

**AGGREGATE RESOURCE INVENTORY MASTER PLAN
GREY COUNTY**

*Prepared for:
Grey County*

*Prepared by:
Jagger Hims Limited
Skelton Brumwell & Associates Inc.
ESG International
C.N. Watson Limited*

October, 2004

File 021323.00

Distribution:

7 c Client, 1 digital

1 c Skelton, Brumwell & Associates Inc.

1 c ESG International

1 c C.N. Watson

1 c Jagger Hims Limited

TABLE OF CONTENTS

	PAGE
EXECUTIVE SUMMARY	i
1.0 INTRODUCTION AND MANDATE.....	1
2.0 PLANNING PROCESS AND AGGREGATE RESOURCES.....	4
2.1 COUNTY AND MUNICIPAL PLANNING.....	4
2.2 PROVINCIAL POLICY STATEMENT	5
2.3 SMART GROWTH	6
2.4 LAND FRAGMENTATION	6
3.0 EXTRACTION AND AGGREGATE LICENSING.....	7
3.1 THE AGGREGATE RESOURCES ACT AND STANDARDS.....	7
3.2 INTERFACE BETWEEN THE PLANNING ACT AND THE AGGREGATE RESOURCES ACT	8
3.3 LICENSING PROCESS	9
4.0 AGGREGATE RESOURCES	10
4.1 METHODOLOGY	10
4.2 GEOLOGY OVERVIEW	11
4.3 MAP UNITS	12
4.3.1 Primary Sand And Gravel Deposits.....	13
4.3.2 Secondary Sand And Gravel Deposits.....	14
4.3.3 Tertiary Sand And Gravel Deposits.....	14
4.3.4 Primary Bedrock Resources.....	14
4.4 SAND AND GRAVEL RESOURCES.....	15
4.5 BEDROCK RESOURCES	16
4.6 SUMMARY	18
5.0 NATURAL ENVIRONMENT	18
6.0 WATER	20
6.1 GROUNDWATER	20
6.2 SURFACE WATER	21
7.0 AGRICULTURE	22
7.1 SOIL RESOURCES.....	22
7.2 AGRICULTURAL LAND USE.....	23
7.3 AGRICULTURAL POLICIES AND EXTRACTION.....	24
8.0 TRANSPORTATION.....	24
9.0 SOCIAL AND COMMUNITY ASPECTS	26
9.1 SOCIAL	26
9.2 CULTURAL HERITAGE	28
10.0 AGGREGATE MARKET ANALYSIS.....	29
10.1 LOCAL DEMAND.....	29

10.2	EXPORT POTENTIAL	30
10.2.1	Demand Areas.....	30
10.2.2	Potential for Grey County Producers to Export.....	31
10.2.3	Implications	32
11.0	FISCAL AND ECONOMIC ANALYSIS	34
11.1	MUNICIPAL FINANCE.....	34
11.2	CONTRIBUTION TO THE LOCAL ECONOMY	35
11.2.1	Direct, Indirect and Induced Employment.....	35
11.2.2	Other Contributions	37
12.0	EXTRACTION AND REHABILITATION SCENARIOS.....	37
12.1	EXTRACTION.....	37
12.2	REHABILITATION SCENARIOS.....	38
13.0	OPPORTUNITIES FOR ENHANCEMENT OF THE NATURAL ENVIRONMENT .	42
14.0	IDENTIFICATION OF CONSTRAINTS	42
14.1	CONSTRAINT OVERLAY	43
14.2	EVALUATION CRITERIA	43
14.3	RESOURCE EVALUATION MODEL.....	44
15.0	RESULTS OF EVALUATION	48
16.0	PUBLIC REPRESENTATION AND PARTICIPATION.....	50
17.0	CONCLUSIONS.....	51
18.0	RECOMMENDATIONS	54
19.0	REFERENCES	58

APPENDICES

APPENDIX A	TERMS OF REFERENCE
APPENDIX B	PLANNING DOCUMENTS
APPENDIX C	AGGREGATE RESOURCES INVENTORY
APPENDIX D	NATURAL ENVIRONMENT
APPENDIX E	AGRICULTURE
APPENDIX F	TRANSPORTATION
APPENDIX G	PLANNING AND COMMUNITY ANALYSIS
APPENDIX H	FISCAL AND ECONOMIC IMPACT ANALYSIS; AGGREGATE MARKET ANALYSIS
APPENDIX I	PUBLIC PARTICIPATION
APPENDIX J	PUBLIC LIAISON GROUP MINUTES

FIGURES

FIGURE 4-1	PHYSIOGRAPHY
FIGURE 4-2	SAND AND GRAVEL RESOURCES
FIGURE 14-1	ELIMINATED RESOURCE LANDS
FIGURE 14-2	HIGHLY CONSTRAINED RESOURCE LANDS
FIGURE 14-3	MODERATELY CONSTRAINED RESOURCE LANDS
FIGURE 14-4	MINIMALLY CONSTRAINED RESOURCE LANDS
FIGURE 14-5	UNCONSTRAINED AND CONSTRAINED RESOURCE LANDS
FIGURE 15-1	AGGREGATE RESOURCES IDENTIFIED FOR PROTECTION
FIGURE D-1	NATURAL HERITAGE FEATURES
FIGURE D-2	VULNERABLE, THREATENED AND ENDANGERED SPECIES
FIGURE D-3	FISH HABITAT
FIGURE D-4	HAZARD LANDS
FIGURE E-1	PRIME AGRICULTURAL AREAS
FIGURE F-1	ROADWAY SYSTEM

TABLES

TABLE 4-1	SUMMARY OF BEDROCK UNITS
TABLE 12-1	REHABILITATION SCENARIOS – EXTRACTION ABOVE THE WATER TABLE
TABLE 12-2	REHABILITATION SCENARIOS – EXTRACTION BELOW THE WATER TABLE
TABLE 14-1	EVALUATION CRITERIA
TABLE 14-2	RESOURCE EVALUATION MODEL
TABLE 1	AREA OF FARMLAND IN GREY COUNTY, 2001
TABLE 2	USE OF AGRICULTURAL LAND IN GREY COUNTY, 2001
TABLE 3	NUMBER OF FARMS IN GREY COUNTY, 2001
TABLE 4	TYPES OF FARMS IN GREY COUNTY, 2001 (WITH SALES OF MORE THAN \$2,499)
TABLE 5	FIELD CROP FARMS AND AREA OF FIELD CROPS IN GREY COUNTY, 2001
TABLE 6	FARM GATE SALES IN GREY COUNTY, 2000
TABLE G-1	2001 AGGREGATE PRODUCTION BY MUNICIPALITY

EXECUTIVE SUMMARY

Project Assignment

In September of 2001, The County of Grey developed the terms of reference for their Aggregate Inventory Master Plan as required by their Official Plan. The mandate for this study is to identify, protect and prescribe management for the aggregate resources of Grey County.

Specifically, the purpose of the Master Plan is to:

- i) identify and examine the Mineral Aggregate Resource in the County of Grey;
- ii) assess the environmental, social and economic factors affecting the resource utilization;
- iii) develop a management strategy for the aggregate resource and rehabilitation of future and existing extracted areas;
- iv) develop Official Plan policies for the implementation of the management strategy into the Grey County Official Plan; and
- v) ensure that aggregate resources are protected and managed in the County of Grey in a manner that is in the public interest, and which has regard for the Provincial Policy statement.

The Official Plan recommends the Master Plan be implemented by way of an Official Plan Amendment.

The Aggregate Inventory Master Plan meets the purpose of the Master Plan by providing a variety of basic information relating to the sand and gravel resources in Grey County, and identifying and analyzing the economic benefits of the extraction industry, the environmental resources in the County, the social and community context, and a variety of other related aspects.

Data Collection

The data collection phase of the study required the gathering of all readily available data on the aggregate resource, environmental features, surface hydrology, agriculture, ground and surface water, traffic, cultural heritage resources, planning and social issues. An aggregate market analysis, fiscal and economic impact assessment and public participation program were also included as part of this study.

The majority of the data collection involved the gathering of information from existing data sources; however a field re-assessment and reinterpretation of the aggregate resources was included in this phase of the study.

Public participation was a pre-requisite for the Master Plan. There were two objectives for public participation: first to obtain input from the public and second, to distribute information to the public on aggregate resources in Grey County and the Industry in general. Open Houses, surveys and the County web site were used to achieve these goals.

Public representation was carried out from the creation of the Terms of Reference to the final review of the draft report by the Public Liaison Group. The Group consisted of the following representatives:

- aggregate producers;
- Grey County;
- agencies(MMA&H, MNR and Conservation Authority); and
- local municipalities.

This group played a key role in meeting regularly with the consulting team and approving various approaches and stages of the study.

Analysis

The Analysis portion of the Study involved assessing the impact that various constraint factors have on the availability of the resource. The first step was to use a constraint overlay to identify constrained and unconstrained resources.

Evaluation criteria were developed to map all known constraining factors and provide an evaluation of the potential impact on aggregate extraction. Each constraint was determined to have a high or low potential impact based on the ability to potentially mitigate the constraint.

A Resource Evaluation Model was developed to assist in understanding the significance of the constraint or combination of constraints. Aggregate resources were identified that were:

- i) eliminated due to the severity of the constraint(s);
- ii) partially constrained; and
- iii) have no apparent constraints to extraction.

A secondary component of the analysis phase was to develop rehabilitation scenarios. Key components to maximize resource utilization and rehabilitation efforts were identified, and flow charts created to provide guidance for the types of rehabilitation that can be achieved in certain areas.

Results

The fundamental conclusions of the study are as follows:

1. Approximately 15% of the Primary and Secondary deposits are either “eliminated” or “highly constrained”. “Moderately constrained” resource lands are approximately a third of the Primary/Secondary resources, and there is a substantial fragmentation of available lands. The cumulative impact of the moderate constraints plus land fragmentation is approximately half of the primary and secondary aggregate resource

lands in Grey County.

2. Local demand for aggregates in Grey County is expected to remain below 3 million tonnes per year to 2023. There is potential in the medium term (10 to 20 years) for Grey County producers (particularly those in the southern area of the County) to export aggregate to demand areas in the northwestern portions of the GTA. Long term (beyond 20 years) potential exists for Grey County to export to the GTA in greater volumes; however, given the uncertainties regarding supply in areas closer to the GTA, such as Simcoe County, the Waterloo/Wellington area and the Hamilton/Niagara/Brantford area, and possible changes in provincial regulations, it is difficult to predict exactly when significant export of aggregates would occur.
3. Aggregate operations provide a modest positive impact to the municipal finances of Grey County and the local municipalities. This benefit is estimated to be approximately \$60/1,000 tonnes of aggregate extracted. There are approximately 530 jobs in the County in the aggregate industry, and an additional 800 jobs provide a range of support services to the industry.
4. Much of the aggregate resource of Grey County has previously been identified with some, but not complete policy protection. The current study has identified many additional areas of primary and secondary aggregate resources which warrant protection.

Key recommendations of the Master Plan include:

1. The unconstrained, minimally constrained, and moderately constrained Primary and Secondary aggregate resources of Grey County should be designated for protection in the Grey County Official Plan.
2. The resource evaluation model should be periodically updated, particularly following the identification of significant woodlands, significant valley lands, and significant

wildlife habitat by the County, or upon the receipt of new information from other agencies.

1.0 INTRODUCTION AND MANDATE

Grey County contains numerous glacial landforms composed of sand and gravel. These resources were recognized almost a century ago in some of the early physiographic mapping in Ontario, and our knowledge about the sand and gravel in Grey County continues to improve. The existence of these substantial resources within potential truck or train transport distance from the Greater Toronto Area (GTA) has given rise to the belief that sooner or later it would be economic to transport Grey County sand and gravel to the GTA. Several government publications have made reference to the existence of the Grey County resources, and the possibility that they might provide a source of aggregate to supply the GTA when other closer resources become depleted and/or when commodity prices rise sufficiently to justify the greater transport cost. The question iswhen?

A second question relates to the social and environmental cost (or how can we minimize the effect) of removing the aggregate resources. Third question? How much resource is available once social and environmental constraints are assessed?

These key questions have been posed from time to time, but there has been no focused attempt to provide answers. The current Aggregate Inventory Master Plan Study was undertaken to address these key questions and a number of related aspects pertaining to aggregate extraction, both current and future, in Grey County. The Study was completed as a requirement of the Grey County Official Plan. It provides a variety of basic information relating to the sand and gravel resources in Grey County, the economic benefits of the extraction industry, the environmental resources in the County, the social and community context, and a variety of other related aspects. A constraint mapping exercise was completed, and a resource evaluation model developed to identify the areas where extraction might occur, the potential for aggregate resource development, and how extraction may be managed to provide future benefits for the County.

The aggregate industry is commonly misunderstood. Few people are aware of the types of aggregates, the procedures required to obtain a licence, the regulations governing the operation of a pit or quarry, and the extent to which the environment and the community are protected. Ontario has been proactive in its approach to managing both aggregate resources and the aggregate industry since the 1970's, and many look upon Ontario as a leader in this field. This study summarizes a number of aspects of the aggregate industry and explains many of the aspects of the poorly understood industry. The reader is encouraged to read the entire report to gain a greater understanding of the issues involved.

As stated within the Terms of Reference for this study: *“The County of Grey is one of the largest Counties in the Province of Ontario with many diverse natural resources. The County is blessed with many economic factors including agriculture, tourism and industry. The aggregate industry within Grey County has been, for many years, very strong, primarily due to the abundance of significant aggregate resources”*. Refer to Appendix A for the full Terms of Reference.

The Grey County Official Plan identified aggregate as an area that required further study. The Official Plan states:

“... the County will undertake an aggregate resource inventory master plan for aggregate extraction. A primary objective of the undertaking will be to determine, in consultation with local municipalities, representatives of the aggregate industry and the appropriate agencies, the location of areas of mineral aggregate potential that are appropriate for protection.” (Grey County O.P., 1999, section 2.7.4.(1), page 36)

In August 1999, the Ontario Municipal Board approved the Grey County Official Plan which required the development of the Terms of Reference for the aggregate resource inventory and completion of the master plan. The Official Plan recommends the master plan be implemented by way of an Official Plan Amendment to incorporate the areas identified for protection into

the Official Plan.

The mandate for this Study is to identify, protect and prescribe management for the aggregate resources of Grey County. This is intended to ensure that the public interest of the people of Grey County and Ontario is being met regarding this Provincially significant natural resource.

The purpose of the Aggregate Inventory Master Plan is:

- “i) To identify and examine the Mineral Aggregate Resource in the County of Grey;*
- ii) To assess the environmental, social and economic factors affecting the resource utilization;*
- iii) To develop a management strategy for the aggregate resource and rehabilitation of future and existing extracted areas;*
- iv) To develop Official Plan policies for the implementation of the management strategy into the Grey County Official plan; and*
- v) To ensure that aggregate resources are protected and managed in the County of Grey in a manner that is in the public interest, and which has regard for the Provincial Policy Statement.” (Terms of Reference, page 2) See Appendix A.*

The Terms of Reference established three major steps in the study: Data Collection, Analysis and Study Findings.

The Data Collection phase of the study required the gathering of all readily available data on the aggregate resources, natural heritage resources, economics, cultural resources and transportation of Grey County. The majority of the data collection involved the gathering of information from existing data sources; however, a major reassessment and reinterpretation of the aggregate resources was included in this phase of the study.

The Analysis portion of the Study involved assessing the impact that various constraint factors have on the availability of the resource. A constraint evaluation model was developed which identified the various constraint factors as high or low, depending on the ability of an

aggregate producer to potentially mitigate the constraint. The analysis was designed to identify portions of the resource that were eliminated due to the severity of the constraint(s), those that are partially constrained, and resources that have no apparent constraints to extraction.

The results of the data gathering, resource evaluation and constraint mapping tasks are summarized in this report, and much of the primary data has been compiled in digital format for future use by the Grey County.

The reconnaissance level groundwater mapping task, which was originally included in the Study, was removed at the request of the County when a much more extensive study was initiated for the Grey and Bruce County area.

Portions of Grey County fall under the jurisdiction of the Niagara Escarpment Planning and Development Act (NEPDA), and are outside the jurisdiction of the Grey County Official Plan. However, this Study assesses the aggregate resource and aggregate industry for all of Grey County including the NEPDA lands, because of their impact on the County as a whole, and because of a cooperative study arrangement with the Ontario Ministry of Mines and Northern Development to update the Aggregate Resources Inventory Paper for the area (Appendix C).

2.0 PLANNING PROCESS AND AGGREGATE RESOURCES

This section outlines planning related to aggregates. Further planning and community references are found in Appendix G.

2.1 COUNTY AND MUNICIPAL PLANNING

Aggregate resources planning and development is managed at the County and municipal level by The Planning Act and the Official Plans, Zoning By-Laws and in some cases municipal Site Plans and Development Agreements which are in effect. No site can be licensed as a pit or

quarry unless it is first designated and zoned to permit aggregate extraction.

The Grey County Official Plan now identifies “Primary Aggregate” lands on the Constraint Mapping in Appendix A, of the Official Plan. This is based on the Aggregate Resources Inventory of the Townships produced by the Ontario Geological Survey in the 1980’s. These lands “will be protected from incompatible land uses” (2.7.1). This occurs by consideration of the constraint to development in zoning by-law amendments (2.7.5) and in land division having regard to the policies (6.12). This study will further determine location of aggregates appropriate for protection (2.7.4(1)).

The land use designation which permits extraction of aggregate and accessory and incidental uses is the Mineral Resources Extraction designation on Schedule A. Licensed pits and quarries under the Aggregate Resources Act are designated as “Mineral Resource Extraction”. A County Official Plan Amendment is necessary as the first approval required to open or expand a pit or quarry. Further discussion of planning issues is presented in Appendix B.

The County Official Plan provides policy related to permitted uses, development criteria, the creation of new Mineral Resource Extraction designations and implementation.

2.2 PROVINCIAL POLICY STATEMENT

The Provincial Policy Statement (PPS) was issued in revised form in 1997 under The Planning Act to provide policy direction on the matters of provincial interest related to land use planning and development. Mineral resources are part of the Province’s resources providing economic benefits. Mineral Resources, including aggregates, will be protected for long term use. *“As much of the aggregate as is realistically possible will be made available to supply mineral resource needs, as close to the market as possible.”* (Ontario P.P.S., 1997, section 2.2.3.1 page 7). Equally, the Province has an interest in protecting the long term health and safety of the population and the financial and economic well-being of the Province and Municipalities.

2.3 SMART GROWTH

The Province of Ontario initiated in 2001 an overall planning review for the Province in five large zones and produced a vision for promoting and managing growth. It is called Smart Growth and works to “improve economic competitiveness, protect and enhance our environment, build livable communities and create transportation choice.”

The Western Ontario Zone, which includes the County of Grey produced an update in December of 2002 which discusses balancing growth, consensus building, protecting the environment and making sure that the urban, rural and agricultural communities have the infrastructure they need to support growth. Aggregate resources are not identified as an issue in Smart Growth in the Western Zone.

2.4 LAND FRAGMENTATION

In considering any kind of resource development, the size of the available land parcels is important. Larger blocks of land are more cost-effective to operate and provide for better resource use. Land fragmentation is a serious constraint for the aggregate industry in many areas of the province.

Fragmentation due to development pressures is an increasing problem for aggregate resource utilization. As the urban population settles closer to these rural resource activities and developments infringe upon, and breaks up, the larger land blocks, access to these resources is reduced, many may be effectively eliminated. It is necessary to recognize that large blocks of aggregate resources are an asset that needs protection.

At the County level it is difficult to assess the extent to which land fragmentation has constrained development of aggregate resources. Land fragmentation by consents to create smaller rural parcels or the development of estate residential subdivisions was seldom raised in

municipal staff interviews or by the public. This was not warranted as a constraint to be further assessed in the evaluation model.

At the local municipal level the assessment maps may be overlain on the Mineral Aggregate Resource areas in suitable scale. The constraint of land fragmentation may become evident in some areas but this is expected to be limited.

3.0 EXTRACTION AND AGGREGATE LICENSING

3.1 THE AGGREGATE RESOURCES ACT AND STANDARDS

The Aggregate Resources Act (ARA) is the provincial legislation that governs the approval, operation and rehabilitation of pits and quarries within designated areas of the province. Most of southern Ontario is currently designated, along with the more urban areas in northern Ontario.

Grey County was originally designated under the Pits and Quarries Control Act in 1972. The Pits and Quarries Control Act was replaced by the Aggregate Resources Act in 1990, and this Act was amended in 1997.

The purposes of the Aggregate Resources Act are:

- “a) to provide for the management of aggregate resources of Ontario;*
- b) to control and regulate aggregate operations on Crown and private lands;*
- c) to require the rehabilitation of land from which aggregate has been excavated; and*
- d) to minimize adverse impact on the environment in respect of aggregate operations.”*

In 1997, the Aggregate Resources of Ontario Provincial Standards were developed to accompany the ARA. The Standards expand on the original Regulations in the preceding legislation, and identify the criteria for meeting the requirements of the Act. The Provincial

Standards are divided into 15 categories relating to the type of aggregate licence. For instance, a Category 3 licence is a Class A (production in excess of 20,000 tonnes per year) pit above the water table. Within each category, detailed information is provided on site plan and report requirements for that particular type of pit or quarry, along with notification and consultation requirements for a new application. Prescribed conditions that apply to any new licence are also listed.

The Provincial Standards also outline operational requirements that apply to licenced properties and annual compliance assessment reporting requirements.

The Ministry of Natural Resource (MNR) has the responsibility for administering the ARA, and the MNR's Owen Sound Area Office is responsible for all the aggregate operations in Grey County.

3.2 INTERFACE BETWEEN THE PLANNING ACT AND THE AGGREGATE RESOURCES ACT

The licence application process for a pit or quarry is a lengthy process that requires significant technical, environmental and planning research and design to fully prepare an application for submission and agency and public consideration.

Whereas The Planning Act, and associated Official Plans and Zoning By-Laws address the appropriateness of the extractive land use at a particular location, the ARA focuses on the licence application process and operation and rehabilitation of a pit or quarry. The ARA requires that appropriate zoning be in place before a licence can be issued.

The two processes deal with different approvals, but often require similar investigations, references and justification. As a result, many applications under The Planning Act and the ARA are submitted concurrently, supported by the same studies, reports, site plans and other documentation.

This Study makes recommendations relative to Official Plan policies, which will address the planning and zoning process at a County level. However, the Study does not impact the ARA. The application process for a pit or quarry licence under the ARA remains unchanged. It continues to be a parallel requirement to any Planning Act application. The ARA will also continue to be the primary legislative power to ensure compliance for the operation and rehabilitation of licenced pits and quarries.

3.3 LICENSING PROCESS

The Aggregate Resources of Ontario Provincial Standards outline the requirements for licensing a pit or quarry in a designated area of Ontario. The components of an application consist of an application form, site plans, summary statement report and technical reports. Essentially there are two types of licences issued – Class A or Class B and either may include the following categories of licence: pit below the water table, quarry below the water table, pit above the water table and quarry above the water table. Site plan and report requirements vary depending on the type of application.

Once the application package has been submitted to the Ministry of Natural Resource, it is reviewed for completeness, and then circulated to applicable agencies for review and comment. During this circulation period, the applicant must hold a Community Information Session. Notice of the application and the Information Session must be provided to local residents by way of a mail out notice, a sign on the site and local newspaper publication.

The applicant must attempt to resolve any concerns at the termination of the circulation and review process. If there can be no resolution to objections, then the application is forwarded to the Ontario Municipal Board for a hearing to review the merits of the application. This may be amalgamated with any objections under the Planning Act so that one hearing covers all the necessary applications for a proposed pit or quarry.

4.0 AGGREGATE RESOURCES

4.1 METHODOLOGY

The methodology used to prepare the Aggregate Resources Inventory, which will form a new publication of the Ontario Geological Survey, is outlined in the introduction to that publication, or any other publication in that series of documents. The following is a summary of the methodology used as it pertains to the aggregate resource assessment of Grey County.

The first step in assessing the aggregate resources of Grey County was to gather the previous aggregate resource publications, published geological maps and reports. These were compiled, and a review of information pertaining to all licenced pits and quarries was conducted. These data were tabulated prior to field checking.

Field work was then undertaken to check available road cuts, pit faces, and any other exposures of geological materials in order to verify and, where possible, improve on existing geological interpretations. All licenced pits and quarries were field checked, and abandoned pits were checked wherever possible. Landforms containing potential aggregate resources were checked and viewed in the field to assess their geology and aggregate potential. Adjustments to previous interpretations were made as appropriate, and a series of samples were taken in selected deposits for detailed aggregate testing.

Additional data were obtained from an analysis of water well data. These data provided an indication of materials in the subsurface, and will be shown on the final versions of the maps to be published. The same data were used to plot drift (overburden) thicknesses overlying bedrock resources.

The field data, water well interpretations, field mapping, laboratory test data and previously published information were used to produce an updated sand and gravel resource map of the county. All available data were used to designate the deposit as primary, secondary and

tertiary according to the assessment procedures of the Ontario Geological Survey. A description of the deposits was prepared to document the findings of the analysis and summarize the aggregate resource in each deposit. The report and mapping to be published by the Ontario Geological Survey will contain the same data and conclusions, but will contain additional technical detail.

4.2 GEOLOGY OVERVIEW

Grey County contains some of the most scenic glacial terrain in southern Ontario. The glacial features document the gradual withdrawal of the Quaternary ice sheet from total coverage of the County to a time where the ice had nearly disappeared, and eventually to the time when the only remaining impact of the ice was an elevated water level in Georgian Bay.

The overall physiography of Grey County is noted on Figure 4.1. The oldest part of the glacial landscape is located in the southeast of the county in the Dundalk and Maxwell areas. The land in this area is a broad rolling till plain punctuated by a series of northwest-southeast oriented drumlins and several linear esker ridges oriented in the same general direction.

The till sheet found in the Dundalk area occurs across most of Grey County, but it thins in the vicinity the Niagara Escarpment where bedrock is exposed. Numerous drumlins in the Owen Sound-Meaford-Walters Falls area, plus the orientation of the Gibraltar and Banks Moraines, indicate that the ice was moving in a northerly direction during the later stage in the deglaciation. The Niagara Escarpment is a very prominent bedrock feature, which is present in the northern and northeastern part of the County. Several prominent bedrock valleys, notably the Beaver River Valley and Owen Sound, are cut into the Escarpment and extend southward significant distances.

Much of the Townships of West Grey, Southgate, and Chatsworth, plus the adjacent area near Flesherton, are dominated by a series of moraines and glacial spillways which contain large quantities of sand and gravel. From south to north, the moraines included in this area are the

Maple Moraine, the Singhampton Moraine, the Gibraltar Moraine and the Banks Moraine. The current geological work has confirmed that large portions of the Maple and Singhampton moraines are composed of sand and gravel. The Banks Moraine, the Gibraltar Moraine, and particularly the Singhampton Moraine have large aprons of outwash (spillway) sand and gravel associated with them. These deposits are generally located on the southeast side of the moraines, away from the previous ice-front, and tend to be in the lower and flatter topographic areas, which contain many of the present-day rivers and streams.

North of the Banks Moraine, the general size and variety of glacial features indicate that the ice was losing strength. There are a number of small morainic features in the Sullivan-Derby-Keppel area west of Owen Sound and also in the Collingwood area, which trace the positions of the ice as it receded to the Niagara Escarpment. As the ice pulled back to the Escarpment, and into Georgian Bay, ponding of water occurred. This resulted in the deposition of small patches of silt and fine sand in the Owen Sound area, and later the ponded water became a series of substantial proglacial lakes in the Georgian Bay area, which formed beach deposits, such as those that occur in the Thornbury and Meaford areas.

4.3 MAP UNITS

Excellent physical and chemical durability, a suitable grain size with a modest amount of fines (<8%) and sufficient crushable gravel is highly desirable for aggregate operations. Variable deposits and/or poorer quality materials may be used, but the range of products may be limited and costs may increase. Most provincial, municipal, and many commercial customers require that minimal physical and chemical aggregate specifications be met. The best overall aggregate deposit will be a coarse material with low fines, but deposits with lesser quality can be used but costs may increase due to the increased need to process the material, and it may not be possible to produce some types of aggregate.

The accompanying map describing the Sand and Gravel Resources of Grey County (Figure 4.2) has assigned a Primary, Secondary or Tertiary level of significance to the resources in

Grey County. This assignment of resource levels was developed by the Ontario Ministry of Northern Development and Mines in its Aggregate Resource Inventory Program for use throughout Ontario. The bedrock resources of the County have also been addressed using a similar approach, although the sand and gravel resources are the main focus in the present study. The wording has been adjusted slightly to tailor the description specifically to the Grey County conditions; however, the same map units are used in the Ministry of Northern Development and Mines publication “Aggregate Resources Inventory of Grey County” which forms Appendix C of this report.

The map units described below identify the main differences between Primary, Secondary and Tertiary deposits. The lack of good quality subsurface information on the thickness and textural consistency of the sand and gravel deposits in Grey County has impeded the ability to assess the deposits, and many deposits have received a lower designation because of a lack of data. The availability of new and/or better subsurface information will necessitate the periodic reassessment of these resource designations. It is recommended that the County include both Primary and Secondary resources as part of the resources to be protected within the Official Plan in recognition of the fact that many of the Secondary Deposit areas may be reassessed as Primary if appropriate subsurface information is available. It is also recommended that the planning process make allowance for the reassessment of any resource lands if new information substantiated by a qualified professional geoscientist or qualified professional engineer becomes available.

4.3.1 Primary Sand And Gravel Deposits

Primary sand and gravel deposits are those with a minimum of 35% gravel and the proven or inferred presence of crushable (>26.5mm) gravel in commercial quantities (approximately 20% or more). The materials are of mineable size and thickness, exhibit reasonable textural consistency, contain moderate to low quantities of fines (< 8%), and have the proven or inferred ability to meet medium to high physical quality standards.

4.3.2 Secondary Sand And Gravel Deposits

Secondary Sand and gravel deposits are those that do not meet the requirements for a 'Primary' designation in one or two areas of general aggregate quality. Secondary deposits may exhibit one or more of the following characteristics:

- A lack of data from which to infer higher levels of quality,
- A paucity of either gravel or crushable gravel,
- An excess of fines,
- Textural variability,
- Significant overburden, or
- Known or inferred concerns relating to physical quality.

4.3.3 Tertiary Sand And Gravel Deposits

Tertiary sand and gravel deposits are commonly sand deposits with minor gravel lacking in several areas of general aggregate quality such as:

- A lack of data from which to infer higher levels of quality,
- A paucity of either gravel or crushable gravel,
- An excess of fines,
- Textural variability,
- Significant overburden,
- Known or inferred concerns relating to physical quality, or
- Small deposit areas or thin materials.

4.3.4 Primary Bedrock Resources

Identified bedrock resources are those with little to moderate overburden cover (< 8m), occurring in mineable thickness, and with proven or inferred ability to meet medium to high physical quality standards.

4.4 SAND AND GRAVEL RESOURCES

The largest aggregate resource in Grey County is the Singhampton Moraine and the associated outwash/spillway deposits. It is outlined approximately by the centres of Markdale, Flesherton, Mount Forest and Durham. The Singhampton Moraine is generally ice-contact/glaciofluvial in origin and it has been dissected into a series of large kame-like deposits by a network of spillways. The spillways contain outwash sand and gravel and represent what was essentially a proglacial network of drainage channels, which conducted drainage away from the ice as it sat to the north. In general, the remnant blocks of the Singhampton Moraine are thick (many in excess of 30 m), but the materials exhibit some variability in texture. The network of spillway outwash deposits tend to be somewhat thinner (commonly 10 to 15 m) but of more consistent grain size.

This same ice-contact/spillway deposit relationship is repeated to the north along the Gibraltar Moraine, the Banks Moraine, and on a smaller scale in the Tara Strands west of Owen Sound. Available field evidence suggests that the Gibraltar Moraine is dominantly composed of sand, thus it is designated as a "secondary" resource, although subsurface data are limited. The Banks Moraine contains a larger proportion of till, and most of the moraine is not considered an aggregate resource. There are kame-like features associated with the Banks Moraine, but those appear to be discrete kame features. Associated kame-like deposits were also noted in the Tara Strands to the south and west of Owen Sound. The till portions of the Banks Moraine and the Tara Strands are not designated as aggregate resources, while the associated kame deposits are noted as secondary resources, based on their high content of sand and the variable nature of the deposits.

The Maple Moraine is located to the south of the Singhampton Moraine/outwash complex, and it is somewhat different in character from the other moraines noted above. The Maple Moraine occurs in a till plain area, and there is relatively little outwash associated with this feature. The moraine appears to be dominated by sand and it is therefore designated as a "secondary" deposit. However, there are several occurrences of gravel in the moraine, and there may be

significant gravel resources contained within the feature.

The description above has addressed the major deposits associated with the moraine/spillway systems. However, there are a number of smaller aggregate resource deposits that contain resources. There are a series of sub-parallel eskers in the southeastern portion of the county, and in the area southwest of Owen Sound. While many of these features are of limited size and have been designated as tertiary resources, there are two eskers in the former Township of Proton now the Township of Southgate, which have been identified as primary resources.

There are a number of small scattered shoreline deposits in the areas adjacent to Georgian Bay which relate to proglacial lakes. These deposits are generally identified as tertiary deposits based on their relatively small size, limited thickness and sparse gravel content. However, there are three areas, one at Thornbury, one at Meaford, and one northwest of Owen Sound, where shoreline deposits are a significant size and have appreciable gravel content. These three areas have been identified as secondary aggregate resources.

4.5 BEDROCK RESOURCES

The main focus in the Grey County Aggregate Inventory Master Plan is the glacial sand and gravel, due to its prominence and position in the south and central portion of the County. It is of note that the County does not have jurisdiction over the bedrock resources on or near the Niagara Escarpment, as they fall under the planning jurisdiction of the Niagara Escarpment Plan. There are, however, areas just outside the Niagara Escarpment Plan area and occasionally in the deep river and stream valleys that do encounter bedrock, and that may be considered for resource development.

Most bedrock extraction operations are developed in areas of thin drift cover because the removal of overburden is an overhead cost that operators prefer to keep to a minimum. The aggregate industry has two practical approaches to overburden: 1) less is better (none is preferred), and 2) anything more than 25 feet (8 m) is considered prohibitive, unless there are

unusual circumstances. Most quarries are established in areas where the overburden is 3 m or less; however, the removal of larger amounts of overburden may be warranted in particular cases.

The following table summarizes the various rock units contained in Grey County. For most practical purposes, there is one rock unit of significant interest at this time - the Amabel Formation. It is currently used as a source of aggregates, a source of building stone, and a source of rock for industrial mineral use (glass manufacturing). The Manitoulin Formation (Clinton and Cataract Group) is currently being extracted at one location for aggregate use. The Georgian Bay and Queenston Formation shales have been used in the past for brickmaking, but there is little indication of new activity. The Guelph, Salina, and Bertie Formations have been used for aggregate and other industrial mineral uses elsewhere in Ontario, but the potential for activity in Grey County appears remote at this time.

The map of bedrock resources is included in Appendix C.

Table 4-1: Summary of Bedrock Units

Rock Unit	Rock Type	Potential Users	Occurrence
Georgian Bay Formation	Shale, with limestone (grey)	Brick making ¹	Georgian Bay shore area
Queenston Formation	Shale, some limestone (red)	Brick making ¹	Base of Niagara Escarpment
Clinton and Cataract Groups	Dolostones, shales, sandstone	Aggregates, building stone ²	On Niagara Escarpment
Amabel Formation	Dolostone	Aggregates, industrial minerals, building stone ²	On or close to Niagara Escarpment
Guelph Formation	Dolostone	Aggregates (quality limitations), industrial minerals ²	Central part of County, limited exposure
Salina Formation	Shale, dolostone, gypsum, salt	Gypsum, salt ²	Southwest corner of County, limited exposure
Bertie Formation	Dolostone	Aggregate ²	No exposure in County.

¹ not currently in Grey County

² outside Grey County

4.6 SUMMARY

There are large quantities of sand and gravel resources in the Townships of Southgate, West Grey and Chatsworth within the County. The bulk of the resource is contained in the Singhampton Moraine and the adjacent outwash spillway channels. Outwash aprons of significant size are also located adjacent to the Gibraltar and Banks Moraines. There are a variety of smaller scale aggregate deposits elsewhere in the County, and there are several quarry operations on or near the Niagara Escarpment.

5.0 NATURAL ENVIRONMENT

There are a number of natural heritage features located in Grey County, and some of these features are located on or adjacent to aggregate resource areas. It is important to consider the natural environment as part of Grey County's long-term strategy to ensure appropriate management of their aggregate resource base.

The natural heritage features in Grey County were identified largely through an interpretation of the Ministry of Natural Resource's digital National Registry, NRVIS (Natural Resource Values Information System). The information this database provides allowed for the identification of provincially significant wetlands, other wetlands areas, fish habitat (lakes, ponds, rivers, streams, etc.), significant woodlands, significant wildlife habitat, and Areas of Natural and Scientific Interest (Earth Science ANSI's and Life Science ANSI's). In addition, the County of Grey provided areas identified as "Hazard Lands" in the Official Plan. The natural heritage features and hazard lands are shown in Appendix D, Figures D-1 through D-4.

The NRVIS database was used to identify fish habitat by displaying the surface water features across the County. At this County level scale of mapping it is assumed that all surface waters are fish habitat.

Significant woodlands have not yet been defined or identified in the County. The Natural Heritage Reference Manual recommends that in areas with 15 to 30% woodland coverage, woodlots of 40 ha or greater should be considered for significance. In areas where woodland coverage is greater than 30% no minimum woodlot size is suggested. The MNR suggests that the woodland coverage for the County of Grey ranges from 23 to 58%. Therefore, using the NRVIS mapping, this study has identified all those contiguous woodlands greater than 40 ha as potentially significant woodlands. It is recommended that the County of Grey evaluate its forested areas to identify significant woodlands in a more formal process. The result would be part of a future update of the resource evaluation model.

The NRVIS database identifies deer wintering yards, which are considered to be significant wildlife habitat. No other significant wildlife habitat was identified through the NRVIS database, the County of Grey or from other information sources. It is recommended that as information is obtained in the future from OMNR, the Conservation Authorities and other agencies regarding wildlife habitats in the County of Grey, that it be evaluated as recommended in the Natural Heritage Reference Manual and, where appropriate, identified as significant wildlife habitat by the County. The resource evaluation model should be updated as significant wildlife habitat is identified.

The County of Grey has not recognized any habitats of endangered and threatened species. The OMNR and the Canadian Wildlife Service (CWS) were contacted and are not aware of any areas that have been recognized as habitat of endangered and threatened species. Information regarding the location (within a 1km square grid) of vulnerable, threatened and endangered (VTE) species was provided by the NHIC. The occurrence of VTE species is often useful in the identification of significant portions of the habitat of endangered and threatened species. However, these locations generally represent records of sightings of the species. Sightings of VTE species do not necessarily indicate that suitable habitat exists, therefore, no habitats of endangered and threatened species are shown on the mapping in Appendix D, Figures D-1 and D-2. However, a map showing the approximate location of the sightings of VTE species is

provided as Figure D-4.

The responsibility for the evaluation and identification of significant valleylands lies with the County of Grey. To date, the County has not identified any significant valleylands. The Natural Heritage Reference Manual helps guide municipalities in the evaluation and identification of significant valleylands through the adoption of a natural heritage systems approach. It is recommended that the County consider this approach when identifying its significant valleylands, and that the results be incorporated into the resource evaluation model.

6.0 WATER

6.1 GROUNDWATER

The existence of sensitive groundwater regimes was identified as a potential constraint to the establishment of a pit or quarry in the current study due to the need to protect both the quality and quantity of groundwater in the vicinity of a proposed extraction operation. Shortly after the initiation of the Aggregate Resource Inventory Master Plan Study the counties of Grey and Bruce commissioned the Grey and Bruce Counties Groundwater Study, and the study has recently been made available for review.

The groundwater study has synthesized a large quantity of water well data and general geological and hydrogeological information to produce regional scale interpretations of the groundwater in Grey County. The study also goes on to review data at a more detailed level in areas where there are municipal water wells, with the objective of providing for the protection of municipal groundwater sources.

The Aggregate Resources Act was amended in 1997, and part of the revisions included the release of Provincial Standards for the Act. The Standards are detailed Provincial Regulations that must be met in order to obtain a licence for a pit or quarry. Requirements for addressing

groundwater are a prominent part of the Provincial Standards, and each of the eight categories of licence has specific requirements for addressing groundwater protection at the site being proposed for licence.

The interpretations provided in the Grey and Bruce Counties Groundwater Study provide regional interpretations of the groundwater occurrence in the county. The study was mandated to focus on the protection of municipal water supplies, and does not address issues relating to pit and quarry operations. While the study does provide a regional interpretation of groundwater conditions, it does not provide the detail necessary to determine where one might site a pit or quarry, or what the impact of an operation may be. The Provincial Standards for the Aggregate Resources Act specify that groundwater conditions, and possible remedial measures for dealing with potential impacts, must be studied at a site specific level.

The existence of sensitive groundwater regimes, as identified in the Grey and Bruce Counties Groundwater Study as ‘moderate’ and ‘high’ ISI indices have been used as a Level 2 constraint in the constraint evaluation (Chapter 14), with the recognition that the groundwater must be studied at a site specific level for all pit and quarry applications to meet Provincial Standards.

6.2 SURFACE WATER

The County of Grey contains the headwaters for several significant rivers including the Grand, Nottawasaga, Bighead, Beaver and Saugeen Rivers. According to the Owen Sound District Fisheries Management Plan 1986-2000, the Niagara Escarpment divides the County into the Lake Huron and Georgian Bay drainage systems which are comprised of four watersheds: the Bruce Peninsula streams, fourteen Georgian Bay tributaries, the Saugeen River and twenty-three Lake Huron tributaries. These water courses as well as the ponds and lakes in the County provide important fish habitat for coldwater (e.g. Trout and salmon), coolwater (e.g. pike, walleye and yellow perch), and warmwater (e.g. bass), fish species.

The surface water features in the County were identified by the NRVIS mapping. They are

identified as Fish Habitat and are shown in Appendix D, Figure D-3. The more significant surface water features are also contained within the Hazard Land mapping, Figure D-2.

The Federal Fisheries Act requires that fish habitat be protected. The Provincial Policy Statement is consistent with the Fisheries Act. It recognizes fish habitat as a natural heritage feature of Provincial importance and it provides protection for all fish habitat. Aggregate operations wishing to locate or expand on or adjacent to fish habitat must adhere to both Federal and Provincial requirements and consider the potential impacts on the fish habitat as a result of aggregate extraction. Negative impacts will need to be mitigated to acceptable levels. The implementation of monitoring programs are often required, and in some cases compensation agreements are negotiated.

7.0 AGRICULTURE

Agriculture is an important component of the economy in the County of Grey and its relationship to potential aggregate resource areas is one of the issues identified by the County to be addressed in this study. The County's agricultural resources, agricultural economic statistics and agricultural policies were characterized through a review of the physiographic features, soil resources and the Canada Land Inventory mapping; the agricultural statistics for the County to characterize the nature and importance of agriculture to the County; and the agricultural policies contained in the Provincial Policy Statement and the Official Plan for the County of Grey.

The locations where the prime agricultural areas in the County correspond to the aggregate resource areas were identified, mapped and a field reconnaissance survey to selected areas within the County was completed to characterize agricultural land uses with the aggregate resource areas.

7.1 SOIL RESOURCES

The physiography of the County of Grey is diverse (Chapman and Putnam, 1984) and the glacial parent materials in Grey County include a broad spectrum of both grain size and origins. The soils are therefore variable in nature, are generally loamy to sandy in texture and commonly stony. The most common mineral soils (in terms of area) are the Osprey loam, Pike Lake loam, Harriston silt loam, and Listowel silt loam. Approximately 53% of the County (ARDA, 1970) is considered to be comprised of Canada Land Inventory (CLI) Classes 1, 2, & 3, which are highly to moderately productive lands for common field crops. The remaining area is comprised of marginal to low capability lands for agricultural production. The best use for the majority of these low capacity lands is as pasture, forestry or other non-agricultural use.

7.2 AGRICULTURAL LAND USE

In Grey County, there are close 3,000 farms cultivating approximately 600,000 acres of farmland. In 2000, approximately \$241 million in farm gate sales were generated through the sale of a wide range of agricultural products. Beef and, to a lesser extent, dairy operations are the most common livestock operations in the County, however other livestock operations such as poultry, hog and mixed operations also occur. After beef farms, field cropping is the most common form of agricultural production in the County. Specialty crops (fruit and vegetables) are also grown and are common in the Meaford and Thornbury areas.

Field reconnaissance was undertaken in areas containing both aggregate resources and agricultural production to assess the interaction between the two land uses. Agricultural production in aggregate resource areas consisted of primarily of livestock (dominantly beef) and mixed agricultural production, with extensive pasture and forage production lands. Some field crop production was found in these areas, often on outwash plain deposits. The field observations confirmed the results of the general trend identified in Census of agriculture statistics for the County.

7.3 AGRICULTURAL POLICIES AND EXTRACTION

Grey County recognizes the importance of agriculture and has taken steps to protect its important agricultural resources by limiting the uses of these lands to primarily agricultural uses. To identify prime agricultural areas, the County has developed an alternative land evaluation system to determine the highest priority agricultural lands. The prime agricultural areas include prime agricultural lands (i.e., specialty crop lands and CLI Classes 1-3) as well as lower capability soils that are under agricultural production and deemed to be integral to the types of agricultural common in Grey County. Two agricultural land use designations are recognized in the Official Plan, "Agriculture" and "Special Agriculture". The types located within the "agriculture" designation commonly include livestock and field crop operation, whereas "Special Agricultural" includes areas where specialty crops such as fruits and vegetables are grown.

These two agricultural designations were used to identify the County's prime agricultural areas and are shown in Appendix E, Figure E-1.

The Provincial Policy Statement allows for aggregate extraction on lands that have been identified as prime agricultural areas. The PPS recognizes that aggregate extraction is an interim use and that the site may be rehabilitated to the same area and same average soil quality. Complete agricultural rehabilitation is not required where site specific issues exist (e.g., extraction below water table). Grey County permits aggregate extraction in both agricultural designations providing appropriate rehabilitation plans have been developed and implemented as part of the site plan approval process. General rehabilitation guidelines for progressive agricultural rehabilitation are provided in Appendix E.

8.0 TRANSPORTATION

Grey County is served by about 241 kilometres of Provincial Highways and 812 kilometres of County Roads which form the backbone of the transportation system. These roads carry the

majority of the traffic generated by the aggregate operations within the County.

Between 1992 and 2001, aggregate production in Grey County averaged about 2.4 million tonnes per year. The average annual production would generate about 208,600 truck trips per year using an average truck capacity of 23 tonnes. This converts to about 1,100 trips per day assuming approximately 190 days per year of operation. In 2001, the Township of Georgian Bluffs accounted for 21.8% of the County's aggregate production, followed by Chatsworth and Grey Highlands at 15.4% and 15.3% respectively. The highest current traffic impact would therefore be in these municipalities.

In the short term, the majority of aggregate produced in Grey County is expected to be used in the County, with some export to neighbouring municipalities such as Huron and Bruce Counties. Truck volumes and trip distribution will likely be similar to what has occurred over the past five or six years, although specific construction projects would generate higher traffic volumes during those projects. County Road 4, Highway 89 and Highway 21 will act as the main routes to markets in Bruce and Huron Counties. Existing road networks are considered adequate to meet current traffic needs, and the needs for the immediate future.

In the longer term, the potential exists for Grey County aggregate producers to export materials to the northwestern part of the Greater Toronto Area (GTA), as well as the Guelph and Kitchener / Waterloo areas. If this occurs, Highways 6 and 10 will form the main routes south. Increased demands will result in additional truck traffic using Provincial Highways and County Roads, and also the local roads used to access the extraction operations.

If and when aggregate extraction and trucking substantially increases then there will be a need to identify municipal concession roads or side roads which are well located and suited to provide access for pits in a particular area to the County and Provincial road system. This may be best accomplished at the local municipal level to assess the combined traffic generation from one or more license applications in an area, the potential for additional applications, the

need to select one access route to the County Road or Provincial Highway and options for that road's locations and assessment of impacts.

It may become necessary for the County, the Municipalities and the Province to collectively ensure that the impacts of significant aggregate truck traffic are managed to ensure community and public safety, and practical truck traffic movement through existing communities. Should there be a substantial increase of aggregate and other traffic through communities on Provincial Highways, such as Markdale, Flesherton, Durham and Dundalk, then traffic management and alternate routes would be options to consider.

The Grey County Official Plan requires that any new or expanding extractive operation prepare a Traffic Impact Study to demonstrate that traffic movement on existing streets will not be unduly obstructed or interfered with by aggregate carrying vehicles. If negative impacts are identified, there are various measures that may be required to be implemented in order to mitigate the impacts. The proponent may be required to enter into a Development Agreement with the municipality with regards to any improvements that are proposed. Should the County choose to establish a consistent approach for road upgrades relating to aggregate operations, it will be necessary to develop standards within the Official Plan amendment process.

9.0 SOCIAL AND COMMUNITY ASPECTS

9.1 SOCIAL

Aggregate resource extraction, processing and shipping to market potentially involves both direct and indirect social matters and both positive and negative impacts. Direct impacts on people and their communities are felt when the extraction, and processing of the aggregate is in close proximity to residences. These impacts are mainly noise and dust and must be minimized by aggregate operators to achieve compliance with the standards and guidelines set by the Province. The methods of reducing the impacts of operations to acceptable levels

include use of set backs for excavation and equipment; berms; tree screens; positioning of extractive faces and equipment relative to homes; spraying of water, calcium chloride or other dust suppressants on roads and plant areas; spray bars on conveyors or stockpiles and specific limits on, and timing of, blasting.

Indirect impacts often create problems and conflicts between aggregate operations and communities. These impacts include:

- 1) the noise, potential safety threat, and physical presence of large trucks,
- 2) the view of extractive operations may affect the rural landscape, and
- 3) the fear or anxiety created by applications related to protection of ground water and local well water supply.

Other indirect social impacts of the development and operation of pits and quarries relate to employment, schools, safety, community activities and support for construction of housing and municipal infrastructure. Pits and quarries hire local people, as well as trucking or service firms to extract, process and haul aggregates. Employment with an aggregate producer is often on a long-term basis.

Buses moving to schools in rural and urban areas must share the roads with aggregate trucks during two key times each day. Traffic speed and the safety of children is a matter significant concern for all traffic, including commercial vehicles such as aggregate trucks.

School locations were reviewed and shown on Figure G-1. Schools are generally found not to be in potential conflict with aggregate resource areas. Exceptions include one elementary school located north of Holstein in Southgate on County Road 109 in an area containing aggregate. Also, several Mennonite Parochial schools are located in the area of aggregate resource in Chatsworth. Careful attention should be given to avoidance or minimization of aggregate operation and trucking from pits in the area on these and other schools.

Some local producers commonly support local sports teams, sports fields and facilities, and community programs and activities. The aggregate industry provides necessary support and construction materials for residential, school and municipal road and services construction.

9.2 CULTURAL HERITAGE

The County of Grey Official Plan contains heritage policies which advise: “The County of Grey has a rich and diverse cultural heritage, which includes sites of archaeological value; buildings and structural remains of historical, architectural and contextual value; and rural, village and urban districts or landscapes of historic and scenic interests. The County recognizes the importance of its cultural heritage resources, and in managing them in a responsible manner which perpetuates their use and benefit to the community or records their heritage value.” (Grey County O.P., section 3(1), page 45).

Information on the registered archaeological sites of Grey County from the Ministry of Culture and Recreation was obtained through Grey County mapping. There are about 35 registered sites in the County, mostly in the northern municipalities. The location of these sites does not become a factor at a County scale when determining aggregate resources for protection and designation in the Official Plan. The County of Grey Official Plan requires that “development on lands containing significant archaeological resources shall avoid the destruction or alteration of these resources.” (Grey County O.P., section 3(5), page 45).

An application for a rezoning, Official Plan Amendment and/or a license to extract must provide information to determine the potential of a site to contain archaeological resources. This is referred to as Stage 1 in the Aggregate Resources of Ontario Provincial Standards. This would involve a reference to any known registered sites or archaeological resources in the vicinity and to the potential of the site for heritage resources. If medium or high potential is determined then Stage 2 involves an assessment of the property by a licensed archaeologist. This could result in Stages 3 and 4 which are detailed site investigations by a licensed

archaeologist involving test pits, plowing fields and other surveys. The Ministry of Culture is to receive, and be satisfied with, the archaeological reports which establish that any significant archaeological resources found are conserved by removal, preservation or avoidance and documented under the Ontario Heritage Act.

The mapping of registered archaeological sites by the Ministry of Culture is available for reference by property owners subject to the discretion of the County in protecting heritage resources.

10.0 AGGREGATE MARKET ANALYSIS

The aggregate market analysis considers both the potential for changes in the annual demand within the current market areas of the county and the potential for expansion of the market to other demand areas such as the GTA.

The current resource inventory has confirmed the presence of large quantities of aggregate in Grey County. This aggregate is potentially available to provide asphaltic, concrete and granular aggregates for local use, and for possible transportation to larger markets such as the GTA.

10.1 LOCAL DEMAND

Various forms of construction constitute the primary use of mineral aggregates including concrete and concrete products (e.g. poured concrete, blocks, bricks, tiles and pipes), road construction, building construction, and engineering construction (e.g. dams, sewer and water mains, airports). New population in an area will require housing, schools, roads and services. Anticipated population growth is considered a reasonable indicator of demand on a micro level.

Aggregate production levels (1992 to 2001) in Grey County averaged 2.4 million tonnes and have ranged from 2.1 million to 2.7 million tonnes per annum. Most of the aggregate extracted

in the County is consumed within Grey or shipped to Bruce and Huron Counties.

Projections prepared by the Province of Ontario forecast population increases in Grey and Bruce Counties of approximately 10% for the 2001 to 2026 period. Huron County population is forecast to increase by 2% over the same period. This suggests the local demand for aggregates will remain at current or slightly higher production levels and below 3 million tonnes per year.

10.2 EXPORT POTENTIAL

10.2.1 Demand Areas

Aggregate production in southern Ontario has averaged approximately 150 million tonnes per year for the past several years. It is estimated that the GTA consumed approximately one third of that amount (51 million tonnes 1995 to 1999). Demand in the GTA is forecast to increase to 60 million tonnes per year for the 2006 to 2010 period.

Producers in Caledon and Milton provide much of the supply to the western portion of the GTA at the present time. A modest amount is imported from areas such as Kitchener/Waterloo/Guelph.

It is difficult to make meaningful estimates of the size of the potential supply of aggregate within the GTA and the Regions and Counties that surround it. The 1992 report, A State of the Resource Study (Planning Initiatives Ltd. And Associates: 1992) prepared for the Ministry of Natural Resources concluded that at that time there existed sufficient resource to supply aggregate demand for many decades within the GTA though some of the demand for sand and gravel would have to be substituted with quarry stone. In addition, an abundant supply of quarry stone and sand and gravel was identified in the surrounding areas of Kitchener/Waterloo/Cambridge/Guelph and Brantford/Hamilton/Niagara. The study found that the combined resources in GTA, Kitchener/Waterloo/Cambridge/Guelph and

Brantford/Hamilton/Niagara areas would meet demand in these areas well beyond 2050, though sand and gravel resources would be exhausted by 2030. It is important to note that these resource assumptions were based on both licensed and potential supply with potential supply accounting for 95% of the total for the GTA.

There are a number of factors that limit the amount of potential resource that can be ultimately licensed and extracted. Recent experience with licence applications indicate that it is becoming increasingly difficult and expensive to get approval for new or expanded pits and quarries. Urban development has sterilized, and will continue to sterilize, a significant portion of the potential supply. In addition, constraints exist in special planning areas such as the Oak Ridges Moraine and the Niagara Escarpment Planning Area. It is estimated that only 15% of available resources may ultimately be licensed for extraction (Hollingsworth, October, 2002). When this 15% factor is applied to the unlicensed resources in the GTA and surrounding supply areas, the potential supply is significantly reduced.

Within the past several years, the aggregate import areas for the GTA have expanded to the northern portions of Dufferin and Simcoe County. It is inevitable that the trend of increasing distance for the transportation of aggregates will continue as the supply in the GTA and immediate areas is diminished or sterilized.

10.2.2 Potential for Grey County Producers to Export

A survey of producers in the County found limited opportunity for exporting aggregate outside of Grey at the present time. Some export of specialty materials does occur on a limited basis; however, this does not represent a significant portion of the production.

Local producers have confirmed that the high cost of transportation makes it difficult to compete with producers closer to the GTA. Delivered prices in the GTA for Granular A are in the range of \$8.00 to \$15.00 per tonne. Based on a price of about \$5.00 per tonne F.O.B. (freight on board at the pit), it is estimated that aggregates from central and southern Grey

County could be delivered to the western and northern demand areas of the GTA for approximately \$15.00 to \$20.00 per tonne.

There are a number of other areas in addition to traditional and potential suppliers, closer to the GTA, that would have lower transportation costs (e.g. Brantford). Until resources in these areas are exhausted, it is unlikely that Grey County producers will be able to deliver aggregate to the GTA at a competitive price without reduced transportation costs. Truck transportation costs may be reduced through an improved road network or more efficient vehicles. Another possibility would be the development of alternative methods of transportation such as rail or water. The use of these means would involve significant investment in infrastructure to provide a shipping location in Grey County and receiving location in the GTA. The investment associated with this infrastructure would likely require large quantities of sand and gravel in order to make the undertaking economically viable.

10.2.3 Implications

Local demand for aggregates in Grey County is expected to remain below 3 million tonnes per year over the next two decades. Given the large quantities of aggregate resources in Grey County, there would then be substantial quantities of resource potentially available for export.

At the present time, transportation costs for shipping aggregate to the demand areas such as the GTA, prohibit Grey County producers from competing successfully with current GTA suppliers. The cost differential is in the order of \$5.00 to \$10.00 dollars per tonne.

Over time there are a number of factors that may close the gap including:

- a) increased extraction costs in traditional supply locations as a result of higher land costs, more complicated approval processes and requirement for extensive mitigation measures;
- b) depletion of resources and sterilization of future supply in the GTA and surrounding area that would increase the market price; and
- c) reduced transportation costs from Grey as a result of larger vehicles, improved road networks, or the development of alternative methods of transportation.

There may be medium term potential for Grey County producers (particularly those in the southern area of the County) to export their product to demand areas in the northwestern portions of the GTA. It is noted that southeast Grey borders on the outer limits of the current import areas for the GTA, although the major resources in Grey are farther north.

Long term potential exists for Grey County to export to the GTA in greater volumes, however, given the uncertainties regarding supply in closer areas such as Simcoe County, the Waterloo/Wellington area and the Hamilton/Niagara/Brantford area, it is uncertain when that would occur. One of the most difficult aspects of predicting the potential to export aggregate rests in the impact of government planning – Acts such as the Oak Ridges Moraine Conservation Act may significantly change the existing conditions.

Monitoring of aggregate demand, supply and pricing in the GTA and surrounding areas is recommended to ensure that Grey County will be prepared to meet emerging demands and the possible initiation of export of aggregates from Grey County. This monitoring may be accomplished, in part, through a survey of local producers to assess emerging demand.

11.0

FISCAL AND ECONOMIC ANALYSIS

The fiscal and economic analysis used case studies of three selected aggregate operations to assess the typical impact of aggregate extraction on municipal finances and its contribution to the local economy.

Three aggregate operations of varying magnitude, as determined by annual license limits, were examined. Interviews were conducted with the representatives from each business to obtain information regarding nature of the operation, employment, local spending, etc. The municipalities in which the operations were located were contacted to obtain information regarding taxes, assessment, land area and background municipal finance data.

11.1 MUNICIPAL FINANCE

The intent of this portion of the study is to identify the average costs/revenue resulting from aggregate operations. The findings are presented on an average per tonne basis.

The fiscal impact analysis assessed the net effect of the case study operations on the municipal finances of both the lower tier and upper tier municipality. Monies paid by the aggregate operations to the municipality in the form of property tax and license fees were considered relative to the expenditures made by the municipality to provide services to the aggregate operations.

The most significant payments made by the aggregate operations in Grey County to municipal governments are property taxes and the municipal share of aggregate license fees. Under the regulation to the Aggregate Resources Act, an annual licence fee of 6 cents per tonne of aggregate removed from a licensed property is paid by licence holders. Of this amount, 0.5 cents is distributed to the County or Region in which the operation is located and 4 cents per tonne is provided to the local municipality. In 2001, the lower tier municipalities in Grey County received almost \$100,000 from this source. The County received \$12,500 during the

same period.

Municipal expenditure areas for which the aggregate operations are expected to demand services include general government, planning and roads.

The effect on municipal expenditures was estimated using average costing (based on employment). The financial impact assessment is based on the 2001 financial data for both the County and local municipalities as this is the most recent year for which audited financial statements are available.

The results of the analysis indicate that aggregate operations provide a modest positive impact to both the County and local municipality in which they are situated. The magnitude of the positive impact varies with the size of the operation. On average, it is estimated that the net combined upper and lower tier benefit is in the range of approximately \$60/1,000 tonnes of aggregate extracted.

11.2 CONTRIBUTION TO THE LOCAL ECONOMY

11.2.1 Direct, Indirect and Induced Employment

This analysis considers the role of the aggregate industry in the local economy measured in terms of employment (direct, indirect and induced) as well as other contributions made to civic and community projects and activities.

The case study data indicate that for 1 full time equivalent job is required for every 20,000 tonnes of aggregate extracted annually. Based on Grey County's 2001 total production of 2.6 million tonnes, it is estimated that 130 persons are employed directly in aggregate production. In addition, it is estimated that employment at aggregate processing operations such as concrete and asphalt plants account for a further 400 jobs.

Employment related to aggregate extraction is referred to as basic employment in that, unlike non-basic employment, such as that in the service industry, it exists largely independent of the local population. Non-basic employment is associated with businesses that provide services to the population and basic industries including retail and food establishments, business and personal service, institutions such as schools and hospitals and government offices.

Direct employment created through aggregate extraction gives rise to the multiplier effect of “spin off” benefits to the local economy. One component of the multiplier effect is the indirect employment that is generated through the money spent locally by basic industry on goods and service.

The results of the case study analysis indicate that a significant share (70-75%) of expenditures made by aggregate operations are purchased in the local area for things such as fuel, office supplies, accounting and other services.

The induced effect is the second component of the multiplier effect. It is defined as the economic activity resulting from the purchase of local goods and services by workers with the wages they earn from their employers.

A review of employment data for Grey County by industry division, indicates that for every direct job created by basic industries, a further 1.5 indirect or induced jobs are produced. Based on a employment of 530 persons involved in aggregate extraction and processing, it is estimated that a further 800 jobs in Grey County are dependant on the aggregate industry.

11.2.2 Other Contributions

Sampled aggregate operations make a measurable contribution to the local community by sponsoring sports teams, contributing materials to civic projects, and giving financial support to community groups and events. In addition, the aggregate industry provides a source of materials to support other industries - primarily construction. The availability of locally produced aggregates provides the construction industry with a comparatively low cost material. This is also a benefit to the County and local municipalities contracting out road construction work.

12.0 EXTRACTION AND REHABILITATION SCENARIOS

12.1 EXTRACTION

In developing any aggregate resource, the goal is to maximize resource utilization while minimizing the operational costs, including the costs associated with rehabilitation following extraction of the resource. Recent experience has proven that it is possible to maximize rehabilitation efforts and results through the development and implementation of a good rehabilitation plan and reduce operational costs at the same time. A good rehabilitation plan that considers extraction and rehabilitation in a progressive manner will help to minimize rehabilitation costs during the operational phase of the extraction process.

There are some key principles and concepts that can be applied to all areas of extraction that will help to maximize resources, rehabilitation efforts and results.

- a) Eliminate setbacks between licenced properties. This not only increases the volume of aggregate that can be extracted, but also provides for a more natural rehabilitated topography.

- b) Extract the deposit to the full extent of the resource. Recognizing there are developmental constraints that identify extraction limits, the remainder of the resource should be extracted to its maximum limits, including depth.
- c) Plan ahead for the rehabilitation to most efficiently and effectively use overburden, topsoil and other non-product material. Wherever possible topsoil and overburden should be stripped and directly replaced to an other area. This not only reduces the costs of moving the material, but also maintains the soil fertility and natural seed bed.
- d) Maximize the potential for compatible industrial uses on a licenced property. Land uses such as recycling concrete and bricks, and transfer stations are naturally compatible with activities associated with aggregate operations.
- e) Produce as wide a variety of products as possible that meets local needs and best utilizes the type and variety of aggregate on site. To the greatest extent possible, waste product should be reduced on site.

12.2 REHABILITATION SCENARIOS

There are two main types of glacial deposits in Grey County, which form the majority of good quality aggregate resources: outwash deposits and ice contact deposits. Outwash deposits are often located in lowlands and therefore may be extracted from below the water table. Ice-contact deposits, often located at higher elevations with a dry, hummock topography, are likely rehabilitated to a dry after use.

The two fundamental types of extraction (above water and below water) provide the focus for broad scale considerations for rehabilitation trends. Rehabilitated land uses (both wet and dry) that are most commonly developed are explained below:

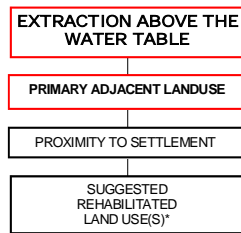
- Aquaculture - Fish farming.
- Natural Area - Passive recreation such as bird watching.
- Park - Active recreation such as ball fields and play grounds, trails, hiking, camping.

Residential	-	Various forms of housing.
Agriculture	-	Crop production, pasture, tree nurseries, tender fruit.
Industrial	-	Warehousing, trucking, feed facilities, lumber.
Commercial	-	Sales centres, tourist facilities, campgrounds, golf courses.
Institutional	-	Schools, churches.
Woodlot	-	Areas planted to establish a self sustaining wooded property.

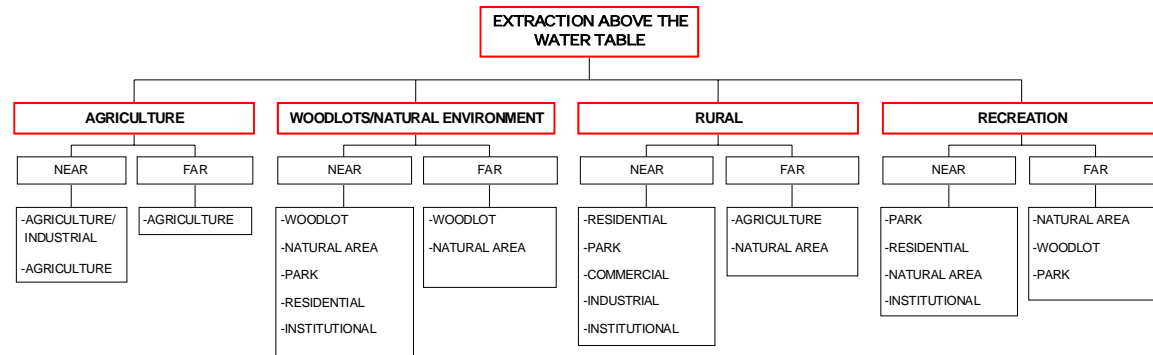
In order to provide guidance for the types of rehabilitation that can be expected in certain areas, flow charts were developed to identify reasonable and beneficial rehabilitation options given the primary adjacent land use and the proximity to settlement. Table 12.1 and Table 12.2 represent rehabilitation options for extraction and rehabilitation above the water table and below the water table, respectively.

Table 12-1: Rehabilitation Scenarios - Extraction Above the Water Table

CHART STRUCTURE



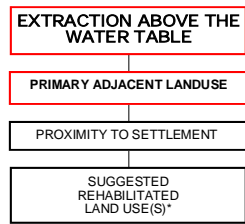
REHABILITATION SCENARIO



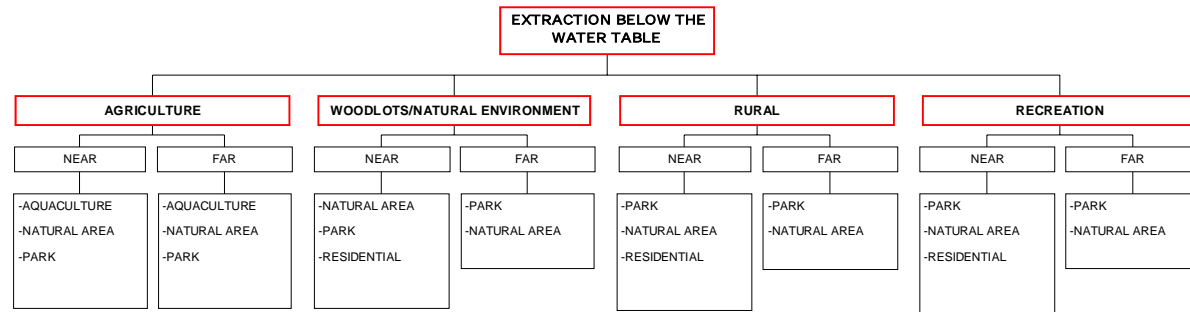
* This in no way implies a pre-approval for a new land use, but is a guide for the most appropriate progressive and final rehabilitation for a pit or quarry.

Table 12-2: Rehabilitation Scenarios - Extraction Below the Water Table

CHART STRUCTURE



REHABILITATION SCENARIO



* This in no way implies a pre-approval for a new land use, but is a guide for the most appropriate progressive and final rehabilitation for a pit or quarry.

General Rehabilitation guidelines are in Appendix E, Sub-Appendix A.

13.0 OPPORTUNITIES FOR ENHANCEMENT OF THE NATURAL ENVIRONMENT

Traditionally, after-use design of most pits and quarries that do not extract below the water table has focused on some form of agricultural rehabilitation. Many pits and quarries are in rural areas that have agricultural land use designations and the focus has been on restoring sites to previous land uses.

The rehabilitation efforts of the aggregate industry have now evolved beyond relatively straightforward rehabilitation practices to include more sophisticated and holistic approaches to improve the human and ecological landscape. Pits and quarries are being effectively rehabilitated to after uses that promote the development of the natural environment. Proposed after uses should take into account the surrounding natural environment in order to ensure compatibility. The rehabilitation of a pit or quarry often offers unique opportunities to enhance or re-establish natural features that are currently significant or sensitive. Cumulative rehabilitation techniques that account for adjacent land uses, natural features and rehabilitation activities are capable of increasing the ecological integrity as well as capacity of a landscape to support a range of human activities. Innovative recreation concepts can be employed in the context of a regional ecosystem rehabilitation initiative. A number of opportunities exist in remnant natural areas for the rehabilitation and naturalization of currently degraded features and areas with limited habitat diversity (i.e. old field meadows and pasture lands). When larger scale natural processes are considered in the rehabilitation plans for new and existing aggregate extraction sites, net economic and environmental benefits are realized.

14.0 IDENTIFICATION OF CONSTRAINTS

Several disciplines were studied independently as components of the Study during the data gathering phase. The primary analysis that brings them all together and assesses the implications of the information is the constraint overlay. This part of the analysis determined

the portion of the County underlain by resource and then determined if those resources were constrained or unconstrained.

In addition to using the constraint overlay, the study team developed two new tools: the Evaluation Criteria and the Resource Evaluation Model. By using all three methods, it was possible to assess the impacts of the data collection and identify recommendations for resource identification and protection.

14.1 CONSTRAINT OVERLAY

The constraint overlay exercise is a process that assesses the aggregate resources in relation to a series of constraints which affect potential for extraction. All of the known aggregate resources are identified on Figure 4-2. The potential constraints which exist on those resources as listed on Table 14-1 were overlain. This establishes a map illustrating “constrained” and “unconstrained” aggregate resources. (See Figure 14-5)

14.2 EVALUATION CRITERIA

The evaluation criteria were developed to list constraining factors and to provide an evaluation of the potential impact relative to aggregate extraction. Each constraint was determined to have a high or low potential impact based on the regulatory requirements, with an associated rank of 1 or 2, respectively.

The potential impact and associated ranking were based on the ability of an aggregate producer to potentially mitigate the constraint. For example, if there is an undesignated wetland on the site, it does not automatically mean there can be no extraction on that property, it simply identifies that there is an issue that will require detailed investigation. The results of that detailed investigation may constrain extraction of the property to a “high” degree, or it may confirm a minor constraint.

All Natural Heritage features listed in the Provincial Policy Statement are given the same rank

(1).

Table 14-1 illustrates the Evaluation Criteria.

Table 14-1: Evaluation Criteria:

Constraint	Potential Impact	Rank
Settlement Areas (including schools)	High	Eliminated
Provincially Significant Wetlands	High	Eliminated
Significant Portions of Habitat of Threatened and Endangered Species ¹	High	Eliminated
Sensitive Rural Communities	Low	2
Agriculture	Low	2
Specialty Agriculture	Low	2
Fish Habitat	High	1
Significant Woodlands ²	High	1
Significant Valley Lands	High	1
Significant Wildlife Habitat ³	High	1
Provincial Life & Earth Science Areas of Natural and Scientific Interest (ANSI's)	High	1
Wetlands ⁴	High	1
Archaeological Sites	Low	2
Karst Areas	Low	2
Sensitive Groundwater Regimes	Low	2
Hazard Lands Mapping	Low	2

¹ Information on the habitat of T & E species is not available. Records of sightings of these species is available and has been identified for further evaluation on a site specific basis

² Needs to be defined and mapped by Grey County

³ Deer wintering yards is the only information available from MNR - other information needs to be defined.

⁴ Not provincially significant or unevaluated..

14.3 RESOURCE EVALUATION MODEL

A Resource Evaluation Model was developed to assist in understanding the significance of the constraint or combination of constraints.

The following definitions for each of these categories constitute the Resource Evaluation

Model.

Five possible categories were identified: eliminated lands, highly constrained lands; moderately constrained lands; minimally constrained lands and unconstrained lands. These constraint levels are overlaid on the resource as follows on Figures 14-1 through 14-5.

a) Eliminated Lands

Definition: - Existing built or approved development areas including all school sites;
or
- areas of Provincially significant wetlands, or significant portions of habitat of threatened and endangered species are such that Provincial Policy does not permit development (including aggregate extraction) at this time.

Implication: - There is no potential for aggregate extraction at this time.

b) Highly Constrained Land

Definition: - More than one Level 1 constraint was identified in the current study that may have significant impacts.

Implication: - Extraction may be possible, but it is expected to require significant efforts to ensure acceptable impacts (eg. mitigation, remediation or compensation related to no loss of feature or function).

c) Moderately Constrained Lands

Definition: - One Level 1 constraint was identified that may have significant impacts;
or
- One Level 1 constraint and any number of Level 2 constraints were identified that may have significant impacts.

Implication: - Extraction may be possible, but it is expected to require efforts, which may be significant, to ensure acceptable impacts (eg. mitigation, remediation or compensation related to no loss of feature or function).

d) Minimally Constrained Lands

Definition: - One or more Level 2 constraints were identified by this study that have minimal impacts.

Implication: - Extraction may occur and is expected to require commonly employed efforts to ensure acceptable impacts.

e) Un-Constrained Lands

Definition: - No constraints were identified in the current study.

Implication: - Extraction may occur, and standard efforts will be required to ensure acceptable impacts.

Table 14-2 summarizes the Model:

Table 14-2: Resource Evaluation Model

Category	Definition
Eliminated	Settlements, schools, habitat of threatened or endangered species, provincially significant wetlands.
High Constraints	Two or more Level 1 constraints
Moderate Constraints	One Level 1 and any number of Level 2 constraints.
Minimal Constraints	One or more Level 2 constraints.
Un-constrained	No constraints identified.

The Resource Evaluation Model identified five different descriptions for aggregate resource lands: lands not available for extraction, highly constrained lands, moderately constrained lands, minimally constrained lands and resource lands that are unconstrained. These lands/constraints are represented on Figures 14-1 through 14-5, and the County has a digital record, which can be viewed and printed out at a more detailed scale.

Figure 14-1, Eliminated Resource Lands, identifies those areas where the sand and gravel is not available due to Provincial Policy and existing land development. The eliminated lands contain provincially Significant Wetlands, existing built-up areas, or habitat for threatened or endangered species. Although there are a number of small land parcels that are “eliminated”, there is only one location where there is a significant impact on the available resource. Eliminated lands cover significant portions of the total resource in the immediate vicinity of Meaford.

Figure 14-2 identifies those areas containing two or more level 1 constraints as being “Highly Constrained”. Highly Constrained Lands contain a combination of features, which will pose challenges for any extraction development. Serious efforts will be required to limit impacts to acceptable levels, and mitigation, remediation and/or compensation will be required. Two sizeable blocks of highly constrained land are present in the County: one located several kilometres southwest of Markdale, and a second west of Highway 6 along the Chatsworth – West Grey line. It should be noted that the effect of a highly constrained area may extend beyond the actual constrained lands due to the need for buffers and the need for protection of adjacent lands.

Moderately constrained resource lands, Figure 14-3, are those containing one level 1 constraint and any number of level 2 constraints. A level 1 constraint is a significant concern and it will be necessary to avoid, mitigate, remediate or compensate in order to ensure acceptable levels of impact. The existence of level 2 constraints may complicate site management, but these are usually manageable concerns. Moderately constrained lands cover 30 to 40% of the primary

resources in the Singhampton Moraine and many of the adjacent outwash areas. The fact that the moderately constrained areas are scattered over the primary and secondary deposits and thus fragment the available resource, renders the impact of the moderate constraint greater than it might normally be. If one includes the effect of resource fragmentation, the moderately constrained lands may impact in the order of 50% of the primary and secondary deposits in Grey County.

Minimally constrained resources are those affected by one or more level 2 constraints (Figure 14-4). Level 2 constraints are features such as hazard lands, sensitive communities and specialty agricultural areas, for which there are recognized, proven and effective approaches available for dealing with the constraint to ensure acceptable impacts.

Figure 14-5 identifies those resource lands that are free of all known constraints. There are a number of land blocks scattered throughout the Singhampton Moraine area which are unconstrained primary resources; however, the amount of land is reduced to approximately 30% of the resources identified. There is a slightly larger proportion of unconstrained secondary resources, and these are concentrated in West Grey, Chatsworth and in the area southwest of Owen Sound. There is very little unconstrained resource in the Thornbury and Meaford areas.

15.0 RESULTS OF EVALUATION

The evaluation of the constraints on the aggregate resources of Grey County provides a basis for selecting an appropriate extent of all aggregate resources for identification for potential extraction in the Official Plan.

All lands are potentially available for extraction except eliminated lands but the approval process will be significantly different depending on the level of constraint.

We therefore are left with resource lands that are constrained to various degrees. The question then becomes what level of constraint renders the resource worthy of protection?

Based on the results of the analysis of this study, we recommend the following:

- i) Lands that contain aggregate resources, which are eliminated or highly constrained do not warrant protection for future potential extraction at this time because of the nature and effect of those constraints.
- ii) Lands that contain sand and gravel resources with no, minimal or moderate constraints should be protected for future potential extraction in a manner consistent with the Provincial Policy Statement (Figure 15-1). The nature and effect of these constraints allows for aggregate extraction to proceed with minimal impact if appropriate and accepted mitigative measures are employed.

Primary, Secondary and Tertiary resources were inventoried as part of this Study. Primary and Secondary resources should be identified for protection.

Tertiary resources and other sand fill materials are important to the local community. Therefore, they should be recognized within the Official Plan so that small pits utilizing these materials may be licenced outside of those Primary and Secondary resource lands. It is important to maintain access to these lower quality resources for local construction purposes. There needs to be a mechanism within the Official Plan to permit such applications to proceed with a streamlined approval process.

16.0

PUBLIC REPRESENTATION AND PARTICIPATION

A varied approach to public participation was taken, using open houses, handouts, news releases and the County website. There are two objectives for the public participation program. First was to obtain input from the public, and second, was to distribute information to the public on aggregate resources in Grey County and the industry in general.

An open house was held in the fall of 2002 at the end of the data collection stage, and a second one was held in the spring of 2003, at the end of the analysis stage. Public attendance for both open houses was about 25 people. A small number of written comments were received from the first open house, and two written submissions were received from the second. These are attached, along with open house notices and handouts in Appendix I.

Generally speaking, there was support for the study, and what was being attempted. Several members of the public expressed concern regarding below-water extraction, and it was apparent that these comments generally related to one specific site. The concerns related to licence administrative issues and to potential impacts of below-water extraction. Licence issues are the exclusive mandate of the Ministry of Natural Resources, and technical issues related to below-water extraction are normally addressed by the Ministry of the Environment during review of technical documents, site plans and applications.

The results from the current hydrogeological study covering the Counties of Grey and Bruce has been used to identify “sensitive groundwater areas” as a constraint in the Aggregate Resource Inventory Master Plan Study.

Public representation on this study has been a fundamental role since the beginning. The Public Liaison Group was established, consisting of Aggregate Producers (3), County Representative (1), Agency Representatives (1 each from the MNR and the Conservation Authority), and local municipal representatives from the Township of Chatsworth and

Municipalities of West Grey and Grey Highlands. Ron Glenn, Senior Planner with Grey County was the Project Coordinator. It is important to note that a representative from the Ministry of Municipal Affairs and Housing was to have been on the Liaison Group and did attend a couple of meetings, but was not successfully replaced when he moved to another job. Also, there was provision for representatives of the public at large, but there were none represented.

The Public Liaison Group played a key role including developing the terms of reference, reviewing proposals and determining the successful consultants, meeting regularly with the consulting team to review the work completed to date and approaches to future tasks and providing input into the study itself. At key steps within the study, the Liaison Group was requested to vote on new approaches that would provide the model for the analysis of the study. This was further supported by Grey County's Planning Committee's endorsement. The ongoing contributions and support of this study by the members of the Public Liaison Group were instrumental in the ultimate content, analysis and recommendations of this study.

17.0 CONCLUSIONS

The following conclusions are presented as a result of the Study:

1. There are large areas of lands within Grey County, which are underlain by sand and gravel resources. Available mapping has been updated and reinterpreted at County scale to identify Primary, Secondary and Tertiary level deposits. Primary deposits are those containing sand and gravel deposits of greatest interest for commercial development. Secondary deposits may exhibit lesser quality, greater variability or be downgraded on the basis of a lack of information. Tertiary deposits are commonly small and sandy, and they are important sources of local construction materials, but are unlikely to support major commercial operations.

2. Approximately 15% of the Primary and Secondary deposits are either “eliminated” or “highly constrained”. “Moderately constrained” resource lands are approximately a third of the Primary/Secondary resources, but there is a substantial fragmentation of available lands. The cumulative impact of the moderate constraints plus land fragmentation is close to half of the primary and secondary resource lands.
3. There is an abundance of natural heritage features in Grey County. Many natural heritage features are associated with aggregate resource areas. These features potentially constrain the extraction of the aggregate resources to varying degrees.
4. Aggregate extraction is not permitted in Provincially Significant Wetlands and significant portions of the habitat of threatened and endangered species.
5. Aggregate extraction is permitted on lands adjacent to Provincially Significant Wetlands and on other natural features of provincial significance provided that there is not negative impact on the feature or its ecological function.
6. The County has limited the uses permitted on lands designated “Agriculture” and “Special Agriculture”. Aggregate extraction is permitted as an interim use on these lands provided that the lands are rehabilitated to substantially the same area and average soil quality.
7. Local demand for aggregates in Grey County is expected to remain below 3 million tonnes per year to 2023.
8. There is potential in the medium term (10 to 20 years) for Grey County producers (particularly those in the southern area of the County) to export aggregate to demand areas in the northwestern portions of the GTA.

9. Long term (beyond 20 years) potential exists for Grey County to export to the GTA in greater volumes; however, given the uncertainties regarding supply in areas closer to the GTA, such as Simcoe County, the Waterloo/Wellington area and the Hamilton/Niagara/Brantford area, it is difficult to predict when that would occur.
10. Aggregate operations provide a modest positive impact to the municipal finances of Grey County and the local municipalities. This benefit is estimated to be approximately \$60/1,000 tonnes of aggregate extracted.
11. It is estimated that 530 persons are employed in aggregate extraction and processing in Grey County and a further 800 jobs are supported through local purchasing of goods and services by the aggregate operations and its employees.
12. The construction industry in Grey County benefits from the local availability of aggregate for its construction products.
13. Some local aggregate producers provide financial support for a variety of civic and other organizations in Grey County.
14. Much of the aggregate resource of Grey County has previously been identified with some, but not complete policy protection. The current study has identified many additional areas of primary and secondary aggregate resources which warrant protection.
15. Some of the Primary Aggregate currently identified within the Official Plan has been evaluated to have a level of constraint which would remove it from protection.
16. Truck volumes and trip distributions will likely continue to be similar to those experienced over the past several years, although specific construction projects will generate higher volumes on a temporary basis.

17. The potential exists for export to the northwestern part of the GTA in the longer term. This would result in higher truck volumes on Highways 6 and 10, which form the main routes to those markets.
18. The existing Official Plan Policies relating to the requirements for Traffic Impact Studies and Development Agreements are appropriate for review of new and expanding aggregate operations.
19. There may be a need to identify local municipal roads that are best suited to provide access between aggregate operations and the County and Provincial roads, as increased truck traffic occurs.
20. Significant increases in truck traffic will require the County, the lower tier municipalities and the Province to work together to manage the traffic impacts through existing communities.
21. Tertiary resources and other sand fill materials are important to the local community.

18.0 RECOMMENDATIONS

The recommendations of this Aggregate Resource Inventory Master Plan are:

1. The unconstrained, minimally constrained, and moderately constrained Primary and Secondary aggregate resources of Grey County should be designated for protection in the Grey County Official Plan. The extent of these aggregate resources is shown on Figure 15-1, Aggregate Resources Identified For Protection.
2. A new designation, in the Grey County Official Plan should identify the location of the licensed pits and quarries as Mineral Aggregate Extraction. The extent of this designation should be based on Ministry of Natural Resources licence information and be updated as

necessary as a housekeeping measure.

3. An Official Plan Amendment to rewrite Section 2.7 Mineral Resource Extraction Designation should be prepared based on the references and results of the Aggregate Resource Inventory Master Plan, for public and agency review, public meeting, revisions as appropriate and consideration for adoption by County Council.
4. The “Mineral Aggregate Resource” designation should permit aggregate extraction and related uses subject to Municipal and County satisfaction that the policies and tests of the appropriateness for extraction and related uses are met on a particular site.
5. The County of Grey should regularly request information from the appropriate agencies to update its database with information for those features that are beyond the responsibility of the County (e.g., wetlands, ANSI's, significant portions of the habitat of endangered and threatened species and fish habitat).
6. The County of Grey should identify and evaluate its forested lands, valleylands and wildlife habitats to determine their significance in the County.
7. The resource evaluation model should be updated following the identification of significant woodlands, significant valleylands and significant wildlife habitat by the County, and after receipt of other new and developing information from other agencies.

8. Any changes to the land use designations that affect the agricultural designations should be incorporated into the resource evaluation model.
9. Monitoring of aggregate demand, supply, and pricing, in the GTA and surrounding areas is recommended to ensure that Grey County is prepared to meet emerging demands.
10. Grey County should encourage aggregate operations located on low agricultural capability soils.
11. Grey County should promote rehabilitation alternatives that are designed to enhance existing natural features adjacent to the site or natural features that are not well represented in the County.
12. “Primary” and “Secondary” aggregate resources in Grey County should be treated in the same manner in the Official Plan. It is inappropriate to separate the two resource levels because the difference between the two is often made on the basis of a lack of information.
13. There needs to be a mechanism within the Official Plan to permit applications on Tertiary and sand fill resources to proceed with a streamlined approval process.

All of which is respectfully submitted,

JAGGER HIMS LIMITED

Per

Andy Cooper, M. Sc., P. Geo
Senior Geologist

ESG INTERNATIONAL INC.

Per:

Sean Colville, President
now; Coville Consulting Inc.

SKELTON, BRUMWELL &
ASSOCIATES INC.

Per:

Anne Guiot, B.E.S., RPP
Senior Planner – Aggregate Resources

C.N. WATSON AND ASSOCIATES LTD.

Per:

Cam Watson, CMC, PLE
President

19.0 REFERENCES

Aggregate Resources Act (1996).

Statutes of Ontario Chapter 23 and Ontario Regulation 702/89.

ARDA Branch, Canada Land Inventory, Ontario Department of Agriculture and Food. 1970.
Acreages by Counties and Townships for Agricultural Land Use Capability in Southern Ontario.

Browning, M.H.R. and M.J. Tan 2001.

Rehabilitation of aggregate extraction sites: opportunities for establishing native ecosystems. Ontario Ministry of Natural Resources, Science and Information Branch, Southcentral Science and Information Section. Ontario's Living Legacy Science Report OLL RT.REC. 104.04, 47 p.

Chapman, L.J. and D.F. Putnam. 1984.

The physiography of southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume 2.

County of Grey. 1999.

County of Grey Official Plan.

Gillespie, J.E. and N.R Richards. 1954.

Soil Survey of Grey County, Report No. 17 of the Ontario Soil Survey ; Ministry of Agriculture and Food; Agriculture Canada, Research Branch, Guelph; 2 maps, scale 1:63,360, 79p.

Hollingsworth, Brian

October, 2002: Mineral Aggregates Issue Paper prepared for The Smart Growth Panel;

Central Ontario Zone.

Michalski, Michael F. P., Daniel R. Gregory, and Anthony Usher. 1987.

Rehabilitation of Pits and Quarries for Fish and Wildlife. Aggregate Resources Section,
Land Management Branch, Ontario Ministry of Natural Resources

Ontario Ministry of Municipal Affairs and Housing. 1997.

Provincial Policy Statement. MMAH: Toronto, Ontario.

Ontario Ministry of Natural Resources. 1986-2000.

Owen Sound District Fisheries Management Plan

Ontario Ministry of Natural Resources. 1997.

Aggregate Resources of Ontario. Provincial Standards. Queens Printer for Ontario.
Toronto, Ontario.

Ontario Ministry of Natural Resources. 1999.

Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement.
OMNR: Peterborough, Ontario.

Ontario Ministry of Natural Resources. 1999.

Natural Heritage Information Centre. Provincial status of plants, wildlife, and
vegetation communities' electronic database. OMNR: Peterborough, Ontario.

Ontario Ministry of Natural Resources. Oct 2000.

Significant Wildlife Habitat Technical Guide. 151p.

Ontario Ministry of Natural Resources. 2002.

Natural Resources and Values Information System electronic database.

Planning Initiatives Ltd and Associates

1992: Aggregate Resources of Southern Ontario: A State of the Resource Study.

Statistics Canada. 2002.

2001 Census of Agriculture. Farm Data: Full Release. Stand-alone CD-ROM Catalogue
Number 95F0304XCB.

APPENDICES

APPENDIX A

TERMS OF REFERENCE

APPENDIX B

PLANNING DOCUMENTS

- PROVINCIAL POLICY STATEMENT
 - SECTION 2.2 MINERAL RESOURCES
 - SECTION 2.3 NATURAL HERITAGE
- GREY COUNTY OFFICIAL PLAN
 - SECTION 2.7 MINERAL RESOURCE EXTRACTION DESIGNATION
 - SECTION 2.8 NATURAL ENVIRONMENT

GREY COUNTY OFFICIAL PLAN

SECTION 2.7 MINERAL RESOURCE EXTRACTION DESIGNATION
SECTION 2.8 NATURAL ENVIRONMENT

APPENDIX C

AGGREGATE RESOURCES INVENTORY

(In preparation – to be same as OGS Publication)

APPENDIX D

NATURAL ENVIRONMENTAL

**GREY COUNTY AGGREGATE RESOURCES
INVENTORY MASTER PLAN
APPENDIX D – NATURAL ENVIRONMENT**

Prepared by:



ESG International Inc.
361 Southgate Dr., Guelph, ON
N1G 3M5

&



Colville Consulting Inc.
24 B Nihan Dr., St. Catharines, ON
L2N 1L2

G2006

October, 2004

EXECUTIVE SUMMARY

This appendix has identified several significant natural heritage features and areas that pose some constraint to the aggregate resource extraction in Grey County. This was completed through a review of the Ministry of Natural Resource's NRVIS mapping for Grey County and other information sources. The Provincial Policy Statement and the Official Plan for Grey County were consulted to determine the significance of the natural features identified. Only those areas determined to be of Provincial interest were considered to be constraints for extraction because current provincial policies limit development to varying degrees. These areas include provincially significant wetlands, portions of the habitat of endangered and threatened species, fish habitat, significant woodlands, significant valleylands, significant areas wildlife habitat, ANSIs, other wetlands and hazard lands.

These significant natural features were included as components of the constraint overlay mapping exercise that was used to identify constrained and unconstrained aggregate resource lands. The constraints were evaluated based on the potential impact ("high" vs. "low") of aggregate extraction on the natural features and ranked accordingly (1 and 2, respectively). A Resource Evaluation Model was then developed for the overall study (Section 14 of the main report) and identified eliminated lands, highly constrained lands, moderately constrained lands, minimally constrained lands and unconstrained lands. Aggregate resource areas constrained by significant natural heritage features were eliminated from the aggregate resource area or were determined to be highly constrained or moderately constrained aggregate resource lands. Hazard lands, with no other factor involved, are considered to be a minimal constraint for aggregate extraction.

Aggregate extraction can provide unique opportunities for habitat creation through rehabilitation efforts. A discussion of natural environment rehabilitation and generalized guidelines are provided in this appendix.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	II
SUB-APPENDIX A	III
1. INTRODUCTION.....	1
1.1 Data Sources.....	1
2. ENVIRONMENTAL POLICIES.....	2
2.1 Provincial Policy Statement (PPS)	2
2.2 Grey County	2
2.3 Aggregate Resources Act	3
3. NATURAL HERITAGE FEATURES.....	4
3.1 Provincially Significant Wetlands.....	4
3.2 Other Wetlands Areas	4
3.3 Hazard Lands	5
3.4 Surface Water Features – Fish Habitat	5
3.4.1 Surface Water Features	5
3.4.2 Fish Habitat	5
3.5 Significant Woodlands.....	5
3.6 Significant Areas of Wildlife Habitat	6
3.7 Areas of Natural and Scientific Interest	6
3.7.1 Earth Science ANSI.....	6
3.7.2 Life Science ANSI.....	6
3.8 Portions of the Habitat of Endangered and Threatened Species	7
3.9 Significant Valleylands	7
4. CONSTRAINT ANALYSIS AND RESOURCE EVALUATION	8
5. OPPORTUNITIES FOR ENHANCEMENT OF THE NATURAL ENVIRONMENT	9
6. CONCLUSIONS.....	11
7. REFERENCES.....	12

SUB-APPENDIX A

GUIDELINES FOR REHABILITATION TO NATURAL ENVIRONMENT

1. INTRODUCTION

The purpose of the Grey County Aggregate Inventory Master Plan is to identify and evaluate the County's aggregate resources to ensure that these resources are protected and managed in a manner that is in the public interest, and which has regard for the Provincial Policy Statement. As part of the process to identify the aggregate resource areas, a constraint overlay mapping exercise was completed. Significant natural heritage features are a constraint to aggregate extraction. The following report was prepared to identify the significant natural heritage features and areas, evaluate the level of constraint for each feature and assist with the constraint overlay mapping exercise to identify Grey County's aggregate resources areas.

In addition, the County recognizes that aggregate extraction can provide opportunities for restoration of the natural environment by providing desirable habitats through rehabilitation efforts. The concept of natural environment enhancement is discussed, and generalized guidelines for the development of a rehabilitation plan are provided.

1.1 Data Sources

The following data were reviewed:

- The Physiography of Southern Ontario, Chapman and Putnam, 1984;
- Natural Heritage Reference Manual, OMNR
- Natural Heritage Information Centre, OMNR
- Natural Resources and Values Information System (NRVIS) for Grey County, OMNR
- Owen Sound District Fisheries Management Plan 1986-2000
- Aggregate Resources mapping – generated by Jagger Hims for the Grey County Aggregate Resources Inventory Master Plan (2002); and
- Policy Documents
 - Provincial Policy Statement (1997)
 - Grey County Official Plan (2000)
 - Aggregate Resources Act (1996)
 - Aggregate Resources of Ontario Provincial Standards (1997)

In addition, information was provided by members of the Steering Committee, Canadian Wildlife Service, Bird Studies Canada, Conservation Authorities and the local Ministry of Natural Resources staff.

2. ENVIRONMENTAL POLICIES

2.1 Provincial Policy Statement (PPS)

The Provincial Policy Statement (PPS) identifies the natural heritage features considered to be important to the Province of Ontario and provides policy direction on matters of provincial interest related to land use planning and development. Development includes new or expanding aggregate operations Policy 2.3.1 states that:

Natural heritage features and areas will be protected from incompatible development.

- a) Development and site alteration will not be permitted in:
- significant wetlands south and east of the Canadian Shield; and
 - significant portions of the habitat of endangered and threatened species.
- b) Development and site alteration may be permitted in:
- fish habitat;
 - significant wetlands in the Canadian Shield;
 - significant woodlands south and east of the Canadian Shield;
 - significant valleylands south and east of the Canadian Shield;
 - significant wildlife habitat; and
 - significant areas of natural and scientific interest.

if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified.

Policy 2.3.2 describes conditions under which development and site alteration may occur on lands adjacent to those listed in Policy 2.3.1 above. Policy 2.3.2 states:

"Development and site alteration may be permitted on adjacent lands to a) and b) if it has been demonstrated that there will be no negative impacts on the natural features or on the ecological *functions* for which the area is identified."

2.2 Grey County

The Natural Environment land use designations for Grey County include Hazard Lands, Provincially Significant Wetlands and Areas of Natural and Scientific Interest (ANSIs). These areas are shown in Schedule A of the Official Plan. The County has not compiled county-wide mapping of fish habitat, significant woodlands, valleylands, portions of the habitat of endangered and threatened species, and wildlife habitat. However, the Official Plan states, "In General, development and site alteration that is incompatible with significant natural features and areas will not be permitted."

Development or site alteration is not permitted in portions of the habitat of endangered and threatened species. Development and site alteration may be permitted within ANSIs, fish habitat, woodlands, valleylands, wildlife habitat, and their adjacent lands or on lands adjacent to portions of the habitat of endangered and threatened species provided that it can be demonstrated that there will be no negative impacts on the natural features or on the ecological function for which the area is identified.

2.3 Aggregate Resources Act

The purposes of the Aggregate Resources Act are,

- (a) to provide for the management of the aggregate resources of Ontario;
- (b) to control and regulate aggregate operations on Crown and private lands;
- (c) to require the rehabilitation of land from which aggregate has been excavated; and
- (d) to minimize adverse impact on the environment in respect of aggregate operations.

Additional protection of the natural environment is provided by the Section 12 (1) of the Aggregate Resources Act. The Minister or Board charged with determining whether or not a licence should be issued or refused, must consider 'the effect of the operation of the pit or quarry on the environment'. The Aggregate Resources of Ontario Provincial Standards were developed to support the Aggregate Resources Act. Each new licence application must include site specific technical reports addressing the natural heritage features identified above. A Natural Environment Level 1 Technical Report will determine whether any natural heritage features exist on and within 120 metres of the site. A Natural Environment Level 2 Technical Report assesses the impact on those features identified in the Level 1 report (on and within 120 metres of the site) in order to "determine any negative impacts on the natural features or ecological functions for which the area is identified, and any proposed preventative, mitigative or remedial measures".

3. NATURAL HERITAGE FEATURES

The natural heritage features identified in the County of Grey are based primarily on the information provided by the Ontario Ministry of Natural Resources in the form of digital NRVIS mapping. This data resource shows environmental and human made features that are of interest to the OMNR. It is based on the 1:10,000 scale OBM map sheets and the majority of the information deals with wildlife and natural area management.

The information collected was interpreted to identify natural heritage features such as provincially significant wetlands and other wetlands areas, fish habitat (lakes, ponds, rivers, streams, etc.), significant woodlands, significant areas of wildlife habitat, and Areas of Natural and Scientific Interest (Earth Science ANSI's and Life Science ANSI's).

In addition to the NRVIS data, the County of Grey provided those areas identified as Hazard Lands in the Official Plan. The natural heritage features listed below are shown in Figures D1, D2 and D3. The Natural Heritage Information Centre was also consulted to provide more specific information on certain natural heritage features identified by the NRVIS data.

3.1 Provincially Significant Wetlands

Wetlands are defined in the Provincial Policy Statement as "lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants". The PPS defines provincially significant wetlands as "an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time". The Natural Heritage Information Centre identified 65 wetlands within Grey County, 46 of which have been evaluated and determined to be provincially significant. These wetlands are shown in Figure D1 and were identified directly from the NRVIS mapping.

The Provincially Significant Wetlands include; Beaver Meadow Wetland, Beaver Valley Lowlands Wetland, Beavertale Bog Wetland, Bell's Lake Wetland, Binns Lakes Wetland Complex, Bognor Marsh Wetland, Boothville Swamp, Camp Creek Wetland Complex, Eugenia Lake Wetland, Flesherton Swamp, Gildale Wetland, Hatherton Wetland, Headwaters to Pottawatomi River Wetland, Indian Creek Wetland, Keldon Swamp Wetland Complex, Kollapore Headwaters Wetland, Letterbreen Bog, Little Germany Wetland Complex, Long Swamp, Louise Boyd and McDonald Lakes Wetland, Maxwell Swamp Wetland Complex, McGill Lake Wetland, McKechnie Creek Wetland, McLean Lake Wetland, McNab Lake Wetland, Mountain Creek Wetland, Mountain Lake – Skinner Marsh Complex Wetland, Negro Lakes Wetland, Oxenden Creek Wetland, Portlaw Fen, Proton Station Wetland Complex, Rob Roy Swamp, Robson Lakes-Hamilton Creek-Lily Oak Wetland Complex, Rocklyn Swamp, Shallow Lake Wetland, Shouldice Wetland, South Saugeen River Wetland, Stewart and Minkes Lakes Wetland, The Glen Wetland, The Marsh, Topcliff Swamp Wetland Complex, Traverston Creek Wetland Complex, Turner-Gillies-Wilcox Lakes Complex Wetland, Welbeck Wetland Complex and Yoevil Swamp Wetland Complex.

Aggregate extraction is not permitted within provincially significant wetlands. Therefore, where aggregate resources occur within a PSW they have been eliminated as a potential resource area. Aggregate extraction can occur on adjacent lands, however, it must be demonstrated that there will be no negative impact on the wetland or on its ecological functions.

Wetlands evaluations and re-evaluations are completed from time to time and may result in a change in classification from provincially significant to "other" or vice versa. Updates of the resource evaluation model should include an update of the wetland mapping provided by the NRVIS data.

3.2 Other Wetlands Areas

Other wetland areas in the County have been mapped and are considered to be evaluated wetlands not of provincial significance. These wetland areas are still important valuable natural resource features that provide important hydrological and ecological functions. "Other" wetlands are shown in Figure D1 and were identified directly from the NRVIS mapping. They include, Congers Creek Wetland, Dornoch Swamp, Dromore Swamp Wetland Complex, Harrison Lake Fen, Hoath Head Wetland, Kinghurst Swamp, Louise Swamp, Marshall's Lake Wetland, Melancthon #4 Wetland, North Sprey Wetland Complex, Riverview Swamp, Slough of Despond Wetland, Sydenham River Lowlands Wetlands, The Sinkhole Wetland, Townline Lake Wetland, Unnamed (Sutherland Project) Wetland, Ventry Swamp Complex Wetland, Walters Creek Wetland, Wodehouse Marsh Wetland.

The Provincial Policy Statement permits development, including aggregate extraction, within these wetlands provided that any negative impacts can be adequately mitigated to acceptable levels. Local Conservation Area representatives have expressed

concerns with any development within wetlands regardless of their classification and are likely oppose a development proposal within the boundaries of the wetland.

3.3 Hazard Lands

Hazard lands include floodplains, steep or erosion prone slopes, organic or unstable soils, poorly drained areas and lands along the Georgian Bay shoreline impacted by flooding, erosion, and/or dynamic beach hazards. These lands are identified and mapped by the Conservation Authorities in Grey County and include many areas that may be considered to be of provincial significance (e.g., valleylands, wetlands, woodlands, etc.). The Hazard Lands are shown in Figure D-4. The Natural Environment policies as outlined in the County's Official Plan permit new development and site alteration within Hazard Lands, however, a number of tests need to be satisfied and consultation with the Conservation Authority whose approval may be required.

3.4 Surface Water Features – Fish Habitat

3.4.1 Surface Water Features

The County of Grey contains the headwaters for several significant rivers including the Grand, Nottawasaga, Bighead, Beaver and Saugeen Rivers. The height of land associated with the Niagara Escarpment divides the County into the Lake Huron and Georgian Bay drainage systems. These two drainage systems are comprised of four watersheds: the Bruce Peninsula streams, fourteen Georgian Bay tributaries, the Saugeen River and twenty-three Lake Huron tributaries (Owen Sound District Fisheries Management Plan 1986-2000). These watercourses as well as the ponds and lakes in the County provide important fish habitat for coldwater (e.g. Trout and salmon), coolwater (e.g. pike, walleye and yellow perch), and warmwater (e.g. bass), fish species.

The surface water features in the County were identified by the NRVIS mapping and include lakes, rivers, stream, ponds and any other open bodies of water. These areas are identified as Fish Habitat and are shown in Figure D3. Many of the more significant surface water features are also contained within the boundaries of the Hazard Land mapping.

3.4.2 Fish Habitat

The predominance of coldwater streams and rivers is a major feature of the Owen Sound District. There are 111 coldwater streams and rivers that currently support salmonid populations. In the Georgian Bay watershed, the escarpment also serves to partition fish species. Brook trout and brown trout populations are generally found in streams above the escarpment and migratory species, such as rainbow trout and chinook salmon, confined to waters below the escarpment.

There are relatively few (100) inland lakes and ponds within the Owen Sound District. The majority of these lakes and ponds are small and support either warmwater or coolwater fisheries. A notable exception is Gillies Lake on the Bruce Peninsula, which represents the only inland lake in southwestern Ontario supporting a resident population of lake trout.

Portions of both Lake Huron and Georgian Bay also fall within the boundaries of the Owen Sound District. These waters support commercial fisheries and also provide a high quality angling opportunities for coldwater (e.g. trout and salmon), coolwater (e.g. pike, walleye and yellow perch), and warmwater (e.g. bass), fish species.

The Federal Fisheries Act requires that fish habitat be protected. The Provincial Policy Statement is consistent with the Fisheries Act. It recognizes fish habitat as a natural heritage feature of Provincial importance and it provides protection for all fish habitat. Aggregate operations wishing to locate or expand on or adjacent to fish habitat must adhere to both Federal and Provincial requirements and consider the potential impacts on the fish habitat as a result of aggregate extraction. Negative impacts will need to be mitigated to acceptable levels and the implementation of compensation agreements and monitoring programs are often required.

The County Official Plan also does not permit development within 30 metres of the banks of a coldwater stream or 15 metres of a warm water stream.

3.5 Significant Woodlands

The NRVIS mapping shows woodlands of various size and form throughout the County. The identification and evaluation of significant woodlands is the responsibility of the County of Grey. Significant woodlands have not yet been defined or identified in the County. The OMNR's Natural Heritage Reference Manual assists planning authorities in identifying significant woodlands. One of the means of identification recommended is based on woodland size in context to percent forest cover in the planning area. In the County of Grey where woodland cover ranges between 15 and 30%, the Natural Heritage Reference Manual

recommends that woodlots 40 ha or greater be considered as significant woodlands. Therefore, this study has identified all those contiguous woodlands greater than 40 ha as significant woodlands. These are mapped in Figures D1.

Aggregate extraction is permitted within significant woodlands provided that there will be no negative impacts on the woodland or on its ecological function.

It is recommended that the County of Grey evaluate its forested areas to identify significant woodlands in a more formal process and update the resource evaluation model.

3.6 Significant Areas of Wildlife Habitat

Significant wildlife habitat includes areas of seasonal concentration of animals; rare vegetation communities or specialized habitats for wildlife; habitats of species of concern; and wildlife movement corridors. Deer wintering areas are shown in the NRVIS mapping and are considered to be significant wildlife habitat. Although other forms of significant wildlife habitat are known to exist in the County of Grey, the NRVIS mapping does not identify other areas of significant wildlife habitat. It is the responsibility of the County of Grey to evaluate and identify significant wildlife habitat.

Aggregate extraction is permitted within significant areas of wildlife habitat provided that there will be no negative impacts on the habitat or on its ecological function.

It is recommended that as information is obtained from OMNR, the Conservation Authorities and other agencies regarding wildlife habitats in the County of Grey, that it be evaluated as recommended in the Natural Heritage Reference Manual and, where appropriate, identified as significant wildlife habitat by the County. The resource evaluation model should be updated as significant wildlife habitat is identified.

3.7 Areas of Natural and Scientific Interest

The Ontario Ministry of Natural Resources has identified Earth Science Areas of Natural and Scientific Interest, as areas having provincially or regionally significant representative geological features. Life Science Areas of Natural and Scientific Interest are areas identified as having provincially or regionally significant representative ecological features. The NRVIS mapping shows both the Earth and Life Science ANSI's identified within Grey County (Figures D1).

Aggregate extraction is permitted within ANSIs provided that there will be no negative impacts on the ANSI or on the ecological function of the area.

3.7.1 Earth Science ANSI

The Ontario Ministry of Natural Resources has identified Earth Science Areas of Natural and Scientific Interest, as areas having provincially or regionally significant representative geological features.

Within Grey County there are 26 designated Earth Science ANSI. They include; Allan Park Crevasse Fillings, Allan Park Ice-Marginal Delta, Banks Moraine, Beaver Valley Lowlands, Crevice Caves of Blue Mountain Area, Delphi Point (Lower Whitby FM), East Meaford Creek Shales, Egerton Esker, Eugenia Lake Drumlins, Gibraltar Moraine, Hatherton Wetland (Esker Site) Hopeville Drumlins, Keldon Esker, Keldon Esker Extension, Kolapore Swamp, Kolapore Uplands, Moraines of Blue Mountain Area, Pretty River Valley, Pretty River Valley - Southeast, Saugeen Kame Terraces, Shrigley Esker, Slough of Despond, Sucker Creek Valley – Cape Rich, Top Cliff Crevasse Fillings, West of Pretty River Valley, and Wodehouse Creek Karst.

3.7.2 Life Science ANSI

The Ontario Ministry of Natural Resources has identified Life Science Areas of Natural and Scientific Interest, as areas having provincially or regionally significant representative ecological features. There are 58 Life Science ANSI's within Grey County.

Twenty five of the Life Science ANSI's have Provincial significance. They include; Bayview Escarpment, Beaver Valley Lowlands, Beaverdale Fen, Blue Mountain Slopes, Duncan Crevice Caves, Harrison Lake and Fern, Hatherton Wetlands, Kemble Wetland, Kimberly Creek, Kinghurst Forest, Kinghurst west, Kolapore Escarpment, Lily Oak Forest, McGill Lake, Mountain Lake Fen, Pretty River Valley, Rocky Saugeen River, Skinner Bluff, Slough of Despond, South Saugeen River, Sucker Creek – Cape Rich, The Glen, Traverston Creek Forest, Upper Beaver Valley, Walters Creek Headwater Area.

The remaining 33 Life Science ANSI's have Regional significance. They include; Allan Park, Forest, Banks Moraine Forests, Bass Lake Escarpment Forest, Beatty Saugeen Swamp, Beaver Valley East Slope, Beaver Valley West Slope, Black Lake Forest, Bognor Marsh and Escarpment, Desboro East Forest, Duncan Lake South, East Warton Woods, Farden Lake Forest,

Feversham Gorge, Gildale Esker and Swamp, Habermehl Lake, Ingils Falls Forests, Keldon Esker and Swamp, Kemble Forest, Kolapore Southwest, McDonald Lake, McClean Lake, Mitchell Creek Valleys, Moss Lake, Negro Lake, North Sprey River Headwaters, Orchard Valley Forest, Pretty River Valley, Pretty River Valley Moraine, Pretty River Valley South, Rocklyn Creek Valley, Spey River Headwaters, Tuner Lake Swamp, Westfall's Lake.

3.8 Portions of the Habitat of Endangered and Threatened Species

In the County of Grey, endangered and threatened species include the Bald Eagle, Loggerhead Shrike, Henslow sparrow, Peregrine Falcon, Hill's Pondweed and Redside Dace. However, the County of Grey has not recognized any habitats of endangered and threatened species. The OMNR and the Canadian Wildlife Service (CWS) were contacted and are not aware of any areas that have been recognized as habitat of endangered and threatened species. The NRVIS mapping does provide some limited information on sightings (within a 1km square grid) of vulnerable, threatened, and endangered (VTE) species. These sightings generally represent recordings of sightings of the species which may or may not also represent their habitat. A map showing the approximate location of the sightings of VTE species is provided in Figure D4. However, no significant portions of the habitat of endangered and threatened species was mapped.

As significant portions of the habitat of endangered and threatened species are identified within the County, the resource evaluation model should be updated to reflect these additions. This natural heritage feature is a significant constraint to the aggregate industry, as aggregate extraction is not permitted within significant portions of the habitat of endangered and threatened species.

3.9 Significant Valleylands

The responsibility for the evaluation and identification of Significant Valleylands lies with the County of Grey. To date, the County has not identified any significant valleylands within the County, nor have any other agencies. The Natural Heritage Reference Manual helps guide municipalities in the evaluation and identification of significant valleylands through the adoption of a natural heritage systems approach. The County should consider this approach when identifying its significant valleylands. Regardless of the methods used to identify significant valleylands, as they are identified the resource evaluation model should be updated to include this feature.

4. CONSTRAINT ANALYSIS AND RESOURCE EVALUATION

A constraint overlay mapping exercise that considered all factors that potentially have an impact on aggregate resources areas (including natural environment, agriculture, settlement areas, etc.) was used to identify areas of aggregate resource that were either "unconstrained" or "constrained". A constraint analysis was then completed and a Resource Evaluation Model was developed to assist in understanding the significance of the constraint or combination of constraints. Each of the constraints identified (e.g., provincially significant wetlands, significant woodlands, fish habitat, etc.) were categorized by the level of "potential impact" on or adjacent to these features resulting from aggregate extraction. Aggregate extraction was determined to have a high potential impact on all the natural heritage features identified and were therefore ranked as a Level 1 Constraint. Hazard lands were determined to have a low potential impact and were ranked as a Level 2 Constraint. However, it was recognized that these areas often contain significant natural heritage features. In this event, it is likely that this feature would be identified as a Level 1 Constraint and it would take precedence over the Hazard Lands.

The Resource Evaluation Model listed five possible categories into which the aggregate resource areas were classified: eliminated lands, highly constrained lands, moderately constrained lands, minimally constrained lands and unconstrained lands. Two natural heritage features were used to identify eliminated lands: provincially significant wetlands and significant portions of habitats of threatened and endangered species. Aggregate resource areas that contain these two significant natural features were eliminated because present provincial policies do not permit extraction or any other development within these areas. The remaining areas do not prohibit aggregate extraction, however they do provide moderate or high constraints to the aggregate resource (see Section 14 of the main report for a description of the Resource Evaluation Criteria).

5. OPPORTUNITIES FOR ENHANCEMENT OF THE NATURAL ENVIRONMENT

Traditionally, after-use design of most pits and quarries that do not extract below the water table has focused on agricultural rehabilitation. Many pits and quarries are in rural areas that have agricultural land use designations and the focus has been on restoring sites to previous land uses. The Provincial Policy Statement recognizes that aggregate extraction is an interim use and requires the site to be rehabilitated in such a manner that substantially the same areas and same average soil quality for agriculture are restored.

In Grey County, the agriculturally designated lands include significant amounts of low capability soils (Canada Land Inventory Classes 4, 5, 6, 7 and O). In general, under agricultural production, these lower capability lands are best suited for pasture and hay crops because they are not suitable for the sustained production of other field crops (corn, soybean, cereal grains, etc.). Large areas of these lower capability soils remain forested or have been reforested because of their low agricultural productivity. As a result most of the County's natural heritage features occur on lands that are relatively poor agricultural lands and rehabilitation to an agricultural after use may not be a practical solution.

Historically, on lands that contain significant amounts of low capability land, the demand and opportunities for naturalization have been relatively rare, even for the rehabilitation of old, abandoned sites using the industry's Management of Abandoned Aggregate Properties (MAAP) fund. When such opportunities have arisen, the focus of rehabilitation was most often on traditional plantation development on lands graded for farming (i.e. a relatively flat base with uniform slopes and side slopes with gradients of 3:1 or more). The ecological functions of lands rehabilitated in such a manner are limited.

Land use conflicts, social values (i.e. in the environment) and urbanization pressures have increasingly placed aggregate extraction within or near areas of environmental significance. Therefore, demand for more natural rehabilitation alternatives on extraction sites has increased. Aggregate extraction and rehabilitation by nature involves significant excavations and major landscaping efforts. For some areas, it also presents opportunities to enhance local habitats, regional ecosystem functions and natural spaces for recreation and education.

The rehabilitation efforts of the aggregate industry have now evolved beyond relatively straightforward rehabilitation practices to include more sophisticated and holistic technologies to improve the human and ecological landscape following aggregate extraction. Pits and quarries can be, and are being, rehabilitated to after-uses that promote the development of the natural environment. Proposed after uses should take into account the surrounding natural environment in order to ensure compatibility. The rehabilitation of a pit or quarry may offer unique opportunities to enhance natural features that are currently significant or sensitive. Cumulative rehabilitation techniques that account for adjacent land uses, natural features and rehabilitation activities are capable of increasing the ecological integrity as well as capacity of a landscape to support a range of human activities. Innovative recreation concepts can be employed in the context of a regional ecosystem rehabilitation initiative.

In addition to the protection of important remnant natural areas, a number of additional opportunities exist on these lands for the rehabilitation and naturalization of currently degraded features and areas with limited habitat diversity (i.e. old field cultural meadows and pasture lands). When larger scale natural processes are considered in the rehabilitation plans for new sites as well as existing licensed areas, net economic and environmental benefits are more rapidly realized.

Natural environment rehabilitation can be driven by specific goals or there may be multiple objectives at a regional scale. The rehabilitation of a pit or quarry may have a specific focus such as the development of a habitat to encourage the establishment of aquatic, wildlife, or plant species. More general goals could include the establishment of linkages, restoring the site to previous conditions, or aesthetic based rehabilitation.

Each pit or quarry is unique and the surrounding environments are usually different. It is important to note that the natural rehabilitation of a pit or quarry is site specific, however concepts can be shared. For instance, rehabilitation of pits and quarries where extraction has occurred below the water table can be designed to create fish habitat and/or developed as a wetland environment for aquatic and terrestrial wildlife species. Pits and quarries that remain above the water table may be rehabilitated to terrestrial systems. A number of aggregate extraction/rehabilitation examples exist along the Oak Ridges Moraine and Niagara Escarpment with comprehensive, landscape level ecological design and land use planning.

Figure D1, D2 and D3 show a wide variety of significant natural heritage features in Grey County and many of these occur on lands identified as aggregate resource areas. These include provincially significant wetlands and other wetland areas, fish habitat, significant woodlands, significant wildlife habitats and Areas of Natural and Scientific Interest (ANSI's). The lands on and adjacent to these natural heritage features have different levels of constraint for aggregate extraction and also provide opportunities for restoration, creation and enhancement of these features as part of the rehabilitation plan.

Site specific studies are required to identify the natural features on and adjacent to the site, to determine the potential impact of the proposed aggregate extraction activities, to determine the most appropriate mitigation methods to reduce the impact to acceptable levels and to identify the most appropriate rehabilitation scenarios for the site. Specific rehabilitation guidelines need to be developed following consideration of the proposed extraction activities (e.g., whether extraction occurs above or below water table), the overall objective for rehabilitation, and the natural features and their functions on and adjacent to the property.

Buffers and setbacks require consideration in the development of extraction areas and in rehabilitation design. Standard requirements, while perhaps more consistent for enforcement, do not consider site specific or bio-regional ecological functions. In recognition of this, the PPS now requires that “adjacent lands” be identified near significant wetlands and other natural heritage features, as a threshold distance within which site specific studies are required to determine the final buffer or setback. This process is ecologically sound and we recommend its adoption for appropriate aggregate extraction areas in Grey County.

In many cases, there will be significant species on adjacent lands. Rehabilitated pits and quarries often offer unique opportunities to enhance habitat for significant species. It is essential that the biology of significant species be understood so that key habitat features can be provided for them.

Some pits and quarries may have historically supported very different vegetation communities. Areas of sandy soils may have traditionally supported prairie habitat that was subsequently converted into agricultural uses. Historical vegetation mapping derived from notes of the original surveyors are available and can provide valuable insights into historical vegetation communities. It may be beneficial to review this mapping to see if rehabilitation to a habitat present prior to conversion to agriculture is warranted and feasible.

Quarries offer the opportunity to create more sensitive habitats, such as alvars and certain types of wetlands instead of restoration to more conventional habitats. Some species of plants have evolved to living on bare bedrock or areas where soils are very shallow. Many of these species have limited distribution in the province because of their exacting habitat requirements and there may be opportunities to create patches of alvar habitat while still meeting the broader goals of habitat restoration in quarries. Quarries also often have groundwater seeping into them, and this may be used to create fens and other wetland types that provide habitat for sensitive species of plants. One quarry in the new City of Hamilton has developed a fen supporting several orchid species and other wetland species. Exposed quarry faces eventually support a flora of cliff species.

Where pits and quarries intercept the water table, there is opportunity to rehabilitate to a variety of after uses. Traditionally, after uses have just been lakes. Many of these are relatively sterile, but with a little planning, they may be important to fish and wildlife. If it is desirable to support fish, it is important to know the predicted temperature regime of the water body to ascertain the appropriate fish species to introduce. Then habitat can be provided to ensure that there is suitable spawning, nursery, and foraging habitat for the target species.

In many cases, it is possible to support both cold and warm water fish species. This is accomplished by leaving shallow terraces around portions of the lake. These areas will be warmer than the rest of the lake and, with introduction of suitable substrate will develop into wetlands. These will be important sources of food and shelter for both warm and coldwater fish, and should also provide spawning and nursery habitat for warm water species. It may be necessary to introduce some logs and gravelly areas to ensure that all habitat requirements of key species are met. Shallow wetland areas may also be attractive to waterfowl and other wetland birds.

Depending on natural resources on adjacent lands, it may be beneficial to plan for amphibians instead of fish. Generally, amphibians do not do as well in water bodies that support fish, and salamanders are typically absent. Providing shallow shelves around larger water bodies as for fish may create amphibian habitat. Amphibians also do well in small, shallow ponds or temporary water bodies. These areas should support water until the end of July to ensure that tadpoles and larvae have sufficient time to transform into adults.

Sub-Appendix A provides General Rehabilitation Guidelines that can be employed to reduce potential impacts and rehabilitation costs to the operator.

6. CONCLUSIONS

Grey County has a rich natural heritage and many of its features are found on or adjacent to lands identified as aggregate resource areas. These natural heritage features and areas pose various levels of constraint on the extraction of the aggregate resource ranging from "high" to "low". Provincially significant wetlands, portions of the habitat of endangered and threatened species, fish habitat, significant woodlands, significant valleylands, significant areas wildlife habitat, ANSIs and other wetlands all have a "high" potential to impact on aggregate resources extraction on or adjacent to these areas would require a higher degree of mitigation or potentially portions of the resources may not be feasibly extracted. However, the presence of provincially significant wetlands and significant portions of the habitat of threatened and endangered species resulted in the exclusion of areas from the aggregate resource area. Hazard Lands were determined to have a "low" potential impact on aggregate extraction but these areas are often associated with other natural features that have a "high" potential impact. The Evaluation Resource Model (Section 14 of the main report) identified five categories: eliminated lands, highly constrained lands, moderately constrained lands, minimally constrained lands and unconstrained lands. Areas with significant natural heritage features identified lands eliminated from the aggregate resource, highly constrained aggregate resource lands, and moderately constrained aggregate resource lands. Hazard lands, with no other factor involved, minimally constrained lands were considered to be a minimal constraint for aggregate extraction.

Aggregate extraction is not permitted in provincially significant wetlands and portions of the habitat of endangered and threatened species. Aggregate extraction may be permitted on or adjacent to other significant natural features, providing additional site-specific assessments favourable to the development are provided with the development application. These studies should include an acceptable rehabilitation plan with recommendations and mitigation measures that will ensure negative impacts are minimized to acceptable levels. New or expanding aggregate developments are required to complete a Level 1 Natural Environment Technical Report and possibly a Level 2 Natural Environment Technical Report. These reports should be prepared to also satisfy the requirements of the County's Official Plan for development application in close proximity to natural heritage features.

Sub-Appendix A provides guidelines that will assist in the development of appropriate rehabilitation plans for natural rehabilitation. We recommend that Grey County require aggregate applications to consider opportunities to rehabilitate to natural environment in areas where the average soil capability is CLI Class 4 or lower and in areas adjacent to significant natural heritage features.

It is recommended that the resource evaluation model be regularly updated. The natural heritage features identified in the mapping were interpreted from MNR's NRVIS mapping and many of the features have not been recognized by the County as significant natural heritage features or areas. It is the responsibility of the County to identify and evaluate natural heritage features such as significant woodlands, significant valleylands and significant areas of wildlife habitat. It is recommended that the County undertake these appraisals and update the resource evaluation model as these areas are identified.

The Ministry of Natural Resources is responsible for identifying and evaluating significant wetlands, portions of the habitat of endangered and threatened species and areas of natural and scientific interest and in many areas they also provide broad scale fish habitat mapping. It is recommended that the Ministry be contacted regularly to obtain new information regarding these natural heritage features and areas prior to updating the resource evaluation model.

7. REFERENCES

- Aggregate Resources Act (1996). Statutes of Ontario Chapter 23 and Ontario Regulation 702/89.
- Browning, M.H.R. and M.J. Tan 2001. Rehabilitation of aggregate extraction sites: opportunities for establishing native ecosystems. Ontario Ministry of Natural Resources, Science and Information Branch, Southcentral Science and Information Section. Ontario's Living Legacy Science Report OLL RT.REC. 104.04, 47 p.
- County of Grey. 2000. County of Grey Official Plan.
- Michalski, Michael F. P., Daniel R. Gregory, and Anthony Usher. 1987. Rehabilitation of Pits and Quarries for Fish and Wildlife. Aggregate Resources Section, Land Management Branch, Ontario Ministry of Natural Resources.
- Ontario Ministry of Natural Resources. 1986-2000. Owen Sound District Fisheries Management Plan.
- Ontario Ministry of Natural Resources. 1997. Aggregate Resources of Ontario. Provincial Standards. Queens Printer for Ontario. Toronto, Ontario.
- Ontario Ministry of Municipal Affairs and Housing. 1997. Provincial Policy Statement. MMAH: Toronto, Ontario.
- Ontario Ministry of Natural Resources. 1999. Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement. OMNR: Peterborough, Ontario.
- Ontario Ministry of Natural Resources. 1999. Natural Heritage Information Centre. Provincial status of plants, wildlife, and vegetation communities' electronic database. OMNR: Peterborough, Ontario.
- Ontario Ministry of Natural Resources. Oct 2000. Significant Wildlife Habitat Technical Guide. 151p.
- Ontario Ministry of Natural Resources. 2002. Natural Resources and Values Information System electronic database.

SUB-APPENDIX A
GUIDELINES FOR REHABILITATION TO
NATURAL ENVIRONMENT

GUIDELINES FOR THE DEVELOPMENT OF A TERRESTRIAL HABITAT REHABILITATION PLAN

The following guidelines to the development of a terrestrial habitat rehabilitation plan are necessarily generic and provide a framework for identifying which rehabilitation strategies are most appropriate, given surrounding land uses. Due to the varying nature of the natural resources associated with lands adjacent to pits and quarries, it is not possible, nor advisable, to be prescriptive. The main goal should be to assess the key features of adjacent lands and determine the best opportunities for complimenting or enhancing these features.

1. Identification of local habitat and habitat use patterns in the vicinity of the site;
2. Assess succession patterns in the area and immediately adjacent to the site;
3. Assess general site characteristics (soil resources, terrain & biological inventory);
4. Assess likely future land uses in the surrounding area;
5. Identify local seed sources that may colonize or invade site;
6. Prioritize probability, temporal scale of establishment;
7. Determine function and desirability of species likely to colonize site in predicted timeframe;
8. Establish general regional and site specific ecological targets and goals and blend with local social and recreational interests;
9. Identify key habitats, connections and species to achieve target functionally and spatially;
10. Identify impediments to the establishment of target species;
11. Evaluate actions to enhance succession;
12. Assess need for and establish active management (grading, plantings, etc.);
13. Establish baseline and study design for adaptive management monitoring programs.

APPENDIX E

AGRICULTURE

**GREY COUNTY AGGREGATE RESOURCES
INVENTORY MASTER PLAN
APPENDIX E - AGRICULTURE**

Prepared by:



ESG International Inc.
361 Southgate Dr., Guelph, ON
N1G 3M5

&



Colville Consulting Inc.
24 B Nihan Dr., St. Catharines, ON
L2N 1L2

G2006

July, 2003

EXECUTIVE SUMMARY

Agriculture is an important component of the economy of the County of Grey. There are close 3,000 farms cultivating approximately 600,000 acres of farmland, which in 2000 generated approximately \$240.6 million from farm gate sales of a wide range of agricultural products. Livestock and cash crop operations are the most common forms of agricultural production in the County, although specialty crop production (e.g., apples) is common in the Meaford and Thornbury areas.

The County of Grey recognizes the importance of agriculture and has taken steps to protect the agricultural resources by limiting the uses of these lands to primarily agricultural uses. To identify its prime agricultural areas, the County has developed an alternative land evaluation system to determine the highest priority agricultural lands. The prime agricultural areas include prime agricultural lands (i.e., specialty crop lands and CLI Classes 1-3) as well as lower capability soils that are under agricultural production and deemed to be integral to the types of agricultural common in Grey County. Two agricultural land use designations are recognized in the Official Plan, "Agriculture" and "Special Agriculture". The farm types primarily located within the Agricultural designation generally includes typical livestock and field crop operation, whereas the Special Agricultural designation includes those areas where specialty crops such as fruits and vegetables are grown.

Aggregate extraction is permitted in both agricultural designations providing appropriate rehabilitation plans have been developed and implemented as part of the site plan approval process. The Provincial Policy Statement (PPS) provides policies relating to the preservation of agricultural areas. Policy 2.2.3.6 states that "In *prime agricultural areas*, on *prime agricultural land*, extraction of *mineral aggregates* is permitted as a interim use provided that rehabilitation of the site will be carried out whereby substantially the same areas and same average soil quality for agriculture are restored. Therefore, aggregate extraction can be considered as an interim use of agricultural land and this study concludes that agriculture is a low constraint to aggregate extraction.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	II
1. INTRODUCTION.....	1
2. AGRICULTURAL POLICIES.....	1
2.1 Provincial Policy Statement (PPS)	1
2.2 Grey County Official Plan Policies.....	2
2.3 Aggregate Resources Act	3
3.0 AGRICULTURAL STATISTICS FOR THE COUNTY.....	3
3.1 Agricultural Economic Characteristics.....	3
3.2 Area of Farmland.....	3
3.3 Number and Types of Farms.....	5
3.4 Crop Production	6
3.5 Farm Gate Sales	8
3.6 Agricultural Employment	8
4.0 PHYSICAL RESOURCES	8
4.1 Physiography and Soils.....	8
4.2 Climate	9
5.0 AGRICULTURAL REHABILITATION	9
6. ASSESSMENT OF CONSTRAINT TO AGGREGATE EXTRACTION	10
7. CONCLUSIONS.....	10
8. REFERENCES.....	11

SUB-APPENDIX A

A. General Rehabilitation Procedures and Recommendations	2
A.1 Progressive Rehabilitation Procedures.....	2
A.2 Soil Resources.....	2
A.3 Soil Stripping and Handling Procedures	2
A.4 Post Rehabilitation Recommendations	3
A.5 Seeding Method.....	3
A.6 Fertilizer Applications.....	3

1. INTRODUCTION

A review of agriculture in the County of Grey was completed as per the terms of reference for this study. The relative importance of the agricultural resources and potential impact of aggregate extraction on these resources was considered as part of the evaluation of constraints analysis and provided input to the Resource Evaluation Model. This appendix discusses in detail the agricultural policies contained in the Provincial Policy Statement and the County of Grey Official Plan and the requirements of the Aggregate Resources Act when dealing with aggregate extraction in prime agricultural areas. The importance of agriculture to the County of Grey is discussed through a review of the agricultural statistics for the County and the physical resources of the County (i.e., the soil resources) are described. A discussion of the rehabilitation requirements and general rehabilitation guidelines are also provided.

The following data were reviewed:

- The Physiography of Southern Ontario, Chapman and Putnam, 1984;
- Soil Survey of Grey County, Report No. 17 of the Ontario Soil Survey, 1954;
- Land use designations and zoning mapping, Planning Department, County of Grey (2000);
- Statistics Canada's Census of Agriculture (2002);
- Aggregate Resources mapping – generated by Jagger Hims for the Grey County Aggregate Resources Inventory Master Plan (2002); and
- Policy Documents
 - Provincial Policy Statement (1997)
 - Grey County Official Plan (2000)
 - Aggregate Resources Act (1996)
 - Aggregate Resources of Ontario Provincial Standards (1997)

2. AGRICULTURAL POLICIES

2.1 Provincial Policy Statement (PPS)

The Provincial Policy Statement provides policies relating to the preservation of agricultural areas. Policy 2.2.3.6 states that. In *prime agricultural areas*, on *prime agricultural land*, extraction of *mineral aggregates* is permitted as a interim use provided that rehabilitation of the site will be carried out whereby substantially the same areas and same average soil quality for agriculture are restored.

On these *prime agricultural lands*, complete agricultural rehabilitation is not required if:

- a) There is a substantial quantity of *mineral aggregates* below the water table warranting extraction; or
- b) The depth of planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible; and
- c) Other alternatives have been considered by the applicant and found unsuitable; and
- d) Agricultural rehabilitation in remaining areas will be maximized.

The PPS defines prime agricultural areas as where prime agricultural land predominates. Prime agricultural areas may also be identified through an alternative agricultural land evaluation system approved by the Province, as is the case with Grey County. This classification system will be described as part of the County Official Plan Policies below.

Prime agricultural lands include speciality croplands and/or Canada Land Inventory (CLI) Classes 1, 2, and 3 soils, in this order of priority for protection.

Speciality crop land is defined in the PPS as areas where speciality crops such as tender fruits (peaches, cherries, plums), grapes, other fruit crops, vegetable crops, greenhouse crops, and crops from agriculturally developed organic soil lands are predominantly grown, usually resulting from:

- soils that have suitability to produce speciality crops, or lands that are subject to special climatic conditions, or a combination of both; and/or
- a combination of farmers skilled in the production of speciality crops, and of capital investment in related facilities and services to produce, store, or process speciality crops

According to the PPS speciality crops receive the highest priority, however aggregate development is still permitted, provided that rehabilitation of the site will be carried out whereby substantially the same areas and same average soil quality for agriculture are restored. Former quarries and pits have been successfully developed into existing vineyards and orchards.

2.2 Grey County Official Plan Policies

The protection of the "agricultural way of life" is a primary objective of Grey County.

The County of Grey recognizes the importance of agriculture and has taken steps to protect its important agricultural resources by limiting the uses of these lands to primarily agricultural uses. The County has worked with the Ministry of Agriculture and Food to develop an alternative land evaluation system for determining the highest priority agricultural lands. The prime agricultural areas include prime agricultural lands (i.e., specialty crop lands and CLI Classes 1-3) as well as lower capability soils that are under agricultural production and deemed to be integral to the types of agricultural common in Grey County. Two agricultural land use designations are recognized in the Official Plan, "Agriculture" and "Special Agriculture". The farm types primarily located within the Agricultural designation generally includes typical livestock and field crop operations, whereas the Special Agricultural designation also includes those areas where specialty crops such as fruits and vegetables are commonly grown.

These two agricultural designations were used to identify the County's prime agricultural areas and are shown in Figure E-1.

This evaluation system is based on County-level soil survey information and 1:50,000 CLI manuscript mapping capability information, as well as soils maps prepared by Ontario Hydro. Non-agricultural lands such as wetlands, forest cover, aggregate operations, and urban uses were removed from the areas of good agricultural soils. The remaining areas of good agricultural land were further refined by limiting representative areas to approximately 400 acres or more in size. The Agricultural designation is not restricted to areas with prime agricultural lands (CLI class 1 to 3 inclusive), it also includes larger blocks of good agricultural land under active production.

Permitted uses within the Agricultural Designation include:

- ◆ Agriculture, including all types of farming and related buildings and structures, farm residence, farm related uses such as home/rural occupations
- ◆ Industrial uses supportive of the agricultural operation and required in close proximity to the farm operations in the area
- ◆ Land uses connected with soil, water, wildlife and natural resource conservation
- ◆ A limited amount of non-farm land uses if there is a demonstrated need for additional land to be utilized to accommodate the proposed use and there are no reasonable alternative locations, which would avoid agricultural areas.

Within areas identified as Primary Aggregate Resource Areas in the Official Plan, non-farm development shall only be permitted where it has been demonstrated that extraction is not feasible due to resource quantity, quality, development patterns or the proposed development serves a greater long term interest of the general public than does aggregate extraction.

Schedule 'A' of the County Official Plan also identifies a Special Agriculture Designation. This designation applies to those areas of the County that lend themselves to the growing of fruit and vegetables. Within this designation, permitted uses include:

- ◆ Agricultural uses;
- ◆ Uses connected with the conservation of water, soil, wildlife, and other natural resources;

- ◆ All types of farming and related buildings and structures;
- ◆ Farm residence; and
- ◆ Small scale commercial or industrial uses directly supportive and related to the agricultural operation and required in close proximity to the farm operations in the area.

2.3 Aggregate Resources Act

The purposes of the Aggregate Resources Act are,

- (a) to provide for the management of the aggregate resources of Ontario;
- (b) to control and regulate aggregate operations on Crown and private lands;
- (c) to require the rehabilitation of land from which aggregate has been excavated; and
- (d) to minimize adverse impact on the environment in respect of aggregate operations.

According to Section 12(1), in considering whether a license should be issued or refused, planning and land use considerations, as well as the effects of the operation of the pit or quarry on agricultural resources must be considered. Additionally, the Act requires that every licensee perform progressive rehabilitation and final rehabilitation on the site in accordance with the act, the site plan, and the conditions of the license.

3.0 AGRICULTURAL STATISTICS FOR THE COUNTY

To illustrate the importance of agriculture to the County of Grey a review of the agricultural economic statistics was completed.

3.1 Agricultural Economic Characteristics

Data for this analysis have been drawn from Statistics Canada's Census of Agriculture. The census is conducted at five-year intervals, and organizes data at a number of levels: Canada; Province/Territory; Census Divisions (e.g. Counties, Regional Municipalities, and Districts); and, Census Subdivisions (e.g. Townships, Towns and Villages). The most recent census was conducted in May 2001; basic counts and totals for all farm variables described in this section were gathered from this census, and compared to data from the 1996 census where appropriate.

3.2 Area of Farmland

At the time of the most recent Census of Agriculture in 2001, there were 593,121 acres of farmland in Grey County (Table 1). This is a decrease of 7,295 acres (1.2%) from the 1996 census when there were 600,416 acres of farmland in the county. This rate of decline is much lower than the 12.7% decrease in farmland across Ontario over the same five-year period. West Grey census subdivision has the greatest area of farmland, followed by Grey Highlands census subdivision. Blue Mountains census subdivision has the least amount of farmland in the county.

Table 1. Area of Farmland in Grey County, 2001

Census Subdivision	Acres of farmland
West Grey	122,732
Southgate	99,682
Grey Highlands	116,393
Chatsworth	80,528
Blue Mountains	28,695
Georgian Highlands	71,827
Georgian Bluffs	73,264
Grey County	593,121

Source: Statistics Canada Census of Agriculture, 2002

In 2001 land under crops comprised 317,132 acres, or 53.4% of agricultural land in Grey County (Table 2). Almost one-quarter of the agricultural land in the county was used for pasture (75,847 acres of improved pasture, and 63,989 acres of unimproved pasture). Lands classified as other include all lands used for Christmas tree farms and those agricultural lands not elsewhere classified. In Grey County, 134,056 acres, or 22.6% of agricultural land was classified as other. Very little land is typically used for summer fallow. Only 2,097 acres, or 0.4% of Grey County's farmland, was summer fallow in 2001.

Table 2. Use of Agricultural Land in Grey County, 2001 (in acres)

	Under Crops	Summer Fallow	Improved Pasture	Unimproved Pasture	Other
West Grey	69,403	504	13,781	10,246	28,798
Southgate	58,930	496	8,491	9,291	22,474
Grey Highlands	61,390	356	15,339	12,214	27,094
Chatsworth	40,308	490	12,922	9,292	17,516
Blue Mountains	18,472	N/A	2,704	2,596	N/A
Georgian Highlands	36,220	108	8,832	11,989	14,678
Georgian Bluffs	32,409	N/A	13,778	8,361	N/A
Grey County	317,132	2,097	75,847	63,989	134,056

Source: Statistics Canada Census of Agriculture, 2002

3.3 Number and Types of Farms

In 2001, there were 2,834 census farms¹ in Grey County. This represents a decrease of 300 farms, or 9.5%, from the 3,134 farms recorded in the county in 1996. Over the same time period, the number of farms in Ontario decreased by 11.5%. Within Grey County, West Grey had the greatest number of farms (654), and Blue Mountains had the least (161).

Table 3. Number of Farms in Grey County, 2001

Census Subdivision	Number of farms
West Grey	654
Southgate	488
Grey Highlands	488
Chatsworth	403
Blue Mountains	161
Georgian Highlands	336
Georgian Bluffs	304
Grey County	2,834

Source: Statistics Canada Census of Agriculture, 2002

Table 4 shows the diversity of farm types² in Grey County with gate sales greater than \$2,499, in 2001. This sales figure is used to eliminate any bias that might occur in categorizing farms into types by the inclusion of small 'hobby' farms generating gate sales of less than \$2,500 annually.

¹ Statistics Canada defines a census farm as an agricultural operation that produces at least one of the following products intended for sale: crops (field crops, tree fruits or nuts, berries or grapes, vegetables or seed); livestock (cattle, pigs, sheep, horses, exotic animals, etc.); poultry (hens, chickens, turkeys, exotic birds, etc.); animal products (milk or cream, eggs, wool, fur, meat); or other agricultural products (greenhouse or nursery products, Christmas trees, mushrooms, sod, honey, maple syrup products). The definition of a census farm was expanded for the 1996 Census of Agriculture to include commercial poultry hatcheries and operations that produced only Christmas trees. This expanded definition resulted in the inclusion of 138 commercial poultry hatcheries and 1,593 operations across Canada that produced only Christmas trees.

² Each census farm is classified according to the predominant commodity produced. Statistics Canada does this by estimating the potential receipts from the inventories of crops and livestock reported on the questionnaire. The commodity or group of commodities that accounts for 51% or more of the total potential receipts determines the farm type. For example, a census farm with total potential receipts of 60% from dairy, 20% from hogs and 20% from field crops, would be classified as a dairy farm. Where there is no single major commodity associated with the farm operation (i.e. 45% dairy, 45% hogs and 10% field crops; 40% grains and oilseeds, 35% hogs, 25% maple syrup), the farm is categorized as either a 'livestock combination' or 'other combination' operation. Field Crop farms include wheat, grain, oilseed and other field crops. Miscellaneous specialty includes greenhouse flower and plant production, bulbs, shrubs, trees, sod, ornamentals, mushroom houses, honey production, maple syrup production, etc.

Table 4. Types of Farms in Grey County, 2001 (with sales of more than \$2,499)

	Dairy	Beef	Hogs	Poultry	Field crops	Fruit	Veg.	Misc. spec.	Livestock combo	Other combo
West Grey	56	268	19	14	97	4	4	82	26	13
Southgate	43	197	24	13	80	0	3	43	25	12
Grey Highlands	37	252	7	2	72	3	1	49	11	12
Chatsworth	25	180	2	4	42	2	1	56	31	10
Blue Mountains	4	34	3	0	17	66	3	10	4	9
Georgian Highlands	16	145	4	1	45	24	2	45	11	10
Georgian Bluffs	25	164	2	2	22	2	0	43	6	4
Grey County	206	1,240	61	36	375	101	14	328	114	70

Source: Statistics Canada Census of Agriculture, 2002

In 2001, 2,545 farms in Grey County reported farm gate sales greater than \$2,499. Beef and Field Crop farms were the dominant farm types, comprising 48.7% and 14.7%, respectively, of farm types in the county. Most of these farms are located in West Grey and Grey Highlands census subdivisions. Dairy farms and Miscellaneous Specialty farms were also well represented. Southgate census subdivision is also an important area for these farm types. Fruit farms are concentrated in Blue Mountains and Georgian Highlands census subdivisions.

3.4 Crop Production

Crop farming is the dominant agricultural activity in Grey County in terms of the area of farmland used, and the second-most dominant type of farm. Table 5 compares the area of land used by each of the field crop types in Grey County, in 2001. It also shows the number of farms that grew each type of crop in that year.

It should be noted that the total number of farms that reported crops exceeds the total number of field crop farms in Grey County, as most field crop farms typically grow more than one type of crop, and farms that are not categorized as field crop farms may include field crops as part of their farming operation. The symbol N/A (not available) has been inserted where there were too few farms reporting data to ensure confidentiality. As such, n/a does not equal zero, rather it indicates that a positive figure exists, and has been included as part of the total area under crops.

Alfalfa and alfalfa mixtures, other tame hay, barley and mixed grains use the greatest area of cropland in Grey County. Between them they comprised 232,222 acres, or 73.2% of all cropland, and 39.2% of all farmland, in Grey County in 2001. Alfalfa and alfalfa mixtures were grown by the greatest number of farms (1,861), followed by mixed grains (830) and other tame hay (796).

Table 5. Field Crop Farms and Area of Field Crops in Grey County, 2001 (in acres)

	West Grey		Southgate		Grey Highlands		Chatsworth		Blue Mountains		Georgian Highlands		Georgian Bluffs		Grey County	
	#	area	#	area	#	area	#	area	#	area	#	area	#	area	#	area
Wheat	61	3003	52	2753	34	2058	24	1040	20	922	25	1175	16	759	232	11710
Oats	34	601	30	841	40	1045	45	645	5	92	17	362	25	578	196	4164
Barley	145	5805	116	6226	142	6958	71	3210	21	1084	43	2182	74	2581	612	28046
Mixed Grains	206	6407	172	7395	160	5417	108	3117	33	1167	79	2253	72	2254	830	28010
Corn for Grain	113	6571	68	5039	25	1256	50	2592	11	587	30	2171	16	1562	313	19778
Buckwheat	8	58	8	162	0	0	3	N/A	1	N/A	3	31	0	0	23	271
Rye	3	27	5	50	1	N/A	3	N/A	1	N/A	2	N/A	0	0	15	157
Corn for Silage	99	3148	98	3088	62	2188	71	2194	3	28	34	1329	36	1127	403	13102
Alfalfa	468	29320	317	19290	354	30012	269	18276	71	5822	188	14846	194	14318	1861	131884
Other Tame Hay	139	5951	152	8655	128	7888	134	5949	26	1401	117	7328	100	7110	796	44282
Canola	4	296	18	1237	14	1178	6	319	7	293	8	498	4	1126	61	4947
Flaxseed	3	N/A	4	105	1	N/A	1	N/A	0	0	0	0	0	0	9	554
Soybeans	103	7185	37	3616	32	2866	33	2367	29	2752	30	2282	11	873	275	21941
Sunflowers	1	N/A	0	0	0	0	0	0	0	0	0	0	1	N/A	2	N/A
Potatoes	3	N/A	5	15	3	N/A	7	11	0	0	3	15	0	0	21	72
Dry Field Peas	0	0	1	N/A	1	N/A	2	N/A	0	0	0	0	1	N/A	5	44
Dry Field Beans	5	150	2	N/A	1	N/A	4	242	1	N/A	1	N/A	2	N/A	16	493
Canary Seed	0	0	0	0	0	0	1	N/A	0	0	0	0	0	0	1	N/A
Ginseng	0	0	1	N/A	0	0	2	N/A	0	0	1	N/A	0	0	4	11
Triticale	0	0	1	N/A	1	N/A	0	0	0	0	0	0	0	0	2	N/A
Forage Seed for Seed	1	N/A	2	N/A	2	N/A	2	N/A	3	123	1	N/A	0	0	11	447
Other Field Crops	0	0	4	211	2	N/A	1	N/A	0	0	2	N/A	1	N/A	10	379

Source: Statistics Canada Census of Agriculture, 2002

3.5 Farm Gate Sales

Table 6 shows total farm gate sales at the township level in Grey County for the year 2000³. In 2000, farm gate sales in Grey County totalled over \$240.6 million; an increase of \$27.2 million, or 12.8%, from 1995. Farm gate sales in Grey County in 1995 totalled \$213,375,796. In comparison, farm gate sales across Ontario increased 17.2% over the same five-year period.

Table 6. Farm Gate Sales in Grey County, 2000

Census Subdivision	Total farm gate sales
West Grey	\$78,620,253
Southgate	\$47,139,685
Grey Highlands	\$29,430,954
Chatsworth	\$24,933,221
Blue Mountains	\$15,868,410
Georgian Highlands	\$20,875,952
Georgian Bluffs	\$23,738,398
Grey County	\$240,606,873

Source: Statistics Canada Census of Agriculture, 2002

3.6 Agricultural Employment

In 1996, employment in Agriculture and Related Service Industries represented approximately 9.4% of total employment in Grey County. In that year there were 4,325 farm operators in the county (3,175 males and 1,150 females). The greatest proportion of farm operators (1,875 operators, or 43.4%) spent more than 40 hours per week working for the agricultural operation. Over a quarter of farm operators (1,200 operators, or 27.7%) spent less than 20 hours per week working on-farm. The remaining 1,250 operators (28.9%) spent between 20 and 40 hours per week working on the farm.

4.0 PHYSICAL RESOURCES

4.1 Physiography and Soils

Grey County is composed of ten physiographic regions (Chapman and Putnam, 1984) of varying size and form. The most dramatic physiographic feature is the Niagara Escarpment. Other striking features include the Beaver Valley and Bighead Valley physiographic regions. The Horseshoe Moraines physiographic region makes up the largest portion of Grey County. Located centrally within the county, it consists of till ridges, kame moraines, outwash plains, and spillways. These are divided by till plains and drumlinized areas. The tills making up this area are of a loamy texture and commonly stony. The Dundalk till plain occupies the southern portions of the County. Low, drumlinoid formations and numerous areas of poor drainage characterize this undulating till plain. This physiographic region contains the headlands for several rivers including the Grand, Nottawasaga, Maitland and Saugeen.

The soil capability for agriculture is highly influenced by the mode of deposition and topographic characteristics. The soil has developed from a wide variety of glacial deposits including morainal tills, lacustrine deposits, both poorly sorted and well sorted sands and gravel deposits, shallow drift over limestone bedrock, and more recent deposits such as organic and alluvial deposits. The most common (in terms of area) mineral soils are Osprey Loam, Pike Lake loam, Harriston silt loam, and Listowel silt loam. The soils that have developed from the Burford, Donneybrook and Sargent catenas are some of the more important soils from an aggregate perspective having developed from well sorted sand and gravel deposits.

³ Farm gate sales and operating expenditures data are gathered for the year previous to census year (i.e. farm gate sales and operating expenditures reported in the 2001 Census of Agriculture are for the 2000 calendar year).

The southeastern portions of the County are dominated by the Listowel silt loam and Muck soils. This area corresponds with the Dundalk till plain physiographic region. The Listowell silt loam is an imperfectly drained soil however it is considered to be one of the best agricultural soils in the County. Muck soils are not commonly used for agricultural production in the County of Grey.

The well to rapidly drained Harriston silt loam soil, Donnybrook sandy loam, and Sullivan sand are the most common soil types in the highly variable south western portion of the County. The Harriston silt loam has developed from limestone till and is considered to be a good agricultural soil. The Donnybrook sandy loam has developed from poorly sorted sands and gravels and the Sullivan sand, developed from coarse sandy materials in most cases have limitations (e.g., droughtiness, stoniness, fertility, etc.) that reduce the capability for the production of common field crops.

The central portions of the County located south of the southern tip of Beaver Valley are dominated by the Pike Lake loam soils. The Pike Lake loam is developed from poorly sorted sands and gravels, and has good drainage. These soils have developed on the spillway features located in this area, which corresponds with the southern portion of the Horseshoe physiographic region. Due to their topographic, fertility, droughtiness and stoniness limitations, these soils are considered to be poor agricultural soils, however, they may provide important pasture lands for some livestock operations.

The central portions of the County located north of the southern tip of Beaver Valley are dominated by the Osprey loam soil. This soil is the most common in the County, and occupies the northern portions of the Horseshoe Moraines physiographic region. The Osprey loam is developed on the coarse open till materials that typically comprises this morainal feature. Osprey loams are considered to be marginal for agricultural production of common field crops and in many cases are best suited to providing permanent pasture.

The northern portions of the County, southeast of Owen Sound, are dominated by Vincent silty clay loam. Vincent silty clay loam is developed from fine textured till and has good drainage. This soil dominates the Bighead Valley physiographic region and is highly production on the more gentle slopes for the production of common field crops.

Brighton soils have developed on well sorted sands and are common in the Meaford-Thornbury area. They have moderately severe limitations for the production of common field crops, however, they are often used for the production of specialty crops and in particular apples. This area is recognized as a specialty crop growing area because of the unique combination of soil and climate which supplies the specific needs for these crops.

4.2 Climate

In comparison to other areas in Southern Ontario the climate in the County of Grey is relatively cool. In fact the Dundalk plain has the coolest and shortest growing season. The growing season ranges from generally has less than 120 frost free days on the Dundalk plain located in the central and south eastern portion of the County to up to 140 frost free days for other portions of the county. Corn heat units follow a similar patten geographically and range from below 2300 in the Dundalk region to over 2500 in the north western portion of the County. As a result, crop production is generally limited to common field crops such as cereal grains, corn and pasture/forage crops.

There are two notable exceptions where the climate is moderated due to a combination of their geographic location (i.e., close to Georgian Bay) and topography. These two areas are located near the mouths of Bighead Valley and Beaver Valley. The moderating influences of the Bay and the sheltering hills adjacent to the valley result in a longer frost free growing season than is experienced by the rest of the County and extreme cold winter temperatures that can damage cold sensitive crops are not as severe in this area. As a result of the combination of good soils and mild climate, apples are commonly grown in the Meaford and Thornbury areas. These areas have been recognized by the Province and the County as specialty crop growing areas.

5.0 AGRICULTURAL REHABILITATION

Both the PPS and the County of Grey permit aggregate extraction on lands that have been identified as prime agricultural areas. In prime agricultural areas and on prime agricultural lands, the PPS recognizes that aggregate extraction is an interim use and requires the site to be rehabilitated in such a manner that substantially the same areas and same average soil quality for agriculture are restored. However, it also recognizes that in some cases complete agricultural rehabilitation is not required due to site specific issues (e.g., extraction below water table or pre-extraction capability is unfeasible due to depth of extraction). The County of Grey also permits aggregate extraction in both agricultural designations providing appropriate rehabilitation plans have been developed and implemented as part of the site plan approval process.

The overall intention of rehabilitation is to ensure that the property after extraction is safe and stable; this is the fundamental objective of the Aggregate Resources Act. Issues that would be considered in a rehabilitation plan include the compatibility of the after use with the surrounding land uses, slope creation, floor preparation, overburden replacement, soil replacement, and re-vegetation/crop type. Whenever possible, rehabilitation should be progressive in nature. The disturbance, handling and exposure of the soil resources should be minimized. In addition to the economic benefits to the operator, the successful rehabilitation to an agricultural after use is more easily achieved by employing progressive rehabilitation techniques.

Sub-Appendix A provides General Rehabilitation Guidelines that can be employed to reduce potential impacts and rehabilitation costs to the operator.

6. ASSESSMENT OF CONSTRAINT TO AGGREGATE EXTRACTION

Agriculture is an important component of the economy in the County of Grey and as such its agricultural resources need to be protected. The County of Grey has identified its most important agricultural lands and protects these lands by limiting development to predominantly agricultural uses. However, aggregate resources are often located on agricultural lands and extraction of these resources can have a negative impact on agriculture. As such, agriculture is considered to be a constraint to aggregate extraction.

Aggregate resource extraction is permitted as an interim use of agricultural land as long as the impact is mitigated through the development and implementation of a rehabilitation plan to ensure that substantially the same area and soil quality are restored following extraction. In light of the policy requirements for agricultural rehabilitation and the current rehabilitation technologies employed, the level of impact on agriculture following rehabilitation has been determined to be low. Agriculture is considered to be a low constraint for aggregate extraction.

7. CONCLUSIONS

The purpose of the Grey County Aggregate Inventory Master Plan is to identify, protect and prescribe management for the aggregate resources in Grey County. Agriculture is one of the factors that affect the aggregate resources in the County. This study has shown that aggregate resources are often located on agricultural lands and extraction of these resources can have an impact on agriculture.

Agriculture is an important component to the economy of Grey County. The agricultural resources of the County supports predominantly generalized farming dominated by livestock and common field crop production. However, as a result of the climatic advantages experienced in the Meaford and Thornbury areas, specialty crop production is also successfully supported on good quality agricultural soils. The County has identified its most important agricultural lands through the development of an alternative land evaluation system and protects these lands by limiting uses in agriculturally designated areas to predominantly agricultural uses.

Following an assessment of the agricultural policies, the County's agricultural resources and agricultural statistics it was determined that agriculture poses a minimal constraint to aggregate extraction and that aggregate extraction may occur although it is expected that rehabilitation efforts will be employed to ensure that impacts are minimized to acceptable levels. The generalized rehabilitation guidelines provided will assist in mitigating the potential impacts.

8. REFERENCES

- Aggregate Resources Act (1996). Statutes of Ontario Chapter 23 and Ontario Regulation 702/89.
- ARDA Branch, Canada Land Inventory, Ontario Department of Agriculture and Food. 1970. Acreages by Counties and Townships for Agricultural Land Use Capability in Southern Ontario.
- Chapman, L.J. and D.F. Putnam. 1984. The physiography of southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume 2.
- County of Grey. 2000. County of Grey Official Plan.
- Gillespie, J.E. and N.R Richards. 1954. Soil Survey of Grey County, Report No. 17 of the Ontario Soil Survey ; Ministry of Agriculture and Food; Agriculture Canada, Research Branch, Guelph; 2 maps, scale 1:63,360, 79p.
- Ontario Ministry of Municipal Affairs and Housing. 1997. Provincial Policy Statement. MMAH: Toronto, Ontario.
- Ontario Ministry of Natural Resources. 1997. Aggregate Resources of Ontario. Provincial Standards. Queens Printer for Ontario. Toronto, Ontario.
- Statistics Canada. 2002. 2001 Census of Agriculture. Farm Data: Full Release. Stand-alone CD-ROM Catalogue Number 95F0304XCB.

SUB-APPENDIX A
GENERAL REHABILITATION GUIDELINES

A. General Rehabilitation Procedures and Recommendations

A.1 Progressive Rehabilitation Procedures

There are many advantages to rehabilitating an area progressively both from an agricultural perspective and from an operational standpoint. Progressive rehabilitation limits the time an agricultural area is removed from production. Soil resources (e.g., topsoil, subsoil, overburden) can be more carefully managed and preserved. Transportation and stockpiling of soil resources is reduced and soil exposure is minimized, thereby limiting erosion and loss of soil resources.

Operational expenses are reduced because the majority of soil material is moved only once. The operation of heavy equipment and traffic is reduced as is the manpower required. With the reduced level of traffic, the chances of soil compaction caused by the movement of heavy equipment are reduced, as is the potential for generating dust.

A.2 Soil Resources

The soil resources include the topsoil (A horizon), subsoil (B horizon), and the overburden or parent material (C horizon). The topsoil and subsoil generally contain the majority of soil nutrients required for plant growth and provides a good rooting medium where the vast majority of plant roots are located. The topsoil is the most important medium for agricultural rehabilitation. It is the primary rooting medium and the main source of nutrients required for plant growth. A minimum of 15 cm of topsoil overlying the subsoil is required for successful agricultural rehabilitation although it is recommended that at least 20-25 cm be placed on top of the subsoil.

The subsoil also contains nutrients available to plants and therefore is also a valuable rooting medium. The subsoil is the weathered zone lying below the topsoil and is generally free of carbonates. Carbonates can often reduce the availability of nutrients necessary for root growth and are most often found in high concentrations in the unweathered parent material or overburden. It is therefore important to carefully strip and separate the soil resources to ensure that contamination due to mixing does not occur and reduce the fertility of the soil. An average thickness of approximately 20-25 cm of topsoil and 30-40 cm of subsoil is generally recommended and should provide a 50-65 cm rooting medium above the overburden.

The overburden is used to ensure that at least one full metre of soil material overlies the bedrock surface and/or the high watertable. If sufficient quantities of overburden are available, one full metre of this material underlying the subsoil and topsoil is preferred. The overburden can be easily identified using a 10% solution of hydrochloric acid (HCl). A reaction indicates the presence of free carbonates commonly found in the unweathered soil parent material.

A soil resources inventory should be conducted to assist with the development of the rehabilitation plan. The soil resources inventory will identify the volumes of topsoil, subsoil and overburden on site and will provide an understanding of the materials available for rehabilitation. If there are insufficient volumes of soil material available on site, the soil resource inventory will identify this problem early on in the rehabilitation process and alternative measures can be employed (importation of soil material, use of fines, reduction in area to be rehabilitated to an agricultural after use, etc.) to ensure the rehabilitation requirements are met.

A.3 Soil Stripping and Handling Procedures

The stripping process begins by removing the topsoil, subsoil, and overburden separately. If this material cannot be used immediately for rehabilitation, the soil resources should be stored separately in berms and if necessary, stockpiles. These berms may remain in place for the duration of the mining operation and should be vegetated to prevent soil losses due to erosion. The berms can also be constructed and utilized for long term visual screening and sound attenuation purposes. This will often be the final material used in the progressive rehabilitation sequence, however, use of the materials stored in the berms may not be necessary until the final stages of extraction.

The area to be stripped of the topsoil and subsoil should equal the area that can be extracted in a reasonable amount of time. Stripping and transportation of soil materials should only occur under dry conditions. Any movement of soil materials or vehicular traffic over soil when saturated will cause damage to soil structure and should be avoided. The potential loss of soil structure increases with a rise in soil moisture content.

Extraction of the aggregate resource can begin once the overburden has been removed. Once an area large enough has been extracted, re-application of soil material can begin. In the case of a quarry, it is generally recommended that at least one metre of soil material (topsoil, subsoil and overburden) should be placed over the bedrock surface. This surface should be contoured and graded to a minimum 1% slope to ensure proper drainage of surface water. Grading may result in substantially more than one

metre of soil material is placed over the bedrock. For many pits the overburden is the resource. Extraction of the resource in this case should proceed in a manner that ensures that the following the reapplication of the stripped subsoil and topsoil, at least one metre of soil lies above the level of the high watertable.

To alleviate any soil compaction the overburden may require the use of a subsoiler or ripper to break up the compacted areas prior to application of the subsoil and topsoil. If any stones are brought to the surface during this procedure, they should be removed. No large stones should remain within approximately 50 cm of the surface of the overburden.

The subsoil can now be placed on the overburden. This material (minimum of 30 cm), should be spread evenly over the overburden. Depending on the subsoil's textures and the moisture content, the subsoil may need to be chisel plowed to alleviate any compaction as a result of spreading this material on top of the overburden. The depth of chisel plowing should not occur at a greater depth than the thickness of subsoil material to ensure the potential for mixing with the overburden is limited. Large stones should again be removed following application of the subsoil. The topsoil can then be applied over the subsoil and an appropriate method should be employed to ensure that compaction of the topsoil is minimized.

It is recommended that 15 cm is the minimum depth (more is better) of the topsoil over the subsoil and that there should generally be at least 30 cm of subsoil overlying the overburden. This should provide a good rooting medium for the crops to be planted.

In most cases, storing the topsoil and subsoil material should not be necessary after the initial stages of stripping and reapplication has begun. This material should be transported directly from the stripping area to an area designated for rehabilitation and replaced immediately in the reverse sequence to that carried out during the stripping process. Subsoil is to be placed directly on the contoured, ripped overburden, and the topsoil replaced on the prepared subsoil. Any soil material which is to be exposed for long periods, (i.e., over the winter), should be covered by straw mulch or planted with a cover crop to prevent erosion.

A.4 Post Rehabilitation Recommendations

Post rehabilitation management is crucial for the success of this program. Protection from erosion, improving soil fertility and soil structure are now the primary concerns and the choice of crops should reflect these concerns.

It is recommended that the rehabilitated lands be seeded to a legume-grass mixture for a four to five year period. This combination of both deep rooting and shallow rooting species stabilize soil conditions, enhances soil structure, and increases soil fertility. It will also provide high quality forage (pasture and hay) once the crop is established. The deep rooting legumes improve soil structure by helping to break up compaction and they also supply nitrogen to the soil. Grasses are more shallow rooting and help to bind soil particles together, also improving soil structure. Both legumes and grasses add organic matter to the soil.

A.5 Seeding Method

A seeding technique known as "band seeding" is recommended for seeding the pit or quarry floor. Band seeding enhances seed germination and the establishment of a thick vigorous crop by placing the seed and fertilizer in the optimum position in the soil.

Establishment of a thick vigorous stand of a legume-grass mixture will be beneficial for soil amelioration and can still be used as a high quality forage crop. These crops should remain in place for at least a 4-5 year period. The legume-grass crop may then be plowed under in preparation for another crop such as corn, cereal grains or soybeans if the forage crop is to be replaced.

Establishing a legume-grass crop on the 2:1 side slopes is also highly recommended to reduce the potential for erosion. The steepness of the slopes limits the use of a band seeder and therefore this area should be hydro-seeded. A straw mulch and tacier can also be included in the mix in order to reduce erosion while the seed mix becomes established.

The spring and fall are the best times to seed an area in order to establish a thick, vigorous crop. Seeding during the winter months and the hot summer months (July and August) are not as successful and should be avoided.

A.6 Fertilizer Applications

It is recommended that a soil test be conducted immediately following final topsoil preparation. An OMAFRA approved soil test should be used to determine the rates of fertilizer application. Phosphorous is the primary soil nutrient that is most often required for the establishment of a thick vigorous crop. Other nutrients such as nitrogen and potassium may also be required. Band seeding is the most effective method of application for chemical fertilizers.

Applications of manure are also recommended. Manure provides the soil and crops with important nutrients and organic matter. Organic matter improves soil fertility and soil structure. Proper management of fertilizers, including manure, is essential for

optimum economic benefit and will reduce potential impacts on the environment. Excess levels of certain nutrients can result in contamination of groundwater and surface waters through leaching or erosion.

It is recommended that a nutrient management plan be developed as part of the rehabilitation plan for each aggregate operation to ensure that the risks to the environment are minimized. A nutrient management plan determines the amount and type nutrients required to establish and maintain the crop planted without exceeding the levels required by the crop.

APPENDIX F

TRANSPORTATION

**AGGREGATE RESOURCE
INVENTORY MASTER PLAN
GREY COUNTY**

**APPENDIX F
TRANSPORTATION**

**AGGREGATE RESOURCE INVENTORY MASTER PLAN
GREY COUNTY**

**APPENDIX F
TRANSPORTATION
P/N 02-1722**

October, 2004

Prepared by: Skelton, Brumwell & Associates Inc.
93 Bell Farm Road, Suite 107
Barrie, Ontario
L4M 5G1

Telephone: (705) 726-1141
FAX: (705) 726-0331
E-mail: mail@skeltonbrumwell.ca

Prepared for: GREY COUNTY

TABLE OF CONTENTS

	Page
1.0 TRANSPORTATION.....	1
1.1 Existing Road System.....	1
1.1.1 Provincial Highways	1
1.1.2 County Roads	2
1.2 Existing Truck Volumes	2
1.3 Official Plan Policies On Roads	3
1.4 Haul Routes.....	4
2.0 REFERENCES	5

AGGREGATE RESOURCE INVENTORY MASTER PLAN GREY COUNTY

APPENDIX F TRANSPORTATION

P/N 02-1722

October, 2004

1.0 TRANSPORTATION

1.1 Existing Road System

1.1.1 Provincial Highways

The Provincial Highway network, consisting of Highways 6, 10, 21, 26 and 89, forms the backbone of the transportation system within the County. The length of Provincial Highways within and along the boundary of the County totals about 241 kilometres.

Highway 6 forms the main north-south route through Grey County, extending between Mount Forest, Owen Sound and Wiarton. From Mount Forest, the Highway continues south-east towards Arthur, Fergus and Guelph. Past Wiarton, Highway 6 continues north up the Bruce Peninsula to Tobermory. Average Annual Daily Traffic (AADT) volumes in 2000 varied from a low of 4,100 vehicles per day (vpd) just north of Durham to a high of 20,200 vpd just west of Owen Sound.

Highway 10 crosses the County in generally a north-west direction, extending from Dundalk through to Owen Sound. The road combines with Highway 6 about 13 kilometres south of Owen Sound. From Dundalk, Highway 10 runs south-east toward Shelburne, Orangeville, Caledon, Brampton and then Mississauga. AADT's in 2000 varied from 4,800 vpd near Markdale to 9,100 vpd just south of Owen Sound.

Highway 21 runs westward from Owen Sound to Southampton, and then south to Goderich. Between Owen sound and the Grey / Bruce boundary, it is combined with Highway 6. 2000 Traffic volumes were between 8,450 vpd at the Grey / Bruce boundary to 20,200 just west of Owen Sound.

Highway 26 starts at Owen Sound and connects east to Meaford, where it then follows the shore of Georgian Bay to Collingwood. From Collingwood, Highway 26 extends south-east to Stayner and Barrie. The 2000 traffic volumes varied from 5,200 vpd between Meaford and Owen Sound to 7,700 vpd near the Grey / Simcoe County boundary.

Highway 89 forms the southern boundary of Grey County. East of the County it extends through Shelburne and Alliston before terminating at Highway 400. To the west, the road runs generally south to Harriston and then Palmerston, where it connects to Highway 23 which runs to Listowel and beyond. Traffic volumes in 2000 were measured at 2,800 vpd across this entire length of road as it abuts Grey County.

1.1.2 County Roads

Prior to May of 2003, the County Road system totalled about 823 kilometres, of which 436 kilometres is surfaced with Hot Mix Asphalt, 359 kilometres with Low Cost Bituminous surface, and 28 kilometres with gravel.

The Grey County Road Rationalization Study was adopted by County Council in March, 2002. The Study was prepared to review the County and local municipal road systems in order to determine whether or not the jurisdiction for some roads should be changed. The study recommended that about 89 kilometres of County roads be deleted from the County road system, while 78 kilometres of local municipal roads would be added. The recommendations of the Study were implemented in May, 2003, and the County road system now consists of a total of 812 kilometres.

County Road 4 (formerly Highway 4) extends from Singhampton in the east to Hanover in the west and generally carries the most traffic of all of the County Roads. 2001 AADT's were between 6,100 and 6,700 vpd between Durham and Hanover.

1.2 Existing Truck Volumes

Between 1992 and 2001, aggregate production in Grey County averaged about 2.46 million tonnes per year according to the annual Mineral Aggregates in Ontario statistical update. This includes extraction from sites in the Niagara Escarpment Commission controlled lands. Assuming an average truck capacity of 23 tonnes, this volume would generate about 104,300 two-loads shipped or 208,600 total trips per year.

Assuming aggregates are hauled about 190 days per year, there would be about 1,100 truck trips occurring on each day. The majority of these trips are to and from destinations within Grey County, with some trips to Bruce and Huron Counties.

In 2001, total aggregate production in Grey County was 2,570,975 tonnes. To put this in perspective, this 2001 volume ranked 4th among the neighbouring municipalities, behind Simcoe County (10,672,308 tonnes), Wellington County (8,903,313 tonnes) and Huron County (3,074,828 tonnes), and ahead of Dufferin County (2,444,446 tonnes) and Bruce County (1,566,760 tonnes).

Table F -1 shows the breakdown of the Grey County production by lower tier municipality, along with the proportional number of daily truck trips based on an average of 1,100 total trips per day.

Table F-1: 2001 Aggregate Production by Municipality

Municipality	Tonnes	Percentage	Daily Trips
Georgian Bluffs	560,673	21.8%	240
Chatsworth	395,003	15.4%	169
Grey Highlands	392,211	15.3%	168
West Grey	356,583	13.9%	153
The Blue Mountains	311,116	12.1%	133
Meaford	303,460	11.8%	130
Southgate	251,929	9.8%	108
Total County	2,400,000	100.0%	1101

Source: Mineral Aggregates in Ontario, Statistical Update - 2001

The high production in the Township of Georgian Bluffs is likely a result of demand in Owen Sound, which is the largest urban area in Grey County. Gravel pits in Chatsworth Township would also supply the Owen Sound Area. It is expected that the aggregate operations in The Blue Mountains and Grey Highlands would supply to the west end of Collingwood and the Craigleith area, which has been experiencing substantial growth over the past few years.

1.3 Official Plan Policies On Roads

The Grey County Official Plan does not designate specific haul routes for aggregate transport. It is given that the County Road and Provincial Highway transportation corridors are the framework for aggregate haul routes and trucking as shown on the Official Plan Land Use Schedule A. The Official Plan requires applicants proposing to undertake extractive operations to enter into a Development Agreement with the

local municipality, if requested to do so by the local municipality. Such an agreement can specify truck routes and require the applicant to make capital contributions towards the widening and improvement of roads beyond the boundary of the subject property (Grey County O.P., 1999, 2.7.3, page 36).

As part of the application for a new or expanded extractive operation, a Traffic Impact Study is required to demonstrate that traffic movement on existing streets and roads will not be unduly obstructed or interfered with by aggregate carrying vehicles (Grey County O.P., 1999, section 2.7.4 (2)(c), page 37) . Access driveways onto County Roads “should not create a traffic hazard because of their concealment by a curve, grade or other visual obstruction” (Grey County O.P., 1999, section 5.2.2 (7)(6), pages 54-57).

The Provincial highways and County roads are part of the ‘transportation corridors’ of the Official Plan. Few of the licensed pits and quarries in Grey County front on and have driveway access to these transportation corridors. Where individual or combined aggregate development applications or operations cause new or changed transportation corridors then County and local municipal involvement and review of the Traffic Impact Study would include reference to the affect on the local economy or the safety and social future of communities. “The applicant should provide information on economic and social affects such as employment, education, health and housing.” (Grey County O.P., 1999, section 5.1.2 (5)(d), page 49)

1.4 Haul Routes

There are no County or municipally designated aggregate haul routes. A total of 20 licensed operators were interviewed, and it was found that none of their operations had specified haul routes. An exception to this can be found in an 1998 O.M.B. decision concerning a proposed extraction operation in Chatsworth Township. In this case, the Board decision prescribed the haul route to be utilized by the gravel pit to gain access to Highway 6, and also limited the operating hours to weekdays from 7:00 a.m. to 6:00 p.m.. Much of the consideration given to the haul route related to the existence of an old order Mennonite community in the area. The location of this haul route is being reviewed locally due to further concern for community safety.

Some of the operators indicated that they do use some informal haul routes to access the Provincial Highways or main County Roads, but there is nothing in writing to compel them to use those roads.

If a Traffic Impact Study demonstrates a potential negative impact on a proposed haul route, the following measures could be utilized, where appropriate, to help mitigate the impacts:

- Paving of gravel roads to improve the structural capacity and eliminate problems with dust.
- Upgrading of the base structure of existing roads to suit the increased volume of truck traffic.
- Increasing asphalt and shoulder widths
- Improving horizontal and vertical road alignments
- Construction of auxiliary lanes for trucks turning, accelerating and climbing hills
- Lowering posted speed limits
- Improving sight lines at affected intersections
- Installation of warning lights and traffic signals
- Placing limitations on hours and days of operation.

2.0 REFERENCES

County of Grey. 1999.

County of Grey Official Plan.

APPENDIX G

PLANNING AND COMMUNITY ANALYSIS

**AGGREGATE RESOURCE
INVENTORY MASTER PLAN
GREY COUNTY**

**APPENDIX G
PLANNING AND
COMMUNITY ANALYSIS**

**AGGREGATE RESOURCE INVENTORY MASTER PLAN
GREY COUNTY**

**APPENDIX G
PLANNING AND COMMUNITY ANALYSIS
P/N 02-1722**

October, 2004

Prepared by: Skelton, Brumwell & Associates Inc.
93 Bell Farm Road, Suite 107
Barrie, Ontario
L4M 5G1

Telephone: (705) 726-1141
FAX: (705) 726-0331
E-mail: mail@skeltonbrumwell.ca

Prepared for: GREY COUNTY

TABLE OF CONTENTS

	Page
1.0 PLANNING CONTEXT	1
1.1 Provincial Policy Statement (PPS).....	1
1.2 Planning Process	2
1.3 Grey County Official Plan and Development Pattern.....	3
1.4 Municipal Planning.....	4
1.5 Other Mineral Aggregate Resource Studies.....	5
2.0 SOCIAL CONTEXT	5
2.1 Settlements.....	5
2.2 Communities.....	6
2.3 Community Resources	9
2.3.1 Schools	9
2.3.2 Community Centres.....	9
2.3.3 Parks and Trails	9
3.0 REFERENCES	12

SUB-APPENDIX A

LOCAL MUNICIPAL CONSULTATION

AGGREGATE RESOURCE INVENTORY MASTER PLAN GREY COUNTY

APPENDIX G PLANNING AND COMMUNITY ANALYSIS

P/N 02-1722

October, 2004

The planning policy and social and community analysis for the Grey County Aggregate Resource Inventory Master Plan is provided in this document.

1.0 PLANNING CONTEXT

1.1 Provincial Policy Statement (PPS)

The Provincial Policy Statement (PPS) was issued in revised form in 1997 under The Planning Act to provide policy direction on the matters of provincial interest related to land use planning and development. Mineral resources are part of the Province's resources providing economic benefits.

The full text of the PPS is provided in Appendix B. The key policy is:

"Mineral resources (mineral aggregates, minerals and petroleum resources) will be protected for long term use. ... As much of the mineral aggregate resource as realistically possible will be made available to supply mineral resource needs, as close to market as possible." (Ontario P.P.S., 1997, section 2.2.3.1)

The PPS provides policy on protection of licensed pits and quarries, protection of mineral aggregate resources and adjacent lands, wayside pits and portable asphalt plants, and requires progressive rehabilitation, and rehabilitation of prime agricultural land.

The PPS also prescribes that "Development and land use patterns which may cause environmental or public health or safety concerns will be avoided." The term 'development' includes 'a change in land use' which describes a pit or quarry as they are deemed to be a land use for the purposes of the Zoning By-law section (34(2)) of The Planning Act. In this regard, locations of pits and quarries and the Site Plan and operational notes are to establish that environmental or public health and safety concerns are effectively avoided. This would be to Municipal Council satisfaction prior to zoning a site to permit a pit or quarry.

A Five Year Review of PPS is being conducted by the Ministries of Municipal Affairs and Housing. A summary of its consultations modified to April 2003 was reviewed. The relevant reference are:

- revisions to PPS may be required to refine and/or elaborate on policies to ensure continued effectiveness including managing growth and mineral resources.
- concern related to aggregate extraction and balancing conflicts to quality of life, natural heritage features and agricultural lands.
- issues raised include resource extraction on prime agricultural land, extraction below the water table and off site cumulative impacts.

The Provincial review is now assessing information, clarifying issues and working towards refining the Provincial Policy Statement.

1.2 Planning Process

Aggregate resources planning and development is managed at the County and municipal level by The Planning Act and the Official Plans, Zoning By-Laws and in some cases municipal Site Plans and Development Agreements which are in effect. No site can be licensed as a pit or quarry unless it is first zoned to permit aggregate extraction.

The current planning process to permit a pit or quarry on any property is:

1. Designation as Mineral Resource Extraction in the Grey County Official Plan;
2. Designation to permit aggregate extraction in the local municipal Official Plan;
3. Zoning to permit aggregate extraction in the municipal Zoning By- law; and
4. Establishment of a Development Agreement with the applicant, if requested by the municipality, for roads or other matters beyond the realm of the Licence prior to adoption of the Zoning By- law Amendment.

If an intended site is not designated and zoned Aggregate Extraction or similar category, an Official Plan Amendment (OPA) and a Zoning By- law Amendment are required. Currently an application would involve two public meetings - one at the local municipal Council and an other at County Council. There may be arrangements for a combined local Council / County Council public meeting. The process of application, circulation, public meetings, adoption, notice, appeal to the Ontario Municipal Board, hearing and decision is regulated by The Planning Act.

1.3 Grey County Official Plan and Development Pattern

The Grey County Official Plan and local municipal Official Plans designate many large and small settlement areas for various land uses in towns, villages and hamlets. Areas of expansion for these settlements over the ten year planning period are also designated. Within the settlement areas residential, commercial, industrial, institutional, open space land uses exist or are planned to accommodate future population growth and development. These areas are thus so constrained for future potential aggregate extraction that they are not reasonably available and are eliminated as resource lands. The existing and future land use pattern is shown on Figure G-1.

There are only a small number of licensed pits or quarries which lie in or border on settlement areas. The significant instance is Durham in West Grey where two licensed properties lie within the settlement (Urban Fringe) limits. One of these properties is a County Roads work yard. The Ledgework Quarry at the south west corner of Cruickshank in Georgian Bluffs involves no blasting. In Grey Highlands a gravel pit borders the eastern limits of Feversham. See Photo G-1. Two licensed properties lie at the eastern border of Gibraltar in The Blue Mountains.

Photo G-1: Grey County Pit, East of Feversham, Grey Highlands



There are few estate residential developments in Grey County. There was no reported problems of estate residential development in aggregate areas. Generally there has not been direct land use conflict between aggregate extraction operations and urban or rural settlements in Grey County.

In past decades the consent to sever land process was extensively used in Grey County to create many smaller parcels of land from original lot holdings. This has led to the fragmentation of agricultural and rural land in many areas. This was noted as a concern relative to aggregates in one municipal interview.

More recently Official Plan Policy and Committee of Adjustment practice has limited consents. The Background to the Mineral Resource Extraction section of the County Official Plan indicates that “Primary Aggregate Resource Areas as shown on Appendix A to this Official Plan will be protected from incompatible land uses” (Grey County O.P., 1999, section 2.7.1, page 35). That protection would include restricting consents to sever so that further parcel fragmentation and/or introduction of additional rural residential uses to locations which would not preclude or hinder aggregate operations expansions or continued use as per PPS. This should form part of a new County Official Plan Policy.

The extent of past land fragmentation and its affect as a constraint to aggregate resource development is not practically known or mapped at the County level. Thus small parcel size does not itself establish a constraint in the Evaluation Model and ultimate aggregate resources lands for protection and designation in the County Official Plan.

At the local level using assessment maps overlaid on the aggregate resources to be protected, the Municipal Official Plans and Zoning by-laws can establish if there are any strips or pockets of rural residential development which practically constrain those areas from aggregate development such that the Mineral Aggregate Resources or equivalent designation, is not useful for planning and decision making reference. If a strip or cluster of rural residence fronts on a local or County Road likely to be used for aggregate trucks then consideration should be given to minimizing further potential conflicts.

1.4 Municipal Planning

Interviews of Municipal Planners or other officials were conducted to identify any local municipal interests or perspectives on the Study. The information from the interviews of all the Municipalities is provided in Sub Appendix A.

1.5 Other Mineral Aggregate Resource Studies

The City of Kawartha Lakes, formerly the County of Victoria, is undertaking review of their Official Plan related to Aggregate resources. That study differs from The Grey County Aggregate Resource Inventory Master Plan in that it addresses only the aggregate resource protection and development policies and issues and does not consider the extent of mineral aggregate deposits or develop evaluation criteria or models. This review is currently in the final stages of preparation.

The Town of Caledon in Peel Region recently adopted an Official Plan Amendment (OPA) based on a municipal review of aggregate resource development and demand from the Greater Toronto Area. The adopted OPA was appealed to the Ontario Municipal Board by the Ministry of Natural Resources, the Aggregate Producers Association of Ontario and others. A recent settlement of the policy issues provides the following.

- Designations of “Aggregate Resource Lands” and “Aggregate Reserve Lands” in the Official Plan, encouraging new pit and quarry locations in the Aggregate Resource Lands.
- An applicant is not required to prove need for the application or any type of supply-demand analysis.
- Assessment of social impacts is to be based on predictable, measurable, significant, objective effects on people caused by such factors as noise, dust, traffic levels and vibrations.
- Interpreting negative impacts will require a consideration of change to ecological functions and attributes of core green land areas.

2.0 SOCIAL CONTEXT

2.1 Settlements

A Settlement is any area designated on Schedule A of the Grey County Official Plan as Urban, Urban Fringe, Hamlet, Inland Lakes and Shoreline and also the Niagara Escarpment Recreation designation. All Settlements have been shown on Figure G-1.

Settlement areas are for the most part zoned for existing or planned development or zoned to identify future development. These areas are constrained to the possibility of aggregate extraction by reason of physical development over the resource or intended development of residential, commercial, industrial or other built form uses. The aggregate resource is effectively not available to supply any part of the mineral resource needs.

Small settlements are clusters or pockets of residential development throughout the County which have not been designated in the Official Plan but which may warrant careful consideration in minimizing the effects of aggregate extraction and transport where they exist or might be developed in the area. This can be provided by suitable upgrades to the haul route and other buffering treatment established in agreements between the Municipality and the aggregate producer.

2.2 Communities

In addition to the urban and rural settlement areas there are three other identifiable communities in Grey County. These are the Mennonite and Amish communities which may have been established as the result of growth of Mennonite families in Waterloo moving north to new farm settlement areas in Perth, Wellington and beyond in the mid and late 1800's (*Murdie, 1997*).

The three identified Mennonite-Amish Communities are:

- A Mennonite community is located in former Township of Egremont around the village of Holstein in the Township of Southgate
- A Mennonite community in Grey Highlands is located around the village of Badjeros.
- An Old Order Amish Community has located in the former Sullivan Township now the Township of Chatsworth west of the Village of Williamsford and north of the hamlet of Mooresburg.

This study considers that some communities or groups of people in Grey County may be sensitive to impacts related to aggregate extraction and haulage. A sensitive community is a community of people which, by the nature of methods of transportation and customs, is vulnerable and exposed to the adverse effects of aggregate extraction and/or aggregate transport to an extent which significantly reduces the safety of normal or routine activities occurring at reasonable, expected times.

The first two Mennonite communities operate the farms and travel in the area much as other farm owners do with the exception of using horse drawn vehicles on the roads. Signs advising of this are posted. The existence of these Mennonite communities is considered as less than a minimal constraint and the areas have not been shown in the evaluation.

Photo G-2: Sign to share the Roads



There is little aggregate resource of significance in the portion of Grey Highlands farmed by the Osprey Mennonite Community. In Egremont there are significant aggregate resources and several small pits, one of which is operated by a Mennonite community member.

The Old Order Amish Community of Chatsworth (Sullivan Township) is such a community. Which may be a sensitive community to the aggregate industry. It is an Old Order community using horse and buggy, steel wheels and no hydro to operate a growing number of farms in the Williamsford area. The children are routinely walking to school on the side of the road and Community members travel only by horse drawn buggies and wagons. This presents a real impairment to the safety of the people relative to gravel trucks and other large vehicles traveling in the area.

Photo G-3: Farming the Land with Horses and Steel Wheels



Photo G-4: Sharing the Roads



In the Township of Chatsworth there are a small number of long standing licensed pits operating without issue. A 1998 new pit application by E.C. King originally met opposition from the old Township of Sullivan but upon amalgamation the new Township of Chatsworth Council adopted the required Zoning By-law amendment. An appeal to the OMB by a cottage association resulted in a decision in 2001 which continues to require resolution of the issues of haul route and extractive stages. A public meeting held by

Council in the Spring of 2002 sought to complete the municipal matters in a Road Development Agreement.

There was an intention by the Ontario Municipal Board and Chatsworth Council to specify a haul route for the E.C. King pit to avoid the Amish farm areas as much as possible. It remains to be decided upon whether phasing and haul route will be set as desired by Chatsworth Council.

2.3 Community Resources

The data with regard to Schools, Community Hall, Recreation Centres, Municipal parks and recreation trails was collected and assessed for relevance to aggregate resource management.

2.3.1 Schools

The digital map showing each school for all boards including Bluewater District and the Bruce-Grey Catholic District Boards was obtained. Further consultation with the Transportation Department of the combined Boards revealed that accommodation reviews were completed for all schools in 2002 which consider the age of the facilities, cost to upgrade and future student population located within the attendance area. These reports conclude that no new schools are scheduled to be built or open.

School locations in the rural areas are significant relative to potential constraints on aggregate resource extraction and haulage.

The location of all schools within the Grey County are shown on Figure G-1.

2.3.2 Community Centres

Most of the Grey County Municipalities have their recreation facilities in settlement areas and as such there is not a constraint relative to aggregate resources. The County is not responsible for any community or recreation facilities with the exception of the County Museum located in Owen Sound. There is also the Grey County Archive in Durham and South Grey Museum and Historical Library in Flesherton. The Township of Southgate has located its recreation facilities in rural surroundings due to the existence of limited urban areas to create such facilities. No conflicts with aggregate extraction were identified.

2.3.3 Parks and Trails

There are four Provincial Parks or nature Reserves in Grey County. These are located on the Niagara Escarpment Plan lands. Two licensed pits are located west of the Pretty River Valley Provincial Park in the Town of The Blue Mountains. No conflicts were apparent.

The Bruce Trail traverses the County but is located in the Niagara Escarpment Plan jurisdiction so no constraint to the aggregate resources of Grey County evaluated in this Study, is evident. Municipal parks, arenas and community centres are generally located in settlements and do not establish a distinct level of constraint relative to aggregate resources.

There are approximately 18 locations in Grey County where Primary and Secondary sand and gravel resources, which are subject to minimal or moderate constraints, are found on or directly adjacent to lands owned by one of three Conservation Authorities. The Conservation Authorities are the Grey Sauble, the Saugeen Valley and the Nottawasaga Valley Conservation Authority. Many of the Conservation Authority properties are less than 100 hectares (247 acres). Some locations include both sand and gravel resources and non aggregate lands.

Generally Conservation Authority lands are not in close proximity to licensed pits or quarries. There are a small number of exceptions to this. The locations of sand and gravel extraction near

Conservation Authority lands are:

- A pit east of Feversham borders the south end of a Grey Sauble Conservation Authority site
- A pit borders Grey Sauble Conservation Authority lands at Clarksburg
- A pit north of Robson Lakes in old Holland Township of Chatsworth has Grey Sauble Conservation Authority lands along the north
- Three licensed pits lie to the south and west of Grey Sauble Conservation Authority lands along the Sydenham River in Georgian Bluffs south of Owen Sound.
- The Durham Conservation Area is located on the Saugeen River in the community of Durham with two licensed properties, including the municipal pit and works yard, located close-by to the south.

There were no reported conflicts relative to pits and Conservation Authority interests. The Conservation Authority lands include Conservation Forests, Day Use Parks, Recreation Areas and Wetland properties. Although some of these areas have limited or no facilities, they do provide recreational activities such as hiking, cross-country skiing, wildlife viewing, etc.

Some of these lands contain natural heritage features including significant wildlife habitat, provincially significant wetlands, fish habitat, life and earth ANSI's, significant woodlands and the locations of vulnerable, threatened and endangered species. A large number of the Grey Sauble Conservation Authority land holdings are on Niagara Escarpment Commission controlled area.

The largest Conservation Authority property, related to sand and gravel resources, is the Bells Lake Management Unit of the Saugeen Valley Conservation Authority on 610 ha (1,500 acres) west of Markdale. This area includes Class 1 wetlands, open water fish habitat and excellent recreational canoeing. This is a source of the Rocky Saugeen River.

Ownership by a Conservation Authority of aggregate resource lands of minimal or moderate constraints reduces the likelihood that such lands would become the subject of municipal planning and aggregate licencing applications. There have been successful examples of partnerships between the Grand River Conservation Authority and aggregate producers to extract sand and gravel then to rehabilitate the land to enhance wildlife habitat and improve flood management capabilities. Thus elimination of sand and gravel resources owned by Conservation Authorities from protection is not useful or warranted. Further, Conservation Authority lands which are highly constrained or which are otherwise eliminated as aggregate resources, ie for Provincially Significant Wetlands, should not be subject to aggregate resource protection.

3.0 REFERENCES

County of Grey. 1999.

County of Grey Official Plan.
Web Site, 2004

Murdie, R.A. 1997.

“The Mennonite Communities of Waterloo County”, The Waterloo County Area Selected
Geographical Essays, University of Waterloo, 1997

Ontario Ministry of Municipal Affairs and Housing. 1997.

Provincial Policy Statement

Grey Sauble Conservation Authority

Web Site, October 2004

Saugeen Valley Conservation Authority

Web Site, October 2004

Nottawasaga Valley Conservation Authority

Web Site, October 2004

SUB-APPENDIX A
LOCAL MUNICIPAL CONSULTATION

GREY COUNTY AGGREGATE RESOURCES INVENTORY MASTER PLAN
LOCAL MUNICIPAL CONSULTATION

MUNICIPALITY The City of Owen Sound

CONTACT Planning and Economic Development enquiry October 2002
Bill White Director of Community Services August 2003
519-376-1440

OFFICIAL PLAN

Aggregates designation	- none
Protection policies	- n/a
-consents	
-development	

ZONING BY- LAW n/a

SETTLEMENTS Owen Sound is the major urban settlement of Grey County

SOCIAL, COMMUNITY NOTES

SPECIAL INTERESTS
 - none

APPLICATIONS

- No licensed properties
- Some former pits have been rehabilitated to residential housing

ISSUES

- No land use or direct impact issues
- Some traffic moving through Town from cement silo in harbour
- Securing long term aggregate supply is important to economic development of Owen Sound

GREY COUNTY AGGREGATE RESOURCES INVENTORY MASTER PLAN
LOCAL MUNICIPAL CONSULTATION

MUNICIPALITY Municipality of Meaford

CONTACT Nick McDonald, Planning Consultant
Date: June 2003

OFFICIAL PLAN New Draft OP for formal public meeting July 2003

Aggregates designation - protection policies not specified

ZONING BY- LAW to follow OP approval

SETTLEMENTS Urban area of Meaford

SOCIAL, COMMUNITY NOTES

None mentioned

SPECIAL INTERESTS

None expressed relative to aggregates

APPLICATIONS

- Development Agreement with E.C. King on road upgrades

ISSUES

- Size of major pit
- Impact on water table

LOCAL MUNICIPAL CONSULTATION

MUNICIPALITY Grey Highlands

CONTACT Ray Duhamel, Planning Consultant
June 2002

OFFICIAL PLAN New Official Plan 2001, Approved 2002
Mineral Resource Extraction - licensed sites
Primary Aggregate Area - overly to protect
(County would not approve designation to permit)

Protection Policies consents - no reference
 development caution to 300m adjacent pits

ZONING BY- LAW - new by-law in draft to public meeting

SETTLEMENTS - shown on County and Municipal O.P. - Markdale
 - Flesherton

COMMUNITY AND SOCIAL REFERENCES

A Mennonite community in former Osprey. Horses and buggies and wagons on road

SPECIAL INTERESTS - none noted

APPLICATIONS 4-5 aggregate applications in past 3 years

ISSUES

- not active issues on pits
- local designation to permit pits subject to zoning tests vs. County designation

GREY COUNTY AGGREGATE RESOURCES INVENTORY MASTER PLAN

LOCAL MUNICIPAL CONSULTATION

MUNICIPALITY Township of Southgate

CONTACT Bonnie Riddel, Admin. Clerk
 519-923-2110
 Spoke to Carol Oct 11/02
 Dave Slade

OFFICIAL PLAN - Dundalk old O.P. 1985
 - New O.P./Southgate

Protection Policies consents
 development

ZONING BY- LAW New Comprehensive Zoning adopted May 2002
 Appealed by Grey County

SETTLEMENTS

COMMUNITY AND SOCIAL REFERENCES

A Mennonite Community some of Old Order life style existing in the western part of Township south of Highway 9. One member operates a pit and has applied to expand.

SPECIAL INTERESTS

APPLICATIONS - no applications

ISSUES

- Affect on water table

GREY COUNTY AGGREGATE RESOURCES INVENTORY MASTER PLAN

LOCAL MUNICIPAL CONSULTATION

MUNICIPALITY Town of Chatsworth

CONTACT Arnold Rosenburg
 519-794-3232
 Christine Loft - Planner

OFFICIAL PLAN not independent OP

Protection Policies consents
 development

ZONING BY- LAW - in preparation with D.C. Slade

SETTLEMENTS on County O.P.

COMMUNITY AND SOCIAL REFERENCES

- Amish in Sullivan
- old order, steel wheels, no hydro, children, roads

SPECIAL INTERESTS

- not really, some Ad Hoc groups opposing applications for various things.

APPLICATIONS

- no new sites

ISSUES

- several long established pits
- no new applications past several years but
- 50-60 1998
- Sullivan Township OMB Approved E.C. King Pit
 - conditions
 - Township adopted
 - area residents/cottage Associated appealed
- haul route to avoid Amish community
- issue 4 or 5 stages
Sullivan Township originally opposed then after Amalgamation Council adopted

APPENDIX H

FISCAL AND ECONOMIC IMPACT ANALYSIS AGGREGATE MARKET ANALYSIS

**GREY COUNTY AGGREGATE
MASTERPLAN**

**FISCAL AND ECONOMIC IMPACT
ANALYSIS**

October 12, 2004

P L A N N I N G F O R G R O W T H



**C. N. WATSON
AND ASSOCIATES LTD.**

ECONOMISTS

4304 Village Centre Court
Mississauga, Ontario, Canada
L4Z 1S2

Telephone: (905) 272-3600

Fax: (905) 272-3602

e-mail: info@cnwatson.on.ca

CONTENTS

	<u>Page</u>
1. INTRODUCTION	
1.1 Study Components	1-1
1.2 Case Study Analysis	1-1
2. FISCAL IMPACT ANALYSIS	
2.1 Approach	2-1
2.2 Description of the Case Study Operations	2-2
2.3 The Fiscal Model	2-2
2.4 Expenditure Assumptions	2-5
2.5 Revenue Assumptions	2-7
2.6 Net Fiscal Impact	2-8
3. LOCAL ECONOMY	
3.1 Overview of the Local Economy of Grey County	3-1
3.2 Employment in the Aggregate Industry	3-2
3.3 Indirect and Induced Employment	3-4
3.4 Other Contributions	3-5
3.5 Summary of Local Economic Contribution	3-6

1. INTRODUCTION

1. INTRODUCTION

1.1 Study Components

The fiscal and economic analysis assesses the typical impact of aggregate extraction on municipal finances and its contribution to the local economy. Municipal finance considers the way in which net operating revenues and expenditures of the County and lower tier municipalities can be expected to respond to the service needs of representative types of aggregate operations that may be established in the future. The intent is to identify the average long term incremental costs/revenue resulting from the aggregate operations. The findings are presented on an average per tonne basis.

The economic analysis considers the role of the aggregate industry in the local economy measured in terms of employment (direct, indirect and induced) as well as other contributions made to civic and community projects and activities.

1.2 Case Study Analysis

The fiscal and economic analysis relied on case studies of three representative aggregate operations to assess the typical impact of aggregate extraction on municipal finances and its contribution to the local economy. Three operations of varying magnitude, as determined by annual licence limits for quantities extracted, were examined. In the case of operators with multiple sites, the annual limits were combined to identify larger operations. The full universe of aggregate operations in the County was allocated to one of three categories:

- large (in excess of 1 million tonnes annually);
- medium (150,000 to 1 million tonnes annually); and,
- small (less than 150,000 tonnes annually).

Approximately half of the license operations fall into the latter category. The list was presented to the Public Liaison Group for recommendations regarding candidate sites to be contacted for the case study analysis.

The operations selected included one in West Grey and two in Grey Highlands.

Interviews were conducted with representatives from each business to obtain information regarding nature of the operation, employment, local spending, etc. Each operator was contacted and an attempt was made to arrange an 'in person' interview with follow up information requested by phone. In one case, it was necessary to obtain all information by telephone. Given the nature of the information requested (i.e. financial and market related) participants in the study were guaranteed anonymity.

The municipalities in which the operations were located were contacted to obtain information regarding taxes, assessment and background municipal finance data.

2. FISCAL IMPACT ANALYSIS

2. FISCAL IMPACT ANALYSIS

2.1 Approach

The objective of this fiscal impact analysis is to estimate the way in which the Township and County's net operating revenues and expenditures can be expected to respond, on a generic basis, to the servicing needs of various representative types of new aggregate producing operations. The development description and assessment assumptions are based on examples of development already located in various Townships with Grey County, which are considered to be representative of development likely to occur in future. The intent is to identify the "average long term incremental costs of development":

- "Long term," because of the Township and County's costs increase at intervals and seldom annually on a perfectly one to one basis with development. This is because some costs have been front-ended in some periods/areas, while in other periods or areas, service levels may decline somewhat, awaiting subsequent operating cost increases.
- "Incremental," because the focus is on the way in which net expenditures are likely to be affected by new development. Most service costs can be expected to increase proportionately to existing costs, based on growth in population and employment, but some services or communities may be subject to economies or diseconomies of scale.
- "Average," because much of the analysis is necessarily Township or County-wide in coverage and does not reflect the individual requirements of particular locations.

A more detailed analysis addressing a specific development proposal in specific locations could be undertaken, but the work contained herein provides useful broad perspective on the question.

2.2 Description of the Case Study Operations

This study examines the impact of three actual examples of aggregate-producing development as discussed in Chapter 1. These include:

	<u>Municipality</u>
• Large Aggregate Producer	West Grey
• Medium Aggregate Producer	Grey Highlands
• Small Aggregate Producer	Grey Highlands

Assessment, tax rates and tax amounts have been compiled for the three aggregate properties (Table 2-1), which were sampled. The number of employees and land area have also been compiled.

2.3 The Fiscal Model

This analysis is based on the most recently available financial statements for the County and municipalities of Grey Highlands, and West Grey, i.e. year 2001.

Tables 2-2,3,4 summarize the “Revenue Fund” or “Operating Fund” actual transactions for 2001, as reported in the Financial Information Return’s (FIR). The shortfall between non-tax revenues and expenditures is made up via the tax levy, with tax rates established accordingly. This represents a simple “model” of the financial position for the operating fund and provides the structure of the fiscal impact analysis contained herein. Tables 2-5,6,7 set out the 2001 tax rates.

Tables 2-8,9,10 modify the operating expenditures shown in Tables 2-2,3,4 in two ways.

- Firstly, “Net Debt Payments” and “Own Fund Transfers” are netted from the total. The debt charges are for “sunk” investments, and are unaffected by growth. Net own fund transfers can vary significantly from year to year and relate largely to capital expenditures and general reserves, which are provided for separately in this analysis. It is, therefore, appropriate to remove these two classes of expenditures from the spending

base, before determining average operating fund spending levels per capita or per employee.

- Secondly, grants, fees and service charges were deducted on a service-by-service basis. These revenue items are generally expected to increase in direct proportion to future expenditure increases. These revenues can be most readily provided for on a net expenditure basis, as each expenditure category is expected to increase at different rates, which would otherwise complicate the forecasting of individual revenues.

Tables 2-8,9,10 apportion the net expenditures between residential and non-residential servicing requirements. The basic ratio used was calculated as the year 2001 population/employment ratio. This generally reflects the way in which costs incurred today can be attributed to residential and non-residential development. The resultant expenditure/capita factors are then applied against the subject type of development. The residential/non-residential split, based on the year 2001 population/employment ratio, is as follows:

Grey County

$$\text{Residential: } \frac{89,073 \text{ population}}{89,073 \text{ population} + 34,210 \text{ employment}} = 72.25\%$$

$$\text{Non-Residential: } \frac{34,210 \text{ employment}}{89,073 \text{ population} + 34,210 \text{ employment}} = 27.75\%$$

Grey Highlands

$$\text{Residential: } \frac{9,196 \text{ population}}{9,196 \text{ population} + 3,305 \text{ employment}} = 73.56\%$$

$$\text{Non-Residential: } \frac{3,305 \text{ employment}}{9,196 \text{ population} + 3,305 \text{ employment}} = 26.44\%$$

West Grey

$$\text{Residential: } \frac{11,741 \text{ population}}{\quad \quad \quad} = 69.92\%$$

11,741 population + 5,050 employment

$$\text{Non-Residential: } \frac{5,050 \text{ employment}}{11,741 \text{ population} + 5,050 \text{ employment}} = 30.08\%$$

A number of exceptions are involved, where this global split was replaced by a different service-specific allocation. These include Parks, Recreation Program, Recreation Facilities, Libraries and Cultural Services, where a 95%:5% Res:Non-Res. split was applied, in order to reflect the nominal benefit to non-residential development and the overwhelming focus of those services on residents. Similarly, General Government was split 80%:20%. Finally Cemeteries, Social Housing, Social and Family Services and Assistance to Aged Persons were allocated entirely to residential development, as they provide no direct benefit to industrial/ commercial development.

The result is net operating expenditures of \$55.4 million for Grey County, of which \$51.0 million is attributable to residential development and \$4.3 million is attributable to non-residential (industrial/commercial/institutional) development. In Grey Highlands the net operating expenditures are \$4.9 million (\$3.8 million residential / \$1.1 million non-residential). In West Grey the net operating expenditures are \$5.0 million (\$3.7 million residential / \$1.3 million non-residential). These represent the 2001 expenditure base to be used in establishing residential and non-residential expenditure benchmarks for estimating the fiscal impact of new development.

Tables 2-11,12,13 summarize the basis for forecasting the anticipated incremental non-tax revenues for each item over the long term. It excludes user fees/service charges, as they have already been removed in calculating net expenditures; hence, they are expected to increase in direct proportion to future spending increases. Table 2-14 illustrates the blank format of the overall fiscal impact summary table, which is completed in Section 2.6.

2.4 Expenditure Assumptions

2.4.1 *Operating Expenditures*

In some cases, the County has front-ended and oversized services in anticipation of development. In other cases, plans exist to establish new facilities or to expand the service capacity of existing facilities in future. An annual per capita or per employee operating cost has been attributed to reflect the nature of the County's servicing arrangements for the municipality as a whole, rather than at any particular location.

The following section summarizes the basis for the development-related operating expenditure allocation in each case. These per capita and per employee expenditure allocations are calculated in Tables 2-15,16,17.

General Government

By adding to the occupancy of the County and the number of transactions to be processed and issues to be dealt with, new development will gradually serve to increase spending in these areas over time. However, as a result of the core administrative and Council operation which is already in place, it is estimated that future growth will be subject to 50% economies of scale, in comparison with current per capita/employee costs. i.e. If it costs \$1/capita to provide this service to the existing population, it is estimated that future development can be serviced at an average cost of \$0.50/capita.

Fire

New development will increase the number of fire calls, thereby contributing to the need for firefighter activity, along with fire protection and administrative services. Fire stations generally serve a fixed area, consistent with a response time level of service. The primary response station is localized in this way, secondary response comes from a network of several other stations in each case, affecting a broad area, through a series of linkages. Much of this network is in place, although one new station and a replacement are required. A 25% economy of scale

provision has been attributed to new development, in order to reflect the existence of the basic station network (i.e. a 75% cost attribution).

Police and Protective Inspection

The cost of by-law and related inspections will gradually increase over time, as a result of new development. A 10% administrative economy of scale has been factored into the calculation for the balance.

Roads, Streetlighting and Parking

New development will directly increase the length of local and collector roads to be maintained by the County. It will also contribute, to some degree, to the need for additional road capacity and maintenance costs throughout the County-wide network. The vast majority of that network is already in place, although the County's inventory of local roads, parking and streetlighting will be gradually expanded; hence a 50% provision has been made for economies of scale applicable to future development.

Waste Management

A 100% cost provision has been made for this purpose, in order to provide for the added collection cost per stop or per tonne.

Planning and Other

Planning costs have been allocated on a 75% basis, as the Department is already geared to providing services to a sustained level of new development. "Other costs" have been included on a 100% basis.

2.4.2 Capital Expenditures

It is assumed that the County's net annual contribution to capital and other funds from the operating budget, is as follows:

- 25% of “other expenditures” to cover repairs, replacements, upgrades for development-related works and a share of network requirements.

This percentage reflects a rounded midpoint of the most recent experiences in Grey County, Grey Highlands and West Grey , i.e. in 2001 for Grey Highlands, \$8,267,300 in operating expenditures, less \$1,651,300 in debt charges and transfers to reserves, leaves \$6,616,000. \$1,651,300 is 25% of \$6,616,000. Similar calculations show debt charges and transfers to reserve are 17% and 35% of operating expenditures in Grey County and West Grey respectively.

25% amounts to approximately \$120 for an aggregate operation.

2.5 Revenue Assumptions

The property taxes generated by the various types of development are calculated as the Township and County-purpose tax rates for the applicable property types for the year 2001, applied against the assessment estimates in each case (1999 assessment base year).

The following tax rates for the year 2001 are applicable:

	<u>2001 Tax Rate %</u>			
	<u>Grey County</u>	<u>West Grey</u>	<u>Grey Highlands (Artemisia)</u>	<u>Grey Highlands (Osprey)</u>
Residential	0.575373	0.588928	-	0.491085
Industrial	0.882853	-	0.620238	-
Commercial	0.642002	0.657125	-	-
Farm	0.143843	-	0.101055	0.122771

The assessment estimates are based on the representative sample of existing properties throughout Grey County documented in Chapter 2.

The Township and County-purpose property taxes (2001 \$), which would be generated by the subject development types, are established in Table 6-1.

Tables 2-18,19,20 provide the basis for the potential impact of new development on the County's non-tax revenues per capita and per employee. Some of the items are expected to increase in direct proportion to growth, while others are largely unaffected by growth. Overall, in Grey County \$45.13/capita (employee), in Grey Highlands \$33.12/capita (employee), and in West Grey \$30.21/capita (employee), represent the anticipated increase in non-tax revenue attributed to new development.

License fees paid under the *Aggregate Resources Act* represent a revenue received by municipalities from aggregate producers. The license fee is calculated as \$0.04/extracted tonne for lower tier municipalities and \$0.005/extracted tonne for the County. These revenues are fully required to fund a portion of the development-related capital servicing requirements of new development.

2.6 Net Fiscal Impact

Table 2-21 summarizes the estimated net annual fiscal impact of various forms of residential development on the Townships and County. The annual long term operating surplus (deficit) has been calculated as the difference between:

- property taxation, based on the assumptions in Section 2.5;
- non-tax revenues, as estimated in Section 2.5;

and

- operating expenditures, as addressed in Section 2.4.1;
- capital spending from the current budget, as addressed in Section 2.4.2.

The results of this analysis are as follows:

Development type	Estimated annual tax surplus (deficit)	Estimated tax increase per tonne
1. Large Aggregate Producer	\$8,552	\$0.07
2. Medium Aggregate Producer	\$1,997	\$0.04
3. Small Aggregate Producer	\$543	\$0.03
Weighted Average		\$0.06

Thus the combined net fiscal impact of the sampled aggregate operations is the order of \$60/1,000 tonnes extracted.

3. ROLE OF THE AGGREGATE INDUSTRY IN THE LOCAL ECONOMY

3. ROLE OF THE AGGREGATE INDUSTRY IN THE LOCAL ECONOMY

3.1 Overview of the Local Economy of Grey County

The County of Grey is located in Southern Ontario and extends north to The Georgian Bay shore. It has a land area of 4,426 square kilometres and a 2001 population of 89,000 persons. Agricultural and tourism are two important components of the local economy. Data from the County's website indicates that there are over 3,100 farms in the County encompassing an area of 4,426 acres.

Table 3-1 provides a disaggregation of employment in Grey County by industry division for 1995, the most recent year available. In 1995, there were 34,860 persons working at establishments in the County. As is evident, the largest employment sector was in the Accommodation, Food and Other Services sector (19%). Manufacturing businesses accounted for the next largest share of employment with 16% of the total jobs provided. Primary industries, which include agriculture, forestry, mining (including quarries), and fishing, provided 4,080 jobs or 12% of total employment in the County.

3.2 Employment in the Aggregate Industry

The aggregate industry provides basic employment in the County of Grey. Basic employment is defined as employment that exists independent of the population. Non-basic employment is associated with businesses and service operations that rely on basic industry and or the population. This includes retail and food establishments, business service operations (accounting, office supplies, transportation and utilities, etc.) institutions such as schools and hospitals; and government operations. Basic employment provides the backbone to the economy of an area.

Table 3-1
Employment in Grey County
By Industry Division
1995

	Employment	
	#	%
Primary Industries	4,080	12
Manufacturing	5,415	16
Construction	1,175	3
Trans., Storage, Communication/ Other Utilities	1,720	5
Wholesale	1,035	3
Retail	5,285	15
Finance, Insurance, Real Estate	1,605	5
Business Services	1,110	3
Government Services	1,475	4
Education, Health, Social Services	6,600	19
Accommodation, Food and Other Service Industries	5,360	15
Total	34,860	100

Source: Employment data - 1996 Census

Notes:

1. Primary industries include agriculture, forestry, fishing, trapping and mining (quarries).
2. Basic employment is employment at businesses that are largely independent of the local population.

Employment in the aggregate industry is created as a result of both the extraction and processing of aggregates. As indicated in Chapter 2, there are approximately 120 licensed aggregate operations in Grey County. Specific Information is not available regarding the employment associated with this activity; however, it can be derived from the findings of the case study analysis. Each of the case study operations were asked about the level of employment associated with the aggregate extraction component of their operation. As the level of employment fluctuated throughout the year, the number of jobs was converted to full time equivalent (FTE) positions. The total FTE employment at the case study operations was 9.25 persons excluding persons employed in aggregate processing (discussed separately). These operations extracted a total of 185,000 tonnes of aggregate in 2002 or an average of 20,000 tonnes per employee (FTE)

Aggregate extraction in 2001 in Grey County was 2,571,000 tonnes. The factor of 1 FTE job per 20,000 tonnes can be applied to this tonnage to estimate employment. On this basis, it is estimated that 130 FTE jobs were associated with aggregate extraction in Grey County in 2001. Caution should be exercised in using this factor as it results in higher employment numbers than that derived from other sources such as provincial averages. This may be in part a function of the size of the operations included in the case study analysis. Larger producers extracting annual tonnages in excess of 1 million operate with much higher tonnages per employee. Therefore, a different factor should be applied to any large scale operation that may be established in the County.

The 130 jobs referenced above include only persons involved in extraction including support and administration staff. Aggregate processing is another important component of the aggregate industry. Processing activities include concrete and asphalt plants as well as manufactures involved in the production of brick and stone products. In order to estimate the employment involved, aggregate processing establishments in Grey County were identified using Scott's Industrial Directory. This source also provides data regarding employment. Industries were identified by Standard Industrial Classification (SIC) codes. These codes are used to classify businesses according to the products produced. The SIC codes searched include:

- concrete block and brick;
- ready-mix concrete,
- other concrete products,

-
-
- cut stone and stone,
 - limestone products,
 - gypsum products,
 - stone and stone products;
 - brick and structural clay tile;
 - ceramic wall and floor tile;
 - hydraulic cement; and,
 - asphalt paving mixtures and blocks;

The list of establishments was reviewed with the local Ministry of Natural Resource's office to ensure that all major employers were included. The total estimated employment identified from these sources was approximately 400 persons. Thus, the total basic employment associated with aggregate extraction and processing in Grey County is estimated to be approximately 530 jobs.

3.3 Indirect and Induced Employment

Direct employment created through aggregate extraction and processing gives rise to the multiplier effect or "spin-off" benefits to the local economy. One component of the multiplier effect is the indirect employment that is generated through the money spent locally by basic industries on goods and services. The aggregate operations surveyed as part of the case study analysis indicated that a significant share of their annual expenditures for goods and services were purchased locally. The share of these local purchased expenditures ranged from 70 to 90% of total non-employment and non-tax expenditures. Items purchased locally included fuel, insurance, equipment parts, computer and office supplies and calcium. These expenditures, made in the local economy, create indirect employment at the businesses that provide the goods and services.

The second component of the multiplier effect is the induced benefit. Induced benefit is defined as the benefit that results from the spending of employment income for goods and services such as accommodation, food, personal services and household and family expenditures.

As indicated in Section 3.1, employment in Grey County in 1995 (the most recent year available) was 34,860 persons. Using that allocation of employment by industry division shown in Table 3-1, it is possible to separate basic (direct) employment from non-basic (indirect and induced) employment. Employment in the following industry divisions is considered to be basic to the economy:

- Primary Industries (agriculture, fishing, forestry and mining);
- Manufacturing; and
- Transportation, Communications and Utilities

The latter category also includes non-basic employment that services the local population as well as businesses. For the purposes of this analysis, it is assumed that 50% of the employment in this category is basic. In addition, tourism is a basic industry. Tourism related jobs may be classified in a number of industry divisions including Retail and Accommodation, Food and Other Services Industries. A recent report prepared for the County of Grey, Tourism Economic Impact in the County of Grey, January, 2002, estimated that the tourism industry accounted for 2,265 jobs in the County.

The total employment in all of these basic industry divisions is 12,490. Thus the remaining employment in the County (22,370 jobs) is non-basic. Non-basic includes both indirect and induced employment. The ratio of basic to non-basic employment is 1:1.8. It is recognized that a portion of the non-basic employment is related to the expenditures of retired persons and persons working outside of the County. Local purchasing by these households is not attributable to employment income. In order to exclude the employment generated by expenditures from these households, the ratio of basic to non-basic employment has been reduced to 1:1.5. Therefore, for every basic job in Grey County, a further 1.5 non-basic jobs are created. Based on an employment of 530 person involved in aggregate extraction and processing, it is estimated that a further 800 jobs in Grey County are dependant on the aggregate industry.

3.4. Other Contributions

The Aggregate Producers Association of Ontario (APAO) has established a guideline to encourage its members to provide local support community activities in the areas in which they

are located. The APAO recommends a contribution of 4.5 cents per tonne of aggregate extracted. It should be noted that only a small percentage of the aggregate licenses in Grey County are issued to members of this Association.

The aggregate operations surveyed as part of case study analysis were asked about contributions made to community groups. It was found that each of the operators makes a significant contribution in proportion to their size. Beneficiaries of these funds, and in some cases materials, include sports teams, cultural groups, schools, civic events and charitable organizations.

Another economic benefit resulting from locally produced aggregates is effect on construction costs. As discussed in the aggregate market analysis, aggregate is a component in all construction projects such as buildings and, in particular, road construction. Transportation costs are significant factor in the price of aggregate and therefore, a local source of aggregate materials for use in construction will ensure lower construction costs. This benefit accrues to both private construction projects as well as municipalities that tender road improvement and maintenance projects.

3.5 Summary of Local Economic Contribution

The Aggregate industry provides basic employment within the County. It is estimated that 530 persons are involved in aggregate extraction and processing and a further 800 jobs in the County of Grey are supported through local purchasing of goods and services by the aggregate operations and its employees. The local construction industry benefits from the local availability of aggregate for its projects. This benefit can be passed on to consumers including the municipality. Aggregate operations provide financial support to a variety of civic and other organizations in the County.

APPENDIX I

PUBLIC PARTICIPATION

APPENDIX J

PUBLIC LIAISON GROUP MINUTES