



Arbour Farms Aggregate
Extraction Proposal
Level 2 - Natural Environment

Lot 23, Conc. 7ECL, Mulmur

P/N 1998-8

January 2001



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Arbour Farms Aggregate Extraction Proposal Level 2 Report - Natural Environment

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1.0 INTRODUCTION

Arbour Farms owns approximately 83 ha of land in Mulmur Township in the County of Dufferin. These lands are located in Lot 23, Concession 7 EHS (Figure 1).

Arbour Farms is seeking approval to extract sand and gravel from below the water table. They are making application under the Aggregate Resources Act for a Category 1 Licence - Class "A" pit below the water table for production of a maximum of 650,000 tonnes of aggregate per year. Applications for land use approvals under the Planning Act are also being made.

The proposed project involves the development of a sand and gravel extraction operation on the cleared portions of the site, outside of the woodlands which occur in the northwest and south-east corners of the property. A haul route is to be located in the woodland at the northwest corner of the property due to County access requirements. The scale and scale house are to be located in either the vicinity of the access onto the County Road in the woodlot or in the proposed pit itself.

A Natural Environment Level 1 Report was prepared by Krystawyn Environmental Consulting to identify natural heritage features and functions on the site and adjacent lands which might have a potential to be impacted by the proposal. This analysis identified a range of environmentally sensitive features on the property and adjacent lands. The Krystawyn report established initial avoidance and mitigation recommendations to be further considered in this Level 2 Natural Environment Report. It is recommended that this Level 2 report be read in conjunction with the Level 1 report.

Both the Level 1 report and this Level 2 report are intended to meet the environmental analysis and review requirements of not only the Aggregate Resources Act, but also the Planning Act, as expressed in the Provincial Policy Statement, and the Township of Mulmur Official Plan.

2.0 THE PROPOSAL

Extraction is to occur in the areas shown on Figure 2.

Extraction above and below the water table is proposed. Extraction below the water table is to be set back a minimum of 200 metres from the adjacent Lisle Creek to the south (measured parallel to the direction of groundwater flow), and is to be initiated as far from Lisle Creek as is practical. The sequence of extraction is to be illustrated on the site plans prepared for the licence application. All excavation faces are to be stabilized to prevent erosion into the setback.

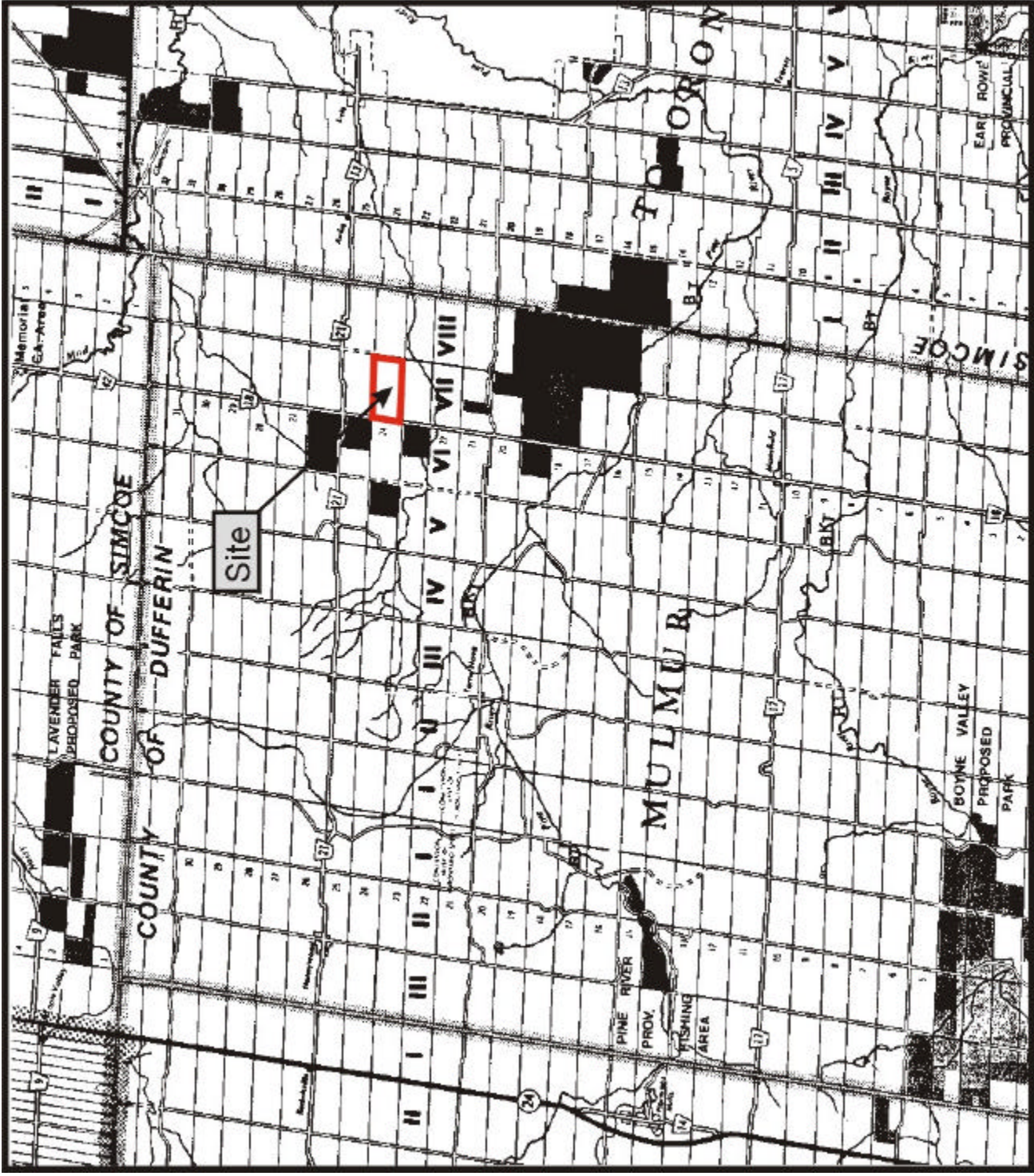



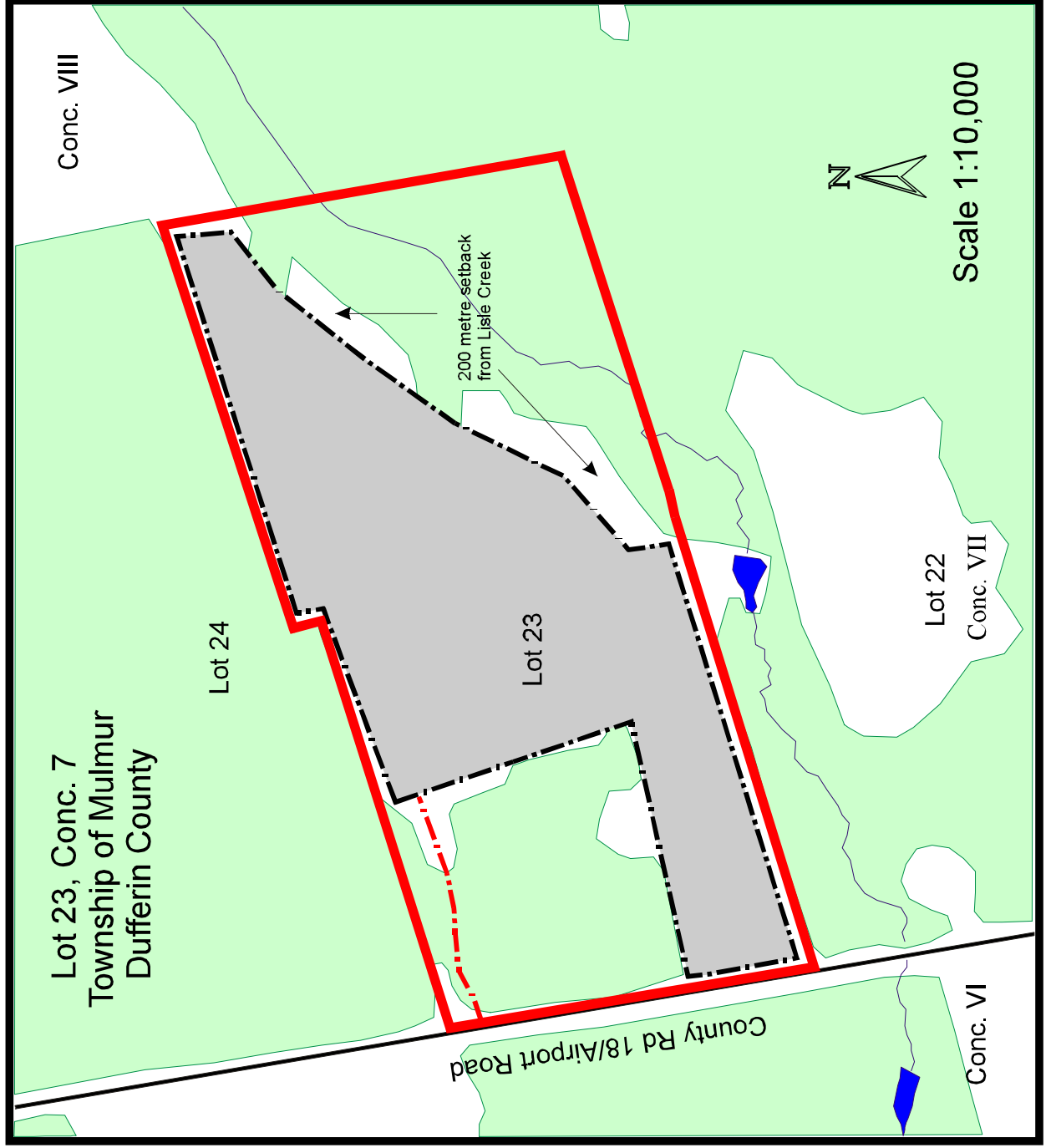


Figure 1 Location

Figure 2 Proposed Extraction Site

-  Potential licenced area (approx.)
-  Haul route
-  Approximate property boundary



The maximum depth of extraction above the water table will be approximately 17.0 metres, to be extracted in up to two lifts, with a maximum depth of 10 metres in any one lift. Extraction below the water table will be to a maximum depth of 20 metres. Below the water table extraction is to be limited to the mid and eastern portions of the site. The entire western portion of the site will involve extraction above the water table.

Topsoil and overburden will be stripped from the area to be extracted as part of the site preparation. This material will either be placed in berms or stockpiled, and seeded to control erosion.

In addition to extraction, processing and storage of on site material, the proposal may also incorporate storage and processing of recyclable material, and the import and blending of other aggregate related material for resale.

Gasoline or diesel fuel storage may occur on the site. Refueling and minor equipment maintenance on permanent site equipment are also proposed to occur on site. These activities are anticipated to occur in the licenced area. Maintenance of mobile equipment and major maintenance of permanent equipment may also occur on-site. Internal haul roads will be temporary and will be developed to provide access to active areas within the licenced area only.

Portable equipment will be used for extraction and processing, and will move to stay in relative proximity to the extractive faces.

One or more wash ponds are to be located in the processing area of the proposed pit. These wash ponds will be isolated from the ponds created for below water extraction and will have no outlets to the natural drainage system (i.e. they will be fully contained).

The on site haul road between the licence area and the County Road is to be located in the northwest portion of the property, cutting through the woodlot to a location specified by the Dufferin County Road's Department. The scale and scale house are to be located in the vicinity of the access to the County Road or within the pit itself.

3.0 SITE DESCRIPTION AND SURROUNDING LANDS

The subject property is located in Lot 23, Concession 7, of the Township of Mulmur, in the County of Dufferin.

The property is to the east of, and fronts on, County Road 18, or Airport Road, approximately seven kilometers north of the community of Mansfield. Arbour Farms owns the entire lot, however extraction is proposed only in the cleared portions of the property.

Arbour Farms has been cultivating Christmas trees on large cleared portions of the lands since the 1970's. A mature woodlot is situated in the northwest corner of the property, and Lisle Creek and an associated riparian woodland occupy the southeast corner of the site. A more detailed description of vegetation cover on the site is contained in the Level 1 Natural Environment Report.

The Arbour Farms property is located within the Horseshoe Moraines physiographic region of southern Ontario, an area east of the Niagara Escarpment, which is typified by ridges composed mostly of till separated by sand and gravel terraces and swampy valley floors. The Arbour Farms property itself is situated on the transition between the ridges, terrace and valley, with the proposed extraction area being located almost entirely on the sand and gravel terrace on the north side of the Lisle Creek valley. Lisle Creek flows from west to east parallel to, but off of, the site along the majority of the south property boundary, and then cuts northeast across the southeast corner of the lands.

The adjacent ridge and valley lands generally slope to the east and southeast from the northwest corner of the lands, at a high elevation of 285 metres (asl) to a low elevation of approximately 253 metres (asl) where Lisle Creek crosses the east property line. The majority of the drop in elevation across the lands occurs in the west half of the site where the relief is somewhat steep. The relief in the east half of the site and lands closer to Lisle Creek is lightly rolling.

Lands to the north, east, and south are privately owned and are primarily tree covered. Lands to the northeast are cleared and have also been utilized for tree cultivation and agriculture. The lands directly to the west are Dufferin County Forest and incorporate a small parking area and interpretive trail. Lands to the southwest are privately owned and predominantly tree covered. A farm and residence are located to the northwest. The east boundary of the property is an unopened and untraveled road allowance.

4.0 HYDROLOGICAL & HYDROGEOLOGICAL SETTING

Lisle Creek, which flows across the southeast corner of the property, is a tributary of the Pine River. The Pine River flows into the Nottawasaga River. Lisle Creek originates in a series of tributaries on the Niagara Escarpment approximately 6.5 km west of the subject lands in the vicinity of the community of Ruskview. The Creek enters the Pine River to the northeast of the subject lands approximately 9.5 km downstream inside Canadian Forces Base Borden.

In addition to Lisle Creek, which is a permanent watercourse, there are two significant drainage swales in the eastern half of the site within two “fingers” of forest extending in a west direction from Lisle Creek. The eastern most swale contains a permanent stream originating at a spring within 20 to 30 metres of Lisle Creek. There are also a number of other small intermittent streams or swales located entirely within the riparian woodland along Lisle Creek.

The flow in Lisle Creek on and in the vicinity of the property was measured on a number of occasions and detailed flow information is presented in the Hydrogeological Study prepared by Ian D. Wilson Associates

These flow observations indicate that flows increase dramatically as the stream travels east from Airport Road to the east property boundary. The proportional increase attributable to the reaches of the stream on the subject lands, particularly during low upstream flow conditions, suggests that the on-site portion of the stream may play the

most significant role in flow increases in the observed stream reaches.

5.0 STANDARDS AND POLICY CONTEXT

5.1 Aggregate Resources Act Standards

For a Natural Environment Level 2 study, the standards established under the Aggregate Resources Act require:

“...impact assessment where the level 1 identified any features 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.”

5.2 Provincial Policy Statement

The proposed use requires amendments to the Township of Mulmur Official Plan and Zoning By-law as well as approval of a site plan and site plan agreement. Under the Planning Act, the approval authorities must demonstrate that any decision regarding these applications has regard to matters of Provincial interest as expressed in the Provincial Policy Statement. The applicant is also required to support their submissions with studies demonstrating regard to the applicable policies of the Provincial Policy Statement.

The Provincial Policy Statement states that “the quality and quantity of groundwater and surface water and the function of sensitive groundwater recharge/discharge areas, aquifers and headwaters will be protected or enhanced”.

The Provincial Policy Statement also requires that natural heritage features and areas be protected from incompatible development.

Development and site alteration are not permitted within significant wetlands south and east of the Canadian Shield, or in significant portions of the habitat of threatened or endangered species.

Development and site alteration may be permitted in fish habitat, significant woodlands, significant valleylands, significant wildlife habitat, and significant areas of natural and scientific interest where it is demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified. This criteria also applies to development or site alteration on lands adjacent to the identified significant environmental features. The Policy Statement further indicates that “the diversity of natural features in the area, and the natural connections between them should be maintained, and improved where possible”.

The elements of the Policy Statement that are applicable to this application are those which deal with significant woodlands, significant wildlife habitat, fish habitat, connections between natural areas, and water resources. These features are found on and adjacent to the subject property. Site investigations and a review of the Ministry of Natural

Resources data base indicate that none of the other natural heritage features of Provincial significance are located on the site or adjacent lands.

The Ministry of Natural Resources Natural Heritage Reference Manual (June 1999) indicates, in a discussion of significant woodlands, that these natural heritage features perform a number of important ecological functions and have economic benefits. These include:

- reducing the intensity and volume of stormwater run off and decreasing soil erosion and flooding
- improving the quality of surface and sub-surface flows
- shading of waterbodies
- protection of recharge areas
- providing habitat for a variety of wildlife including interior species
- providing linkages between habitats and ecosystems
- providing a sustainable source of lumber and other products such as firewood and maple syrup

The determination of whether or not a detrimental impact occurs is therefore based on an assessment of the impact of the proposal on those functions which may be present in a particular woodland.

The adjacent lands for woodlands are generally those within 50 metres of the edge of a significant woodland, since development within 50 metres has a reasonable potential for having an impact on the functions of a woodland.

The Natural Heritage Reference manual also provides guidance with regard to significant wildlife habitat which incorporates areas where there are seasonal concentrations of animals, rare vegetation communities or specialized habitats for wildlife, habitats of species of concern, and wildlife movement corridors. In this case, both the consideration of impacts and the identification of adjacent lands is determined in accordance with the specific nature of the significant wildlife habitat identified. However, generally 50 metres is used as guideline for the width of adjacent lands.

The Nottawasaga Valley Conservation Authority has an agreement with the Township of Mulmur to carry out a review and provide comments on the management of natural heritage resources in the context of a watershed approach.

The Ministry of Natural Resources no longer deals with site specific fish habitat protection. This is the responsibility of the Department of Fisheries and Oceans, who have an agreement to provide this service through the Nottawasaga Valley Conservation Authority. The federal policies concerning management of fisheries resources incorporate a no net loss/net gain approach.

Policies identify project evaluation criteria on the basis of the type of fish habitat which may be impacted by the proposal. Where groundwater discharges to water bodies inhabited by cold-water fish species, the habitat is to be considered Type1. Type 1 habitat are those areas which limit overall productive capacity and include groundwater recharge areas in

cold-water streams. Low order streams (e.g. headwater streams) which are typically considered Type 1 habitat, are considered more dependent on groundwater to maintain baseflow characteristics than higher order streams, and are therefore generally more sensitive to baseflow impacts.

Generally, the requirements to protect Type 1 fish habitat include:

- water temperatures increases should be avoided, as they are not considered to be acceptable for these sensitive fish habitat resources
- compared to baseline conditions, post-development construction scenarios should demonstrate no detrimental reduction in baseflow or water level, no detrimental reduction in the volume of water recharged on the site, no detrimental reduction in the volume of groundwater discharged to the receiving water body, no significant disruption of groundwater discharge patterns, and maintenance of seasonal response characteristics of the shallow water table (all to be based on a worst case scenario rather than annual or seasonal averages)
- maintenance of groundwater discharge during the critical mid-summer and mid-winter periods is the primary factor.

The federal hierarchy of impact avoidance includes relocation, redesign, mitigation and compensation. The chosen options must ensure that there is no loss of fish habitat productive capacity (productive capacity is defined as the maximum natural capacity of habitats to produce healthy fish safe for human consumption, or to produce aquatic organisms upon which fish depend). Compensation for the loss of productive capacity is generally not an option with regard to Type 1 habitat.

For the purposes of fish habitat considerations, adjacent lands are those lands within 30 metres of identified fish habitat. However, proposals which may have impacts at greater distances may also be required to undergo an impact analysis and approval.

Provincial policy requires that environmental planning take into consideration the maintenance of connections between larger areas. This is based on the functions of such connections in allowing for wildlife movement and in protecting natural process linkages. The functions and values of such linkages are determined by whether or not they are aquatic or terrestrial in nature, as well as their width, length, permanence and gradient of flows (aquatic), and nature of vegetative cover (terrestrial).

The protection of water resources in the planning system is linked to other legislative and regulatory tools such as the Aggregate Resources Act and the Ontario Water Resources Act, Permit to Take Water process. Any water taking which exceeds 50,000 litres/day requires a Permit and the approvals process involves a consideration of the impacts on the aquifer, other users of the aquifer, and the natural environment.

Under the Planning Act, land use approvals also require consideration of the impacts on surface and groundwater resources. These considerations involve alterations to recharge and surface drainage patterns, erosion and sediment control, stormwater management,

and prevention of contamination.

There are a variety of guidelines and regulatory tools which assist in implementation of the objective of protecting the quality and quantity of water resources. These include proactive stormwater best management practices and design approvals and municipal site planning. They also include review and enforcement measures under the Environmental Protection Act, Ontario Water Resources Act, and the Fisheries Act.

5.3 Township of Mulmur Official Plan

The Township of Mulmur Official Plan designates the majority of the property as “Rural”. The riparian woodlands associated with Lisle Creek, which occupy the south-east corner of the property, are designated “Natural Area”.

The Official Plan contains policies related to the protection of the natural environment which establish review and approval criteria related to the natural heritage considerations. These include:

- avoiding changes to natural drainage
- the establishment of setbacks from watercourses with buffers which take into consideration soil type, vegetation cover, slope of the land including existing drainage patterns, fish and wildlife and the nature of the development
- sediment and erosion control measures
- water taking or diversion projects must demonstrate that they are an essential component of the operation and must be of a scale and intensity that will not adversely affect water quality, quantity and the environment
- disturbance of significant forest areas should be minimized
- prior to development occurring in and adjacent to significant forest areas an assessment of the forest area and the impact of development on the features and functions of that area is to be prepared
- existing tree cover or other stabilizing vegetation will be maintained on slopes in excess of 25%
- development shall be separated from Areas of Natural and Scientific Interest by setbacks which are sufficient to protect the scenic, scientific, educational, or interpretive value of such areas
- development shall ensure net gain and/or no net loss of the productive capacity of fish habitat
- maintenance of a minimum baseflow

- maintenance of watercourses in a healthy natural state
- maintenance of vegetative buffers in accordance with the sensitivity of the fishery resource
- use of the best available management practices to protect water quality and quantity before and after construction
- development is not permitted in the identified habitat of endangered species
- impacts on wildlife habitat, in particular rare, vulnerable, threatened and endangered species identified by on-site evaluation, shall be minimized
- maintain wildlife corridors and linkages with adjacent areas
- enhance wildlife habitat wherever possible

6.0 POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSAL

The applications are for the development of a pit, with extraction below the water table. Although this is considered an interim land use, the associated activities do have the potential to create short and long term environmental impacts which must be identified and avoided or mitigated through design and operation.

As with any land use alteration, construction and operation of a pit has a theoretical potential to result in environmental impacts including:

- a change in the relationship and quantities of on-site recharge and surface discharges due to changes in surface cover and grade
- alterations to groundwater flows and quantities due to surface grading or interception of the aquifer as a result of extraction below the water table
- contamination of the surface or groundwater as a result of discharges or spills by vehicles or on-site equipment/processes
- contamination of surface waters as a result of erosion and sedimentation
- airborne contamination by on-site processes
- direct habitat loss due to site alteration
- indirect habitat loss or degradation of habitat quality due to site alteration, and development and operational activity
- severing natural heritage linkages or connections

The determination of the potential impacts associated with a particular development require analysis of the effects of the specific proposal on the site and ecological functions and features of the site, and the potential for avoidance or mitigation.

The primary impacts of extraction will be on the lands actually proposed to be stripped and excavated. These lands are not environmentally sensitive and there will therefore be no direct development impact.

7.0 SUMMARY OF FINDINGS OF THE LEVEL 1 REPORT

With the exception of Monarch butterflies, no vulnerable, threatened or endangered species were observed on the site or adjacent lands. Threatened species have been recorded to the west of the site across County Road. None of the known rare species of Dufferin County were observed on the site or adjacent lands.

Analysis of the potential habitat utilization of the site indicates that there is a potential for a number of significant species to utilize adjacent lands and portions of the site. Effective mitigation will ensure that there are no impacts to the potential utilization of such habitat.

The proposed area of extraction does not contain any significant natural heritage features. The natural heritage features on the property are contained within the riparian woodland and the north-west woodland, which are both to be retained, as well as other surrounding lands. These include fish habitat, significant wildlife habitat, significant woodlands and ANSIs. Again, direct impacts are avoided by extraction being limited to cleared areas and effective mitigation should eliminate any potential for off-site impacts.

The proposed haul route takes advantage of existing logging roads and clearings to minimize the loss of forest cover. Field investigations along the proposed haul route indicate that a relatively small number of larger trees may need to be removed. Numerous smaller trees, shrubs and understorey vegetation will also be required to be removed, however this represents a relatively small loss in the context of the woodland and is minimized through the utilization of existing logging roads and clearings. The creation of the haul road will therefore not affect core or interior habitat or other significant wildlife habitat.

Since extraction is to be limited to the cleared areas which do not exhibit significant natural heritage features or functions, the potential impacts on natural heritage features requiring further consideration are limited to indirect impacts. Of these, the hydrogeological and hydrological impacts of the pit proposal on Lisle Creek and the associated riparian corridor will require the greatest attention, particularly for extraction below the watertable. The quality of this resource and its multiple functions suggest that the desirable goal is one of no impact through avoidance. The resources on adjacent lands will be best protected through the establishment of appropriate buffers or setbacks as well as mitigation measures associated with the operation of the extraction site (eg. drainage management).

8.0 SUMMARY OF RECOMMENDATIONS OF THE LEVEL 1 REPORT

The determination of acceptable impacts on flows to the stream should be based on ensuring that the stream remains a viable coldwater stream capable of supporting the existing fish community. This would be accomplished through the water quantity and quality performance criteria recommended as a result of the BioMAP analysis.

This reach of Lisle Creek is inhabited by a temperature sensitive community and is driven by nutrients delivered to the stream from the forested riparian corridor.

Maintaining the integrity of the forested riparian corridor is vital to the living community of the stream. This corridor moderates temperatures, provides leaf litter and woody debris that represent a food source for the aquatic community and, together with gradient and other hydrological factors, acts to shape the morphology of the stream. The proposal seeks to carry out extraction outside of the forested riparian area. This results in the avoidance of any direct impact on the stream/woodland system.

In order to maintain health at the present level, sources of groundwater that eventually contribute substantial discharge in the sampled reach as well as the rest of the stream should not be negatively impacted to a degree which would impair the function of this aquatic community. This does not necessarily mean that there should be no impact on base flows to the stream since such impacts are permitted for a variety of uses. For example, Water Taking Permits routinely allow the removal of up to 10% of the flow in a stream, even in coldwater systems. In pre-consultation the Nottawasaga Valley Conservation Authority indicated that they are prepared to accept some level of impact on flows in Lisle Creek, and that the significance of the impact would determine acceptability and the potential need for compensation.

The determination of acceptable impacts should be based on detailed analysis of hydrological and hydrogeological conditions and the theoretical impact of extraction below the water table. These investigations should examine and recommend avoidance of, or mitigation for, the following potential impacts:

- the loss of groundwater flow, and upwelling in particular, to Lisle Creek as a result of water loss associated with the need for groundwater to replace aggregate extracted below the watertable (short-term impact) and/or alterations to the water budget of the site (long-term impact)
- groundwater temperature impacts as a result of warming in the resultant ponds
- the potential for a direct surface flow connection being created with Lisle Creek and resulting implications regarding water quality

In this regard, it should be demonstrated that annual water taking to replace aggregate material below the water table should not exceed 10% of the observed low flow measured at the east property (1380 litres/minute, August 1998). This represents an appropriate threshold since flows during 1998 represent low flow conditions due to drought conditions and this particular flow measurement was at the end of the summer period, thereby also representing a seasonal low flow condition. This flow should therefore be indicative of a

low base-flow condition.

Longterm water taking can occur due to alterations to the sites water budget through topographic alterations and the creation of pond surfaces. This should be avoided, although this may not be feasible. Avoidance of impacts exceeding 5% of the low flow baseflow addition across the site should not be significant since this again represents a conservative approach. The total flow impact on Lisle Creek would be less, since this criteria relates to baseflow addition on this property.

Temperature impacts on Lisle Creek should be avoidable given the extensive woodland edge separating the proposed extraction area from the Creek. Generally a one year residency period is considered to be sufficient to avoid groundwater temperature impacts. This criteria is therefore recommended for this proposal.

The annual water taking threshold should be subject to monitoring of the abiotic and biotic stream parameters. Water quality, flows, upwelling rates, and water temperature should be measured at least once during the Spring, Summer and Fall, while BioMAP and fish sampling should occur at least once every five years when extraction below the water table proceeds. Water quality parameters to be considered include dissolved oxygen, turbidity, total suspended solids, BOD, and hydrocarbons. Results should be analyzed and submitted to the Conservation Authority and municipality with regard to findings concerning actual versus predicted impacts and recommendations concerning appropriate extraction rates and totals.

To avoid or minimize even localized impacts associated with the haul road it is recommended that:

- the width of the haul road be minimized where feasible to a maximum width of 6 metres,
- the area needed for the scale house be accommodated in such a manner as to minimize the removal of mature tree cover,
- design of the haul road should incorporate temporary construction sediment and erosion control measures and permanent erosion control features (eg. rip rap ditching) on slopes to avoid impacts on adjacent woodland habitat,
- prior to road construction, the detailed routing of the road be established in the field with tree marking and every attempt be made to avoid removal of larger trees,
- tree removal be conducted by professional loggers to limit damage to adjacent trees and vegetation,
- tree removal and road construction be monitored to avoid damage to adjacent trees and other vegetation,
- tree removal for the haul road and scale area occur during the winter when the ground is frozen, and
- haul road grading and construction occur during the late summer or fall.

Field investigations of the woodland in relation to the proposed haul route indicated that there were two significant opportunities to improve the woodlot, more than effectively compensating for the relatively minor impact of the proposed haul road .

The existing haul road in the woodland remains relatively open with little vegetative growth and no evidence of colonization by tree species. This appears to relate primarily to compaction since the road is not raised or surface treated. With relatively little effort this road could be restored to productive forest floor. It is recommended that the existing haul road in the woodland be ripped or plowed to create a suitable medium for colonization by adjacent woodland species. The length of road involved equals the length of new road created (not including the existing logging trails).

An existing clearing on the south edge of the woodland creates a significant edge effect contributing to the lack of interior habitat in this woodland. This clearing exhibits only sparse tree growth with relatively small numbers of Red Oak, White Pine, Poplar and Hemlock. There are a significant number of Scot's Pine, an undesirable invasive species. The edge of this clearing is also dominated by Poplar and Trembling Aspen.

It is recommended that the clearing on the southern edge of the woodland be managed to extend and fill out the woodlot through the removal of Scot's Pine and Poplar and the planting and temporary tending of Red and White Pine seedlings. These species are more tolerant of the initial conditions in the clearing and would have a greater potential for successful woodlot enhancement than an initial planting of hardwoods. Furthermore these species are consistent with species observed in the existing woodland and would provide a longterm basis for tolerant hardwood succession. The area which would subsequently be rehabilitated to a more desirable forest cover significantly exceeds the area which would be disturbed by the new haul road.

To avoid potential off-site impacts on other significant and non-significant woodlands on the site and adjacent lands it is recommended that a minimum no disturbance setback of 30 metres be utilized for natural forest areas and that a minimum setback of 15 metres be utilized for plantation forests. In all cases, the setback should be measured from the drip line of the canopy.

9.0 ADDITIONAL SITE DESIGN AND ENVIRONMENTAL MANAGEMENT PRACTICES RECOMMENDATIONS

The following additional site design and environmental management practices are recommended to further avoid or mitigate impacts of the proposed development.

9.1 Site Design

- The site plans for the extraction area and the associated entrance, scale house, maintenance and main haul road should be designed with the objectives of controlling all erosion and sediment on site, controlling and not significantly altering site drainage, and protecting all fish habitat in accordance with Type 1 habitat criteria.
- There should be no outlet from the wash ponds, to the extractive ponds and no outlet from both the wash ponds and the extractive ponds to the natural drainage system.

- The operational and final water levels of all ponds should incorporate sufficient free-board to ensure that the regional storm event can be accommodated without discharge to the natural drainage system.
- The site should be graded to contain all surface flow within the pit area, with all drainage ultimately being directed to the pond(s) created by extraction. A shallow sediment control ditch with outlets directing to the pit area should be constructed along the entire setback area between the pit and the woodland associated with Lisle Creek (with the exception of the two woodland “fingers”). This ditch should be installed within 20 metres of the limit of extraction, should have a depth no greater than 1 metre, and should be constructed prior to any clearing or grading activity on the site.
- Prior to any site disturbance or development in the licenced area, the limits of extraction should be identified in the field, and marked with readily visible stakes or posts which are to be maintained until the limit of extraction has been reached and rehabilitation has occurred.
- Pit design and operation should ensure that the slopes adjacent to setbacks are stable at all times to avoid erosion and slope encroachment into the setbacks.
- There should be no storage or processing of aggregate material on the site other than within the licenced area. The processing area for wet aggregate should be located so as to drain into the on-site ponds, with no drainage outside the disturbed areas.
- Hours of operation for production should be restricted to the hours of 7:00 a.m. to 5:00 p.m. during the months of November to March inclusive. Loading and trucking only may occur during other hours over this period as long as all activity is located a minimum of 200m from the tree line associated with Lisle Creek. There are no further restrictions anticipated on hours of operation for environmental reasons.
- Material blending and processing may include the production of winter sand or “pickled” sand. All salt (eg. NaCl, CaCl₂, MgCl₂, KCl and brines) stored on site, processing materials, and all resulting storage of mixed product should be stored on an impervious, contained and enclosed surface to prevent salt leaching into groundwater or salt contaminated water from entering ground or surface waters.

9.2 Site Clearing, Grubbing, Stripping and Grading

- A temporary silt fence should be installed downgradient of disturbance areas prior to any clearing, grubbing, stripping or grading. The silt fence should be located in the setback within 2 metres of the extraction face. The silt fence may be removed when extraction has reached an elevation 2 metres below the adjacent downgradient setback.

- Site clearing, grubbing and grading, other than for extraction (eg. haul road construction, ditches), should be kept to the minimum required area and cleared areas should remain exposed for the minimum length of time required to permit operations/construction etc.
- Where tree clearing is required, trees should be felled in the direction of existing or proposed cleared areas.
- As required under the Aggregate Resources Act, topsoil should be managed and stored separately from overburden, wherever practical.
- With the exception of areas to be extracted, all exposed surfaces (eg. ditches, road cuts) should be re-vegetated as soon as possible following disturbance and the timing of such works should ensure that such re-vegetation is feasible relative to seasonal conditions.
- All re-vegetation should occur with the use of grasses, wildflowers and sedges indigenous to the area and non-invasive annuals or forage grasses.

9.3 Site Drainage Management

- A site drainage plan should be prepared as a component of site plan approval for the entrance, the scale and scale house area, and the associated driveways and parking areas and the main road. Ditches and grassed swales should be utilized to retain and treat stormwater.
- Maintenance of mobile equipment (eg. loaders, trucks, dozers, scrapers, graders, excavator) is not anticipated to occur on site. Should this activity become a development component, a maintenance and equipment parking area should be created within the licenced area. All mobile equipment maintenance should occur in this location. Major maintenance should occur off-site unless a fully enclosed structure is proposed. It is recommended that all surfaces where vehicles or equipment will be parked or maintained be constructed of an impermeable surface and that drainage be collected and treated to a level suited to Type I fish habitat and to meet the PWQOs. Type I fish habitat criteria establish the highest level of protection in accordance with Department of Fisheries and Oceans and Ministry of Natural Resources policies and guidelines. A stormwater management plan for the maintenance area should be prepared and facilities designed, constructed and maintained in accordance with the Type I and PWQO criteria.

Collection and treatment facilities should be designed to accommodate spring melt events in addition to stormwater events.

The Ministry of Environment manual “Stormwater Management Practices Planning and Design Manual” provides additional guidance with respect to Level I protection criteria for stormwater management.

As an additional precaution, it is recommended that the equipment parking and maintenance area be located no closer than 50 metres to the limits of a pond or 200 metres to Lisle Creek, and be surrounded by a minimum 15 m wide grass buffer strip.

- Maintenance to “permanent” site equipment (eg. screening plant, power plant, feed bin, crushing plant, conveyors, tool trailer, stackers, dragline/stitchway), is to occur throughout the excavation area wherever equipment is placed. Recommendations regarding waste and spills management associated with these activities follow.
- Pit drainage should be addressed on the site plans for the entire licenced area. Full retention and re-infiltration are the preferred method of treatment for stormwater and melt water generated in the extraction area. This is intended to be achieved by having all drainage directed to the extraction pond. Should it be determined that not all drainage can be confined to the pond, any drainage from the proposed extraction area should be controlled and treated to Level 1 fish habitat criteria and PWQO criteria prior to any discharge
- Any required retention ponds and detention ponds should be placed to avoid increases in water temperature in Lisle Creek.
- Any drainage installations such as ponds, ditches, culverts, check dams and sediment traps should be regularly inspected and kept clear of any obstructions or build up of sediments or debris.
- If required, employee/visitor parking spaces should be limited to two spaces at the scale house location and additional spaces in a designated area in the existing clearing along the proposed haul road in the vicinity of the licenced area.

9.4 Dust Control and Atmospheric Emissions

- Disturbed lands and overburden/topsoil stockpiles should be minimized in surface area and stabilized as soon as possible. This may involve covering, enclosing, mulching or the planting of vegetation.
- As required under the Aggregate Resources Act, dust is to be mitigated on-site and fugitive emissions of dust should be controlled with water and/or use of approved dust suppressants as required. The use of used engine oil as a dust suppressant is prohibited.
- The entrance and adjacent County Road should be maintained in a condition free of significant deposits of dust, sand and aggregate material.
- Containers, loading/unloading and conveyor systems should minimize the free-fall of materials where excessive dust is generated.

9.5 Noise and Vibration Control

- Portable crushers and screeners and the associated power plant should be located no closer than 100 metres to the edge of a woodland boundary unless separated from such a feature by an extraction face, berm or topography with a height equivalent to the operating machinery.
- All equipment should be maintained and appropriate muffler/exhaust systems and engine covers installed.

9.6 On-site Road Construction and Maintenance

- During road grading operations along the main haul road, loose material should be brought back to the centre of the roadway to prevent the creation of berms that could channelize and direct runoff.
- Roadside ditches outside the extraction area should be maintained to properly function relative to site drainage management and treatment.
- Snow removal and piling can result in a concentration of sediments and other contaminants found on roads and in parking and maintenance areas. To avoid bypassing stormwater treatment, it is recommended that all snow collected from any maintenance and vehicle and equipment parking area in the licenced area be piled in an area which is graded to direct resulting runoff to the stormwater treatment system, and the system should be designed to accommodate and treat the meltwater.
- Ice and snow should be managed through site grading which minimizes potential problems, snow clearing and/or minimal sanding with clean sand. No salts or brines should be utilized for ice or snow removal.
- Cleared snow within the extraction area should not be placed in setbacks.
- Any culverts should be kept free of ice and debris to prevent flooding and erosion

9.7 Design and Construction of the Main Haul Road

- The main haul road should be re-surveyed in the spring prior to construction of the road to confirm the absence of Ginseng and Spotted Wintergreen in this location. Should plants be identified, the haul road could be relocated, or alternatively, with permission and cooperation from the Ministry of Natural Resources, it may be possible to transplant the species.
- The width of the main haul road should be minimized where feasible to a maximum width of 6 metres.
- The area needed for the scale house should be accommodated in an area near the entrance to the County Road which has minimal impact on mature tree cover, or

more preferably within the pit.

- Design of the main haul road should incorporate appropriate temporary construction sediment and erosion control measures and permanent erosion control features (eg. rip rap ditching) on slopes to avoid impacts on adjacent woodland habitat. A sediment and erosion control plan should be prepared and submitted to the Conservation Authority for approval prior to any site work.
- Prior to road construction, the detailed routing of the main haul road should be established in the field with tree marking and every attempt should be made to avoid removal of larger trees.
- Tree removal to create the main haul road should be conducted by professional loggers to limit damage to adjacent trees and vegetation.
- Tree removal and road construction should be monitored to avoid damage to adjacent trees and other vegetation.
- Tree removal for the haul road and scale area and haul road grading and construction should occur during the late summer or early fall to minimize impact on wildlife during the breeding and rearing season while still allowing for re-vegetation of disturbed areas.
- In an effort to create additional potential habitat for Salamanders, fallen logs removed from the haul road should be placed inside the woodland and logs not suitable for harvesting, produced during road clearing, should also be placed in the woodland. Several culverts should be placed beneath the road, particularly where a raised road profile is necessary, to facilitate spring migration to breeding sites. Culverts to provide for drainage would also be appropriate for this purpose.

9.8 Solid Waste Management

- Proper enclosed waste storage facilities should be provided for any solid waste generated by the scale house.
- Hazardous solid waste resulting from equipment maintenance (eg. used oil containers/filters, lubricants etc.) should either be disposed of immediately in an approved fashion or be separated from other solid wastes, temporarily stored in appropriate and approved containers inside a building or structure designed for containment of spills, and disposed of properly in approved off-site facilities.
- All woody debris should be stockpiled and subsequently chipped for re-utilization in site rehabilitation (larger stumps may be stockpiled and retained for surface placement during rehabilitation). No burying of woody debris should occur.

9.9 Hazardous Liquids Management

- A spills management plan should be prepared and spills management materials should be stored on site.
- All vehicle and equipment operators should be trained in spill clean up procedures and be familiar with the spills response plan.
- Immediate spills containment should be the priority of the spills response plan.
- A hazardous liquids (including fuels) management plan should be prepared and at a minimum should require the following:
 - S Liquid waste generated in the maintenance area (eg. waste oil, cleaning fluids, hydraulic fluid) should be contained and stored for a minimal period in appropriate containers labelled using WHMIS guidelines.
 - S Storage of liquid waste materials and all non-fuel hazardous liquid materials should occur inside the maintenance building, or another enclosed and covered structure, on an impervious surface with secondary containment features. No outdoor drum storage should be permitted.
 - S Staff should be trained with regard to proper storage, handling and disposal of hazardous liquid materials.
 - S Designs of storage tanks should follow applicable regulations, codes and guidelines for the types or classes of materials to be stored.
 - S Storage tanks should have secondary product containment and/or leak detection systems.
 - S Storage tanks and dispensing equipment should be located away from high traffic areas and protected against impacts from vehicles.
 - S All fuel storage should be in an above ground container placed over an impervious surface designed for containment or an in approved container which provides secondary containment.
 - S Prior to receipt of deliveries, tanks should be dipped to ensure adequate volume is available.
 - S If a tank leak is detected, the contents of the tank should be removed to approved alternative storage immediately and the faulty tank safely repaired or properly disposed of.
 - S A complete inventory of stored petroleum, chemical or other products should be maintained.

- S Unused storage tanks should be immediately decommissioned and removed in accordance with applicable regulations and codes.
- S Stockpiling and storage of hazardous liquid materials should be minimized.
- Vehicle, machine and processing equipment should be washed with clean water only. Washing with any detergents or other cleansers should occur off-site, or on an impervious and contained surface, and all water should be directed to an approved treatment system.
- Portable chemical toilets should be utilized for sanitary sewage and these should be maintained on a regular basis by a licenced contractor with waste being disposed of off-site at an approved treatment facility.
- Refueling should not to occur while equipment is in operation.
- All mobile equipment should be refueled on an impervious surface graded for and/or otherwise designed for containment of spills. Refueling shall meet the requirements of the Gasoline Handling act and the refueling area shall not be located within 200 metres of Lisle Creek and 50 metres of the extraction pond(s).
- Fueling of the permanent equipment (ie. power plant and dragline/stitchway) should occur on location only by staff trained in spills management and with equipment available to assist in spills containment, including immediate excavation and containment of contaminated material.

9.10 Equipment and Vehicle Inspection/Maintenance

- All obsolete or scrap equipment containing fuel, oil, hydraulic or other fluids, should be either immediately removed from the site or stored on an impervious contained surface and all fuels, hydraulic liquids etc. should be removed and stored for proper recycling or disposal.
- All mobile and permanent equipment with fuel tanks or other fluid should be regularly inspected to detect leakage.

9.11 Habitat Management

- The existing logging road accessing the County Road in the woodland should be ripped or plowed to create a suitable medium for colonization by adjacent woodland species.
- Clearing on the southern edge of the northwest woodland should be managed to extend and fill out the woodlot through the removal of Scot's Pine and Poplar, and the planting and temporary tending of Red and White Pine seedlings.

- The area located between the limits of extraction and the forest cover associated with Lisle Creek and the County Road, as well as all other setbacks, should be maintained as open field habitat with the additional use of Christmas tree cultivation where suitable. To enhance the browse and forage value for deer and other species, these areas should be upgraded by seeding with trefoil and clover to compliment existing cover and cluster planting of Dogwoods, Highbush Cranberry, and Nannyberry. Within 15 metres of the woodland edge along Lisle Creek, edge species such as Dogwood, Gooseberry and Sumacs should be planted to enhance winter browse for deer.
- It would be desirable to consider the requirements of the Monarch butterfly relative to property management plans and rehabilitation of the site. This may however conflict with municipal by-laws requiring the control of Milkweed. Subject to discussions with the municipality in this regard, it may be desirable not to destroy Milkweed plants in the setback areas, pre-extraction areas or rehabilitated areas in the rear half of the site which is virtually surrounded by extensive woodlands.
- Additional habitat for the Red-headed Woodpecker should be developed through the creation of dead standing trees along woodland edges. This would also provide habitat for other cavity nesting species.
- Additional potential Flying Squirrel habitat should be established through the creation of dead standing trees, by girdling, within the woodland. Undesirable (relative to species or forestry management objectives) or diseased trees should be selected for this purpose.

9.12 Monitoring

- A monitoring program should be established to monitor water levels in standpipes and stream bed mini-piezometers, and to measure stream flow in Lisle Creek.
- The water level in standpipes should be monitored at least once during the spring, summer and fall prior to extraction being initiated and bi-monthly once extraction has been initiated. All existing standpipes should be monitored until they are removed as extraction proceeds. A minimum of four additional standpipes (two up-gradient of extraction and two down-gradient of extraction) should be installed in the setback areas for long term monitoring.
- The water level in all existing mini-piezometers and stream flows should be monitored at least once during the spring, summer and fall prior to extraction being initiated and bi-monthly during this same period once extraction has been initiated. Stream flows should be measured at Airport Road, the south property line, and the east property line.
- After a minimum of five years of operation as observed trends are established, the water level and flow monitoring may be adjusted in frequency, but should not occur less than once in the spring, summer and fall.

- Lisle Creek should be monitored at the three flow measuring stations, once in the spring, summer and fall, with regard to dissolved oxygen, turbidity, total suspended solids, BOD, temperature, a BTEX scan and Total Petroleum Hydrocarbons (fuel oil/diesel phase) scan.
- Two standpipes downgradient of extraction, and one upgradient, should be monitored once in the spring, summer and fall, with regard to a BTEX scan and Total Petroleum Hydrocarbons (fuel oil/diesel phase) scan.
- Following the first two years of extraction and thereafter every five years, Lisle Creek should be monitored using the BioMAP technique (or a similar and comparable technique) and a fisheries assessment conducted, and results compared to the baseline data established by the Level 1 Natural Environment study and subsequent monitoring trends.
- After each monitoring visit, water levels, stream flows, temperature data, water quality results, and ecological sampling data should be compared with baseline conditions. A copy of the data and analysis should be promptly forwarded to the Nottawasaga Valley Conservation Authority. Should there be any change in water quantities which is beyond the impact predicted for extraction, and which can not be explained by natural phenomenon, extraction below the water table should halt and the Conservation Authority and Ministry of Natural Resources should be contacted to discuss the findings, implications and a future course of action.

Should there be any change in water quality or the ecological monitoring results which can not be explained by natural phenomenon, the Conservation Authority, Ministry of Natural Resources, and depending on the nature of the findings, the Ministry of Environment should be contacted to discuss the findings, implications and a future course of action.

9.13 Rehabilitation

- The objective of terrestrial rehabilitation should be to stabilize slopes, re-vegetate all exposed surfaces and create open space suitable for natural succession. This should be accomplished by establishing a vegetation cover using species of grasses, wildflowers and sedges indigenous to the area and non-invasive annuals or forage grasses, and cluster plantings of indigenous shrubs and/or trees.
- The objective of aquatic rehabilitation should be to create deep and shallow water habitat. Shallow water habitat should include both wide shallow sandy beaches and vegetated shoreline. This should be accomplished by varying surface soils between sandy/gravelly material and topsoil/organics. Cluster plantings of indigenous emergent, submerged and floating aquatic flora should be introduced to promote natural regeneration. The shoreline should also be irregular incorporating peninsulas and embayments. In no case should the slope below the water line within 10 metres of the shoreline exceed a slope of 5:1. The potential creation of ponds associated with extraction below the water table provides an

opportunity to provide habitat for species such as Least Bittern if extensive shallows suitable for colonization by Cattails is provided.

- Compacted areas should be ripped or tilled prior to applying top soil and re-vegetating.
- All slopes above water level should have a maximum grade of 3:1.
- All slopes below water level should be extracted or graded to a stable slope.
- Backfilling should be accomplished with the use of overburden, subgrade material, or imported clean fill.
- Topsoil and overburden stockpiles and berms should be removed and material used in rehabilitation
- Graded surfaces should be roughened perpendicular to the slope to avoid channelization, reduce flow velocities and promote infiltration.
- All extraction areas above the watertable should be graded to promote surface or sub-surface flow into the pond resulting from extraction below the watertable.

10.0 NET ENVIRONMENTAL IMPACTS OF THE PROPOSAL

The net environmental impacts of the proposal can be determined relative to the resulting list of non-mitigated theoretical impacts, and with regard to the requirements of the Aggregate Resources Act and the applicable policies of the Provincial Policy Statement, the protection of critical elements of the County natural heritage unit, and compliance with Official Plan policy.

10.1 Mitigation or Avoidance of Theoretical Impacts

Soil contamination is to be prevented through recommended mitigation measures associated with the management of wastes, maintenance operations, and fuel storage and handling. A spills contingency plan is also to be prepared.

Operational and rehabilitation recommendations will ensure that erosion is controlled, sediment is contained, and that stable re-vegetated slopes are ultimately achieved.

As indicated in hydrogeological investigations undertaken by Ian D. Wilson Associates Inc., surface water recharge should not be significantly impacted.

An additional but acceptable level of short-term impact on discharge to Lisle Creek and associated base flows and water levels has been identified. As outlined in the hydrogeological study prepared by Wilson Associates Inc., the removal of aggregate from below the water table will result in acceptable levels of impact over the potential impact zone based on conservative methods of analysis.

To mitigate this impact it is recommended that the rate of extraction of material below the water table in any one year be limited to the equivalent of a maximum of 10% of the actual stream flow at the east property line based on the lowest measured incoming (ie. south property line) flow. Again, the reference flow measurements occurred during a multi-year extremely dry period.

A 10% flow impact was selected since this is the acceptable threshold routinely used and found to be acceptable in the review and approval of other water taking projects. Based on visual observations of the low flows and the channel, this level of impact should not detrimentally impact the quantity or quality of fish habitat during the critical summer period. As flows increase during other times of the year, including the spawning season, the impact on flows is even less significant and should not detrimentally impact the quantity or quality of fish habitat.

Discharge to the stream bed will continue to occur and would be expected to maintain the current pattern of channel characteristics and morphology.

On a basis similar to such other water takings the resulting impact, if found through monitoring to have unacceptable consequences, can be reduced or eliminated by reducing, restricting or prohibiting the annual rate of extraction of material below the watertable.

Drainage within the extraction area is to be designed to contain all surface water and maximize infiltration. No direct discharge to a watercourse is to be anticipated.

The quality of surface water is intended to be protected by mitigative recommendations concerning setbacks, sediment and erosion control, drainage management, waste management, maintenance, and fuel storage and handling. A spills contingency plan is also to be prepared. A monitoring program to sample groundwater and surface flows, and an ecological monitoring program have also been recommended.

Groundwater contamination is to be prevented through recommended mitigation measures associated with the management of wastes, maintenance operations, and fuel storage and handling. A spills contingency plan is also to be prepared.

A monitoring program to measure groundwater levels and surface flows has also been recommended.

Changes in surface water temperatures are avoided through avoiding extraction below the water table within 200 metres of Lisle Creek. Hydrogeological investigations have demonstrated that this separation provides a one year groundwater residence time which is commonly utilized to ensure no significant alteration to groundwater and surface water temperature regimes. This separation has been calculated with an allowance for the increase in groundwater velocities which is anticipated to be associated with extraction. Mitigative measures have been proposed to ensure that air quality from dust and other emissions are kept within acceptable levels.

There will be additional noise on the site as a result of operations. Mitigative measures

have been proposed to minimize these impacts. Observations of fauna on other operating extractive sites indicate that there is a tolerance for the noise and operations of gravel pits by a considerable number of species. For example, a variety of mammals, waterfowl and other birds, and reptiles and amphibians can be regularly observed adjacent to or even within pits and quarries.

The greatest potential concern with regard to noise and associated disturbance impacts relates to the deer yard located to the south of the proposed extraction area. In this regard the findings of a study by H.N. Chabwela on the distribution of white-tailed deer relative to gravel pits located in Aberfoyle and Erin Townships in Ontario provides useful information (The Effects of Aggregate Mining Operations on Wildlife in Southern Ontario, Ph.D. Diss., University of Guelph, 1982). Chabwela found that there was a lack of difference in the occurrence of deer track signs in and around high disturbance versus low disturbance areas. A preference for closed canopies and decreased horizontal habitat visibility were noted and the effect of traffic and noise on deer is minimized if suitable dense vegetation cover is available.

Deer are most active prior to dawn and after dusk when pit activities and pit traffic will be low to nonexistent. During the critical wintering period, hours of operations would restrict pit operations to daylight periods. The forest cover associated with Lisle Creek provides the high density, low visibility habitat which is effective in minimizing the impacts of daytime activity in the pit. The separation recommendations associated with the processing plant further limit potential impacts. The deer yard is a wintering area, and its function will therefore be further protected by the lower level of activity in the pit at this time of the year. It is anticipated that the site will be virtually shut down for much of the winter period, particularly with regard to operations below the water table.

No other particular species of concern have been noted on site relative to potential noise impacts.

Since no clearing of significant tree cover is proposed, there is no potential for related wind damage in the tree covered adjacent lands.

There is no documented habitat for vulnerable, threatened, or endangered species on or adjacent to the subject lands. As a further precautionary measure, potential habitat for these species was identified. The recommended techniques of avoidance, setbacks and recommended mitigative measures are intended to ensure that there will be no direct or indirect loss of potential significant habitat for rare species.

The open field which is proposed for extraction provides no habitat for rare species. It does however, provide a localized function as habitat for more common species and as deer browse area in proximity to the deer yard. The recommendations concerning the management of the area between the extraction area and the forest cover associated with Lisle Creek ensure that a sufficient area of open field habitat will continue to be available.

All fish habitat adjacent to the site was considered to be Type 1 Fish Habitat, requiring the most stringent controls with respect to maintenance of base flows and water quality. There is no direct loss of fish habitat, since the proposed uses avoid fish habitat including

adjacent riparian areas. Indirect impacts are to be avoided through setbacks and mitigative measures including operational recommendations related to the location of site facilities and activities, sediment and erosion control, drainage management, waste management, maintenance, and fuel storage and handling.

The protection of the riparian woodlands to the south of the proposed extraction area assures that the significant natural heritage linkages or connections to other area features are maintained. None of the proposed pit development aspects compromise any other significant corridor or linkage function.

Each of the theoretical impacts of the proposal has been satisfactorily addressed with no remaining significant environmental impact.

10.2 Aggregate Resources Act

This report has met the requirements of the standards by identifying any provincially significant natural heritage features on the site or within the 120 metres of adjacent lands and the preparation of an impact assessment to determine any negative impacts on the natural features or ecological functions for which the provincially significant area is identified and any proposed preventative, mitigative or remedial measures.

The provincially significant features of fish habitat, significant woodlands, and significant wildlife habitat are protected from direct impacts through avoidance and protected from indirect impacts through extensive mitigative recommendations.

The qualifications of the author of this report are enclosed as Appendix A.

10.3 Provincial Policy Statement

There are no provincially significant wetlands on the site or adjacent lands.

There is no documented significant habitat of threatened or endangered species on or adjacent to the subject lands. A potential habitat analysis indicates that there would be no significant impact on the potential habitat of threatened or endangered species.

Fish habitat will not be directly impacted. Fish habitat will be protected from indirect impacts by the proposed mitigative measures related to setbacks, and surface and groundwater quality controls and measures.

The woodlands will not be impacted as a result of avoidance through the location of the proposed pit and associated facilities, setbacks and the mitigative measures which prevent indirect impacts.

There are no provincially significant valley lands on or adjacent to the subject lands.

Significant wildlife habitat is not located on the lands proposed for development of the pit and associated facilities. Significant wildlife habitat on adjacent lands is protected from

indirect impacts by the recommended mitigative measures.

There are no significant areas of natural or scientific interest on or adjacent to the subject lands.

The diversity of natural features in the area and the natural connections between them are maintained through avoidance and setbacks. The mitigative recommendations avoid any indirect impacts to these features and the connectivity between them.

The quality and quantity of surface and groundwater are protected from significant impacts through the limitations recommended on the extraction of aggregate below the water table and the proposed mitigative measures. Additionally monitoring recommendations ensure that this will be the case as actual experiences can be evaluated against anticipated conditions, base data, and trends and further mitigated, in consultation with the appropriate agencies, if required.

The proposal therefore has regard to the Provincial Policy Statement.

10.4 Township of Mulmur Official Plan

Changes to natural drainage are avoided.

Setbacks to watercourse have been established taking into consideration relevant physical and ecological factors, and the nature of the proposed development.

Appropriate sediment and erosion control measures have been recommended.

The impacts on water resources are essential to the operation of the pit, but are within acceptable levels and are at a scale and intensity that will not adversely affect water quality, quantity, and the environment. Furthermore, monitoring is recommended to ensure that should the impacts differ from those anticipated, the appropriate agencies can be consulted and actions taken to remedy the situation.

Disturbance of the forest cover associated with Lisle Creek is avoided. Disturbance to the forest cover in the northwest corner of the property is minimized to that necessary to provide access in the location specified by the County. It is also compensated for by proposed improvements to other areas in and adjacent to the woodlot.

Existing slopes to be impacted along the main haul road will be protected from erosion through the design and installation of appropriate erosion control facilities as part of road development.

Slopes created by extraction will be appropriately stabilized through grading and revegetation during rehabilitation.

There is no net loss of productive fish habitat. Over the long term, the creation of the pond(s) will create additional potential fish habitat. There are no negative impacts on the

habitat of rare, vulnerable, threatened or endangered species. Wildlife corridors and linkages are maintained, and there is no negative impact to significant wildlife habitat. Habitat management and rehabilitation recommendations have been made to enhance wildlife habitat for common species as well as potential habitat for rare species which could utilize adjacent lands the.

The proposal therefore has had regard to the environmentally related policies of the Township's Official Plan.

11.0 CONCLUSION

Although the site is adjacent to features of ecological significance, the lands to be extracted support no significant natural heritage features.

The application of setbacks for extraction from the adjacent woodlands and streams and the proposed mitigative measures ensure that the proposed pit and associated works can be approved and developed without a negative impact on the environment. Recommended monitoring will however allow the approval agencies to determine whether mitigative recommendations are being followed and are adequately protecting the environment, or whether additional measures are required.

Based on the recommendations of this report, and the hydrogeological report, approval and development of the proposed pit and associated works, meets the requirements of the Aggregate Resources Act with regard to Level 1 and Level 2 Natural Environment Study requirements; has regard to the Provincial Policy Statement regarding the protection of natural heritage resources and functions; conforms to the policies of the Township of Mulmur Official Plan with regard to protection of the environment in pre-designating, rezoning and establishing site plan approval for site entrance, scale area and on-site haul road.

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