

One of the most important sources of sand and gravel in the Toronto area is the Oak Ridges kame moraine in Whitchurch and Uxbridge townships. Near Aurora three gravel pits are operated by Baker Sand and Gravel, George A. White, and Aurora Sand and Gravel. North of Stouffville, pits are operated by Commercial Sand and Gravel, Uxbridge Sand and Gravel, Lee Sand and Gravel, F. H. Roberts & Sons, Western Sand and Gravel, Stouffville Sand and Gravel, and Gormley Sand and Gravel.

### **Markham Township**

There are only two sand and gravel pits in Markham township. Markham Sand and Gravel is located in an isolated buried kame deposit. A glaciofluvial outwash deposit of sand is operated by J. Sabiston.

## **ONTARIO COUNTY**

### **Pickering Township**

The sand and gravel deposits in Pickering township are located either in the ancient beach of glacial Lake Iroquois or in isolated kame deposits. Orrell Limited, Consolidated Sand and Gravel, Kinsale Sand and Gravel, I. A. Hess, Highland Creek Sand and Gravel, Miller Paving Company, Cooper Concrete Supply Company Limited, and Valley Sand and Gravel operate pits in the Iroquois beach. Giordano Sand and Gravel, and the Pickering township pit are in buried kames.

### **Uxbridge Township**

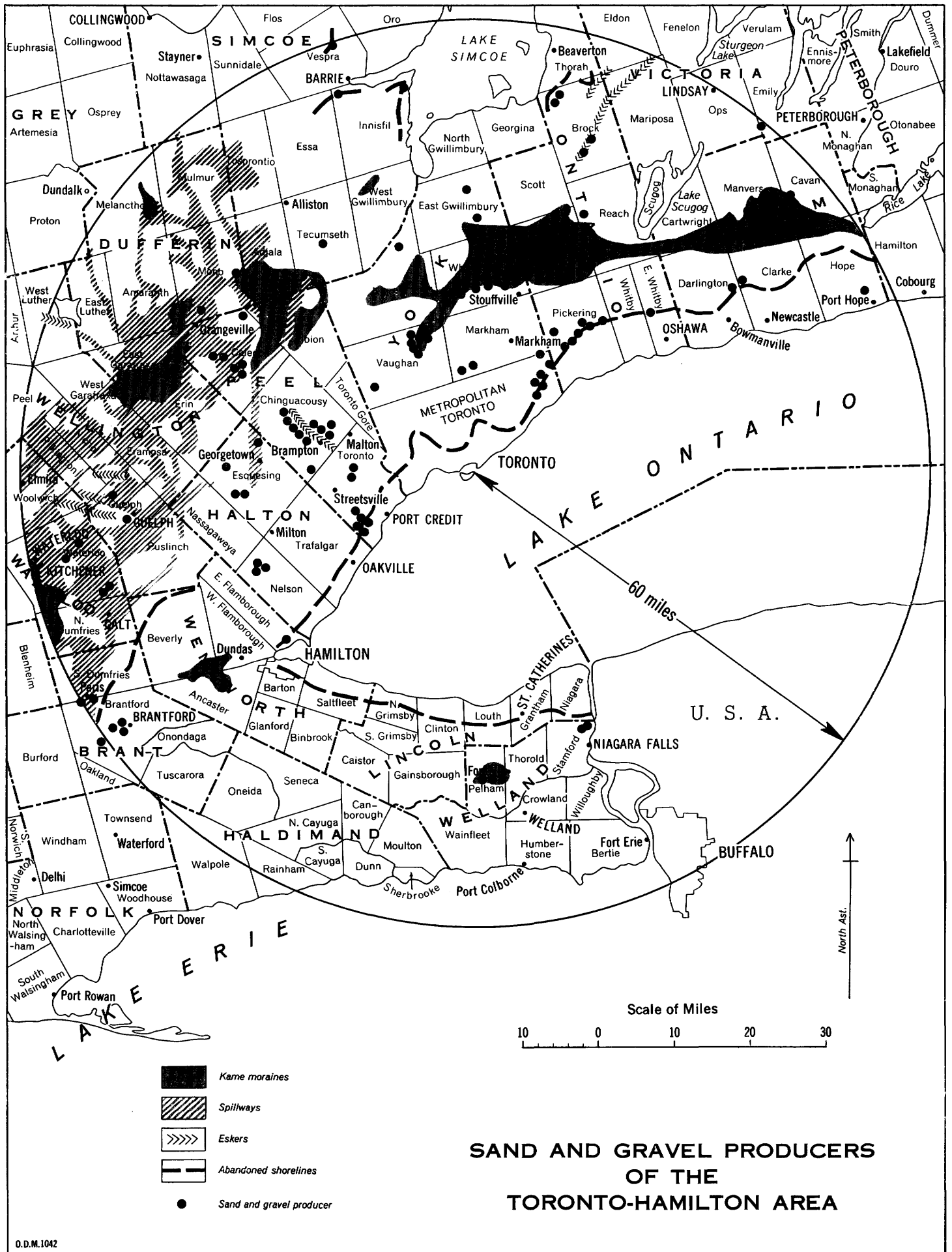
The Oak Ridges kame moraine covers most of Uxbridge township, and sand and gravel deposits are numerous. Commercial Sand and Gravel, Stouffville Sand and Gravel, Uxbridge Sand and Gravel, and several smaller producers operate in the township.

### **Brock Township**

A kame deposit of gravel is worked near Port Bolster by Eastern Sand and Gravel, and M. L. Avery. An esker is worked near Sunderland by Sunderland Sand and Gravel, and Hancock Sand and Gravel.

### **Reach Township**

Although the Oak Ridges kame moraine extends through Reach township, the sand and gravel deposits have not been commercially developed.



#### **Whitby Township**

Several small sand and gravel deposits may be found along the old Iroquois shoreline in Whitby and East Whitby townships.

#### **DURHAM COUNTY**

##### **Darlington, Clarke, and Hope Townships**

The old Iroquois shoreline extends across Darlington, Clarke, and Hope townships; gravel deposits in this beach are worked by Bowmanville Sand and Gravel, General Aggregates Limited, and Sleeman Brothers.

##### **Cartwright, Manvers, and Cavan Townships**

The Oak Ridges kame moraine extends across Cartwright, Manvers, and Cavan townships, and sand and gravel deposits are likely to be found within the area. At present the only substantial operation is that of Highland Creek Sand and Gravel at Dranoel Station.

#### **SIMCOE COUNTY**

##### **Vespra Township**

An ancient beach deposit of glacial Lake Algonquin is worked by Varcoe Brothers in Vespra township near Barrie.

##### **Innisfil Township**

A kame deposit of gravel is worked by McColgan Sand and Gravel south of Barrie. Innisfil Gravel Supplies operates in a beach deposit of glacial Lake Algonquin.

##### **Adjala Township**

Bolton Sand and Gravel operation is located in a kame moraine deposit in Adjala township.

#### **DUFFERIN COUNTY**

##### **Mono Township**

Mono Sand and Gravel operates in a kame moraine deposit north of Mono Mills. Hyco Limited gravel deposit near Orangeville is in a glacial spillway.

#### **PEEL COUNTY**

##### **Caledon Township**

Extensive spillway gravel deposits are worked in the Caledon area by C. Smythe Limited, Caledon Sand and Gravel, Armstrong Brothers Company, Eastern Gravel and Crushed Stone, Premier Building Materials, and Franceschini Brothers.

A kame moraine deposit is worked near Mono Mills, on the south side of highway No. 9, by Mineral Industries Sand and Gravel Limited.

##### **Chinguacousy Township**

An important source of gravel in Chinguacousy township near Brampton is the Brampton esker that is worked by Armstrong Brothers Company, J. C. Duff, Franceschini Brothers, Salisbury Sand and Gravel, Argo Block Company, Gormley Sand and Gravel, and Kenmore Building

Materials Limited. Two miles east, a buried kame deposit is worked by Consolidated Sand and Gravel. A beach deposit south of Brampton is operated by Ace Sand and Gravel.

#### **Toronto Township**

Gravel bars along the old Iroquois shoreline between Erindale and Clarkson are worked by Hugh's Haulage, Sherman Sand and Gravel, Clarkson Sand and Gravel, Franceschini Brothers, and Mineral Industries Sand and Gravel Limited.

#### **HALTON COUNTY**

##### **Nelson Township**

A deposit of kame gravel is worked in Nelson township by Hayward and Picket Limited, DCB Gravel Company, Sherman Sand and Gravel, and the Township.

##### **Esquesing Township**

The Industrial Sand and Gravel pit north of Glen Williams in Esquesing township is in the Georgetown spillway, an old glacial river valley. Sand and gravel pits, near Stewarton, in this spillway are operated by Consolidated Sand and Gravel, and H. R. Greenley Construction Company. The Brooks pit, near Limehouse, is in a similar deposit.

#### **WELLINGTON COUNTY**

##### **Guelph Township**

Gravel deposits in the Guelph area, operated by Guelph Sand and Gravel, and by Marden Sand and Gravel, are located in the extensive Orangeville-Guelph-Paris spillway system.

#### **WATERLOO COUNTY**

##### **Waterloo Township**

Gravel deposits in the Kitchener-Galt area, operated by E. & E. Seegmiller, Forewell Sand and Gravel, Martini Sand and Gravel, and Preston Sand and Gravel, are located in the Orangeville-Guelph-Paris spillway system.

#### **BRANT COUNTY**

##### **South Dumfries and Brantford Townships**

The Galt-Paris glacial spillway system extends through South Dumfries and Brantford townships; the deposits worked by Consolidated Sand and Gravel, Telephone City Gravel Company, Flintkote Company, Brown Sand and Gravel, and Daiken Sand and Gravel, near Paris and Brantford, are in the spillway.

#### **WENTWORTH COUNTY**

##### **East Flamborough Township**

The only gravel deposit presently being operated commercially in Wentworth county is that of J. Cooke & Sons Limited at Aldershot in the old beach of glacial Lake Iroquois. Several small gravel deposits formerly operated in the Iroquois bar in Hamilton are now closed.



Park and playground situated on the site of a former gravel pit, Bloor Street West, Toronto.

**West Flamborough Township**

Substantial gravel deposits in West Flamborough township are held by Guelph Sand and Gravel, J. Cooke & Sons Limited, and Howard Concrete and Materials Limited.

**WELLAND COUNTY  
Stamford Township**

Calaguiro Brothers, and Braas Brothers operate sand pits near St. Davids in glacial outwash deposits filling a buried valley in the Niagara Escarpment.

**Pelham Township**

An extensive glacial kame deposit in Pelham township is worked by Moyer Sand and Gravel, and Fonthill Sand and Gravel.

The location and extent of the various glacial features with which the sand and gravel deposits of the Toronto-Hamilton area are associated can be ascertained from maps showing the surficial geology of the area.

**Crushed Stone**

The principal formation quarried for crushed stone in the Toronto-Hamilton area is the Lockport-Amabel Dolomite (Hewitt 1960, p. 88 and map-sections), which forms the Niagara Escarpment extending from Queenston to Hamilton and north through Milton and Georgetown as indicated on the accompanying map. This important source of stone is quarried by twelve companies between Queenston and Georgetown; these include the largest quarries in Ontario. As well as producing crushed stone for concrete aggregate and roads, these quarries produce substantial tonnages of flux stone for the steel industry, and stone for paper mills and refractory uses. Up to 90 feet of stone is available in places in quarry faces in the Milton area; elsewhere the thickness available is somewhat less.

**Lockport-Amabel Dolomite**

The Lockport-Amabel Formation is available for quarrying in parts of Saltfleet, Barton, East Flamborough, and West Flamborough townships in Wentworth county; Nelson, Nassagaweya, and Esquesing townships in Halton county; Grimsby, Clinton, Louth, Grantham, and Niagara townships in Lincoln county; and Thorold township in Welland county.

Locations and names of companies operating quarries at present in the Lockport and Amabel formations for the production of crushed stone in the Toronto-Hamilton-St. Catharines area are given below.

**LINCOLN COUNTY  
Niagara Township**

Queenston Quarries Limited.

**Grantham Township**

St. Catharines Crushed Stone Limited.

**Clinton Township**

Vineland Quarries and Crushed Stone Limited.

**WELLAND COUNTY  
Stamford Township**

Walker Brothers Limited.

**WENTWORTH COUNTY  
Saltfleet Township**

Armstrong Brothers Company Limited, and A. Cope and Sons Limited.

**West Flamborough Township**

Canada Crushed and Cut Stone Limited, and James D. Gray and Son.

**East Flamborough Township**

Armstrong Brothers Company Limited.

**HALTON COUNTY  
Nelson Township**

Nelson Crushed Stone Limited.

#### **Nassagaweya Township**

Milton Quarries Limited, and Halton Crushed Stone Limited.

#### **Esquesing Township**

Armstrong Brothers Company Limited.

New quarries are to be opened in the Milton-Acton area by Associated Quarries, Standard Paving Company, and Acton Limestone Quarries Limited.

#### **Bertie-Akron Dolomite and Bois Blanc Limestone**

Two other formations are quarried between Hagersville and Fort Erie. These are the Bertie-Akron Dolomite and the overlying Bois Blanc Limestone (Hewitt 1960, p. 127 and map-sections), which are exposed in a wide band from Hagersville to Fort Erie. Quarrying is carried out at Fort Erie, Port Colborne, Dunnville, Cayuga, and Hagersville. The maximum vertical thickness of Bois Blanc Limestone is 39 feet at Ridgemount Quarries near Fort Erie. The Bois Blanc Formation contains chert that is sometimes objectionable in concrete aggregate.

Names and locations of companies at present operating quarries in the Bertie-Akron and Bois Blanc formations are given below.

#### **WELLAND COUNTY Bertie Township**

George C. Campbell Company Limited, and Ridgemount Quarries Limited.

#### **Humberstone Township**

Niagara Crushed Stone (Humberstone) Limited, and R. E. Law Crushed Stone Limited.

#### **Wainfleet Township**

Canada Cement Company Limited.

#### **HALDIMAND COUNTY Dunn Township**

Dunnville Quarries Limited.

#### **North Cayuga Township**

Cayuga Quarries Limited.

#### **Oneida Township**

Haldimand Quarries and Construction Limited.

#### **Walpole Township**

Canada Crushed and Cut Stone Limited, and Hagersville Quarries Limited.

#### **Other Sources**

In addition to these quarries, which lie within a radius of 60 miles from Toronto, limestone flux is shipped by rail from Beachville, near Woodstock, to Hamilton steel plants. Crushed stone is shipped to the Toronto area by rail from the Uthoff quarry of Limestone Products Limited, near Orillia. This is the closest source of limestone to Toronto.

#### **Brick and Tile**

Brick and tile are manufactured both from surface clay and from bedrock shale formations. In the Toronto-Hamilton area, there is much bedrock shale suitable for the manufacture of brick and tile. Deposits of surface clay, formerly used much more extensively, have been depleted, and the industry now relies mainly on shale as a source of raw material.

As indicated on the map opposite, the red Queenston Shale and the grey-green Meaford-Dundas Shale underlie the St. Catharines-Hamilton-Toronto area north and east of the Niagara Escarpment. Adequate supplies of shale suitable for brick and tile are available in several places in the area where overburden is sufficiently thin to allow the underlying bedrock to be quarried without excessive stripping costs.

Brick and tile plants are operating at present in the areas, as shown below.

#### **LINCOLN COUNTY Grantham Township**

St. Catharines Brick and Tile Company Limited operates a brick plant utilizing weathered red Queenston Shale.

#### **Clinton Township**

Grimsby Tile Limited produces tile from the weathered Queenston Shale.

#### **WENTWORTH COUNTY Barton Township**

Hamilton Pressed Brick Company and Canadian Pressed Brick Company produce brick from red Queenston Shale.

#### **East Flamborough Township**

Natco Clay Products Limited produces tile from Queenston Shale quarried at the National Sewerpipe pit in East Flamborough township.

#### **HALTON COUNTY Nelson Township**

Diamond Clay Products Limited produces brick from red Queenston Shale quarried near Tansley.

#### **Nassagaweya Township**

Milton Brick Company Limited produces brick from Queenston Shale quarried near Milton.

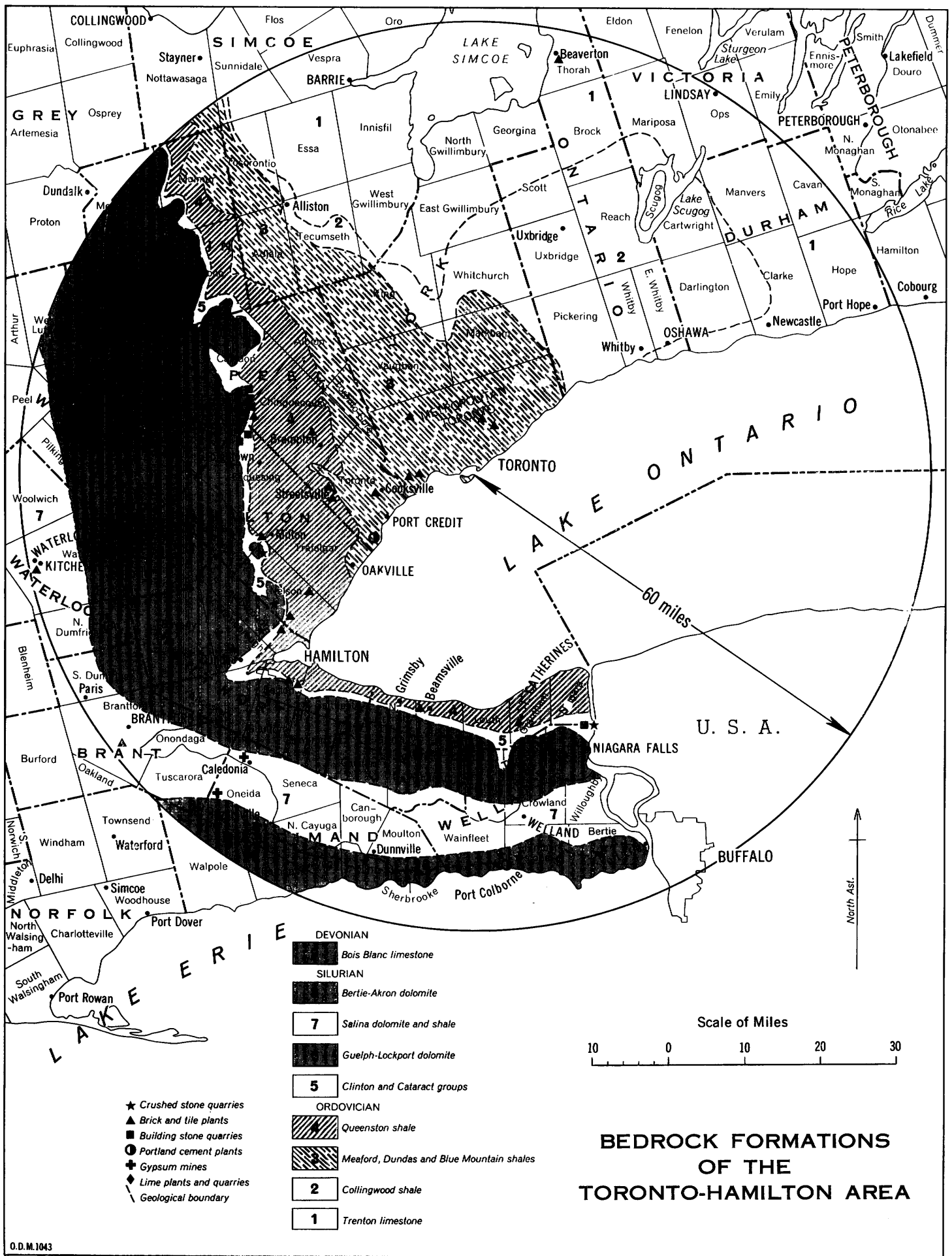
#### **PEEL COUNTY Chinguacousy Township**

Queenston Shale is quarried for the manufacture of brick at Brampton by Brampton Brick Limited, and at Cheltenham by Domtar Construction Materials Limited.

#### **Toronto Township**

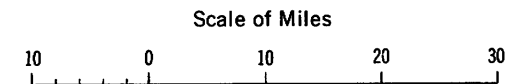
Queenston Shale is quarried for brick manufacture at Streetsville by F. B. McFarren Limited and Canada Brick Limited.

Brick is manufactured at Cooksville by Domtar Construction Materials Limited from Dundas Shale.



- |            |  |
|------------|--|
| DEVIATION  | Bois Blanc limestone                     |
| SILURIAN   | Bertie-Akron dolomite                    |
| 7          | Salina dolomite and shale                |
|            | Guelph-Lockport dolomite                 |
| 5          | Clinton and Cataract groups              |
| ORDOVICIAN | Queenston shale                          |
|            | Meaford, Dundas and Blue Mountain shales |
| 2          | Collingwood shale                        |
| 1          | Trenton limestone                        |

- ★ Crushed stone quarries
- ▲ Brick and tile plants
- Building stone quarries
- Portland cement plants
- ⊕ Gypsum mines
- ◆ Lime plants and quarries
- Geological boundary



## BEDROCK FORMATIONS OF THE TORONTO-HAMILTON AREA

## **YORK COUNTY**

Five brick plants operate in the Metropolitan Toronto area. The Ontario Reformatory brick plant and Booth Brick Limited in New Toronto, quarry Dundas Shale. The Edgar Avenue plant of Booth Brick Limited uses surface clay and Dundas Shale from the Etobicoke plant. The Toronto Brick Company's Don Valley plant uses surface clay and Dundas Shale quarried on the property, and uses some Queenston Shale that is hauled in from Milton. The Greenwood Avenue plant of Toronto Brick Company uses surface clay.

Owing to urban expansion and to depletion of clay resources, the number of brick plants in the Metropolitan Toronto area has decreased from 16 in 1930, to 5 in 1962.

### **Sewer Pipe**

National Sewer Pipe Limited operates plants at Clarkson and Hamilton, producing sewer pipe and flue lining from Queenston Shale and red surface clay from the Aldershot area.

### **Building Stone**

The Gasport dolomitic limestone is quarried for building stone by Queenston Quarries Limited at Queenston. This is the largest building-stone quarry in Canada and supplies a considerable quantity of Canadian limestone dimension stone for facing buildings. The same formation has been quarried near Thorold by Niagara Cut Stone Limited.

The Medina Sandstone, which is exposed near the base of the Niagara Escarpment from Niagara Falls to the Credit Forks, is quarried for building stone in the Glen Williams-Credit Forks area. Operations are in Esquesing and Caledon townships. The production from these small quarries is mainly ashlar and flagstone.

A small amount of ashlar and flagstone is produced at the Cooksville quarry of Domtar Construction Materials Limited.

## **Portland Cement**

Portland cement is produced in the Toronto-Hamilton area by plants at Clarkson and Port Colborne. Much of the portland cement used in the area is shipped in from plants at St. Marys, Woodstock, Picton, and Belleville.

Limestone, one of the essential raw materials for the manufacture of portland cement, is lacking in the Toronto area. The Clarkson plant of St. Lawrence Cement Company uses limestone from a quarry at Colborne on Lake Ontario. Shale is quarried in a pit at the Clarkson property. The Port Colborne plant of Canada Cement Company takes part of its limestone requirements from a nearby quarry, but also uses limestone from Beachville.

### **Gypsum**

Adequate reserves of gypsum, for the manufacture of gypsum plaster, lath, and wallboard, exist in the Caledonia-Hagersville area near Hamilton. Beds of gypsum, 4-11 feet thick, occur underground in the Salina Formation of Silurian age. Gypsum is mined at Caledonia by Gypsum Lime and Alabastine (Canada) Limited, and at Hagersville by Canadian Gypsum Company Limited.

### **Lime**

Dolomite, suitable for the manufacture of dolomitic lime used in the building trade, is quarried from the Guelph Dolomite Formation at Glen Christie near Hespeler, and at Guelph. The Amabel Formation is quarried for lime kiln feed at Rockwood. These three plants, operated by Gypsum Lime and Alabastine (Canada) Limited, Canadian Gypsum Company Limited, and the Rockwood Lime Company Limited, produce over \$2,000,000 worth of lime annually. Adequate reserves of dolomite are available in the areas currently being quarried. The Amabel Formation of the Milton area was formerly quarried for lime production.



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