GRANULAR AGGREGATE RESOURCES OF THE WOODSTOCK AND MILLVILLE MAP-AREAS NEW BRUNSWICK

(N.T.S. 21 J/4 and 21 J/3)

BY

P.F. FINAMORE

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ABSTRACT

This report provides an inventory of granular aggregate resources for the Woodstock (21 J/4) and Millville (21 J/3) map-areas, New Brunswick. The inventory included mapping granular aggregate deposits, collecting samples and estimating material depth to determine the general quality and quantity of individual deposits.

The total amount of granular aggregate material in the Woodstock and Millville map-areas is approximately 57.4 million m^3. Of this total, approximately 1.8 million m^3 in the Woodstock map-area and 14.7 million m^3 in the Millville map-area may be qualitatively considered as good to exçellent.

RESUME

Ce rapport fait état d'un inventaire des ressources en aggrégat effectué au Nouveau-Brunswick, à l'intérieur des limites des cartes Woodstock (21 J/4) et Millville (21 J/3). L'inventaire, qui comprenait la cartographie des dépôts d'aggrégats, la cueillette d'échantillons et l'évaluation de l'épaisseur du matériel, avait pour objectif de déterminer la qualité et la quantité de matériel présent à l'intérieur des différents dépôts.

On évalue à environ 57.4 million m^3 le volume total d'aggrégat granulaire présent dans la région couverte par les cartes Woodstock et Millville. De ce total, on estime qu'environ 1.8 million m^3 (Woodstock) et 14.7 million m^3 (Millville) sont de qualité allant de bonne à excellente.

INTRODUCTION

Location

The areas investigated are the Woodstock (N.T.S. 21 J/4) and Millville (N.T.S. 21 J/3) map-areas, New Brunswick, and they are confined by 46°00' and 46°15' north latitude and 67°00' and 67°47' west longitude (Figure 1).

The area lies in west-central New Brunswick and includes the town of Woodstock, the village of Millville and surrounding communities.

Previous Work

Early studies of the bedrock geology were carried out by Caley (1936) and Anderson (1968) of the Geological Survey of Canada. More recent detailed mapping by the New Brunswick Department of Natural Resources includes most of the study area at a scale of 1 inch to ¼ mile (Venugopal, 1978a, b, c, 1979a, b and Hamilton-Smith, 1972).

Early work on the surficial geology was reported by Chalmers (1885). Lee (1962) has compiled the most recent mapping of the Woodstock map-area and his work provides a basis for this study.

In 1975, an inventory of sand and gravel in New Brunswick was compiled to "provide a basis for the establishment of an overall granular resource management plan for the Province" (Hamilton and Carroll, 1975). A

map of the generalized surficial geology of New Brunswick accompanied that report.

Present Study

This report summarizes field work undertaken during the summer and fall of 1979. It provides an inventory of granular aggregate resources for the Woodstock and Millville-centred regions. The inventory included mapping granular aggregate deposits, collecting samples and estimating material depth to determine both the general quality of material and the volume of individual deposits.

Field work involved the examination of man-made and natural exposures. Aerial photograph interpretation supplemented field work where access was difficult. In some instances, this necessitated the interpretation of the extent of some deposits.

Seismic studies were carried out near Temperance Vale by J. Chandra (Geophysicist, Department of Natural Resources). This information has complemented field data so that reserve estimates could be made. Consequently, the reliability of reserve estimates is greater in those areas where geophysics has been employed.

PHYSIOGRAPHY

Topography

The study area can be subdivided into two physiographic divisions: the Chaleur Uplands and the New Brunswick Highlands. Both divisions are part of the

Appalachian Region of eastern Canada (Bostock, 1970).

The boundary between the two physiographic divisions roughly follows the Woodstock Fault which separates rocks from the Ordovician-Silurian and the Silurian-Devonian (Venugopal, 1979a).

The Chaleur Uplands have a gently rolling surface broken only by the local prominence of resistant rock such as Iron Ore and Moody Hills (Anderson, 1968). The New Brunswick Highlands, in contrast, are more diversified and irregular. Hills and ridges are more prominent and the plateaux are, in most instances, similar to those of the Chaleur Uplands.

The northeast quarter of the Millville map-area exhibits hummocky topography in a relatively low-lying enclosure. The area is occupied by muskegs and deadwaters marking the heads of several streams (Anderson, 1968).

Drainage

The study area lies entirely within the St. John River drainage basin. The St. John River follows an ancient course in a mature valley and the river exhibits some youthful characteristics that were observed by Anderson (1968) prior to the construction of the Mactaquac Dam:

> "Where the Saint John River flows across Woodstock map-area its characteristics are those of late youth. No flood plain has yet been developed, and the river is just able to carry away the material supplied to it by its tributaries.

> Exposures of bedrock and rapids along this part of the river indicate that a large part of the energy of the river is yet to be expended in downcutting".
>
> (Anderson, 1968, p. 8)

Major tributaries of the St. John River include the Meduxnekeag, Keswick, and Nackawic rivers. These tributaries exhibit some form of rejuvenation that can be attributed to glaciotectonic activity.

The overall drainage pattern is dendritic with the majority of the tributaries being subsequent in origin.

Most of the lakes in the study area occupy topographic depressions directly related to the structural trend of the bedrock. In the northeast quarter of the Millville map-area however, drainage is poor and small lakes have formed in kettled depressions of an expansive ablation unit.

BEDROCK GEOLOGY

The study area lies within two tectonostratigraphic zones: the Miramichi and Matapedia Anticlinoriums to the east and west respectively. The anticlinoria are separated by the Woodstock Fault (Venugopal, 1979a).

Rocks vary in age from Mississippian in the north-central portion of the Millville map-area to Cambro-Ordovician occurring dominantly in the eastern and western halves of the Woodstock and Millville map-areas, respectively. The Cambro-Ordovician rocks are the most common in both map-areas. They are composed dominantly of metaquartzite and quartz wacke interbedded with slate and siltstone.

Other rocks occurring in relative abundance are Devonian granites, tonalite and related intrusives and Ordovician and/or Silurian limestone, slate, siltstone, shale a minor conglomerate (Venugopal, 1979a).

Quarrying activities have occurred at several localities in both map-areas and the most notable sites are mentioned below.

A limestone quarry commonly referred to as the Waterville limestone deposit (J3-41) has been extensively worked in the past. Although the quality of the limestone is excellent, the deposit is small and "reserves are estimated to be in the order of 40,000 short tons of limestone with an average of 97 percent $CaCO_3$ to 100 feet"

(Hamilton, 1965, p. 61).

Intensely weathered granites occur in several localities in the Millville map-area (J3-41, near J3-31, etc.). The material has been used locally for road construction and general fill.

SURFICIAL GEOLOGY

Introduction

The primary movement of ice was in a south to southeasterly direction as suggested by glacial striae. Greater easterly variations were observed along the tributaries of the St. John River and near the Keswick River, at Lower Hainesville. Widespread occurrences of cross-cutting striae were also recorded and both sets appear to be in a southerly direction. Variations of about 15° are common.

Cross-cutting striae may reflect more than one glacial period or they may represent variations in the pattern of flow during various phases of a single glaciation (Gadd, 1973).

Recent glacial models have been developed by Genes, Newman and Brewer (1980) from studies conducted in Aroostook County, Maine. They suggest that Laurentide ice was either a continuous ice cap with variable thermal conditions at the ice-bedrock interface or it coalesced and displaced an independent ice cap to the southeast.

Both models could account for the minor divergence of striae recorded in the study area.

Deglaciation

The sequence of events that relate to deglaciation are complex and not as yet fully understood. Both the Millville and Woodstock map-areas exhibit different topographic features and will therefore reflect different conditions of deglaciation. For this reason, the two map-areas are treated separately.

Woodstock Area

Multiple till sections have been reported by Lee (1962) and the author within the St. John River Valley. Lee (1962) suggests that the superposition of a grey till over a red till north of Woodstock (in the St. John River Valley), was a result of a compressive or thrust flow of ice. Lee uses this evidence to support an ice front position north of Woodstock. However, multiple till exposures near Hillman, in the southeast corner of the Woodstock map-area (J4-43) suggest that late glacial activity may have been restricted to the St. John River Valley. This assumption is based on the fact that all of the multiple till sections are confined to the St. John River Valley. The close association of ice-contact and glaciofluvial sediments within the Valley and the lack of evidence to extend "late" glacial activity beyond the confines of the Valley (particularly near Hillman) may

further support this idea.

Within both the Meduxnekeag and St. John River Valleys, deltaic sediments have been observed and their formation can be attributed to one of the following proposals:

(1) active ice creating small lakes

(2) the influence of marine transgression

(3) a combination of (1) and (2)

In certain instances, there is evidence to suggest that the first proposal is appropriate. For example, in the lower reaches of the Meduxnekeag River, fine grained sediments (mostly silt and in one locality, rhythmites) underlie sand and gravel with no apparent discontinuity. The presence of a short moraine (approximately 20 to 25 metres high) in the town of Woodstock (U.T.M. 098 113) and ice-contact sediments to the north and northeast of this area suggest that ice may have blocked the Meduxnekeag River to create this environment. However, it is equally conceivable that the deltaic environment was created by the influence of marine transgression into the St. John River Valley.

Deltaic sediments in the northeast section of the St. John River Valley also suggest that water must have ponded. However, it becomes increasingly difficult to block southerly exits for drainage if the net ice retreat was northwards. In this instance, the influence of marine transgression appears likely.

There are problems with each proposal because the time during which sedimentation occurred (with respect

to marine transgression) is not known. It appears that both mechanisms influenced the area.

Millville Area

Deglaciation is believed to have been primarily by downwasting and ice stagnation. For example, the large complex of ablation drift in the northeast quarter of the map-area occupies a 'regional' topographic depression. Furthermore, the abundance of ice-contact sediments in the Keswick River Valley and the close association between ice contact and glaciofluvial sediments in the Temperance Vale area also suggests ice stagnation.

In the southerly portions of the Nackawic River Valley, particularly near Cullerton, fine grained sediments (primarily silt) underlie what have been called glaciofluvial outwash sediments. The influence of marine transgression may have affected this area and, as a result, some of the glaciofluvial sediments may be proglacial or simply fluvial in origin.

A large delta just east of the Millville map-area in the Keswick River Valley again suggests that waters must have ponded, probably due to the influence of marine transgression. Lee (1957) also suggests that a "fingerlike arm of the sea" may have occupied the St. John River in the vicinity of Fredericton. The Keswick River empties into the St. John River and would therefore be influenced by such an 'arm', should it be ice free.

One of the more unique features in the study area is a discontinuous esker system which transects the Millville map-sheet from Lower Cloverdale in the north to Springfield in the south. Associated with the esker is a large delta near Woodstock Road, west of Millville. The delta is approximately 150 m (500 feet) a.s.l. so that the influence of marine transgression would appear to have been negligible. Therefore, the delta is probably ice proximal (ie., "esker delta").

Summary

Deglaciation was primarily by downwasting with ice stagnation occurring in topographic depressions.

In the St. John River Valley, ice probably remained active relative to the main ice mass. The effects of marine transgression creating an estuarine environment appears likely. However, the time during which marine transgression occurred relative to ice retreat is not known and it is therefore difficult to associate sedimentation with marine transgression.

GRANULAR AGGREGATE RESOURCES

Quality Limitations

Although excessive amounts of silt and/or clay (commonly referred to as fine particles) are not a serious limitation in most of the local sand and gravel sources, they have limited the use of some deposits which would otherwise be useful as a high-quality aggregate. Ablation till and some ice-contact deposits commonly contain excessive amounts of fine particles. Depending upon the quantity and location of such a deposit, benefication of the material by washing could upgrade it to become economically suitable.

Two of the most important factors that determine whether a deposit is suitable as a high-quality aggregate are abrasion and soundness losses. In this study, the "relative soundness" of pebbles is determined on the basis of lithology and to some extent on durability. Rock types commonly unsuitable for concrete aggregate are grouped as "unsound lithotypes". Friable clasts and those that have been oxidized are also classified in this manner. Since this procedure does not conform to any standard tests that aggregate producers use, the author suggests that if the material from any site exceeds a 10 per cent 'unsound' rating, it should be tested using conventional and acceptable methods for soundness and abrasion if that material is desirable and otherwise suitable for high specification

aggregate. It should be noted that the given results apply only to gravel in its pit-run form.

Description of Map Units and Major Aggregate Sources

The four types of granular deposits in the study area are ablation till, ice-contact stratified drift, glaciofluvial outwash, and ancient and modern alluvial deposits.

Since quality characteristics are usually common to the type of granular deposit, a description of each type of deposit, as well as a discussion of some of the more important deposits, is given. Information on smaller and less significant deposits can be found in the appendices.

Ablation Till

Ablation till is material that has been transported either within or upon a glacier and, as the ice melts, is deposited on the ground. In some instances, tensional stresses will develop abnormal concentrations of crevasses along the terminal area of a receding glacier. The ablation till can accumulate in these crevasses and take on a variety of landforms. The most common topographic characteristics of these deposits include hummocks and complexes of short and irregular ridges.

Texturally, ablation till is largely unsorted material that contains percentages of the entire range of clast sizes. It is usually moderately to loosely compact

and may include pockets of material that exhibit some degree of sorting.

Ablation till is considered to be a poor-quality aggregate due to excessive amounts of fine particles. It is probably suitable for borrow or subgrade material in its pit-run state.

One large body of ablation drift has been mapped in the northeast quarter of the Millville map-area. It is characterized by hummocky topography and poor drainage.

The area near Burtt Lake and south of the Canadian Pacific Railway is probably the thickest part of the ablation unit. Thicknesses of at least 12.0 m can be expected. Other local workable thicknesses exist near all of the sample locations, particularily near J3-37 and between J3-31 and the Keswick River.

In some areas of the deposit, the material is shallow and discontinuous. For this reason, no attempt has been made to calculate reserves. The areas outlined should serve as a guide to locate abundant quantities of low-grade material.

Ice-Contact Stratified Drift

Ice-contact deposits comprise good to poorly sorted sand and gravel with variable amounts of silt and/or clay. These deposits are ice-disintegration features that are deposited in contact with and usually totally confined by the glacier itself.

Stratification of ice-contact deposits is commonly contorted and faulted. This can often be attributed to slump structures that are formed by melting of the supporting walls of ice and subsequent collapse of the unsupported granular materials. Abrupt changes in grain sizes are characteristic of such deposits as well.

This class of deposits commonly includes kames, eskers, kame terraces, and morainic ridges. It should be noted that some ice-contact deposits (such as eskers) are glaciofluvial in origin. Such deposits often exhibit characteristics similar to glaciofluvial outwash.

The most important ice-contact deposit is a discontinuous(?) esker system in the Millville map-area. Three major segments are worthy of mention.

The northern portion of the system is located near the Becaguimec River (J3-13, -14, -15) and the material comprises gravelly sand to sand and gravel of average quality. Reserves are estimated to be in excess of 2.7 million m^3.

The central portion of the deposit is located south of Mapleton (J3-34, -38) and the material comprises sand and gravel of excellent quality. The material has been used by the Department of Transportation for sub-base and base course aggregate. Reserves are estimated to be 2.6 million m^3.

The southern segment, near Lower Caverhill, is similar in quality to the central portion of the system. Reserves are estimated to be 5.9 million m^3.

Thick ice-contact deposits occupying the Keswick River valley are present in the form of ridges near Hayne (J3-23), and as kame terraces, northeast of Barton (J3-27). Although textural qualities appear excellent, the presence of numerous friable granite clasts suggests that high abrasion losses can be expected. Reserves are estimated to be in excess of 4.3 million m^3.

A very coarse ice-contact deposit near Pinder (J3-8) comprises poorly sorted sand and gravel of average quality. Reserves are estimated to be in excess of 2.4 million m^3.

A thick accumulation of ice-contact sediments near Cullerton comprises gravelly sand of average to poor quality. The silt content appears to increase with depth. Reserves are estimated to be 1.9 million m^3.

Ice-contact deposits in the St. John River Valley represent some of the most active areas of extraction in the study area. These deposits are usually overlain by glaciofluvial and/or alluvial sediments. Major active pits are located near Lower Wakefield (J4-13 and J4-15), McKenna (J4-11), north of Flemington (J4-39) and south of Hillman (J4-35). Reserves are estimated to be 0.4, 0.2, 0.4 and 0.3 million m^3 respectively. A large portion of the reserves near J4-15 are glaciofluvial in origin.

Glaciofluvial Outwash

Glaciofluvial outwash deposits originate as

the bed load of meltwater streams within or upon the glacier and consist mainly of sand and pebble to cobble-size gravel. Depending on the proximity and gradient of the glacier, these deposits can take on a variety of morphological forms. The most common are plains, deltas, and channel deposits.

Texturally, the material, which comprises sand and gravel, is commonly well sorted and tends to decrease in grain size downstream. Pebbles typically show more rounding with increasing distance of transport. In general, glaciofluvial outwash deposits can be considered a good source of clean and workable aggregate.

The most extensive system of glaciofluvial outwash can be found between Temperance Vale and Cullerton in the Millville map-area. Recoverable reserves for the entire system are estimated to be 12.0 million m^3. A large portion of this total may be suitable for base, cover, and asphaltic concrete aggregate (see J3-5). The overall quality of this deposit is average to excellent (see sample descriptions, Appendix A). Seismic data have supplemented depth estimates for this deposit (Figure 2 and Table 1).

Glaciofluvial sediments west of Millville (J3-16) comprise sand and gravel of average to excellent quality. Certain portions of the deposit are suitably graded for base course aggregate. Reserves are estimated to be 0.8 million m^3.

Glaciofluvial outwash deposits along the

TABLE 1

Seismic Data

PROFILE #	V1	V2	V3	V4	X1	X2	X3	D1	D2	D3
1	570.	1570.	2500.	6000.	9.	20.	59.	3.1	4.3	17.2
2	430.	1210.	3000.	7500.	4.	22.	35.	1.4	6.9	10.0
3	500.	840.	1700.	25000.	8.	21.	37.	2.0	5.5	15.5
4	470.	2000.	4900.	0.	9.	30.	0.	3.5	9.3	0.0
5	480.	1100.	2300.	5500.	8.	20.	34.	2.5	5.4	9.4
6	450.	900.	4200.	0.	2.	13.	0.	0.6	5.1	0.0
7	860.	1210.	5000.	0.	24.	32.	0.	4.9	10.5	0.0
8	470.	2000.	5000.	0.	8.	26.	0.	3.1	8.2	0.0
9	490.	1900.	4500.	0.	14.	59.	0.	5.4	18.2	0.0
10	380.	2100.	4900.	0.	9.	42.	0.	3.7	13.0	0.0
11	350.	2500.	3900.	0.	10.	61.	0.	4.3	14.0	0.0
12	280.	500.	5000.	0.	3.	19.	0.	0.8	8.4	0.0
13	390.	1100.	4000.	0.	6.	15.	0.	2.1	5.3	0.0
14	400.	620.	3900.	0.	3.	13.	0.	0.7	5.3	0.0
15	950.	3000.	4000.	0.	8.	40.	0.	2.9	7.2	0.0
16	560.	1200.	3300.	0.	10.	23.	0.	3.0	7.2	0.0
17	280.	600.	4400.	0.	3.	14.	0.	0.9	5.9	0.0

V1 = FIRST VELOCITY (METRES/SEC)
X1 = FIRST CRITICAL DISTANCE (METRES)
D1 = THICKNESS OF FIRST LAYER (METRES)

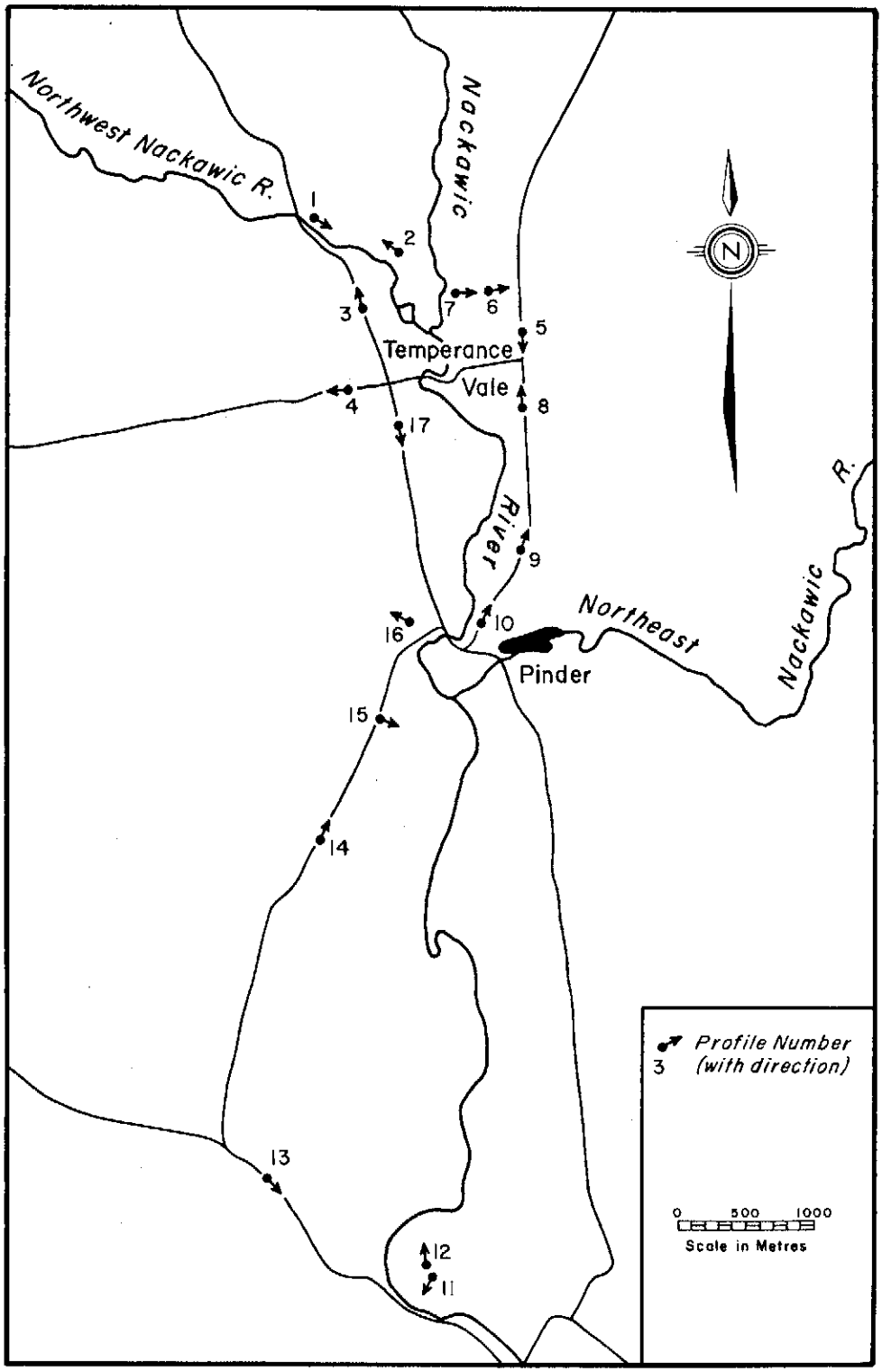

Figure 2. Location of seismic profiles, Temperance Vale

Keswick River (J3-25, -26) comprise sand and gravel of average to poor quality. Although the material appears to satisfy the grading requirements for high specification aggregate, the presence of numerous friable granite clasts suggests that high abrasion losses can be expected. Reserves are estimated to be 2.5 million m^3.

The most important outwash deposits along the Meduxnekeag River are located near Bellville (J4-22, -23, and J4-24, -25). The material comprises sand and gravel of average to excellent quality. When visited, an asphalt plant was operating at sample location J4-23. Recoverable reserves are estimated to be 0.3 and 1.3 million m^3 for the northern and southern portions respectively.

The pitted outwash deposit near Oakville (J4-20, -21) comprises sand and gravel to sandy gravel of average quality. Reserves of at least 1.1 million m^3 can be expected.

A complex system of ice-contact sediments overlain by glaciofluvial outwash occurs along the St. John River Valley in various localities. The ice-contact "core" usually projects above an otherwise flat terrace. Two such deposits are located near Lower Wakefield (J4-13, -14) and south of Flemington (J4-36, -37, -38). Textural characteristics are variable and reserves are estimated to be in excess of 1.0 million m^3 for both deposits (see data sheets, Appendix B).

An outwash terrace south of Ferryville comprises

sand and gravel of average to excellent quality (J4-3, -4). Approximately 1.0 million m^3 of suitably graded material can be expected.

An outwash deposit near the mouth of Bulls Creek (J4-34) is composed of material that is variable in texture and quality. Approximately 90,000 m^3 of the material is suitably graded for base course aggregate and 1.7 million m^3 is of average to unknown quality. Very coarse ice-contact sediments occur below the glaciofluvial outwash.

What is presumed to be an ice-marginal delta is located near McKenna (J4-10). The material comprises sand and gravel and the overall quality is excellent. Recoverable reserves are estimated to be 0.8 million m^3.

Ancient and Modern Alluvium

Ancient alluvial deposits occur primarily as terraces that have formed after ice withdrawal. It more precisely defines material that has been deposited at higher-than-present levels of rivers and streams in response to isostatic rebound.

Deposits of this kind are texturally similar to glaciofluvial channel deposits since depositional processes are similar.

Most alluvial deposits are confined in valleys. For this reason, they are usually inaccessible.

Alluvial deposits have been mapped in the valleys of the St. John, Meduxnekeag and Nackawic Rivers. Most of them are small in size and/or shallow with depths

seldom exceeding 1.5 m.

The absence of alluvial deposits in the St. John River Valley can be attributed to the effects of the Mactaquac dam. Higher water levels have either flooded low-lying alluvial terraces or decreased workable thicknesses for conventional extraction methods.

CONCLUSIONS

The total amount of granular aggregate material in the Woodstock and Millville map-areas is approximately 57.4 million m^3. This total has been subdivided as follows:

Quantity		Quality
MILLVILLE	WOODSTOCK	
14.7 million m^3	1.8 million m^3	Good to Excellent
15.8 million m^3	10.2 million m^3	Average
7.5 million m^3	4.1 million m^3	Poor
0.9 million m^3	2.4 million m^3	Unknown

These reserves refer to quantities that have been calculated (Appendices A and B) and to those that have been referred to in the text. In most instances, the quantities of sand and gravel refer to those which are readily extractable.

Other significant deposits have been mapped but have not been included in the total amount of granular aggregate material because depth control and access are lacking and quality characteristics are unknown.

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APPENDIX A

SAMPLE DESCRIPTIONS

OF

MILLVILLE MAP-AREA

21 J/3

Apart from mapping granular aggregate deposits, samples were collected and analysed to determine the general quality of each deposit.

Mechanical and lithological analyses as well as reserve estimates have been tabulated in Appendices A and B. Material depths used for volume calculations were usually arrived at by projecting depths observed from exposures to areas beyond the exposure(s) with the aid of geologic and topographic observations.

Since thicknesses vary in some deposits (see 'Estimation of Reserves' table on data sheets), the deposit has been subdivided to accommodate the appropriate thickness.

Data sheets also include a section description of the exposure and comments on the overall quality of the material as observed in the field.

Some of the data sheets have incorporated information from the Department of Transportation. This information can be recognized by the abbreviated form of the Department of Transportation and the year that the site was tested; for example, D.O.T., 1969.

Location #: J3-1 County: York

Type of Deposit: Glaciofluvial outwash? Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 355 033

Section Description & Comments:

0.5 m Overburden

6.0 m Sandy Gravel: Poorly sorted sand and gravel; pebble to cobble size gravel with medium to coarse sand and a few small boulders; exhibits near-horizontal stratification with minor cross-bedding; contains some silty fine sand layers; clasts are generally subangular in shape and most are silt-coated.

The silt content is excessive in places (5% ± 3).

The material is fairly compact; especially at the base of the section.

Some lenses(?) of gravelly sand were noticed.

D.O.T., 1974:

Sieve Analyses (17 samples):
between 25.0% and 44.0% passing #4 (average of 33.4%)
between 2.7% and 5.7% passing #200 (average of 3.8%)

Los Angeles Abrasion Loss (from 17 samples):
average 21.7%

Recommended for borrow, sub-base, base (1½" crushed), cover (½" and 3/4" chips) and asphaltic concrete aggregate.

Mechanical Analysis: WET SIEVE

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	86.4	77.7	60.3	42.2	27.6	19.3	12.0	6.7	3.2	1.9
	b (partial)				100.0	65.4	45.7	28.4	15.9	7.6	4.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone and siltstone 6; shale and slate 4; metavolcanic 4; metasediments 2; weathered pebbles 6	felsic intrusive 1; mafic intrusive 13; felsic extrusive 1; mafic extrusive 1; sandstone 11; siltstone 7; quartz 5; quartzite 12; metavolcanic 4; metasediments 23

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J3-5			

Location #: J3-2 County: York

Type of Deposit: Ice contact Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 372 959

Section Description & Comments:

0.3 m Overburden

12.0 m Gravelly Sand: Predominantly medium sand with pebble gravel and a few cobbles; exhibits well stratified beds dipping in a southeasterly direction (130°Az) clasts are subangular to subrounded in shape and most are clean.

6.0 m Slump Covered

In other portions of the pit, the sand fraction is finer and silty.

Beds are dipping in a westerly direction (250°Az) on the south face of the p

D.O.T., 1973:

Sieve Analyses (9 samples):
between 30.0% and 76.0% passing #4 (average of 50.9%)
between 1.0% and 2.1% passing #200 (average of 1.4%)

Los Angeles Abrasion Loss (from 9 samples):
average 21.8%

Recommended for sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	93.7	92.6	83.6	74.1	56.8	38.4	7.0	0.6	0	0
	b (partial)				100.0	76.5	51.8	9.4	0.8	0	0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	47.0	18.5	10.0	1,850,000
outwash to the east	45.0	38.0	1.5?	570,000

Location #: J3-3 County: York

Type of Deposit: Glaciofluvial outwash Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 367 964

Section Description & Comments:

0.8 m Overburden: Vegetation and the oxidized equivalent of the material described below.

1.0 m Gravelly Sand to Sand: Predominantly medium to coarse sand with pebble gravel; appears horizontally stratified.

4.5 m Slump Covered

Approximately 3.5 m down the section, some interstratified layers of silt and silty sand were noticed.

Seismic data have supplemented depth estimates.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	100.0	99.6	94.6	85.6	62.5	40.0	11.0	0.3	0	0
	b (partial)				100.0	73.0	46.7	12.8	0.4	0	0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J3-3	30.0	4.0+	1,200,000
	13.5	?	?
outwash west of the Nackawic River	29.0	1.5	435,000
	45.0	?	?
	17.0	2.5	425,000

Location #: J3-4 County: York

Type of Deposit: Glaciofluvial outwash Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 365 004

Section Description & Comments:

0.5 m Overburden: Vegetation and oxidized silty fine sand.

1.0 m Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; no structures observed (poor exposure); clasts are subangular to subrounded in shape and some are partially silt-coated.

1.0 m Slump Covered

The pit floor is very sandy.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	95.0	86.7	62.3	47.2	35.9	29.0	12.2	1.3	0.7	0.4
	b (partial)				100.0	76.0	61.5	25.8	2.7	1.4	0.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable granite 7; siltstone 2; schist 1; metasediments 9; weathered pebbles 7	felsic intrusive 10; mafic intrusive 11; felsic extrusive 9; mafic extrusive 7; siltstone 12; quartz 5; quartzite 7; metavolcanic and metasediments 11; rhyolitic tuff 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash south of the Northeast Nackawic River	10.0 97.5	2.0 ?	200,000 ?
lower terraces	13.0	1.5?	195,000

Location #: J3-5 County: York

Type of Deposit: Glaciofluvial outwash Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 360 029

Section Description & Comments:

0.5 m Overburden: Removed; estimated thickness.

2.0 m Sand and Gravel to Sandy Gravel: Pebble to cobble-size gravel with medium to coarse sand and a few small boulders; poorly sorted; no structures observed (poor exposure); clasts are generally subrounded in shape and most are silt-coated.

3.0 m Slump Covered

The material is quite silty in places.

The average section height is 5.0 m.

Seismic data have supplemented depth estimates. One profile near J3-5 suggests that a depth of 15.4 m can be expected.

D.O.T., 1976:

Sieve Analyses (6 samples):
between 18.0% and 41.0% passing #4 (average of 30.7%)
between 1.7% and 3.9% passing #200 (average of 3.2%)

Los Angeles Abrasion Loss (from 5 samples):
average 22.3%

Crushed Sample (3/4" minus):
40.0% passing #4 and 4.2% passing #200

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	70.6	66.5	49.6	34.1	21.9	16.3	8.5	4.4	2.7	1.5
	b (partial)				100.0	64.3	47.9	24.9	13.0	7.9	4.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone and siltstone 7; schist and slate 3; metavolcanic 2; metasediments 2; weathered pebbles 6	felsic intrusive 5; mafic intrusive 7; felsic extrusive 3; mafic extrusive 7; sandstone and siltstone 19; quartz 3; quartzite 16; metavolcanic 4; metasediments 16

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash east of the Nackawic River	174.0	2.5+	4,350,000
and north of the Northeast Nackawic River	106.0	?	?
ice contact	2.0	5.0	100,000

Location #: J3-5 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Soundness Loss of 2.46%

Recommended for borrow, sub-base, base (1½" crushed), asphaltic concrete and cover aggregate.

Only 6 of the 18 test holes were suitable for testing.

D.O.T., 1974(pit southeast of J3-5):

Sieve Analyses (13 samples):

between 24.0% and 37.0% passing #4 (average of 28.8%)

between 1.4% and 3.4% passing #200 (average of 2.3%)

Los Angeles Abrasion Loss (from 12 samples):

average 23.4%

Crushed Sample (1½" minus):

45.0% passing #4 and 3.1% passing #200

Los Angeles Abrasion Loss: 18.1%

Soundness Loss: 3.0%

Recommended for borrow, sub-base, base (1½" crushed), cover (½" and 3/4" chip and asphaltic concrete aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-6

County: York

Type of Deposit: Glaciofluvial outwash

Parish: Southampton

Exposure Type: Pit

NTS: 21 J/3

Status: Active on demand

UTM: 394 078

Section Description & Comments:

0.5 m Overburden

1.5 m Sand and Gravel: Predominantly coarse sand and pebble to cobble gravel; the material is very clean and loose; bedding is near-horizontal in the upper 0.5 m and beds are dipping in a northeast (035°Az) direction in the lower 1.0 m; clasts are subangular to subrounded in shape and many are flat and elongate; numerous schistose clasts were noticed.

2.0 m Slump Covered

Some large scale channel structures (cut-and-fill?) were noticed in other sections. The paleocurrent data are inconsistent in this pit.

Water was noticed on the pit floor.

A few boulders were noticed on the pit floor. The maximum clast size observed is 1.2 m in diameter.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	89.9	85.2	69.2	51.4	27.4	12.9	1.0	0.2	0.2	0.2
	b (partial)				100.0	53.3	25.0	1.9	0.4	0.4	0.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist and shale 9; metavolcanic 4; metasediments 12; weathered pebbles 15	mafic intrusive 2; felsic extrusive 3; mafic extrusive 8; siltstone 3; quartz 4; quartzite 2; metavolcanic 8; metasediments 27; tuff 2; gneiss 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
9.0	7.0	3.0	210,000

Location #: J3-6 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1975:

Sieve Analyses (6 samples):

between 30.0% and 58.0% passing #4 (average of 45.7%)

between 0.1% and 1.0% passing #200 (average of 0.7%)

Los Angeles Abrasion Loss (from 6 samples):

average 28.8%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-7 County: York

Type of Deposit: Glaciofluvial outwash/ ice contact? Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 402 083

Section Description & Comments:

0.5 m Overburden

1.5 m Gravelly Sand to Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel; no structures observed (poor exposure); clasts are generally subangular in shape and most are relatively clean.

1.0 m Slump Covered

Reserve data were calculated from 1976 air photographs.

The maximum clast size is 0.5 m in diameter.

Some very coarse material was noticed on the pit floor suggesting that ice-contact sediments may be present below the fluvial sediments.

D.O.T., 1971:

Sieve Analyses (3 samples):

between 34.0% and 69.0% passing #4 (average of 48.0%)

between 1.9% and 2.1% passing #200 (average of 2.0%)

Los Angeles Abrasion Loss (from 3 samples):

average 36.8%

Recommended for sub-base aggregate.

Test holes suggest that the material is very cobbly and bouldery in places.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	79.9	77.3	68.6	57.8	39.2	24.9	7.2	1.9	0.7	0.5
	b (partial)				100.0	67.8	43.0	12.4	3.3	1.2	0.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 30; sandstone 2; schist and slate 8; metavolcanic 1; weathered pebbles 4	felsic intrusive 5; mafic intrusive 5; felsic extrusive 14; mafic extrusive 7; sandstone 3; siltstone 2; quartz 4; quartzite 6; metasediments 9

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
9.0	4.5	2.0	90,000
	3.0	?	?

Location #: J3-8 County: York

Type of Deposit: Ice contact Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 352 989

Section Description & Comments:

0.3 m Overburden

1.5 m Sand and Gravel: Poorly sorted sand and gravel; predominantly medium sand and pebble to boulder-size gravel; no structures observed (poor exposure); clasts are subrounded to subangular in shape and some are partially silt-coated.

1.5 m Slump Covered

The average pit thickness is 3.0 m.

One large striated boulder was noticed.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	65.8	60.3	48.5	41.6	34.7	25.1	5.3	0.6	0.4	0.2
	b (partial)				100.0	83.3	60.4	12.7	1.5	1.0	0.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 1; schist 2; metasediments 8; weathered pebbles 13	felsic intrusive 7; mafic intrusive 5; felsic extrusive 1; mafic extrusive 10; sandstone and siltstone 7; quartz 1; quartzite 8; metavolcanic 7; metasediments 26; tuff 2; gneiss 1; argillite 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J3-8	98.0	2.5	2,450,000
	28.0	?	?
outwash terrace	12.5	1.5?	190,000

Location #: J3-9 County: York

Type of Deposit: Ice contact? Parish: Queensbury

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 424 046

Section Description & Comments:

0.6 m Overburden: Vegetation and sandy silt.

2.0 m Sand and Gravel: Predominantly medium to coarse sand and pebble gravel with a few cobbles and small boulders; exhibits contorted stratification in places (frost wedge?); dip directions are variable; clasts are subangular to subrounded in shape and some are lightly silt-coated. Sample J3-9 was taken from this unit.

1.5 m Sand: Predominantly medium sand; exhibits cross-bedding and cut-and-fill structures; grades into fine sand and silt(?) with depth.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	100.0	96.3	77.4	52.9	33.5	20.4	6.2	1.8	1.0	0.6
	b (partial)				100.0	63.4	38.5	11.7	3.3	1.9	1.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 9; sandstone and siltstone 7; shale and slate 4; metavolcanic 5; metasediments 8; weathered pebbles 12; chert 1	felsic intrusive 2; mafic intrusive 1; felsic extrusive 9; mafic extrusive 11; sandstone and siltstone 3; quartz 7; quartzite 6; metavolcanic 4; metasediments 9; tuff 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
11.5	6.0	2.0	120,000

Location #: J3-10 County: York

Type of Deposit: Ice contact (esker) Parish: Queensbury

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 444 026

Section Description & Comments:

Overburden: Removed.

1.0 m Sand and Gravel: Oxidized sand and gravel.

8.0 m Sand and Gravel to Sandy Gravel: Predominantly medium to coarse sand and pebble to boulder-size gravel; clasts are generally subrounded in shape and some are silt-coated; grain sizes are extremely variable (poor sorting); beds are dipping in west-southwest direction (240°Az).

5.5 m Slump Covered

On the south face of the pit, beds are dipping in a southeast direction (150°Az). This appears to be the general trend.

Rock was noticed at the base of the pit.

Some of the clasts are mineralized (iron and lead bearing minerals).

Stockpiles of crushed stone were present when visited.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	76.1	74.8	66.4	58.1	43.4	25.3	7.1	2.5	1.5	1.1
	b (partial)				100.0	74.7	43.6	12.2	4.3	2.5	1.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 5; siltstone 1; schist and slate 4; metavolcanic 2; metasediments 8; weathered pebbles 9	felsic intrusive 14; mafic intrusive 4; felsic extrusive 5; mafic extrusive 6; siltstone 10; quartz 6; quartzite 9; metavolcanic 4; metasediments 10; tuff 1; gneiss 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
23.0	17.5	8.0+	1,400,000
	3.5	3.0	105,000

Location #: J3-10 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1974:

Sieve Analyses (8 samples):

between 24.0% and 70.0% passing #4 (average of 44.8%)

between 1.6% and 7.0% passing #200 (average of 3.2%)

Los Angeles Abrasion Loss (from 8 samples):

average 31.2%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-11 County: York

Type of Deposit: Ice contact? Parish: Southampton

Exposure Type: Pit? NTS: 21 J/3

Status: Inactive UTM: 387 034

Section Description & Comments:

0.3 m Overburden

1.0 m Gravelly Sand: Predominantly medium sand with some pebble gravel; the material grades to sand with depth; no structures observed (poor exposure).

2.0 m Slump Covered

A ridge northeast of J3-11 trending roughly north-south comprises silty gravelly sand in the upper 0.5 m. The crest of the ridge is between 15.0 m and 20.0 m above base level.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	95.1	91.3	84.3	77.7	59.8	40.2	11.2	3.4	1.4	0.7
	b (partial)				100.0	76.9	51.6	14.3	4.4	1.8	0.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J3-11	6.5	5.5	2.5	138,000
ice contact ridges	10.5	7.5 3.0	5.0+ ?	375,000 ?
Southwest of J3-11	9.0	8.0	2.0	160,000

Location #: J3-12 County: York

Type of Deposit: Till?/glaciofluvial outwash Parish: Bright

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 326 227

Section Description & Comments:

0.8 m Stony Clayey Silt: Very stony and compact till-like material; contains pebble and cobble-size clasts; varies in thickness from 0 to 2.0 m in places.

0.4 m Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; grades into sand with depth; poorly sorted; contains numerous soft and friable clasts (predominantly sandstone and intrusive pebbles).

1.0 m Sand: Predominantly medium sand with a few pebbles and small cobbles.

1.0 m Slump Covered

Grain sizes are extremely variable and the material is, at best, borrow quality.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	96.9	96.7	91.0	84.4	75.2	58.4	25.2	11.1	6.4	4.0
	b (partial)				100.0	89.1	69.2	29.8	13.2	7.6	4.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			very little

Location #: J3-13 County: York

Type of Deposit: Ice contact (esker) Parish: Southampton

Exposure Type: Pit? NTS: 21 J/3

Status: Inactive UTM: 312 199

Section Description & Comments:

0.2 m Overburden

1.0 m Gravelly Sand: Predominantly medium sand with pebble to small boulder-size gravel; no structures observed (poor exposure); sand is fairly clean and contains numerous quartz grains.

1.0 m Slump Covered: Assumed similar material as above.

The maximum clast size is 0.3 m in diameter.

The colour and composition of the sand suggests that the Carboniferous rocks to the north are the primary "source" for the material.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	98.9	94.6	90.3	87.6	85.0	78.2	19.7	2.3	0.7	0.3
	b (partial)				100.0	97.0	89.2	22.5	2.6	0.8	0.3
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J3-15			

Location #: J3-14 County: Carleton

Type of Deposit: Ice contact (esker) Parish: Brighton

Exposure Type: Road cut NTS: 21 J/3

Status: Undeveloped UTM: 296 226

Section Description & Comments:

0.5 m Overburden: Vegetation and the oxidized equivalent of the material described below.

1.0 m Sand and Gravel: Predominantly medium to coarse sand and pebble gravel with some cobbles; no structures noticed (poorly exposed); clasts are subrounded to rounded in shape and most are partially silt-coated.

4.5 m Slump Covered

The slump face is very sandy suggesting a low gravel content.

Some iron oxide cementation of the sand and gravel was noticed.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	89.2	82.4	64.0	50.5	34.2	22.4	8.0	1.7	0.9	0.6
	b (partial)				100.0	67.7	44.4	15.9	3.3	1.8	1.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 3; metavolcanic 1; metasediments 15; weathered pebbles 11	mafic intrusive 1; felsic extrusive 11; mafic extrusive 3; sandstone 15; siltstone 1; quartz 5; quartzite 8; metavolcanic 5; metasediments 13; tuff 7

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J3-15			

Location #: J3-15 County: York

Type of Deposit: Ice contact (esker) Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 307 205

Section Description & Comments:

0.5 m Overburden: Vegetation and the oxidized equivalent of the material described below.

1.0 m Sand and Gravel: Medium to coarse sand and pebble to cobble gravel with some small boulders; no structures observed (poor exposure); contains numerous soft and weathered clasts (sediments); clasts are subrounded to rounded in shape and most are fairly clean.

1.0 m Slump Covered: Assumed similar material as above.

Reserves were calculated for the entire esker system. Thicknesses vary from 1.0 m to 6.0 m +. A conservative average thickness of 2.0 m was assumed.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	80.4	74.0	60.8	48.2	29.5	16.3	6.2	2.6	1.3	0.9
	b (partial)				100.0	61.1	33.9	12.8	5.3	2.7	1.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone and siltstone 11; schist and shale 4; metavolcanic 1; metasediments 6; weathered pebbles 11; chert 1	intermediate to mafic intrusive 3; felsic extrusive 6; mafic extrusive 3; sandstone and siltstone 11; quartz 4; quartzite 9; metavolcanic 4; metasediments 14; tuff 11; gneiss 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
143.5	135.0	2.0±	2,700,000
18.0	18.0	?	?

Location #: J3-16 County: York

Type of Deposit: Glaciofluvial outwash (deltaic) Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 362 104

Section Description & Comments:

SECTION A (Southwestern pit, west end):

0.5 m Overburden

1.75 m Sandy Gravel: Pebble to small boulder-size gravel with some sand; clasts are generally subrounded in shape and many are friable; some cross-bedding noticed.

1.0 m Sand to Gravelly Sand: Predominantly fine to medium sand and pebble gravel with a few cobbles; beds are dipping in a southeasterly direction (125°Az); some silty sand lenses were noticed between the two units.

0.75 m Slump Covered

SECTION B (Southwestern pit, east end):

0.3 m Overburden

0.5 m Sandy Gravel: Horizontally stratified sandy gravel; pebble to cobble-size gravel; top-set beds.

2.0 m Sand and Gravel to Sand: Predominantly medium sand and pebble gravel; exhibits well defined fore-sets dipping in a southerly direction (210°Az); the distal portion of the pit grades into sand. Sample J3-16B was taken from this unit.

Red till was noticed at the base of the section and elsewhere.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	81.7	76.1	63.1	52.6	41.1	30.1	9.3	1.5	0.5	0.3
	b	81.8	75.3	64.0	55.7	47.3	38.7	11.6	1.4	0.5	0.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist and shale 6; metavolcanic 1; metasediments 8; weathered pebbles 21; chert 2	felsic extrusive 13; mafic extrusive 17; sandstone 1; siltstone 6; quartzite 9; metasediments 15; tuff 1

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash	68.5	32.5	2.5	813,000
ice contact	27.5]	14.0	?	?
		12.0	3.0±	360,000
		9.0	?	?
	29.0	26.0	?	?

Location #: J3-16 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Bedrock was noticed at the base of the pit in one locality.

The average pit thickness is 3.0 m.

SECTION C (Northeastern pit, east end):
The average pit thickness is 4.5 m. Only the upper 1.0 m to 2.0 m are exposed.

The material which comprises stratified sand and gravel to sandy gravel, exhibits a shallow eastward dip direction. The clasts are pebble to cobble-size with a few boulders. Numerous frost wedges were noticed on one face of the pit. Minor cross-bedding is also present.

D.O.T., 1974:

Sieve Analyses (6 samples):
between 17.0% and 79.0% passing #4 (average of 39.0%)
between 1.8% and 3.9% passing #200 (average of 2.3%)

Los Angeles Abrasion Loss (from 5 samples):
average 27.0%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-16 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1975 (south or southwest of J3-16):

Sieve Analyses (9 samples):

between 31.0% and 51.0% passing #4 (average of 41.6%)

between 1.3% and 2.9% passing #200 (average of 1.7%)

Los Angeles Abrasion Loss (from 9 samples):

average 26.9%

Recommended for base course aggregate.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-17

County: York

Type of Deposit: Ice contact?

Parish: Southampton

Exposure Type: Pit

NTS: 21 J/3

Status: Inactive

UTM: 381 088

Section Description & Comments:

Exposures are poor throughout the pit. The sample was taken from a test pit which was dug in the upper metre of the slumped face. The material comprises sandy gravel (pebble to cobble-size gravel with medium to coarse sand) and the sand fract contains numerous shaly (deleterious?) particles. Numerous friable clasts were als noticed (see Lithologic Analysis). Clasts are generally subrounded in shape and ma are flat and elongate. Some of the pebbles are silt-coated.

Numerous boulders presumably screened from the pit material are present on the pit floor.

Portions of the pit appear sandy.

Bedrock was noticed at the base of the pit.

The average pit thickness is 4.0 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	77.5	69.5	55.4	41.6	30.6	21.4	10.0	4.7	1.8	0.7
	b (partial)				100.0	73.5	51.5	24.0	11.2	4.3	1.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist (mostly) 23; metavolcanic 1; metasediments 14; weathered and friable pebbles 10; chert 2	felsic intrusive 1; felsic extrusive 4; mafic extrusive 2; sandstone and siltstone 5; quartz 2; quartzite 5; metavolcanic 6; metasediments 25

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
18.5	11.0	3.0	330,000
	6.0	?	

Location #: J3-17 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1971:

Sieve Analyses (8 samples):

between 19.0% and 43.0% passing #4 (average of 30.6%)

between 1.0% and 2.5% passing #200 (average of 1.6%)

Los Angeles Abrasion Loss (from 8 samples):

average 28.0%

Recommended for base course aggregate.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-18

County: York

Type of Deposit: Bedrock

Parish: Southampton

Exposure Type: Quarry

NTS: 21 J/3

Status: Inactive

UTM: 307 982

Section Description & Comments:

The bedrock is "light to medium grey, medium-to coarse grained, massive to moderately foliated, and ranges in composition from quartz diorite to tonalite" (Venugopal, 1979, p. 18).

According to the owner, the material from the quarry was used by the New Brunswick Electric Power Commission at Mactaquac.

The rock may be a possible source for monumental stone.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-19

County: York

Type of Deposit: Ice contact

Parish: Southampton

Exposure Type: Pit

NTS: 21 J/3

Status: Active on demand

UTM: 347 023

Section Description & Comments:

0.5 m Overburden

2.5 m Sandy Gravel: Predominantly medium sand and pebble to small boulder gravel; exhibits contorted stratification and minor faulting; clasts are subangular to sub-rounded in shape and most are silt-coated.

1.5 m Slump Covered

Water was noticed at the base of the pit.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	76.6	67.7	49.4	37.7	34.6	21.5	13.7	4.0	2.3	1.4
	b (partial)				100.0	91.9	57.1	26.4	10.7	6.2	3.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 2; schist and slate 8; metavolcanic 2; metasediments 3; weathered pebbles 8	felsic intrusive 1; mafic intrusive 2; felsic extrusive 2; mafic extrusive 7; sandstone 10; siltstone 7; quartz 6; quartzite 16; metavolcanic 4; metasediments 21

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
3.0	2.5	4.0	100,000

Location #: J3-20 County: York

Type of Deposit: Glaciofluvial outwash Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 360 012

Section Description & Comments:

0.8 m Gravelly Sand: Predominantly fine sand with some pebble gravel; clasts are well rounded in shape.

0.2 m Lodgement Till: Brown stony silt till.

The upper portion of the pit has been removed and pit faces are poorly exposed.

The maximum thickness of the gravelly sand unit is 1.5 m.

Seismic data have supplemented depth estimates.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash west of the Nackawic River	114.5 25.5	3.5 1.5	4,000,000 380,000

Location #: J3-21 County: York

Type of Deposit: Ice contact (esker complex) Parish: Queensbury

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 467 005

Section Description & Comments:

0.5 m Overburden

3.5 m Sand and Gravel to Gravelly Sand: Predominantly fine sand and pebble gravel; grades into fine sand with some silty layers in the lower 1.5 m of this unit.

7.0 m Sand and Gravel to Sandy Gravel: Poorly sorted sand and pebble to large cobble gravel with a few small boulders; exhibits cross-bedding and cut-and-fill structures; clasts are subangular to subrounded in shape and some are partially silt-coated. Sample J3-21 was taken from this unit.

5.0 m Slump Covered

Although flow directions are variable in this pit, the dominant direction is southward.

The average thickness of the pit is 15.0 m.

A depression which is visible on the air photographs is exposed in this pit. An 11.0 m section of which 6.0 m is exposed, comprises predominantly medium sand with numerous cross-beds. The depression appears to represent a former fluvial channel.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% Passing	a	84.2	81.4	67.4	52.0	28.4	12.5	4.5	1.7	1.0	0.6
	b (partial)				100.0	54.6	24.0	8.7	3.2	2.0	1.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist, shale, and slate 10; friable intrusive pebbles 12; weathered pebbles 1	felsic intrusive 24; mafic intrusive 4; felsic extrusive 1; sandstone and siltstone 20; quartz 1; quartzite 18; metavolcanic 1; metasediments 5; tuff 2; gneiss 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
13.5	13.0	21.0	2,730,000
36.5	27.0	2.5	675,000

Location #: J3-22 County: York

Type of Deposit: Ice contact (esker complex) Parish: Queensbury

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 470 001

Section Description & Comments:

0.5 m Overburden

1.5 m Sand: Predominantly fine sand with some silty layers.

14.0 m Sandy Gravel: Predominantly pebble to large cobble gravel with medium to coarse sand and some small boulders; silt content is variable; contains some sand lenses; beds are apparently dipping in a westerly (290°Az) direction; clasts are generally subrounded in shape and some are silt-coated.

0.5 m Sand: Stratified medium sand dipping in a southerly direction (210°Az).

3.0 m Slump Covered

0.2 m Bedrock: Exposed on the pit floor.

Water seepage was noticed at the base of the section.

Asphalt slag was noticed on the pit floor (previous product?).

D.O.T., 1971 (pit south of J3-22):

Sieve Analyses (6 samples):

between 27.0% and 59.0% passing #4 (average of 43.3%)

between 2.1% and 3.9% passing #200 (average of 2.8%)

Los Angeles Abrasion Loss (from 6 samples):

average 27.2%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	88.0	78.4	57.8	38.7	25.4	13.5	3.3	1.5	1.2	0.8
	b (partial)				100.0	65.5	35.0	8.6	4.0	3.0	2.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 5; sandstone and siltstone 2; schist, shale, and slate 18; weathered pebbles 3	felsic intrusive 12; mafic intrusive 10; felsic extrusive 2; mafic extrusive 1; sandstone 8; siltstone 10; quartz 6; quartzite 20; metasediments 3

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
9.0	8.0	10.0	800,000
5.0	4.5	3.0	135,000
3.0	3.0	3.0+	90,000

Location #: J3-23 County: York

Type of Deposit: Ice contact Parish: Douglas

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 531 077

Section Description & Comments:

Exposures in this pit are few due to steep faces and slump cover. Section heights vary from 18 m to 20 m.

One fresh exposure was examined from approximately 9.0 m to 11.0 m down a section. It exposes stratified sand and sand and gravel beds dipping in an east to northeast direction (between 050°Az and 070°Az). Stratification is contorted in places. A layer of boulders was noticed below the sand and gravel beds.

Clasts are pebble to cobble-size with some boulders and they are generally subrounded in shape.

The sand is predominantly medium grained and is derived largely from granitic rocks.

Reserves were calculated for ice-contact and glaciofluvial outwash deposits along the Keswick River (approximately 2 km on either side of J3-23).

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	86.7	82.1	75.7	71.5	63.9	48.9	15.7	6.6	3.1	1.4
	b (partial)				100.0	89.3	68.4	22.0	9.2	4.3	2.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 37; sandstone 1; schist and slate 4; weathered pebbles 4	felsic intrusive 27; mafic intrusive 2; felsic extrusive 2; mafic extrusive 7; quartzite 8; metasediments 2; gneiss 6

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	14.5	12.5	8.0	1,000,000
	14.0	12.5	3.0+	375,000
J4-23	13.5	13.0	10.0	1,300,000
	9.5	8.0	?	?
outwash terraces	46.0	25.5	2.0	510,000

Location #: J3-24 County: York

Type of Deposit: Glaciofluvial outwash Parish: Douglas

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 519 111

Section Description & Comments:

0.3 m Overburden

1.0 m Sand and Gravel to Sandy Gravel: Predominantly coarse sand and pebble gravel with some cobbles; no structures observed (heavily slumped); clasts are generally subrounded in shape and some are partially silt-coated.

2.0 m Slump Covered

0.2 m Sand: Fine to medium sand (auger hole in pit floor).

This terrace is adjacent to an ice-contact ridge.

Reserves were calculated for the two ice-contact ridges nearby and for the ice-contact (kame terrace?) system on the east side of the Keswick River, south of Barton.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	80.1	74.6	55.6	36.1	17.8	7.6	1.4	0.5	0.3	0.2
	b (partial)				100.0	49.4	21.0	4.0	1.3	0.8	0.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 12; sandstone 4; siltstone 1; schist and slate 2; weathered pebbles 1	felsic intrusive 25; mafic intrusive 17; felsic extrusive 6; mafic extrusive 1; sandstone 1; siltstone 12; quartzite 12; metasediments 1; tuff 1; gneiss 4

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J3-24	2.0	1.5	3.0	45,000
ice contact ridges	5.0	5.0	5.0+	250,000
ice contact	26.5	19.0	3.0±	570,000

Location #: J3-25 County: York

Type of Deposit: Glaciofluvial outwash Parish: Douglas

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 523 175

Section Description & Comments:

0.2 m Overburden: Mostly vegetation.

0.5 m Sand and Gravel: Predominantly fine sand and pebble to small cobble gravel; clasts are generally subrounded in shape and most are fairly clean.'

0.8 m Sand: Predominantly fine sand; silt content is variable; well stratified in places. Sample J3-25 was taken from this unit.

2.5 m Slump Covered

The average thickness of this portion of the deposit is 4.0 m.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a						100.0	99.8	68.2	8.4	1.3
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist and slate 4; metavolcanic 1; weathered pebbles 15; chert 2	felsic intrusive 29; mafic intrusive 1; mafic extrusive 1; sandstone 4; siltstone 7; quartz 5; quartzite 25; metavolcanic 1; metasediments 1; gneiss 4

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J3-26			

Location #: J3-26 County: York

Type of Deposit: Glaciofluvial outwash Parish: Douglas

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 525 172

Section Description & Comments:

0.5 m Overburden

1.0 m Sand and Gravel: Predominantly medium sand and pebble to large cobble gravel clasts are generally subrounded in shape and some are coated with sandy silt; numerous granitic clasts were noticed.

1.0 m Slump Covered

The material is fairly clean and the overall quality appears good. Abrasion values may be high.

Reserves were calculated for all of the outwash terraces in this area.

Access is generally poor.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	79.1	70.5	57.1	51.4	47.8	41.5	13.4	2.1	0.8	0.4
	b (partial)				100.0	93.1	80.8	26.1	4.1	1.6	0.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 3; schist and shale 3; metasediments 1; weathered and friable pebbles (mostly granite) 32	felsic intrusive 14; mafic intrusive 1; felsic extrusive 2; sandstone 6; siltstone 15; quartz 2; quartzite 15; metasediments

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
156.0	125.0	2.0±	2,500,000

Location #: J3-27 County: York

Type of Deposit: Ice contact Parish: Douglas

Exposure Type: Roadcut NTS: 21 J/3

Status: Undeveloped UTM: 528 125

Section Description & Comments:

0.5 m Overburden

1.0 m Gravelly Sand: Predominantly medium sand with some gravelly layers; clasts are pebble to cobble-size; the silt content is approximately 1% ± 1.

16.5 m Slump Covered

The gravel content increases with depth. Numerous cobbles and boulders were noticed on the talus slope of the exposure.

Reserves were calculated for the ice-contact system on the east side of the Keswick River, north of Barton and for the smaller ice-contact and glaciofluvial outwash terraces nearby.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	94.3	92.5	90.4	89.0	87.2	80.5	46.5	6.2	1.1	0.4
	b (partial)				100.0	97.9	90.4	52.2	7.0	1.2	0.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
		3.0	10.0	300,000
J3-27	13.5	10.0	3.0+	300,000
ice contact	6.0	5.0	3.0	150,000
to the north	0.7	0.5	4.0	20,000
outwash terraces	5.5	4.0	2.0?	80,000

Location #: J3-28 County: York

Type of Deposit: Ice contact (esker?) Parish: Queensbury

Exposure Type: Pit NTS: 21 G/14

Status: Active on demand UTM: 508 954

Section Description & Comments:

0.3 m Overburden

1.5 m Gravelly Sand: Stratified fine to medium sand with pebble gravel; strata are dipping in a southeast (140°Az) direction (measured on the northeast flank of the ridge).

0.6 m Silty Sandy Gravel: Similar to the material described below except for the excessive silt content (approximately 10%).

1.0 m Sandy Gravel: Pebble to small boulder gravel with medium to coarse sand; clasts are subangular to subrounded in shape and some are partially silt-coated. Sample J3-28 was taken from this unit.

8.0 m Slump Covered

The gravelly sand unit appears to be fluvial (alluvial?) in origin. It is much thicker and siltier along the flanks of the ridge (3.0 m+).

The average height of the ridge at this locality is 10.0 m.

D.O.T., 1972:

Sieve Analyses (4 samples):

between 30.0% and 71.0% passing #4 (average of 56.5%)

between 2.8% and 4.9% passing #200 (average of 4.0%)

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	71.9	63.6	50.3	37.4	23.5	14.4	5.3	3.5	2.8	2.1
	b (partial)				100.0	62.9	38.6	14.1	9.3	7.4	5.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 3; siltstone 8; schist and slate 13; weathered pebbles 5	felsic intrusive 5; mafic intrusive 6; felsic extrusive 2; sandstone 2; siltstone 26; quartz 3; quartzite 5; metasediments 22

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice-contact ridges (Millville map-area)	6.5	6.5	8.0	520,000
glaciofluvial outwash	9.5	3.5 6.0	1.5 shallow	50,000 --

Location #: J3-28 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Los Angeles Abrasion Loss (from 4 samples):
average 24.0%

Sieve Analysis (1 sample):
98.0% passing #4 and 3.5% passing #200
Recommended for borrow and as a possible source for blending sand.

D.O.T., 1974 (ridge segment northwest of J3-28):
Sieve Analyses (6 samples):
between 69.0% and 99.0% passing #4 (average of 86.3%)
between 2.0% and 13.7% passing #200 (average of 5.6%)

Los Angeles Abrasion Loss (from 4 samples):
average 23.5%

The material as represented by the samples was recommended for borrow and as possible filter, blending and winter sand.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-29 | County: York

Type of Deposit: Ground moraine (ablation drift) | Parish: Douglas

Exposure Type: Road cut | NTS: 21 J/3

Status: Undeveloped | UTM: 515 223

Section Description & Comments:

0.7 m Overburden: Vegetation and the oxidized equivalent of the material described below (very silty).

1.0 m Sand and Gravel: Predominantly fine to medium sand and pebble to cobble-size gravel with a few boulders and some silt; appears massive; clasts are angular in shape and silt-coated.

4.0 m Slump Covered: Assumed similar material as above (similar material was noticed at the base of the exposure).

Clasts are primarily granitic and many are friable.

The material is very loose and somewhat gap-graded.

Mechanical Analysis: WET SIEVE

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.8	81.7	72.0	65.5	58.4	50.4	34.9	22.9	14.9	10.2
	b (partial)				100.0	89.2	76.9	53.3	35.0	22.7	15.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 19; sandstone and siltstone 4; schist and slate 6	felsic intrusive 27; mafic intrusive 5; felsic extrusive 6; mafic extrusive 8; sandstone and siltstone 13; quartzite 1; metavolcanic 2; metasediments 9

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-30 County: York

Type of Deposit: Ground moraine (ablation drift) Parish: Bright

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 498 186

Section Description & Comments:

0.8 m Overburden: Vegetation and the oxidized equivalent of the material described below (very silty).

1.0 m Gravelly Sand: Predominantly fine to medium sand with pebble gravel and some silt; appears massive; the material is almost totally granitic in origin; clasts are angular in shape and silt-coated; many are friable.

2.5 m Slump Covered

The material appears to contain weathered boulder-size granite clasts.

Although the material looks like weathered rock in places, the presence of foreign clasts indicates otherwise.

The average pit thickness is 4.0 m.

Mechanical Analysis: WET SIEVE

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	97.5	95.6	92.6	87.8	81.4	69.8	47.4	29.3	15.8	7.8
	b				100.0	92.7	79.5	54.0	33.4	18.0	8.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-31 County: York

Type of Deposit: Ground moraine (ablation drift) Parish: Bright

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 494 191

Section Description & Comments:

0.5 m Overburden

2.0 m Silty Gravelly Sand: Predominantly fine to medium sand with pebble to cobble gravel and some silt; material appears massive; clasts are primarily granitic and many are friable; clasts are angular in shape and heavily silt-coated.

1.5 m Slump Covered

The material is very loose and somewhat gap-graded.

Weathered bedrock is exposed southwest of the section described. Therefore, the material thickness may be shallow.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	85.9	82.3	79.3	76.6	73.0	65.1	46.2	30.2	17.3	8.4
	b (partial)				100.0	95.3	85.0	60.3	39.4	22.6	11.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 16; sandstone 2; weathered pebbles 8	felsic intrusive 34; mafic intrusive 21; felsic extrusive 2; mafic extrusive 2; siltstone 7; metasediments 8

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-32 County: York

Type of Deposit: Ground moraine (ablation drift) Parish: Bright

Exposure Type: Road cut NTS: 21 J/3

Status: Undeveloped UTM: 473 159

Section Description & Comments:

0.7 m Overburden: Vegetation and the oxidized equivalent of the material described below.

1.5 m Silty Sand and Gravel: Predominantly fine to medium sand and pebble to cobble gravel with some silt; appears massive; silt content increases with depth; clasts are angular in shape and silt-coated.

0.5 m Slump Covered

Clasts are primarily granitic and many are friable.

The material is very loose and somewhat gap-graded.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	81.5	76.0	63.2	54.1	48.2	42.5	31.1	21.4	12.6	7.9
	b (partial)				100.0	89.0	78.6	57.5	39.6	23.2	14.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 22; siltstone 5; shale 4; weathered pebbles 7	felsic to intermediate intrusive 25; mafic intrusive 1; felsic extrusive 1; sandstone and siltstone 32; quartzite 1; metavolcanic 1; metasediments 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-33 County: York

Type of Deposit: Ice contact Parish: Bright

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 452 098

Section Description & Comments:

1.0 m ± Overburden: Vegetation and oxidized silty sand to sandy silt with a few pebbles; very compact in places; till-like.

4.0 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel with some boulders; exhibits contorted stratification in places; silt content is variable; clasts are subangular to subrounded in shape and most are partially silt-coated.

2.5 m Slump Covered

A section (upper portion removed) in the northern end of the pit exposes 3.0 m of sand which exhibits delta-like structures. The fore-sets are dipping in a northerly direction (010° Az).

A glacial(?) drainage channel south of the ablation drift may have flowed eastward, towards the Keswick River. This channel may account for the northward current direction.

An exposure west of the pit (near the logging road) exposes 1.0 m ± of a reddish brown and stony silt till over 0.5 m + of sand and gravel. Further to the southwest and adjacent to the logging road, an exposure of 2.0 m ± of a grey, stony, and compact silt till suggests that at least two tills are present. Sand and gravel overlies the grey till in places (see J3-40).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.4	81.4	65.1	45.9	26.0	14.8	6.0	3.2	1.9	1.1
	b (partial)				100.0	56.6	32.3	13.1	7.0	4.2	2.3
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 7; siltstone 1; friable clasts 4; metavolcanic 1; metasediments 1; weathered pebbles 17	felsic intrusive 5; mafic intrusive 11; felsic extrusive 1; mafic extrusive 1; sandstone 3; siltstone 12; quartz 3; quartzite 13; metavolcanic 6; metasediments 11; tuff 3

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
4.0	2.5	3.0±	75,000

Location #: J3-33 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

The "ablation till" near Burtt Lake and south of the Canadian Pacific Railway is probably the thickest part of the ablation unit. Thicknesses of at least 12.0 m can be expected.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-34 County: York

Type of Deposit: Ice contact (esker complex) Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 355 129

Section Description & Comments:

0.5 m Overburden

1.0 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel with a few boulders; no structures observed (snow covered); clasts are sub-angular to subrounded in shape and some are partially silt-coated; numerous friable and weathered pebbles noticed.

4.0 m Slump Covered

Pit thicknesses vary from 4.5 m to 6.0 m.

D.O.T., 1972 (tested along the esker ridge northwest of J3-34):

Sieve Analyses (17 samples):

between 14.0% and 62.0% passing #4 (average of 28.8%)

between 0.7% and 2.3% passing #200 (average of 1.7%)

Los Angeles Abrasion Loss (from 17 samples):

average 25.3%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	74.3	67.7	54.9	41.3	24.2	10.5	2.2	1.0	0.6	0.4
	b (partial)				100.0	58.5	25.5	5.4	2.3	1.5	1.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 5; friable clasts 5; metasediments 12; weathered pebbles 17	felsic intrusive 5; mafic intrusive 10; felsic extrusive 4; mafic extrusive 8; sandstone 2; siltstone 12; quartz 2; quartzite 2; metavolcanic 2; metasediments 5; tuff 4; argillite 5

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
8.5	7.0	3.0	210,000
esker 28.5	21.0	10.0+	2,100,000
ridge	6.0	4.0	240,000

Location #: J3-35 County: York

Type of Deposit: Ground moraine (ablation drift) Parish: Douglas

Exposure Type: Old pit NTS: 21 J/3

Status: Inactive UTM: 468 233

Section Description & Comments:

0.5 m Overburden

1.5 m Gravelly Silty Sand: Poorly sorted sand with pebbles and silt; appears massive; clasts are angular in shape and silt-coated.

4.0 m Slump Covered

The average pit thickness is 6.0 m.

Most of the material is derived from a granitic source.

Although the material looks like weathered rock in places, the presence of foreign clasts indicates otherwise.

Some boulders up to 1.0 m in diameter were noticed.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	94.5	93.8	91.3	85.6	73.9	59.5	40.0	27.4	17.5	11.0
	b (partial)				100.0	86.4	69.6	46.8	32.0	20.4	12.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-36 County: York

Type of Deposit: Ice contact Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Active on demand UTM: 380 988

Section Description & Comments:

0.5 m Overburden: Removed; estimated thickness.

2.0 m Sand and Gravel: Predominantly medium to coarse sand and pebble to boulder-size gravel; exhibits near-horizontal stratification in places; some bouldery layers noticed; clasts are subangular to subrounded in shape and most are partially silt-coated.

2.0 m Slump Covered

Although the overburden has been removed, the upper 0.5 m of the sand and gravel unit is oxidized.

A section south of J3-36 exposes 0.7 m of fluvial gravelly sand over ice-contact sediments. A similar exposure north of J3-36 was noticed.

D.O.T., 1973:

Sieve Analyses (9 samples):
between 37.0% and 64.0% passing #4 (average of 52.2%)
between 1.1% and 2.3% passing #200 (average of 1.6%)

Los Angeles Abrasion Loss (from 9 samples):
average 29.3%

Recommended for sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	83.6	74.7	58.7	45.9	34.1	19.3	4.7	1.9	1.3	1.0
	b (partial)				100.0	74.3	42.1	10.3	4.1	2.9	2.1
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 3; schist, shale, friable clasts 9; metavolcanic 1; metasediments 11; weathered pebbles 13	felsic intrusive 6; mafic intrusive 4; felsic extrusive 1; mafic extrusive 5; sandstone and siltstone 28; quartzite 3; metavolcanic 1; metasediments 15

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	7.5	3.0	225,000

Location #: J3-37 County: York

Type of Deposit: Ground moraine (ablation drift) Parish: Bright

Exposure Type: Road cut NTS: 21 J/3

Status: Undeveloped UTM: 445 143

Section Description & Comments:

0.5 m Overburden: Vegetation and the oxidized equivalent of the material described below.

0.5 m Sand and Gravel: Predominantly medium to coarse sand and pebble to small cobble gravel with some silt; appears massive; the material is moderately to well compact (compaction appears to increase with depth); clasts are angular in shape and silt-coated.

Roadbase

The sample does not reflect the overall silt content.

Clasts are primarily granitic and many are friable.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	85.8	78.9	68.4	56.8	40.3	30.0	17.6	9.0	3.8	1.6
	b (partial)				100.0	70.9	52.8	31.0	15.9	6.7	2.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable intrusive pebbles 47; sandstone 2; metasediments 2; weathered pebbles 2	felsic to intermediate intrusive 28; mafic intrusive 2; siltstone 2; quartzite 2; metavolcanic and metasediments 6; tuff 2; gneiss 4

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-38 County: York

Type of Deposit: Ice contact (esker) Parish: Southampton

Exposure Type: Pit NTS: 21 J/3

Status: Inactive UTM: 335 157

Section Description & Comments:

0.8 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

2.0 m Sandy Gravel: Predominantly pebble to cobble gravel with medium to coarse sand; contains some well sorted layers of pea-size gravel; clast shape is variable and most of the gravel is silt-coated.

3.0 m Slump Covered

This portion of the esker is almost depleted.

D.O.T., 1971:

Sieve Analyses (from 7 samples):
between 25.0% and 63.0% passing #4 (average of 37.7%)
between 0.5% and 4.1% passing #200 (average of 1.8%)

Los Angeles Abrasion Loss (from 7 samples):
average 26.7%

Recommended for base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	92.4	88.4	61.8	37.2	21.2	13.3	5.5	3.2	2.3	1.7
	b (partial)				100.0	57.1	35.7	14.8	8.5	6.3	4.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 4; metasediments 5; weathered and friable clasts 29	felsic intrusive 2; mafic intrusive 1; felsic extrusive 6; mafic extrusive (includes tuff) 36; sandstone and siltstone 6; metavolcanic 11

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
9.0	2.0	5.0	100,000 max.
	2.0	?	?

Location #: J3-39 | County: York

Type of Deposit: End moraine | Parish: Southampton

Exposure Type: Test pit | NTS: 21 J/3

Status: Undeveloped | UTM: 396 186

Section Description & Comments:

0.2 m Overburden: Mostly vegetation.

0.4 m Gravelly Silty Sand: Predominantly fine sand, medium sand, and silt with pebble to small cobble-size clasts; clasts are angular in shape and silt-coated; loosely compact.

A test pit was dug approximately 20.0 m up-slope from J3-39. The material is similar to this site.

Mechanical Analysis: WET SIEVE

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	93.9	88.6	75.7	67.5	60.3	54.2	42.3	31.1	23.4	18.1
	b (partial)				100.0	89.3	80.3	62.7	46.1	34.7	26.8
	c										

Lithologic Analysis: (28 pebbles)

Unsound Lithotypes %	Sound Lithotypes %
	Predominantly felsic and mafic extrusive pebbles with some siltstone and meta-sediments

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
			abundant low-grade material

Location #: J3-40 County: York

Type of Deposit: Till/ice contact Parish: Queensbury

Exposure Type: Road cut NTS: 21 J/3

Status: Undeveloped UTM: 402 027

Section Description & Comments:

0.3 m Overburden: Mostly vegetation.

1.5 m Till: Mottled red and grey silt till; contains pebble-size clasts with a few cobbles and boulders; very stony in the upper 0.5 m; moderately compact; lodgement till?

0.5 m Silty Sand and Gravel: Predominantly coarse sand with some silt and pebble to cobble gravel; sand grains are angular and silt-coated.

1.5 m Slump Covered

Two red conglomerate boulders were noticed at the base of the section. They are presumably Carboniferous in age.

Reserves were calculated for an ice-contact (kame?) deposit south of J3-40.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
2.5	2.5	10.0	250,000

Location #: J3-41 | County: York

Type of Deposit: Limestone | Parish: Southampton

Exposure Type: Quarry | NTS: 21 J/3

Status: Inactive | UTM: 299 041

Section Description & Comments:

This quarry incorporates an area commonly referred to as the Waterville limestone deposit. The quarry which has been worked extensively in the past, has been inactive since 1962.

The rocks in the quarry comprise thin-bedded feldspathic greywacke interbedded with dark grey slate and limestone (Venugopal, 1979).

Although the quality of the limestone is excellent, the deposit is small and "reserves are estimated to be in the order of 40,000 short tons of limestone with an average of 97 percent $CaCO_3$ to 100 feet" (Hamilton, 1965, p. 61).

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% Passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J3-42 County: York

Type of Deposit: Weathered granite Parish: Southampton

Exposure Type: Pits NTS: 21 J/3

Status: Inactive UTM: 345 028

Section Description & Comments:

Intensely weathered granite occurs in three quarries at this locality. Anderson (1968) refers to the rock as 'recomposed granite' and suggests that it has been intensely weathered during the Carboniferous.

The granite is overlain by very compact lodgement till (0.8 m) which is, in turn, overlain by sandy gravel (0.6 m).

The deep glacial drainage channels 'carved' into the granite suggest that it has weathered prior to the last glaciation.

The quarries are located on the slopes of the drainage channels and the weathered granite has been excavated to a depth of approximately 15.0 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

APPENDIX B

SAMPLE DESCRIPTIONS

OF

WOODSTOCK MAP-AREA

21 J/4

Location #: J4-1

County: Carleton

Type of Deposit: Ice contact

Parish: Wakefield

Exposure Type: Pit

NTS: 21 J/4

Status: Inactive

UTM: 965 197

Section Description & Comments:

0.5 m Overburden

0.5 m Sand and Gravel: Poorly sorted sand and gravel; very cobbly; no structures observed (poor exposure); clasts are subrounded to rounded in shape and many are silt-coated.

2.5 m Slump Covered: Assumed similar material as above.

Numerous friable (shaly) particles are present in the sand fraction. Many soft clasts are also present suggesting a poor quality aggregate for this portion of the deposit.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-2			

Location #: J4-2 County: Carleton

Type of Deposit: Ice contact Parish: Wakefield

Exposure Type: Pits NTS: 21 J/4

Status: Active on demand UTM: 967 201

Section Description & Comments:

0.5 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

4.0 m Sand and Gravel: Predominantly medium sand and pebble to small boulder gravel; exhibits contorted stratification and minor faulting; contains some silty fine sand layers; clasts are subangular to subrounded in shape and some are coated with silt and/or $CaCO_3$.

A small pit north of J4-2 exposes 7.5 m of similar material. Numerous large boulders were noticed in section and on the pit floor.

Reserves are calculated for those deposits west of the North Meduxnekeag River.

D.O.T., 1973 (probably J4-2):
Sieve Analyses (8 samples):
between 31.0% and 48.0% passing #4 (average of 39.9%)
between 4.3% and 15.5% passing #200 (average of 9.0%)

Los Angeles Abrasion Loss (from 8 samples):
average 25.7%

Recommended for borrow and borderline sub-base aggregate.
Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	74.9	63.9	52.8	46.5	42.8	38.2	18.6	9.2	6.3	4.6
	b (partial)				100.0	92.1	82.2	40.0	19.8	13.5	9.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable sandstone 1; metasediments 7; metavolcanic 1; weathered pebbles 4; chert 1; calcite rich pebbles 3	intermediate to mafic intrusive 6; felsic extrusive 2; mafic extrusive 2; sandstone 4; siltstone 27; quartz 1; quartzite 3; metasediments 12; limestone (some argillaceous) 26

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	33.5	22.0	2.5±	550,000
outwash	18.0	12.0	2.0	240,000
alluvium	8.0	6.0	2.0	120,000

Location #: J4-3

County: Carleton

Type of Deposit: Ancient alluvium/ glaciofluvial outwash

Parish: Northampton

Exposure Type: River cut

NTS: 21 J/4

Status: Undeveloped

UTM: 118 025

Section Description & Comments:

0.5 m Overburden: Mostly decayed vegetation.

2.0 m Silty Sand: Horizontally stratified sand with silt interbeds.

3.0 m Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; exhibits near-horizontal stratification; clasts are generally subrounded in shape and most are clean.

2.0 m Slump Covered: Assumed similar material as above.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	72.9	65.9	51.8	40.9	32.5	29.2	20.3	4.7	1.3	1.1
	b (partial)				100.0	79.5	71.5	49.7	11.5	3.1	2.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable clasts 2.5; calcareous shale 1; metasediments 5; weathered pebbles 2.5; chert 2.5; calcite rich pebbles 5	felsic intrusive 6; mafic intrusive 1; felsic extrusive 2.5; mafic extrusive 6; sandstone 19; siltstone 7; quartz 2.5; quartzite 11; metavolcanic 2.5; metasediments 17; limestone 4; argillite 2.5

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice-contact ridge south of J4-3 1.5	1.0	6.0	60,000

Location #: J4-4 County: Carleton

Type of Deposit: Ancient alluvium/ glaciofluvial outwash Parish: Northampton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand? UTM: 116 017

Section Description & Comments:

0.3 m Overburden: Mostly decayed vegetation.

1.0 m Sand and Silt: Horizontally stratified fine sand and silt; alluvium.

1.0 m Sandy Gravel: Predominantly medium to coarse sand and pebble to cobble gravel; no structures observed (poor exposure); clasts are subrounded to rounded in shape and some are lightly silt-coated. Sample J4-4 was taken from this unit.

2.0 m Slump Covered

The sand and silt unit can be from 2 to 3 m thick. Selective quarrying would be necessary to extract higher quality aggregate.

D.O.T., 1967:

Sieve Analyses (9 samples):

between 35.8% and 55.7% passing #4 (average of 47.7%)

between 1.0% and 4.7% passing #200 (average of 2.6%)

Los Angeles Abrasion Loss (from 9 samples):

average 22.6%

Recommended for borrow and sub-base aggregate.

In 1961, the Department of Transportation tested what is now the northern end of the pit and results were similar.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	83.1	77.6	59.2	43.6	33.0	26.9	18.7	8.2	3.7	2.5
	b (partial)				100.0	75.6	61.7	42.8	18.9	8.5	5.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable sandstone and siltstone 8; metavolcanic 1; metasediments 2; weathered pebbles 5; chert 4	mafic intrusive 4; mafic extrusive 12; sandstone 25; siltstone 2; quartz 8; quartzite 6; metavolcanic 2; metasediments 16; tuff 5

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
LOWER TERRACE	59.5	33.0	3.0	990,000
UPPER TERRACE (SILTY)	35.5	24.0	1.5	360,000
	12.0	7.0	2.5	175,000
	15.0	14.0	?	?
ICE CONTACT	5.0	2.5	?	?

Location #: J4-4 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1972 (near Gibson Millstream):

Sieve Analyses (8 samples):

between 20.0% and 41.0% passing #4 (average of 31.4%)

between 1.8% and 3.9% passing #200 (average of 2.5%)

Los Angeles Abrasion Loss (from 3 samples):

average 21.4%

Recommended for borrow, sub-base and base course aggregate.

Sieve Analyses (1 sample):

54.0% passing #4 and 20.4% passing #200

Recommended for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-5 County: Carleton

Type of Deposit: Ice contact Parish: Northampton

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 148 965

Section Description & Comments:

0.5 m Overburden: Between 0 and 2.0 m of silt overlies the material described below.

0.5 m Sand: Predominantly coarse sand.

1.0 m Sandy Gravel: Pebble to small boulder gravel with fine to medium sand (somewhat gap-graded); no structures observed (poor exposure); clasts are subangular to subrounded in shape and most are lightly silt-coated.

5.5 m Slump Covered: Assumed similar material as above.

Numerous boulders were noticed in the pit.

Two pits southeast of J4-5 expose similar material.

Reserves were also calculated for the glaciofluvial (or alluvial) sediments that surround the ice-contact ridges. The material comprises silty sand to sandy silt and would at best be classified as poor borrow quality material.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	61.7	50.2	37.5	30.1	26.2	22.7	15.8	7.3	3.2	1.7
	b (partial)				100.0	87.0	75.4	52.4	24.3	10.7	5.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
shale 3; metavolcanic 1; metasediments 11; weathered pebbles 2	felsic intrusive 6; mafic intrusive 3; sandstone 13; siltstone 25; quartz 1; quartzite 19; metavolcanic 2; metasediments 13; tuff 1

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact ridges	6.0	2.5	5.0	125,000
fluvial sediments	26.5	10.0	1.5	150,000

Location #: J4-5 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1972 (pit southeast of J4-5):

Sieve Analyses (5 samples):

between 25.0% and 36.0% passing #4 (average of 30.4%)

between 1.0% and 5.0% passing #200 (average of 2.5%)

Los Angeles Abrasion Loss (from 5 samples):

average 18.7%

Recommended for borrow, sub-base and base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-6 | County: Carleton

Type of Deposit: Bedrock | Parish: Northampton

Exposure Type: Quarry | NTS: 21 J/4

Status: Inactive | UTM: 120 125

Section Description & Comments:

Anderson (1967) describes the map unit from which this quarry occurs in, as grey to green slate, greywacke and argillite (Cambro-Ordovician in age).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-7 County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact Parish: Northampton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 112 132

Section Description & Comments:

0.5 m Overburden

0.5 m Sand and Silt: Horizontally stratified sand and silt.

1.5 m Sandy Gravel: Pebble to boulder-size gravel with medium to coarse sand and some silt (10% ± 5); appears somewhat massive in places and near-horizontally stratified elsewhere; clast shape is variable; some of the clasts are striated and most are coated with sandy silt.

1.0 m Slump Covered

Reserved are limited because the area which delineates the ice-contact and glaciofluvial outwash deposits is primarily residential.

D.O.T., 1960:

Sieve Analyses (8 samples):
between 17.7% and 94.1% passing #4 (average of 62.4%)
between 1.5% and 20.2% passing #200 (average of 6.8%)

Los Angeles Abrasion Loss (from 8 samples):
average 19.6%
Recommended for borrow.

Mechanical Analysis: (WET SIEVE)

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	63.7	56.3	44.0	33.7	24.2	18.9	11.6	7.7	6.3	5.8
	b (partial)				100.0	71.8	56.1	34.4	22.8	18.7	17.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable siltstone 3; metavolcanic 1; metasediments 7; weathered pebbles 7; tuff (soft) 1	felsic intrusive 1; mafic intrusive 10; felsic extrusive 1; mafic extrusive 5; sandstone 6; siltstone 33; quartz 1; quartzite 10; metasediments 13; gneiss 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J4-7	7.0	2.5	175,000
	3.0	1.5	45,000
Lowest fluvial terrace	2.5	1.0?	25,000

Location #: J4-7 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

All of the samples were taken from the lower terrace. The lower terrace comprises glaciofluvial outwash over ice-contact sediments. When visited, most of the fluvial sediments were extracted. A new subdivision has also been built on the deposit.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-8 County: Carleton

Type of Deposit: Ice contact? Parish: Northampton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 123 154

Section Description & Comments:

0.5 m Overburden

1.0 m Silty Sand: Predominantly silty fine sand.

5.0 m Gravelly Silty Sand: Interstratified layers of sand, silty sand and sandy gravel (predominantly); beds are dipping in a northerly direction; upper 3.0 m exhibit contorted stratification and minor faulting; an inclusion of till-like material was noticed at a depth of 2 m; clasts are generally subangular in shape and some are partially coated with silt and/or $CaCO_3$.

5.0 m Slump Covered

The overall gravel content is approximately 15% ± 10. Two other current directions were measured at 320°Az and 030°Az.

D.O.T., 1960:

Sieve Analyses (7 samples):
between 41.2% and 73.0% passing #4 (average of 60.2%)
between 2.2% and 7.4% passing #200 (average of 4.5%)

Los Angeles Abrasion Loss (from 7 samples):
average 23.2%

Recommended for borrow.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	89.8	83.9	74.1	64.8	55.1	48.3	35.8	22.6	13.2	6.2
	b (partial)				100.0	85.0	74.5	55.3	34.9	20.4	9.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
friable sandstone 4; schist 2; metasediments 9; weathered pebbles 8; chert 1; calcite 1	felsic intrusive 4; mafic intrusive 2; mafic extrusive 2; sandstone 8; siltstone 11; quartzite 20; metavolcanic 2; metasediments 18; limestone 6; argillite 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
4.5	3.0	4.0?	120,000
Lower fluvial terraces 3.5	3.0	1.5	45,000

Location #: J4-9 County: Carleton

Type of Deposit: Glaciofluvial outwash/ice contact (kame delta?) Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Active UTM: 137 201

Section Description & Comments:

The pit examined extends approximately 300 m from the pit entrance at Route #2 to the northwest.

Pit exposure at the northwestern end:
0.7 m Overburden: Decayed vegetation and near-horizontally stratified silt with some sandy layers; observed to be as thick as 3.5 m in places.

6.3 m Gravelly Sand to Sandy Gravel: Poorly sorted fine to coarse sand and pebble to large cobble gravel with a few small boulders; exhibits contorted stratification and faulting; individual contorted layers exhibit good sorting; in general, the upper 1/3 of the pit comprises gravelly sand and the lower 2/3 of the pit is composed of sandy gravel; possible cut-and-fill (channel) structures noticed in the gravelly sand; silt content and grain sizes are extremely variable; clasts are subangular to subrounded in shape and many are flat and elongate; some of the clasts are partially silt-coated and many appear friable; probably glaciofluvial outwash over ice-contact sediments.

3.0 m Slump Covered

A pit exposure 100 m southeast of the section described above, exposes 4.5 m of stratified sand and gravel. Approximately 5.5 m of the section is slump covered and 3.0 m of bedrock is exposed at the base of the section. The stratified sand and gravel is apparently dipping in a southeast direction. Grain sizes are more regular
Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	85.5	77.9	60.9	47.8	36.0	26.3	14.5	7.3	5.3	4.2
	b (partial)				100.0	75.2	55.0	30.3	15.3	11.1	8.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist, shale, friable clasts 21; metasediments 21; weathered pebbles 2; chert 1; calcite rich pebbles 4	mafic intrusive 1; mafic extrusive 1; sandstone 4; siltstone 8; quartzite 2; metavolcanic 1; metasediments 9; limestone 22; argillite 2; tuff 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-15			

Location #: J4-9 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

here (glaciofluvial outwash exposed). Numerous bedrock exposures are present at the southeastern end of the pit.

D.O.T., 1972 (J4-9 or J4-15):

Sieve Analyses (6 samples):

between 33.0% and 52.0% passing #4 (average of 43.5%)

between 3.2% and 8.8% passing #200 (average of 6.0%)

Los Angeles Abrasion Loss (from 6 samples):

average 26.7%

The material as represented by 5 of the samples was recommended for borrow, sub-base and base course aggregate.

The material as represented by one sample was recommended for borrow and borderline sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-10 County: Carleton

Type of Deposit: Glaciofluvial outwash (deltaic?) Parish: Brighton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 148 187

Section Description & Comments:

0.5 m Overburden: Removed; estimated thickness.

7.5 m Sand and Gravel: Predominantly medium to coarse sand and pebble to large cobble gravel with a few small boulders; exhibits horizontal top-set(?) beds which vary in thickness from 0.6 m at the southeastern end of the pit to 2.4 m near the river; fore-sets are dipping in a southeast direction (approximately 155°Az); clasts are generally subrounded in shape and some are coated with silt and/or $CaCO_3$.

4.0 m Slump Covered: Assumed similar material as above.

Up to 2.5 m of silty sand overlies the sand and gravel near the southern end (river side) of the pit.

A drop on the river side of the pit of at least 30 m was observed. A large portion of this thickness may be sand and gravel.

Stockpiles of sand and crushed stone were present when visited.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	86.6	81.4	61.4	45.2	31.5	21.0	11.4	6.2	2.4	1.1
	b (partial)				100.0	69.8	46.4	25.2	13.7	5.3	2.5
	c		97	71	52	40		16			4.0

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; schist, friable clasts 4; metavolcanic 2; metasediments 6; weathered pebbles 1; calcite 1	felsic intrusive 1; mafic intrusive 5; felsic extrusive 1; mafic extrusive 7; sandstone 5; siltstone 21; quartz 1; quartzite 7; metavolcanic 4; metasediments 21; limestone 8; tuff 1; argillite 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
between Ackers Brook and J4-11 25.0	14.0	6.0±	840,000

Location #: J4-10 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1977:

Sieve Analyses (4 samples):
between 33.0% and 90.0% passing #4 (average of 53.8%)
between 0.5% and 4.3% passing #200 (average of 3.1%)

Los Angeles Abrasion Loss (from 4 samples):
average 19.6%

Sand Equivalent Value (from 4 samples):
average 81.8

Crushed Sample: see Mechanical Analysis, part 'c'.
Soundness Loss: 5.51% stone and 7.05% sand.

Recommended for borrow, sub-base and base course aggregate, and 3/4" and ½" chips (surface treatment).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-11 County: Carleton

Type of Deposit: Glaciofluvial outwash/ice contact Parish: Brighton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 143 181

Section Description & Comments:

Two major levels are present in this pit. The upper level comprises approximately 14.0 m of granular material. The lower level is described below:

3.5 m Gravelly Sand: Predominantly medium sand and pebble gravel with a few cobbles; exhibits cross-bedding and contorted stratification in places; beds are dipping in a northwest (320°Az) direction; clasts are generally subrounded in shape and fairly clean.

1.0 m Lodgement Till: Red gritty silt till; very compact.

Water seepage was noticed above the till.

The lower level is between 4.5 m and 7.5 m thick.

A few boulders were noticed on the pit floor.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	96.0	92.4	79.8	68.8	54.9	41.4	14.5	4.4	2.2	1.2
	b (partial)				100.0	79.8	60.2	21.1	6.4	3.2	1.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 9; siltstone 1; schist, shale, friable clasts 11; weathered pebbles 2; chert 1	felsic intrusive 2; mafic intrusive 7; felsic extrusive 6; mafic extrusive 2; sandstone 4; siltstone 19; quartz 2; quartzite 5; metasediments 10; limestone (some argillaceous) 13; tuff 6

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
6.0	2.0 max	10.0±	200,000

Location #: J4-12 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Northampton

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand? UTM: 139 168

Section Description & Comments:

D.O.T., 1959:
Sieve Analyses (3 samples):
between 36.6% and 40.4% passing #4 (average of 38.9%)
between 8.2% and 9.2% passing #200 (average of 8.6%)
Los Angeles Abrasion Loss (from 3 samples):
average 27.7%
Recommended for borrow only.

D.O.T., 1959 (terrace south of Shaws Creek):
Sieve Analyses (2 samples):
72.8% and 83.7% passing #4
1.6% and 4.4% passing #200
Recommended for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
upper terraces 3.5	2.5	4.0	100,000
middle terrace 7.5	5.0	2.5	125,000
lower terrace 19.5	6.5	1.5	98,000

Location #: J4-13 | County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact | Parish: Wakefield

Exposure Type: Pit | NTS: 21 J/4

Status: Active | UTM: 139 182

Section Description & Comments:

SECTION A:

0.5 m± Overburden: Variable thickness; removed at this locality.

7.1 m Sand and Gravel: Predominantly medium sand and pebble to small boulder gravel with some silt (4% ± 2%); exhibits contorted stratification and faulting; clasts are generally subrounded in shape and most are fairly clean. Sample J4-13A was taken from this unit.

A lower level extends 5 m below the main pit floor. An average depth of 10.5 m can therefore be assumed.

Continuous stratification was observed at the northern end of the pit where the original surface is preserved. Here, the upper 3 m expose predominantly silty fine sand and the beds are dipping westwards, away from the river.

SECTION B (Lower terrace at the southern end of the pit):

0.3 m Silty Sand: Predominantly silty fine sand.

2.5 m Sandy Clayey Silt: Appears weakly stratified; alluvium?

0.2 m Gravel: Predominantly pebbles and small boulders; lag?

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	74.0	68.4	55.4	45.2	35.6	29.0	17.8	8.1	3.4	1.9
	b	97.7	97.7	97.4	96.2	93.7	90.9	77.2	53.5	6.8	2.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 2; siltstone 2; shale, friable clasts 2; metavolcanic 1; metasediments 1; weathered pebbles 2; chert 1	felsic intrusive 4; mafic intrusive 3; felsic extrusive 1; mafic extrusive 5; sandstone 4; siltstone 23; quartz 5; quartzite 16; metavolcanic 3; metasediments 16; tuff 2; limestone 6

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	3.0	2.0	10.0	200,000
upper fluvial terrace	19.0	14.0	3.0+	420,000
lower fluvial terrace	9.5	8.0	2.0+	160,000

Location #: J4-13 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

2.0 m+ Sand: Stratified fine sand with a few pebbles. Sample J4-13B was taken from this unit.

2.0 m Slump Covered: Assumed similar material as above.

This pit continues westward into a higher terrace. Here, a thickness of 22.2 m was measured of which 7.5 m is exposed. The material comprises horizontally stratified fine sand with some gravelly layers grading to sandy gravel with depth. Some of the layers contain almost no sand in places.

Between Section B and the higher terrace referred to above, an exposure of sand which may be stratigraphically similar to the sand unit of Section B, exposes sand beds dipping in a south to southeasterly direction.

The described sequences above may suggest a deltaic environment; the horizontally stratified sand to sandy gravel representing the top-set beds and the sand unit representing the fore-set beds.

D.O.T., 1972:

Sieve Analyses (6 samples):

between 30.0% and 59.0% passing #4 (average of 47.7%)

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-13 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

between 2.5% and 5.0% passing #200 (average of 4.1%)

Los Angeles Abrasion Loss (from 6 samples):
average 21.6%

The material as represented by 4 samples can be recommended for borrow, sub-base and base course aggregate.

The material as represented by 2 samples can be recommended for borrow and sub-base aggregate.

In 1958, the Department of Transportation tested an area north of J4-13. The material was described as fairly fine grained and poorly graded. It was recommended for borrow only.

In 1971, a river terrace above J4-13 was tested. The material varies from silty sand (3 m +) to sand and gravel with some silt. In general, the material is of borrow quality. Removal of the silty sand and/or selective quarrying would improve the overall quality. For example, the material as represented by four of the samples was recommended for borrow, borderline sub-base and base course aggregate.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-14 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Wakefield

Exposure Type: Test pit NTS: 21 J/4

Status: Undeveloped UTM: 140 194

Section Description & Comments:

0.6 m Overburden: Vegetation and the oxidized equivalent of the material described below; appears almost till-like.

0.3 m Gravelly Sand to Sand and Gravel: Predominantly medium sand and pebble gravel with a few small cobbles; numerous slaty (deleterious) fragments are present; clasts are generally subrounded in shape and some are lightly coated with silt.

The silt content may be anomalous because the sample included some of the oxidized material. The material at the base of the test hole is much cleaner than the sample indicates. Bedrock was noticed 70 m east of J4-14.

D.O.T., 1976:

The terrace opposite of J4-14 was tested and results indicate that between 1.2 and 1.8 m (+?) of silty sand is present. One test hole reported bedrock at a depth of 1.2 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	90.4	84.8	62.4	48.3	37.1	26.6	12.4	8.3	6.6	5.3
	b (partial)				100.0	76.9	55.0	25.7	17.1	13.6	10.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
area east of Hwy. #2	57.5	49.0	2.0±	980,000
lower terrace	20.0	14.5	2.0±	290,000

Location #: J4-15 County: Carleton

Type of Deposit: Glaciofluvial outwash/ice contact (kame delta) Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 135 203

Section Description & Comments:

0.5 m Overburden

6.5 m Sand and Gravel: Fine to coarse sand and pebble to cobble gravel; exhibits possible cut-and-fill structures; material is fairly compact in places; clasts are generally subrounded in shape and some are partially coated with silt and/or $CaCO_3$.

3.5 m Slump Covered: Assumed similar material as above.

The compact nature of the material is directly related to calcium carbonate cementation.

The average pit thickness is 9 m.

Previous products include asphalt and crushed stone.

D.O.T., 1958:

Sieve Analyses (5 samples):
between 26.7% and 59.3% passing #4 (average of 42.1%)
between 1.7% and 4.1% passing #200 (average of 2.6%)

Los Angeles Abrasion Loss (1 sample):
28.2%

Recommended for sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	78.5	69.1	55.9	46.0	39.0	31.3	11.6	4.6	2.1	1.8
	b (partial)				100.0	84.9	68.0	25.3	10.1	4.5	3.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
shale, friable clasts 3; metasediments 17; weathered pebbles 5; chert 1	felsic intrusive 1; mafic intrusive 2; mafic extrusive 1; sandstone 8; siltstone 14; quartz 4; quartzite 5; metasediments 7; limestone (mostly argillaceous) 28; calcareous argillite 3

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
area west of Hwy. #2	8.5	1.5 2.5	8.0 3.5	120,000 88,000

Location #: J4-15 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1959:

Sieve Analyses (3 samples):

between 20.7% and 45.8% passing #4 (average of 33.0%)

between 1.1% and 2.4% passing #200 (average of 1.7%)

Los Angeles Abrasion Loss (from 3 samples):

average 25.7%

Recommended for sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-16 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 130 210

Section Description & Comments:

1.0 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

1.0 m Sandy Gravel: Pebble to cobble gravel with some sand; contains numerous schistose clasts; clasts are subrounded in shape and some are coated with silty clay and/or $CaCO_3$; no structures observed (poor exposure).

2.0 m Slump Covered

The average pit thickness is 3.5 m.

A few large boulders were noticed on the pit floor.

D.O.T., 1972:

Sieve Analyses (5 samples):
between 29.0% and 70.0% passing #4 (average of 43.6%)
between 5.6% and 8.5% passing #200 (average of 6.6%)

Los Angeles Abrasion Loss (from 4 samples):
average 27.3%

Crushed Sample: see Mechanical Analysis, part 'C', below.
Soundness Loss: 7.67%

Recommended for borrow, sub-base and base course aggregate. One sample was suitable for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	63.5	57.2	43.9	34.2	25.9	19.2	11.1	7.1	4.2	2.7
	b (partial)				100.0	75.8	56.2	32.5	20.6	12.4	7.8
	c		81	53	40	31		14			7.3

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 6; shale, slate 7; metasediments 10; weathered pebbles 1; calcite 1	mafic intrusive 2; felsic extrusive 1; sandstone 3; siltstone 33; quartz 2; quartzite 5; metasediments 28

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
4.5	2.0	3.0	60,000

Location #: J4-17 County: Carleton

Type of Deposit: Ancient alluvium? Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 156 953

Section Description & Comments:

0.5 m Overburden: Decayed vegetation and massive silty fine sand.

0.8 m Silty Sand: Predominantly silty fine sand with discontinuous layers of very compact gravelly silt (till-like).

0.2 m Silt and Sand: Near-horizontally laminated silt and fine sand with a few clay laminae; contains some soft sediment clasts (dropstones); bedding is discontinuous; exhibits minor ripple laminae in places.

0.5 m Clayey Silt: Predominantly clayey silt with minor silty sand beds.

2.0 m Slump Covered

A section 4.5 m away from the section described, exposes the following:

2.0 m Sand: Mostly fine sand with a few discontinuous and irregular silty beds; contains some thin gravelly lenses (?); exhibits an overall massive appearance.

2.0 m Slump Covered

0.2 m Lodgement Till: Gravelly silt till; very compact.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ancient alluvium and/or glaciofluvial outwash	42.0	1.5	630,000
ice contact	3.5	2.0	70,000

Location #: J4-17 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

This pit is adjacent to a bedrock quarry.

Although reserves appear significant, depths are shallow and the material is at best, suitable for borrow.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-18 | County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact | Parish: Woodstock

Exposure Type: Pits | NTS: 21 J/4

Status: Inactive | UTM: 082 058

Section Description & Comments:

0.5 m Overburden

2.3 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel with a few boulders; contains some silt (3% ± 3); boulders are more frequent with depth; clasts are subrounded in shape and many are flat and elongate; most of the clasts are silt-coated; ice-contact stratified drift. Sample J4-18A was taken from this unit.

0.3 m Boulder Gravel: A layer of boulders separates the upper and lower units; lag.

0.5 m Lodgement Till: Compact stony silt till; contains large clasts.

2.0 m Slump Covered

Another section examined exposes up to 1.0 m of glaciofluvial sand and gravel (sample J4-28B) above the ice-contact sediments.

D.O.T., 1958:

Sieve Analyses (7 samples):

between 25.7% and 37.9% passing #4 (average of 30.9%)

between 0.7% and 2.1% passing #200 (average of 1.1%)

Los Angeles Abrasion Loss (from 2 samples):

38.3% and 44.6%

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.3	77.5	64.0	51.4	38.0	28.4	17.2	9.8	5.6	3.3
	b	98.9	94.4	79.8	62.7	48.7	40.4	28.0	8.8	2.4	1.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 2; siltstone 8; shale 2; metasediments 4; weathered pebbles 12; chert 2	felsic extrusive 1; mafic extrusive 9; sandstone 17; siltstone 18; quartz 1; quartzite 6; metasediments 17

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
31.0	24.0	2.0	480,000

Location #: J4-18 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Recommended for borrow due to high abrasion losses.

D.O.T., 1977:

Sieve Analysis (1 sample):

68.0% passing #4 and 5.8% passing #200

"Rocks and boulders" were encountered in eight of the nine test holes drilled. Bedrock was encountered in 5 of the test holes at depths of 0.5 m, 1.4 m, 1.5 m, 1.8 m and 1.8 m.

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-19 County: Carleton

Type of Deposit: Ancient alluvium/ glaciofluvial outwash Parish: Richmond

Exposure Type: Pit NTS: 21 J/4

Status: Inactive? UTM: 961 180

Section Description & Comments:

SECTION A

0.3 m Overburden

0.9 m Silt and Sand: Interstratified silt and sand; ancient alluvium.

2.1 m Slump Covered

SECTION B

0.3 m Overburden

2.0 m Sandy Gravel: Pebble to cobble gravel with sand and some silt; exhibits pebble imbrication and weak contorted(?) stratification; clasts are subangular to subrounded in shape and most are silt-coated.

1.2 m Slump Covered: Assumed similar material as above.

Bedrock appears to be near the pit floor. Aggregate thicknesses are variable.

D.O.T., 1962:

Sieve Analyses (3 samples):

between 47.1% and 52.1% passing #4 (average of 49.9%)

between 3.4% and 9.4% passing #200 (average of 7.4%)

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
2.5	1.5	2.0	30,000

Location #: J4-19 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Los Angeles Abrasion Loss (from 3 samples):
average 27.2%

Recommended for borrow and borderline sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-20 County: Carleton

Type of Deposit: Glaciofluvial (pitted?) outwash Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 971 213

Section Description & Comments:

0.3 m Overburden

2.0 m Sandy Gravel: Pebble to large cobble gravel with fine to coarse sand; exhibits contorted stratification; contains some sand lenses; clasts are subangular to subrounded in shape and some are coated with silt and/or $CaCO_3$.

2.0 m Slump Covered: Assumed similar material as above.

Reserves are calculated for those deposits east of the North Meduxnekeag River.

D.O.T., 1959:

Sieve Analyses (3 samples):

between 36.6% and 64.6% passing #4 (average of 47.8%)

between 3.3% and 6.5% passing #200 (average of 4.7%)

Los Angeles Abrasion Loss (from 3 samples):

average 22.7%

D.O.T., 1972 (site tested north of J4-20):

Sieve Analyses (from 5 samples):

between 29.0% and 56.0% passing #4 (average of 40.8%)

between 5.8% and 13.1% passing #200 (average of 9.2%)

Los Angeles Abrasion Loss (from 5 samples):

average 21.7%

Recommended for borrow and borderline sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	75.4	66.7	47.9	36.4	26.6	20.8	12.8	7.7	3.7	1.7
	b (partial)				100.0	73.1	57.0	35.1	21.2	10.2	4.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 2; siltstone 8; shale 2; metavolcanic 1; metasediments 6; weathered pebbles 2; chert 1	mafic intrusive 4; felsic extrusive 3; mafic extrusive 2; sandstone 19; siltstone 18; quartz 3; quartzite 4; metasediments 24; tuff 1

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash(?)	59.0	45.0	2.5	1,120,000
ice contact	5.5	4.0	2.5	100,000
alluvium	4.5	3.5	2.0	70,000
ablation till	28.0	21.5	1.5±	320,000

Location #: J4-21 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 971 207

Section Description & Comments:

0.5 m Overburden

0.5 m Sand and Gravel: Medium to coarse sand and pebble to cobble gravel; clasts are subrounded in shape and some are coated with silt and/or $CaCO_3$.

3.0 m Slump Covered: Assumed similar material as above.

In general, exposures are poor and no structures were observed. The average pit thickness is about 3.5 m.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	78.8	74.2	57.6	42.2	27.4	19.7	12.5	6.8	2.2	1.0
	b (partial)				100.0	65.0	46.7	29.6	16.0	5.2	2.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 3; siltstone 1; shale 2; metasediments 14; calcite 2	mafic intrusive 1; felsic extrusive 1; mafic extrusive 3; sandstone 7; siltstone 19; quartz 6; quartzite 5; metasediments 33; limestone 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-20			

Location #: J4-22 County: Carleton

Type of Deposit: Glaciofluvial outwash? Parish: Richmond

Exposure Type: Pit NTS: 21 J/4

Status: Inactive? UTM: 006 165

Section Description & Comments:

0.5 m Overburden

1.5 m Sand and Gravel: Medium to coarse sand and pebble to small boulder gravel; no structures observed (poor exposure); clasts are subangular to subrounded in shape and some are silt-coated; contains numerous slate and/or shale clasts.

6.5 m Slump Covered: Assumed similar material as above.

A lower level within the pit exposes an additional 3 m of granular material. The average pit thickness is 9 m.

D.O.T., 1970 (pit south of J4-22):

Sieve Analyses (9 samples):

between 46.0% and 66.5% passing #4 (average of 53.3%)

between 1.6% and 20.3% passing #200 (average of 8.2%)

Los Angeles Abrasion Loss (from 9 samples):

average 40.2%

Recommended for borrow and, in some instances, borderline sub-base aggregate. Some of the test holes indicate that up to 1 m of silt and/or clay overlies the sand and gravel.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	80.0	74.7	56.6	37.9	19.5	9.9	3.6	2.7	2.0	1.7
	b (partial)				100.0	51.4	26.0	9.4	7.1	5.3	4.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone and shale 4; schist 10; metavolcanic 5; metasediments 4; soft and weathered pebbles 22	felsic intrusive 2; mafic extrusive 3; sandstone 9; siltstone 14; quartzite 9; metavolcanic 3; metasediments 14; limestone 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
35	26	5±	1,300,000

Location #: J4-23 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Richmond

Exposure Type: Pits NTS: 21 J/4

Status: Active UTM: 012 163

Section Description & Comments:

SECTION A

0.7 m Overburden

3.0 m Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; exhibits stratified beds dipping in an easterly direction (080°Az); clasts are sub-rounded in shape and some are coated with silt and/or $CaCO_3$.

4.5 m Slump Covered: Assumed similar material as above.

SECTION B

Overburden: Removed.

1.0 m Sand and Gravel: Poorly sorted sand and gravel; mostly pebble gravel with some cobbles; contains some silt (up to 10%+); exhibits horizontal stratification; contains numerous platy (deleterious) particles; schist and slate clasts are abundant.

1.0 m Sand and Silt: Interstratified layers of silty sand and silt; contains silt layers up to 0.2 m thick; sand layers are more frequent with depth; appears horizontally stratified.

3.0 m Slump Covered

The silt content appears to increase southward, away from the river. The

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	87.0	84.8	72.4	58.7	44.1	30.0	10.6	5.2	3.5	2.1
	b (partial)				100.0	75.1	51.1	18.1	8.8	6.0	3.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-23 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

material is not as coarse as J4-22 and it is much cleaner.

When visited, an asphalt plant owned by Warren Maritimes Ltd., was in operation. They wash and crush the material.

D.O.T., 1973 (pit west of J4-23):

Sieve Analyses (2 samples):

55.0% and 60.0% passing #4

2.1% and 4.2% passing #200

Los Angeles Abrasion Loss (from 2 samples):

25.8%

Recommended for borrow and pit run sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-24 | County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact | Parish: Richmond

Exposure Type: Pit | NTS: 21 J/4

Status: Inactive | UTM: 998 175

Section Description & Comments:

0.3 m Overburden

1.7 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel; appears horizontally stratified; the upper metre contains numerous cobbles and small boulders; clasts are subrounded in shape and some are silt-coated. Sample J4-24 was taken from this unit.

0.5 m Gravelly Sand: Predominantly coarse sand with pebble gravel; appears non-conformable with the upper and lower units (possibly a channel structure).

1.5 m Sandy Gravel: Predominantly pebble to cobble gravel with some boulders; clasts are imbricated; material becomes coarser with depth; clasts are subangular to subrounded in shape and some are silt-coated.

2.0 m Slump Covered: Assumed similar material as above.

The lowest sandy gravel unit comprises almost all gravel.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.6	80.8	63.2	45.7	29.0	17.8	10.0	8.1	6.7	5.7
	b (partial)				100.0	63.5	38.9	21.9	17.8	14.7	12.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 4; siltstone 6; metasediments 2; weathered pebbles 28; chert 1	felsic intrusive 1; mafic intrusive 6; felsic extrusive 1; mafic extrusive 2; sandstone 8; siltstone 8; quartz 1; quartzite 9; metasediments 23

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
HIGHEST TERRACE	14.0	3.0	4.0	120,000
		5.0	2.0	100,000
	5.5	3.5	3.0	100,000
LOWEST TERRACE	2.5	2.0	1.0?	20,000

Location #: J4-24 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1977 (area tested is the lower terrace immediately east of J4-24):

Sieve Analyses (14 samples):
between 34.0% and 66.0% passing #4 (average of 45.6%)
between 4.3% and 11.9% passing #200 (average of 7.2%)

Sieve Analyses (2 samples):
between 91.0% and 93.0% passing #4
between 5.6% and 11.9% passing #200

Los Angeles Abrasion Loss (from 16 samples):
average 25.0%

Crushed Sample (1½" - 0):
51% passing #4 and 6.8% passing #200
Sand Equivalent Value of 49
Soundness Loss of 9.98% (stone) and 5.86% (sand)

Recommended for borrow and sub-base aggregate.

Marginal quality base course aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-24 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

A pit immediately north of J4-24 was tested in 1973 and the material was recommended for borrow, sub-base and as a source to produce 1½" crushed base course, 3/4" and 1½" crushed cover aggregate. The material was not recommended as a paving aggregate due to erratic soundness losses (for example, weighted soundness loss averages of 7.20% and 25.14%).

Mechanical Analysis:

Sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-25 County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact Parish: Richmond

Exposure Type: Pits NTS: 21 J/4

Status: Inactive UTM: 997 178

Section Description & Comments:

A sequence of gravel pits are exposed. Approximately 3.5 m of material has been removed from the main pit.

3.5 m Removed

1.0 m Sand and Gravel: Fine to coarse sand and pebble to cobble gravel; silty in places; one coarse sand layer noticed.

0.5 m Sand and Gravel: Gap-graded silty fine sand (to fine sand with depth) and pebble to cobble gravel; clasts are subrounded in shape and most are silt-coated; the sediments are slightly calcareous.

0.3 m Gravelly Sand: Predominantly coarse sand with pebbles.

0.2 m Gravel: Predominantly pebble to cobble gravel; clasts are heavily coated with silt.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.6	75.1	54.7	40.5	30.0	21.3	14.2	9.0	4.7	2.1
	b (partial)				100.0	74.1	52.7	35.0	22.2	11.7	5.3
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 2; shale and slate 11; metasediments 6; calcite 1	felsic intrusive 2; mafic intrusive 3; felsic volcanic 1; sandstone 4; siltstone 23; quartz 2; quartzite 3; metavolcanic 2; metasediments 38

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-24			

Location #: J4-25 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1969 (north pit, J4-25):

Sieve Analyses (21 samples):

between 27.8% and 80.2% passing #4 (average of 45.3%)

between 2.5% and 16.6% passing #200 (average of 6.0%)

Sieve Analyses (1 sample):

90.3% passing #4 and 32.2% passing #200

Los Angeles Abrasion Loss (from 22 samples):

average 23.4%

Forteen of the samples were suitable for borrow, sub-base and base course aggregate. Eight of the samples were suitable for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-26 County: Carleton

Type of Deposit: Ice contact? Parish: Richmond

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 999 160

Section Description & Comments:

0.5 m Overburden

1.0 m Sand and Gravel to Gravelly Sand: Predominantly medium to coarse sand and pebble gravel; no structures observed (poor exposure).

2.0 m Slump Covered: Assumed similar material as above.

Most of the exposures are overgrown and heavily slumped. The material appears to be very sandy downslope, towards the river. No boulders were noticed.

D.O.T., 1960:

Sieve Analyses (5 samples):
between 42.0% and 63.4% passing #4 (average of 51.2%)
between 4.3% and 8.6% passing #200 (average of 6.2%)

Sieve Analyses (1 sample):
97.8% passing #4 and 7.0% passing #200

Los Angeles Abrasion Loss (from 5 samples):
average 22.1%

Recommended for borrow only.

A pit north of J4-26 was tested and results were similar.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	95.6	94.3	86.4	71.2	54.1	41.5	20.7	9.7	6.0	4.0
	b (partial)				100.0	76.0	58.2	29.1	13.6	8.4	5.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
7.0	5.5	2.5	140,000

Location #: J4-27 County: Carleton

Type of Deposit: Glaciofluvial outwash and/ or ancient alluvium Parish: Richmond

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 979 187

Section Description & Comments:

SECTION A

0.5 m Overburden

1.0 m Sand and Gravel: Pebble to cobble gravel and fine to medium sand; contains numerous weathered clasts; clasts are subangular in shape and some are silt-coated. Sample J4-27 was taken from this unit.

SECTION B

0.3 m Overburden

0.3 m Silty Sand: Horizontally stratified silty fine sand.

0.3 m Sand and Gravel: Poorly sorted sand and gravel; mostly pebble-size gravel.

0.8 m Sand and Silt: Interstratified layers of sand and silt.

The amount of slump covered material was not recorded.

Sections along the river expose ice-contact sediments below the fluvial sediments.

Since grain sizes are extremely variable, the material can be recommended for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	89.8	84.2	63.5	50.5	41.2	36.3	29.1	20.3	10.6	5.3
	b (partial)				100.0	81.6	71.9	57.7	40.1	21.0	10.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 4; siltstone 1; shale 6; metavolcanic 2.5; metasediments 6; weathered pebbles 14; chert 1	felsic intrusive 2.5; mafic intrusive 2.5; felsic extrusive 4; mafic extrusive 1; sandstone 15; siltstone 4; quartz 2.5; quartzite 12; metavolcanic 4; metasediments 17; gneiss 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
4.0	3.0	2.0?	60,000
outwash north of J4-27 14.5	11.0	2.0	220,000

Location #: J4-28 County: Carleton

Type of Deposit: Ice contact or glaciofluvial outwash Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 006 170

Section Description & Comments:

0.5 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

3.0 m Sandy Gravel: Pebble to cobble gravel and fine to coarse sand; appears horizontally stratified; clasts are subangular to subrounded in shape and some are coated with $CaCO_3$ and/or silty sand. Sample J4-28a was taken from this unit.

2.0 m Sand: Mostly fine sand with some silty layers; contains some silty sand layers up to 0.6 m thick; exhibits cross-bedding and cut-and-fill structures; some ripple laminations were noticed. Sample J4-28b was taken from this unit.

2.0 m Slump Covered

Bedrock is exposed at the northern end of the pit.

The sand unit is dipping in a southeast direction (145°Az).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	85.6	79.1	59.9	41.2	32.1	25.4	17.0	8.9	4.0	2.0
	b		100.0	99.7	99.1	97.9	96.2	84.3	40.9	20.6	11.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 1; schist, shale 9; meta-sediments 5; friable limestone 8; weathered pebbles 1	mafic intrusive 1; felsic extrusive 1; mafic extrusive 4; sandstone 11; silt-stone 14; quartz 1; quartzite 7; meta-sediments 9; limestone 22; tuff 1; cal-careous argillite 5

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
2.0	1.0 max.	6.0	60,000

Location #: J4-29 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Wakefield

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 004 171

Section Description & Comments:

0.3 m Overburden

0.3 m Sand and Gravel: Fine to medium sand and pebble to cobble gravel; clasts are subrounded in shape and partially silt-coated.

1.5 m Silt and Sand: Interstratified fine sand and silt; exhibits beds that dip in a southeast direction (130°Az); contains a few fine pebble gravel layers.

2.4 m Slump Covered

Some faulting was noticed at one corner of the pit (possibly due to the movement of heavy equipment on the surface during excavation). The bedding appears near horizontal and regular elsewhere.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	80.4	74.9	64.9	59.2	54.0	49.4	38.7	22.0	9.0	4.4
	b (partial)				100.0	91.2	83.4	65.4	37.1	15.2	7.4
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
upper terrace	5.5	3.5	5.0 m	175,000
lower terrace	15.0	5.0	2.5 m	125,000
		5.5	1.5 m max.	82,000

Location #: J4-29B

County: Carleton

Type of Deposit: Ancient Alluvium?

Parish: Wakefield

Exposure Type: Pit?

NTS: 21 J/4

Status: Inactive

UTM: 004 171

Section Description & Comments:

0.5 m Overburden: Mostly decayed vegetation.

1.5 m Silt: Mostly silt; appears massive.

0.3 m Sand and Gravel: Predominantly fine pebble gravel and fine to medium sand; exhibits minor cross-bedding.

3.3 m Sandy Silt: Horizontally stratified layers of sand and silt; exhibits minor ripple laminations.

5.5 m Slump Covered

This exposure is located approximately 60 m northwest of J4-29, at the base of the terrace.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-30 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 082 125

Section Description & Comments:

0.3 m Overburden

3.0 m Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; no structures observed (most exposures are overgrown); clasts are subrounded to rounded in shape and some are flat and elongate.

It appears as though the lowest terrace was worked some time ago. It is almost depleted.

D.O.T., 1958:

Sieve Analyses (7 samples):

between 28.0% and 34.7% passing #4 (average of 30.9%)

between 0.5% and 2.1% passing #200 (average of 0.9%)

Los Angeles Abrasion Loss:

27.7%

Recommended for borrow and sub-base aggregate.

Crushing was recommended to improve the grading of the material.

D.O.T., 1960:

Six test holes were drilled on the alluvial flats, south of J4-30. The material comprises between 0.3 m and 1.8 m of silt and/or clay

over sand and gravel (between 0 and 1.5 m)

over bedrock (at depths of 0.9 m, 1.8 m and 1.8 m in three of the test holes).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	74.8	67.5	54.0	42.4	33.5	27.5	15.9	7.3	5.8	5.0
	b (partial)				100.0	79.0	64.9	37.4	17.1	13.6	11.7
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
J4-30	2.0 max	2.0	40,000
portion of terrace to the southeast	0.5	2.0	10,000

Location #: J4-31 County: Carleton

Type of Deposit: Ice contact Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 076 123

Section Description & Comments:

0.5 m Overburden

3.0 m Sand: Predominantly fine sand with some gravelly layers and some silt; exhibits contorted stratification and some faulting; silt content is approximately 10%.

3.0 m Slump Covered

Certain portions of the pit are gravelly, especially the upper level. Here, the beds are dipping in an eastward (080°Az) direction.

A section 30 m east of the section described exposes 3 m of interstratified clayey silt and sand.

Bedrock is exposed in the centre of the pit floor.

An overgrown pit southeast of J4-31 is at least 20 m thick. The upper 3 m comprise sand and gravel. The material appears finer with depth.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a		100.0	99.2	98.9	97.7	95.4	86.2	59.3	20.7	6.2
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	32.0	18.0	4.0±	720,000
outwash	3.5	2.5	2.0	50,000

Location #: J4-32 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 059 124

Section Description & Comments:

0.3 m Overburden

2.0 m Sand: Interstratified layers of fine to medium sand with some pebble gravel and silty fine sand; beds are dipping in a southeast direction (approximately 150°Az); individual 'sand' layers exhibit cross-bedding, cut-and-fill and ripple laminations.

2.0 m Slump Covered: Assumed similar material as above.

The silt content appears excessive in places.

D.O.T., 1970:

Sieve Analyses (6 samples from the pit area):
between 98.7% and 100.0% passing #4 (average of 99.8%)
between 8.1% and 28.4% passing #200 (average of 19.3%)
Recommended for borrow only.

Sieve Analyses (7 samples from the fluvial terrace to the west):
between 16.2% and 30.0% passing #4 (average of 23.8%)
between 2.4% and 7.7% passing #200 (average of 5.1%)

Los Angeles Abrasion Loss (from 7 samples):
average 24.3%

Recommended for borrow and borderline sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a				100.0	99.3	97.6	93.7	74.3	29.1	15.6	6.3
	b											
	c											

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

	total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
	19.5	8.0	2.5±	200,000
terrace to the west	1.0	0.3	2.0	6,000

Location #: J4-33 **County:** Carleton

Type of Deposit: Glaciofluvial outwash **Parish:** Woodstock

Exposure Type: Pit **NTS:** 21 J/4

Status: Inactive **UTM:** 068 121

Section Description & Comments:

0.5 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

0.5 m Sand and Gravel: Poorly sorted fine to coarse sand and pebble to cobble gravel; clasts are subrounded to rounded in shape and some are partially silt-coated; contains numerous weathered clasts.

3.0 m Slump Covered: Assumed similar material as above; water at the base of the pit.

The pit is overgrown and heavily slump-covered.
Sections on the north side of the pit are approximately 10 m thick.
Bedrock is exposed on the pit floor, near the main road.

D.O.T., 1974:

Sieve Analyses (9 samples):
between 36.0% and 85.0% passing #4 (average of 57.7%)
between 4.8% and 11.1% passing #200 (average of 7.3%)

Los Angeles Abrasion Loss (from 9 samples):
average 33.3%

Recommended for borrow and marginal pit run sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.5	75.2	49.0	34.8	27.2	20.9	10.9	5.6	3.3	1.9
	b (partial)				100.0	78.2	60.1	31.3	16.2	9.6	5.5
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 4; siltstone 7; schist, shale, friable clasts 15; metasediments 13; weathered pebbles 10; chert 1	mafic intrusive 2; felsic extrusive 1; mafic extrusive 6; sandstone 9; siltstone 1; quartz 1; quartzite 6; metasediments 23; limestone 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-32			

Location #: J4-34 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Active on demand UTM: 102 052

Section Description & Comments:

0.3 m + Overburden: Partially removed; up to 1.0 m in places.

1.0 m Gravelly Sand: Predominantly fine sand and pebble gravel; exhibits near-horizontal stratification with minor ripple laminae. Sample J4-34 was taken from this unit.

0.5 m Sand: Predominantly fine sand with some silty layers; exhibits cut-and-fill and cross-bedding; stratification is discontinuous in places.

1.0 m Slump Covered

The sand and gravelly sand units vary in thickness. The average material thickness is 2.5 m here. Greater thicknesses were noticed in other portions of the pit.

Reserves were calculated for: (1) the thickest terrace adjacent to the St. John River (2) the glaciofluvial outwash near J4-34 (3) the remainder of the glaciofluvial outwash (4) the ice-contact deposit north of J4-34 and (5) the kame adjacent to Route #2 (U.T.M. 106 066).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	98.5	95.9	87.0	76.5	64.0	56.6	47.2	38.0	24.3	9.6
	b (partial)				100.0	83.6	74.0	61.7	49.7	31.7	12.6
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
(1)	3.0	3.0	90,000
(2)	24.0	2.5	600,000
(3)	71.0	1.5±	1,065,000
(4)	7.5	?	?
(5)	1.0	10.0	100,000

Location #: J4-34 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1966 (Pit 1 km east of J4-34):

Sieve Analyses (from 21 samples):

between 26.5% and 51.2% passing #4 (average of 39.3%)

between 2.1% and 5.9% passing #200 (average of 3.4%)

Los Angeles Abrasion Loss (from 21 samples):

average 21.7%

Recommended for base course aggregate.

Only 21 of the 31 test holes were suitable for testing. Clay apparently underlies the deposit.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-35

County: Carleton

Type of Deposit: Ice contact

Parish: Woodstock

Exposure Type: Pit

NTS: 21 J/4

Status: Active on demand

UTM: 137 971

Section Description & Comments:

0.3 m Overburden

10.5 m Sand and Gravel to Sandy Gravel: Fine to coarse sand and pebble to small boulder gravel; contains some silty layers; exhibits discontinuous stratification; grain sizes and clast shape are variable; beds are dipping in an easterly direction; clasts are partially silt-coated, more so near the base of the exposure.

1.5 m Slump Covered: Assumed similar material as above.

The deposit is silty towards the flanks of the ridge. The silt content is approximately 4% ± 2 and the average pit thickness is 10.5 m.

D.O.T., 1963:

Sieve Analyses (8 samples):
between 30.1% and 62.7% passing #4 (average of 50.2%)
between 1.1% and 7.4% passing #200 (average of 3.3%)

Los Angeles Abrasion Loss (from 8 samples):
average 17.0%

Recommended for sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	81.7	76.0	57.3	41.6	25.7	15.9	4.6	1.4	0.8	0.5
	b (partial)				100.0	61.8	38.3	11.0	3.4	1.9	1.1
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 8; shale 4; metasediments 3	felsic intrusive 3; mafic intrusive 5; mafic extrusive 4; sandstone 13; siltstone 13; quartz 1; quartzite 18; metasediments 28

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
ice contact	8.5	5.5	6.0	330,000
outwash south of Hays Brook	40.0	20.0	1.5	300,000

Location #: J4-36 | County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact | Parish: Woodstock

Exposure Type: Pit | NTS: 21 J/4

Status: Active on demand | UTM: 117 997

Section Description & Comments:

SECTION A; UPPER LEVEL:

0.3 m Overburden

1.0 m Gravelly Sand: Horizontally stratified gravelly sand.

1.0 m Silt, Sand, and Gravel: Interstratified beds varying from silt to sand and gravel; one very cobbly and small bouldery layer noticed; beds are dipping in a southerly direction (185°Az); some faulting noticed; grain sizes are extremely variable.

4.0 m Slump Covered

SECTION B; LOWER LEVEL:

3.0 m Sand and Gravel: Predominantly medium sand and pebble to small cobble gravel; contains some sand beds (?) near the base of the section; cut-and-fill structures noticed; the sand and gravel beds are dipping in a northerly direction (350°Az) whereas the sand beds are dipping to the north (020°Az) and east (120°Az); clasts are subangular to subrounded in shape and some are partially silt-coated; sample J4-36 was taken from this unit.

1.0 m Slump Covered: Assumed similar material as above.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	84.0	78.0	59.7	47.1	37.0	31.0	17.3	7.1	2.1	0.9
	b (partial)				100.0	78.6	65.9	36.8	15.0	4.5	1.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
shale, friable clasts 4; weathered pebbles 1; chert 1	felsic intrusive 3; mafic intrusive 3; felsic extrusive 1; sandstone 15; siltstone 34; quartz 1; quartzite 12; metasediments 24; tuff 1

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-37			

Location #: J4-36 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1977:

Sieve Analyses (4 samples):

between 31.0% and 90.0% passing #4 (average of 59.5%)

between 1.2% and 12.2% passing #200 (average of 4.9%)

Los Angeles Abrasion Loss (from 2 samples):

average 17.2%

Recommended for borrow. Selective quarrying and/or washing would be required to produce sub-base, base (1½" crushed) and cover aggregate (½" and 3/4" chips).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-37 County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 118 993

Section Description & Comments:

SECTION A

0.5 m Overburden: Removed; estimated thickness.

0.5 m + Sand and Gravel: Removed; estimated thickness; observed to be as thick as 1.0 m in places.

3.0 m Sandy Silty Gravel: Pebble to large boulder-size gravel in a sandy silt matrix; moderately to loosely compact; appears massive and till-like; clasts are angular in shape and most are heavily silt-coated.

SECTION B

0.5 m Overburden

1.5 m Sandy Gravel: Pebble to large cobble gravel with fine to coarse sand and a few small boulders; no structures observed (poor exposure); clasts are generally subrounded in shape and most are clean. Sample J4-37 was taken from this unit.

1.0 m Slump Covered

This ridge-like feature comprises a core of either poor ice-contact material or till. The composition of the material appears similar to Till B (see J4-43).

Reserves for this deposit were calculated for the area north of Hays Brook. The

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	80.2	72.4	53.6	40.0	28.8	21.8	12.8	5.9	3.4	1.9
	b (partial)				100.0	71.9	54.6	32.1	14.8	8.4	4.8
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 6; siltstone 2; shale 1; weathered pebbles 4; chert 1; friable granite 2	felsic intrusive 7; mafic intrusive 3; felsic extrusive 4; sandstone 19; siltstone 27; quartz 2; quartzite 15; metasediments 4; tuff 2

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
109.5	4.5	3.0+	135,000
	40.0	2.5±	1,000,000
	7.0	2.0?	140,000

Location #: J4-37 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

quality of the reserves will be variable (see below).

D.O.T., 1971 (J4-37 and surrounding area):

Sieve Analyses (5 samples):

between 30.0% and 66.0% passing #4 (average of 51.4%)

between 1.7% and 5.0% passing #200 (average of 3.3%)

Los Angeles Abrasion Loss (from 4 samples):

average 21.0%

Recommended for borrow.

The deposit is very erratic (19 test holes were drilled and only 5 were suitable for testing).

D.O.T., 1974 (J4-37 and surrounding area):

Sieve Analyses (8 samples):

between 20.0% and 64.0% passing #4 (average of 40.8%)

between 1.3% and 7.9% passing #200 (average of 2.7%)

Los Angeles Abrasion Loss (from 8 samples):

average 20.6%

Recommended for sub-base aggregate.

The deposit is very erratic (29 test holes were drilled and only 8 were suitable for testing).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-38 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 115 998

Section Description & Comments:

0.3 m Overburden

1.2 m Sand and Gravel to Sandy Gravel: Poorly sorted fine to coarse sand and pebble to cobble gravel; no structures observed (poor exposure); clasts are subangular to subrounded in shape and some are lightly silt-coated.

3.0 m Slump Covered

A few boulders were noticed on the pit floor.

Reserves appear to be significant for this portion of the deposit.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	70.1	62.8	48.2	37.4	27.8	18.8	6.1	2.4	1.5	1.1
	b (partial)				100.0	74.3	50.3	16.2	6.3	4.1	2.9
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 1; siltstone 1; shale, friable clasts 3; metasediments 1; weathered pebbles 1; chert 1	felsic intrusive 3; felsic extrusive 2; mafic extrusive 1; sandstone 22; siltstone 16; quartz 3; quartzite 20; metasediments 24

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
see J4-37			

Location #: J4-39 County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact Parish: Woodstock

Exposure Type: Pits NTS: 21 J/4

Status: Active UTM: 112 027

Section Description & Comments:

UPPER LEVEL, SOUTHWESTERN PORTION:

2.0 m Sandy Silt: Silt with fine sand; removed in places; exhibits near-horizontal stratification and minor cut-and-fill; variable thickness.

4.0 m Gravelly Sand to Sand and Gravel: Predominantly medium sand and pebble to cobble gravel; exhibits cross-bedding and cut-and-fill structures; clasts are sub-angular to subrounded in shape and some are coated with $CaCO_3$. Samples J4-39A and J4-39B were taken from this unit.

2.5 m Slump Covered

A lower level at the northern end of the pit exposes 6.0 m of cemented sandy gravel. It is very cobbly and bouldery and the material would be difficult to extract.

The total thickness of the pit is approximately 20 m.

Bedrock is exposed near the pit entrance at the base of the deposit.

D.O.T., 1959:

Sieve Analyses (4 samples):

between 23.1% and 63.4% passing #4 (average of 42.6%)

between 1.0% and 3.0% passing #200 (average of 1.8%)

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	76.8	67.0	45.6	36.5	27.7	18.1	6.1	2.7	1.6	0.8
	b	85.7	78.0	64.3	56.9	50.6	43.9	22.4	1.5	0.5	0.2
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
siltstone 1; shale 1; metasediments 4; chert 1	felsic intrusive 3; mafic intrusive 1; felsic extrusive 1; sandstone 7; siltstone 6; quartz 1; quartzite 49; metasediments 25

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
11.0	4.5	5.0	225,000
	1.0	15.0	150,000
4.0	3.0	?	?

Location #: J4-39 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

Los Angeles Abrasion Loss (from 4 samples):
average 17.7%

Sieve Analysis (1 sample):
98.0% passing #4 and 3.4% passing #200

Recommended for sub-base aggregate.

D.O.T., 1971 (small pit south of J4-39):
Sieve Analyses (3 samples):
between 98.0% and 100.0% passing #4 (average of 99.3%)
between 7.4% and 12.4% passing #200 (average of 9.8%)

Recommended for borrow. It could also be considered as a possible source of filter and blending sand.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-40 County: Carleton

Type of Deposit: Ancient alluvium Parish: Woodstock

Exposure Type: River cut NTS: 21 J/4

Status: Undeveloped UTM: 051 128

Section Description & Comments:

0.7 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

2.1 m Sandy Gravel: Poorly sorted sand and gravel; very cobbly and small bouldery; clasts are subrounded in shape.

4.3 m Gravelly Sand to Sand: Predominantly medium to coarse sand with some pebble gravel; beds are dipping 35° in a southeast direction (150°Az); clasts are subrounded to rounded in shape and some are elongate.

5.2 m Sand, Silt and Clay: Interstratified layers of fine sand, silt and clay in varying proportions; clay content increases with depth; generally horizontally stratified with secondary structures (ball and pillow, convolute bedding in places, ripple laminations); rhythmites?

0.8 m Slump Covered

An old gravel pit east of this exposure is present. The original surface was approximately 3 m higher than the present level and the material comprises gravelly sand to sand. The floor of the pit is approximately 2 m above the Meduxnekeag River.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a		100.0	88.4	67.6	47.6	36.8	23.6	1.3	0.0	0.0
	b (partial)				100.0	70.5	54.4	34.9	1.9	0.0	0.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)		area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
outwash(?)	5.5	3.0	3.0	90,000
alluvium	4.0	3.0	shallow	little
outwash terraces west and northwest	4.0	3.0	2.0	60,000
	4.5	3.5	2.0	70,000

Location #: J4-40 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1958:

Sieve Analyses (6 samples):
between 37.4% and 53.7% passing #4 (average of 44.3%)
between 0.4% and 1.3% passing #200 (average of 0.8%)

Sieve Analysis (1 sample):
84.4% passing #4 and 2.6% passing #200

Los Angeles Abrasion Loss (2 samples):
average 23.7%

Recommended for borrow.

Possible source for filter sand.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-41 **County:** Carleton

Type of Deposit: Ice contact? **Parish:** Woodstock

Exposure Type: Pit **NTS:** 21 J/4

Status: Inactive **UTM:** 065 143

Section Description & Comments:

0.5 m Overburden

1.5 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel; clasts are generally subrounded in shape and some are silt-coated; numerous weathered clasts were noticed.

2.5 m Slump Covered: Assumed similar material as above.

The pit is overgrown and exposures are poor.

Bedrock was noticed near the pit floor in one locality.

A similar deposit northeast of J4-41 (across the road) has not been mapped because it is depleted.

D.O.T., 1958 (J4-41 or pit south of J4-41):
Sieve Analyses (4 samples):
between 34.4% and 59.8% passing #4 (average of 43.6%)
between 1.3% and 2.4% passing #200 (average of 1.7%)
Los Angeles Abrasion Loss (1 sample):
31.9%

Recommended for borrow and sub-base aggregate.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a	73.8	68.3	58.3	48.9	38.9	28.7	9.3	2.5	1.7	1.5
	b (partial)				100.0	79.6	58.7	19.0	5.1	3.5	3.0
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
sandstone 3; siltstone 8; shale 7; metavolcanic 1; metasediments 4; weathered pebbles 7; chert 1	felsic extrusive 4; mafic extrusive 8; sandstone 28; siltstone 11; quartz 1; quartzite 4; metasediments 12

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
12.0	4.0	2.5	100,000 max.
	2.0	?	?

Location #: J4-42 County: Carleton

Type of Deposit: Ice contact Parish: Wakefield

Exposure Type: Pit NTS: 21 J/5

Status: Active on demand UTM: 104 228

Section Description & Comments:

0.3 m Overburden: Decayed vegetation and the oxidized equivalent of the material described below.

0.3 m Sand and Gravel: Predominantly medium sand and fine pebble gravel.

1.0 m Sandy Gravel: Pebble to small boulder gravel with some sand; clasts are imbricated suggesting an east to southeast flow direction.

2.4 m Sand and Gravel: Predominantly medium to coarse sand and pebble to cobble gravel with some silt (5% ± 3); clasts are generally subrounded in shape and some are flat and elongate (metasediments); most of the pebbles are coated with silty clay and some are also coated with $CaCO_3$.

4.5 m Slump Covered

Bedrock is exposed 8 m west of the section described.

Approximately one half of the clasts are derived from the underlying bedrock (slate). Owing to the friable nature of the bedrock, numerous deleterious fragments are present.

In the eastern portion of the pit, the material comprises clean gravelly sand and exhibits cut-and-fill structures (possibly a channel which had 'cut' through the deposit).

Mechanical Analysis:

sieve		2"	1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a		90.6	89.3	74.5	47.1	27.7	21.0	13.8	9.8	5.8	4.6
	b	(partial)				100.0	58.9	44.5	29.2	20.9	12.4	9.7
	c											

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %
schist 6; metasediments 12; weathered pebbles 13; friable limestone 9	mafic intrusive 1; sandstone 1; siltstone 15; quartzite 1; metasediments 11; limestone (some argillaceous) 30; tuff 1

Estimation of Reserves: Woodstock map-area only.

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
5.5	5.5	2.0?	110,000
ice contact deposit SE of J4-42 0.7	0.5	3.0	15,000

Location #: J4-42 (cont'd)

County:

Type of Deposit:

Parish:

Exposure Type:

NTS:

Status:

UTM:

Section Description & Comments:

D.O.T., 1973:

Sieve Analyses (4 samples):

between 17.0% and 45.0% passing #4 (average of 32.0%)

between 4.6% and 14.9% passing #200 (average of 10.0%)

Los Angeles Abrasion Loss (from 4 samples):

average 30.8%

Recommended for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-43 County: Carleton

Type of Deposit: Lodgement till Parish: Woodstock

Exposure Type: Stream cut NTS: 21 J/4

Status: Undeveloped UTM: 131 969

Section Description & Comments:

0.5 m Overburden

1.5 m Lodgement Till A: Mottled bluish grey to orange brown silt till; variable compaction; very pebbly.

1.0 m Lodgement Till B: Bluish grey clayey silt till; very pebbly and compact; numerous pebbles were noticed near the contact with till A.

0.4 m Lodgement Till C: Dark greyish brown silt till; very compact; less pebbly than tills A and B.

Till C is absent in places and bedrock is exposed 1.5 m west of the section described.

There are at least two and possibly three tills present at this site. This exposure suggests that either ice readvanced at least in the St. John River valley (representing a glacial phase) or the tills may represent more significant glacial advances. The former idea is preferred because till-like material similar in composition to till B can be found in the St. John River Valley at lower elevations (see J4-37).

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable

Location #: J4-44 County: Carleton

Type of Deposit: Glaciofluvial outwash Parish: Woodstock

Exposure Type: Pit NTS: 21 J/4

Status: Inactive? UTM: 083 117

Section Description & Comments:

D.O.T., 1971:

Sieve Analyses (12 samples):
between 32.0% and 63.0% passing #4 (average of 46.0%)
between 2.3% and 5.9% passing #200 (average of 4.3%)

Sieve Analysis (1 sample):
95.0% passing #4 and 3.7% passing #200

Los Angeles Abrasion Loss (from 12 samples):
average 25.0%

Recommended for borrow and sub-base aggregate.

Problems can be expected with a high water table. Silt apparently underlies most of the deposit suggesting that the material may be fluvial (rather than glaciofluvial) in origin.

Reserves were calculated for the uninhabited area near J4-44. Extraction problems can be expected since the deposit is in close proximity to Karne's Bakery and the town of Woodstock.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
	9	2.5	225,000
	6	1.5	90,000

Location #: J4-45 County: Carleton

Type of Deposit: Glaciofluvial outwash/ ice contact Parish: Brighton

Exposure Type: Pit NTS: 21 J/4

Status: Inactive UTM: 153 216

Section Description & Comments:

D.O.T., 1959:
Sieve Analyses (3 samples):
between 18.2% and 31.8% passing #4 (average of 42.9%)
between 0.7% and 1.8% passing #200 (average of 1.2%)
Los Angeles Abrasion Loss (from 2 samples):
average 17.6%
Recommended for sub-base aggregate.

D.O.T., 1978 (650 m north of J4-45):
Sieve Analyses (5 samples):
between 42.0% and 75.0% passing #4 (average of 51.4%)
between 6.2% and 11.4% passing #200 (average of 8.7%)
Los Angeles Abrasion Loss (from 5 samples):
average 21.6%
Recommended for borrow only.

Mechanical Analysis:

sieve		1"	3/4"	3/8"	#4	8	14	30	50	100	200
% passing	a										
	b										
	c										

Lithologic Analysis:

Unsound Lithotypes %	Sound Lithotypes %

Estimation of Reserves:

total deposit area (hectares)	area workable (hectares)	average thickness (meters)	recoverable reserves (m^3) probable
35.0	14.5	2.5	360,000
	4.5	1.5	67,000
lowest terrace 1.5	0.5	1.5	8,000