Nova Scotia Department of Natural Resources
Mineral Resources Branch

Open File Map ME 2007-3

(Figure 5 of Economic Geology Series ME 2007-1)

Geological Map of Western Halifax Regional Municipality Aggregate Study Area, Halifax County, Nova Scotia

Showing Sample Locations and Aggregate Test Results

(Part of NTS Sheets 11D/12, 11D/13, 21A/09 and 21A/16)

G. Prime and F. J. Bonner

Scale 1:35 000

1 0 1 2 3 km

Halifax, Nova Scotia
2007

Natural Resources

Discussion

This geological map and legend are a compilation of the bedrock maps of others (Corey, 1987, 1990; Ham, and Horne, 1987; MacDonald and Horne, 1987; MacDonald, 1994) and the results of a sampling program conducted during the field component of this study. The geology and rock descriptions have been taken from the work of the above geologists. Although basic geological data are presented on the map, the authors have purposely kept the format simple. Mineral occurrences have been included to indicate areas which should be approached with caution. Metals, such as uranium and arsenic, could present health or environmental risks if exposed during the extraction process. However, it must be stressed that mineral occurrences commonly are very local features and are usually not indicative of hazardous conditions. The reader is cautioned that a variety of geological features, not illustrated on the map (e.g. shear zones and alteration), can significantly impact on stone quality. Anyone contemplating aggregate exploration in the region is strongly encouraged to examine the original bedrock and surficial maps to properly evaluate the area. This should be done in conjunction with an examination of a report by Prime (2001) describing geological characteristics which could affect aggregate performance and quarry potential.

A reference table showing the sample test results is provided in the lower right corner of the map. It should be noted that the locations of the samples taken during this study are not necessarily an indicator of the best sites for quarrying. Many of the samples were taken simply because of the presence of outcrop amenable to sampling with hand tools. However, the samples can be used as a general guide to bedrock quality in the area or within a specific rock type.

Outcrop locations are indicated on the map to show areas where the bedrock can be evaluated and sampled at the surface. But it should be noted that not all exposures present in the area are shown on the maps. Although the original geological mapping was remarkably thorough, time constraints prevented the documentation of all outcrop. Grid line traverses across a candidate quarry area should produce more bedrock exposures than indicated here.

Any attempt to identify an aggregate deposit should be accompanied by a thorough field evaluation of the geology. Ideally this would include trenching, diamond drilling or test hole blasting. Laboratory testing of samples collected during the exploration phase should include analysis for potentially harmful substances such as deleterious metals. These inexpensive tests should also be conducted periodically on the stone products throughout the life of an operation as the quarry face advances. It is strongly recommended that the proponent use the services of a qualified geoscience professional when doing aggregate resource assessment. Employing an individual with this experience could help avoid problems which may arise from opening a new quarry. This can include rock quality problems, health and environmental concerns or liability issues in the future. Caution and due diligence on the part of a proponent should be priorities for any mining development proposal.

References

Corey, M.C. 1987: Geological map of Mount Uniacke, NTS sheet 11D/13 (west half); Nova Scotia Department of Mines and Energy, Map 1987-8, scale 1:50 000.

Corey, M.C. 1990: Geological map of Chester, Nova Scotia, NTS sheet 21A/09; Nova Scotia Department of Mines and Energy, Map 1990-9, scale 1:50 000.

Ham, L.J. and Horne, R.J. 1987: Geological map of Windsor, Nova Scotia, NTS sheet 21A/16 (east half); Nova Scotia Department of Mines and Energy, Map 1987-7, scale 1:50 000.

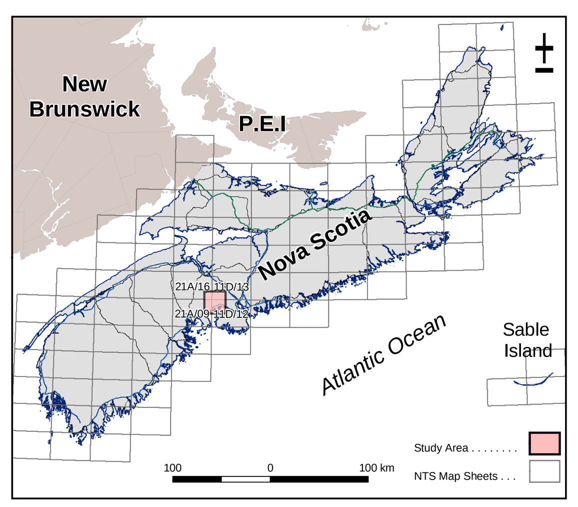
MacDonald, M.A. (compiler) 1994: Geological map of the South Mountain Batholith, western Nova Scotia; Nova Scotia Department of Natural Resources, Mines and Energy Branches, Map 1994-01, scale 1:250 000.

MacDonald, M.A. and Horne, R.J. 1987: Geological map of Halifax and Sambro, Nova Scotia, NTS sheets 11D/12 and 11D/05; Nova Scotia Department of Mines and Energy, Map 1987-6, scale 1:50 000.

Nova Scotia Departments of Health Promotion and Protection, Service Nova Scotia and Municipal Relations, Economic Development, and Tourism, Culture and Heritage 2001: Trails Nova Scotia, available at http://www.trails.gov.ns.ca/SharedUse/hx041.html

Prime, G. 2001: Overview of bedrock aggregate potential in the Halifax-Dartmouth metropolitan area, Nova Scotia; Nova Scotia Department of Natural Resources, Minerals and Energy Branch, Economic Geology Series ME 2001-1, 74 p.

Regional Key Map



Map Notes

Universal Transverse Mercator Projection (UTM), Zone 20, Central Meridian 63°00' West.

North American Datum (NAD) 1983.

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Disclaimer

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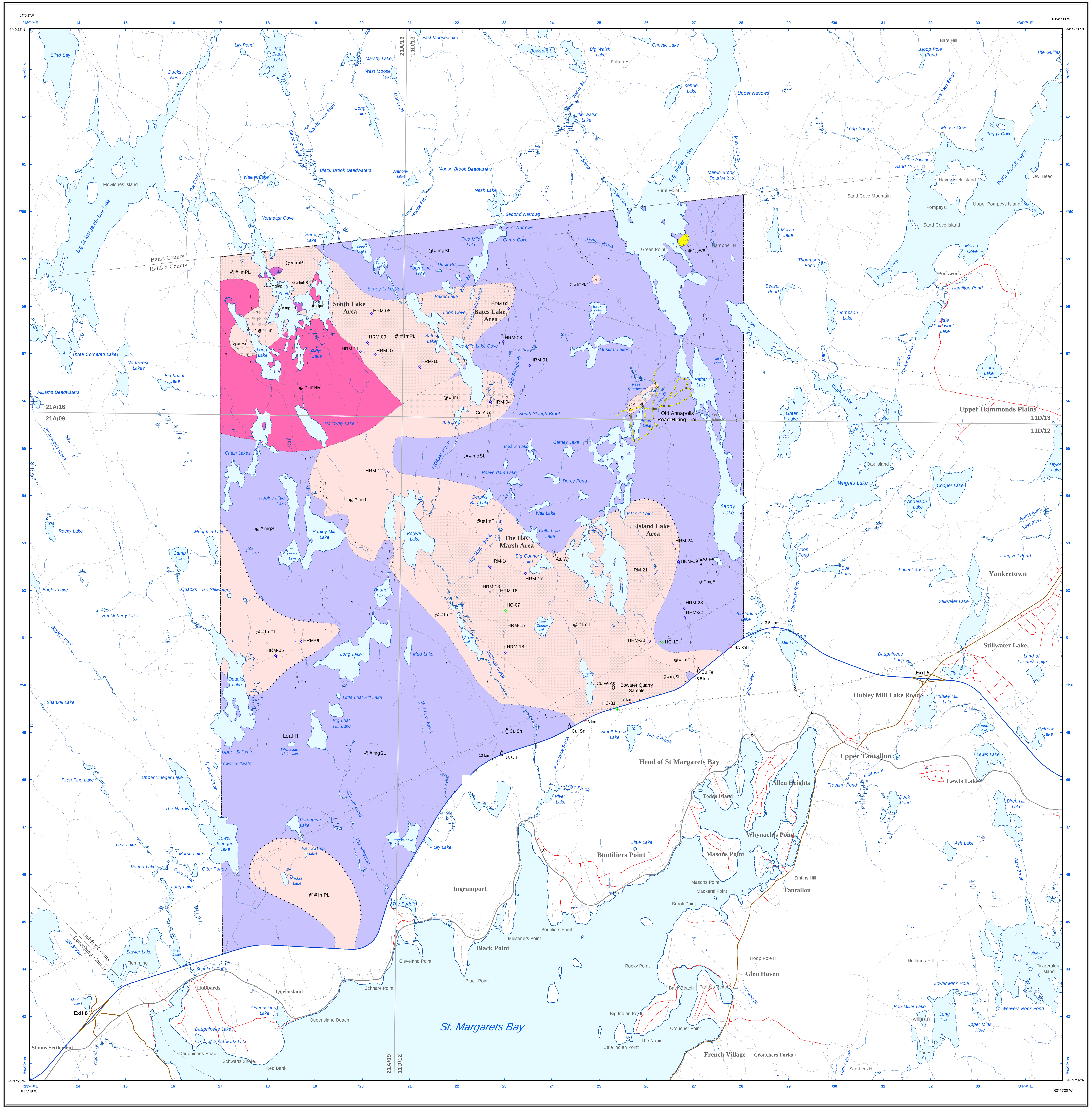
Recommended Citation

Prime, G. and Bonner, F. J. 2007: Geological map of western Halifax Regional Municipality aggregate study area, Halifax County, Nova Scotia, showing sample locations and aggregate test results (part of NTS sheets 11D/12, 11D/13, 21A/09 and 21A/16); Nova Scotia Department of Natural Resources, Mineral Resources Branch, Open File Map ME 2007-3, scale 1:35 000.



Legend

DEVONO-CARBONIFEROUS

@#lgWB — WALSH BROOK LEUCOGRANITE (Corey, 1987): buff to orange-pink, fine- to medium-grained, moderately equigranular; biotite (1-2%), muscovite (2-4%)

@#lmPL | @#lmT — PANUKE LAKE LEUCOMONZOGRANITE (@#lmPL)(Corey, 1987, 1990; Ham and Horne, 1987)/ TANTALLON LEUCOMONZOGRANITE (@#lmT)(MacDonald and Horne, 1987): buff, orange, pink, red, white, grey, predominantly fine- to medium-grained, minor coarse grained, variably porphyritic, equigranular and aplitic; biotite (trace -7%), muscovite (trace - 6%) , cordierite (0 - 4%); phenocrysts and megacrysts of K-feldspar >2.5 cm (0 - 5%)

@#lmPL | @#lmT — PANUKE LAKE LEUCOMONZOGRANITE/ TANTALLON LEUCOMONZOGRANITE: uniform equigranular texture

@#lmPL | @#lmT — PANUKE LAKE LEUCOMONZOGRANITE/ TANTALLON LEUCOMONZOGRANITE: uniform porphyritic texture with some megacrysts

@#lmNR — NEW ROSS LEUCOMONZOGRANITE (Ham and Horne, 1987; Corey, 1990): light to whitish grey, pinkish grey to orange, predominantly medium- to coarse-grained, moderately equigranular to megacrystic (5 - 40%); biotite (4 - 6%), muscovite (trace - 4%), cordierite (trace - 2%); contains minor amount of xenoliths (<1%)

@#mgSL — SANDY LAKE MONZOGRANITE (Ham and Horne, 1987; MacDonald and Horne, 1987; Corey, 1987, 1990): light to medium grey, medium- to coarse-grained, megacrystic (5 - 25%) to slightly porphyritic; biotite (8 - 15%), muscovite (trace - 1%), cordierite (trace - 3%); contains xenoliths (<1%)

@#mgmp — MAFIC PORPHYRY (Ham and Horne, 1987): medium- to dark brownish-grey, fine- to medium-grained, porphyritic with coarse grained phenocrysts of quartz, plagioclase, K-feldspar; biotite (12 - 20%), muscovite (trace); contains abundant xenoliths

Note: Geology only given within limits of study area.

Symbols

Bowater Mersey Paper Company Limited's primary road intersections with Route 103 (approximate distance to Exit 5) . . . . 10 km
Approximate distance along Route 103 to Exit 5 . . . . 4.5 km
Sample locations from Prime (2001) HC-07
Sample locations from current study HRM-16
Bowater Quarry sample location . . . .
Mineral occurrences (from Nova Scotia Department of Natural Resources, Mineral Occurrences Data Base; MacDonald and Horne, 1987) . . . . As
Outcrop locations . . . .
Xenoliths . . . .
Limit of study area . . . .
Old Annapolis Road Hiking Trail (digitized from Nova Scotia Departments of Health Promotion and Protection *et al.*, 2001). . . . .
Geological boundary (defined, approximate, assumed, defined by till clasts). . . . .

100 Series Highway 102
Trunk Highway 4
Collector Highway 333
Hard surface road . . . .
Loose surface road . . . .
Resource access road . . . .
Vehicle track . . . .
Railway inactive . . . .

Coastline . . . .
Rivers, streams . . . .
County boundary . . . .
Transmission lines (multi, single lines) . . . .
Swamps . . . .
Lakes . . . .

Aggregate test results for samples collected in this study. Note that only those samples labelled with HRM were taken as part of this research.

Sample No.	Reference Locations for Sample Groupings	LA Abrasion Loss %	Absorption %	Bulk Relative Density (SSD)	Petrographic Number	Micro-Deval, Loss %
HRM - 01	Bates Lake Area	29.7	1.12	2.60	133.0	7.3
HRM - 02		21.8	0.97	2.61	121.0	6.4
HRM - 03		25.3	0.97	2.61	126.0	7.0
HRM - 04		20.3	0.78	2.61	110.0	5.6
HRM - 05		19.9	0.80	2.62	103.0	6.0
HRM - 06		32.2	0.73	2.62	138.0	8.0
HRM - 07	South Lake Area	17.2	0.85	2.62	104.0	5.8
HRM - 08		20.1	0.98	2.61	111.0	6.3
HRM - 09		24.0	1.19	2.61	119.0	6.4
HRM - 10		23.6	1.09	2.61	115.0	8.1
HRM - 11		15.9	0.96	2.61	110.0	5.2
HRM - 12		18.7	0.75	2.63	116.0	5.3
HRM - 13	The Hay Marsh Area	27.7	1.00	2.61	141.0	8.4
HRM - 14		31.1	1.33	2.59	175.0	10.1
HRM - 15		23.9	0.91	2.61	129.0	6.9
HRM - 16		29.0	0.76	2.62	132.0	7.3
HRM - 17		32.0	0.71	2.62	142.0	7.3
HRM - 18		24.0	0.70	2.61	111.0	5.6
HRM - 19	Island Lake Area	20.2	0.99	2.60	142.0	6.3
HRM - 20		26.6	0.82	2.63	132.0	7.1
HRM - 21		21.2	1.01	2.60	132.0	6.4
HRM - 22		17.5	0.81	2.61	128.0	4.5
HRM - 23		18.9	1.03	2.61	136.0	6.3
HRM - 24		26.7	0.84	2.62	128.0	6.2
Bowater Quarry /Hwy 103*		32.0	0.7	2.62	113.0	N/A
HC-07**		33.1	0.84	2.586	100.4	N/A
HC-10**		31.3	1.36	2.55	102.2	N/A
HC-31**		32.3	0.75	2.595	N/A	N/A

Samples HRM-01 to -24 tested by Jacques Whitford Materials Limited, Dartmouth, Nova Scotia, Project No. NSD 17533; February 2003, using methods outlined in Prime (2001).
*Test results from sample of aggregate produced in quarry on Bowater Mersey Paper Company Limited property. Materials were used by Dexter Construction Co. Ltd. in a Nova Scotia Department of Transportation and Public Works highway contract. Refer to Appendix 5 for detailed results.
**Test results from samples taken in previous study (Prime, 2001). Samples tested by Warnock Hersey Professional Services for Technical University of Nova Scotia Aggregate Survey, samples WHPSL #907, #909, #931; 1990