



**PEER REVIEW OF AIR QUALITY ASSESMENT
Kuntz Topsoil, Sand and Gravel Ltd.
Jigs Hollow Pit**

Submitted to:

Township of Woolwich
24 Church Street West, P.O. Box 158
Elmira, Ontario N3B 2Z6

Submitted by:

AMEC Americas Limited
2020 Winston Park Drive
Oakville, ON
L6H 6X7

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Prepared by:

A handwritten signature in black ink, consisting of several overlapping loops and horizontal strokes, positioned above a horizontal line.

Tony van der Vooren, Ph.D., P.Eng. QEP
Manager, Air Quality

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1.0 INTRODUCTION

AMEC was requested by the Township of Woolwich to undertake a review of air quality issues related to the proposed Kuntz Topsoil, Sand and Gravel Ltd. Jigs Hollow Pit. The review focussed on air quality issues raised in the proponent's application for an open pit sand and gravel operation. These issues were discussed in context of relevant legislation and guidelines. Sources of information included:

- Dust Assessment of the Jigs Hollow Pit, Senes Consultants Limited. Dated March 2009.
- Planning Report, Jigs Hollow Pit; IBI Group, Dec 10, 2008.
- Review of relevant environmental legislation, and Ministry of the Environment guidelines on land use compatibility and separation distances; and,
- Review of the relevant planning documents for the Township of Woolwich.

The predominant air quality issue related to open pit operations is dust (particulate matter). In any large materials handling operation, dust is generated from blasting, materials handling, crushing, wind-blown dust erosion, and truck traffic on paved and unpaved roads. The magnitude of these emissions is directly related to the amount of material handled and the level of activity. Mitigation for these types of emissions is possible, but needs to be carefully designed and implemented. Frequently, off-site impacts from these types of operations occur due to poor or inadequate operational procedures and mitigation.

Particulate matter is a variety of solid and liquid particles that remain suspended in the air. It includes smoke, fumes, dust, pollen, metals and soil materials. Impacts of particulate matter are related to health effects, effects on vegetation, visibility and effects on exposed materials (e.g. building materials, paint finishes). Emissions from quarrying and aggregate operations are predominantly crustal materials released by materials handling and metals contained in the ore and surrounding rock.

The health impacts of particulate matter are directly related to the composition of the particle as well as the size of the particle. Smaller particles (less than 2.5 μm) can penetrate deep into the human lung and at elevated levels, can lead to adverse effects (e.g. respiratory symptoms, decreased pulmonary functions).

Excessive quantities of deposited particulate matter can adversely affect vegetation. Particles can cover the leaves and plug stomata and cause a reduction in the growth and yield of some plants.

Fine particulates can also cause visibility reduction. Particles absorb and scatter light, thereby causing a reduction in long-range visibility. Moisture and particulate characteristics are important in assessing the extent of the visibility reduction.

Particulate matter can also create environmental concerns related to the soiling and corrosion on surfaces. Deposited dust can require increased cleaning of surfaces. Also, the chemistry of the particle may be corrosive to some materials requiring, not only increased cleaning, but potentially replacement of damaged materials or use of more corrosion resistant surfaces.

2.0 LEGISLATIVE FRAMEWORK

2.1 Overview

Air quality in Ontario is regulated by the Ontario Ministry of the Environment (MOE). With a few exceptions, none of which are applicable to this project, the Federal government does not directly regulate air emissions. Municipalities and local governments also do not typically regulate or control air emissions, but do deal with air quality impacts through zoning and land-use.

The current quarry application to the Ontario Ministry of Natural Resources (MNR) is part of a larger process that leads from initial planning through to final approvals and operation. At this stage, consideration is being given to the proponent's application for a license under the Aggregate Resources Act. The Ministry of Environment and the local governments are able to raise concerns and issues through the consultation process, but are not responsible for approving the application. Such responsibility lies with MNR. The proponent has also submitted rezoning and Official Plan Amendment applications through the local government.

A Certificate of Approval (Air) application will still need to be submitted through the MOE for the on-site operations. There is typically much overlap in timing with these applications. As well, even though the MOE does not have a specific approval capacity in the zoning activities at the local level, the MOE has established land-use compatibility guidelines to assist local governments with appropriate zoning and land-use planning. MOE will not issue a Certificate of Approval (Air) until MOE is satisfied that land-use and zoning issues have been settled with a municipality.

Specific requirements for the MNR quarry license application procedure have been provided by the proponent. Issues related to this license application and supporting documents are discussed in Section 3.

The following sections review each of the relevant pieces of legislation and guidance documents as they specifically apply to air quality and the current proposal.

2.2 Aggregate Resources Act

The Aggregate Resources Act of Ontario (as amended in 1997 by Bill 52) was established to provide management of the aggregate resources in Ontario. The act also has the listed purpose:

"to minimize adverse impact on the environment in respect of aggregate operations" (Aggregate Resources Act, RSO 1990, c. A.8, as amended, s. 2(d))

In the definition of the word environment, specific mention is made of the air environment.

"environment means the air, land and water or any combination or part thereof...." (Aggregate Resources Act, RSO 1990, c. A.8, as amended, S. 1(1))

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As part of the duties of the Minister (Section 12 (1) (a)), there must be consideration of “the effect of the operation of the pit or quarry on the environment” (which would include people impacted by the operations) and there must be consideration of “the effect of the operation of the pit or quarry on nearby communities” (Section 12 (1) (b)). These aspects are not further defined or clarified in the Act.

MNR provides further direction for license applications under the Provincial Standards (1997) that have been developed to support the Aggregate Resources Act.

Aggregate Resources Act - Provincial Standards

Provincial standards were developed to support the Aggregate Resources Act. The standards set requirements for:

- Site plan standards;
- Report standards;
- Prescribed conditions;
- Notification and Consultation;
- Operational standards; and
- Annual Compliance Reporting.

As noted in the Introduction of the Provincial Standards, these were developed to provide minimum requirements for delivery of the Act.

There are a few specific requirements in the Standards that address air quality issues. These are:

- I. The Standards recommend that in the preparation of the reports that accompany an application, reference should be made to the Environmental Protection Act (EPA). The EPA and regulations under the EPA are very specific with respect to air quality issues (see Section 2.3 for further details).
- II. Prescribed Conditions in the Standards are minimum requirements that cannot be varied or rescinded by the Minister of Natural Resources or the Ontario Municipal Board (OMB), but on a site-specific basis additional conditions can be attached.
- III. Under the Prescribed Conditions for a Class “A”, Category 2 license the following conditions, that impact air emissions, are required:
 - A. Dust will be mitigated on site. (Condition 3.1)
 - B. Water or another provincially approved dust suppressant will be applied to internal haul roads and processing areas as often as required to mitigate dust. (Condition 3.2)

- C. Processing equipment will be equipped with dust suppressing or collection devices, where the equipment creates dust and is being operated within 300 metres of a sensitive receptor. (Condition 3.3)
- D. If required, a Certificate of Approval will be obtained for processing equipment to be used on site. (Condition 3.8)

No other specific air quality conditions are required under the Aggregate Resource Act Provincial Standards. There are also no specific details provided on the application of the above requirements.

Kuntz Application

The site plans shown in the Planning Document contain notes related to dust mitigation. It indicates dust will be mitigated on site and that watering or chemical suppression on roads will be undertaken. Unfortunately, these notes do not seem to reference the Best Management Plan (BMP) that provides the details necessary to mitigate dust on site. We would recommend that the site plans specifically reference the BMP. In so doing, the BMP would also be enforceable by the MNR through the site plans.

Though not specifically stated in the site plans, the dust report (SENES) does recommend an “off site” mitigation to reduce dust on the nearby roads. This is discussed in more detail in subsequent sections. This would be “included” on the site plans if the recommendation to include the BMP, by reference, on the site plans is included.

2.3 Environmental Protection Act

Air quality in Ontario is regulated under the Environmental Protection Act (EPA), through Section 14 (adverse effects), Section 9 (requirements for Certificates of Approval), Provincial Regulation 419 and the MOE’s ambient air quality criteria (formerly Regulation 337).

Desirable ambient air quality levels in Ontario are set in the list of Ambient Air Quality Criteria (February 2008). Ambient air quality criteria are used to determine the acceptability of air quality in a given region. These criteria are not source specific and all contributing sources are considered. These are used by the MOE to determine areas that require specific air quality action. The MOE’s monitoring network provides details on the existing levels of air quality in an area.

Pursuant to Section 14 (1) of the EPA, “no person shall discharge a contaminant or cause or permit the discharge of a contaminant into the environment that causes or is likely to cause an adverse effect.” An adverse effect is defined in the EPA as, among other things:

- impairment of the quality of the natural environment for any use that can be made of it;
- injury or damage to property or to plant or animal life;
- harm or material discomfort to any person;
- an adverse effect on the health of any person;
- interference with normal conduct of business; and,

- loss of enjoyment of normal use of property (EPA, RSO 1990, c. E.19, as amended, s.1(1)).

Any discharge to the air, requires a Certificate of Approval (Air) under Section 9 of the EPA. A Certificate of Approval (C of A), (Air) is required prior to the construction and operation of a process that will emit to the atmosphere. The C of A (Air) is obtained from the MOE and will indicate the terms and conditions of the MOE's approval. These conditions can include emission limits, operating conditions and maintenance requirements. Compliance with a C of A does not imply overall compliance with the Act. Sources are still governed by other provisions in the Act, including not causing an adverse effect (S.14).

Regulation 419 also requires that specific sources cannot cause exceedances of specific air quality criteria provided in the Regulation and subsequent lists published by the MOE. These criteria are applied against specific modelled concentrations (point-of-impingement) determined at a location away from the source. These points-of-impingement are typically at the fence-line for near-ground level emissions and at the maximum off-property concentrations for elevated sources. MOE requires this to be demonstrated through a site specific Emission Summary and Dispersion Modelling Report.

The MOE requires a facility to meet Reg. 419 point-of-impingement criteria for the combined emissions from a facility, not just for a single emission point; however, background or existing air quality is not considered in Reg. 419.

"As of Oct. 1, 1998 all applications for Section 9 Approvals must include enough information to demonstrate that the entire facility complies with Section 5 of Regulation 346...." (MOE announcement - undated)

This demonstration (i.e. compliance with numerical standards through modelling), according to the MOE's Air Emission Summary and Dispersion Modelling Report guidance material (Guideline A-10), does not have to include fugitive dust emissions, if the facility provides an acceptable dust management plan (Best Management Plan (BMP)) for fugitive dust control.

2.3.1 Kuntz Application

The Kuntz operation will require a full Emission Summary and Dispersion Modelling report and a Section 9 Certificate of Approval for air emissions. This approval will be required prior to construction. The current reports are not structured as a support for a Certificate of Approval submission (i.e. as an ESDM report). The detail necessary for an ESDM is provided in the dust report and is adequate to demonstrate that the site should be approved by MOE.

The Township should confirm that Kuntz will obtain the Certificate of Approval. This could be included as a condition in the ARA application and plans. The Certificate of Approval will require the detailed Best Management Plan and conditions of operations. This will ensure that MOE will have specific enforcement requirements for the site and operations.

2.4 Land Use and Zoning

The property will require re-zoning to allow for aggregate extraction. As such, there are specific planning requirements for both the Region and the Township.

The MOE does not exercise any direct jurisdiction in land use issues. Instead, MOE provides local governments with guidelines related to environmental issues and land use planning.

These are reviewed in the following sections.

2.4.1 Official Plans

There are various parts of both the Regional and Township official plans that address air quality and impacts. These are:

1. The Regional Official Policy Plan (ROPP) (Section 5.3.14 b) states.

“confirmation from the Ministry of Environment that all requirements of the Ministry with respect to noise, vibration and dust related concerns have been addressed to their satisfaction;”

2. The Woolwich adopted OPA 13 Policy 11.11.1(i) and 11.11.9 states:

11.11.1 The Dust and Air Quality Impact Study as described in Section 11.11.1(i) shall provide the following information;

a) an identification of the policy framework which is aimed at addressing dust and air quality impacts, including provincial policy, Regional policy, and Township of Woolwich policy, and an analysis of how this policy framework is being satisfied by the subject proposal;

b) an assessment of background levels of dust and a modeling of additional dust contributions that can be expected from the proposed operation;

c) the nature of dust impacts on air quality, how these impacts can be mitigated, the risks associated with mitigation, and the remaining impacts after mitigation; and

d) a proposed monitoring program which includes an appropriate amount and duration of baseline data and which addresses changes in the proposed operation associated with phasing.

2.4.2 Kuntz Application

In the Planning report, Kuntz argues that a comprehensive dust study as required by the Township policy is not warranted. They argue that the ARA and site plan requirements are sufficient. We do not agree with this position and obviously since that report was filed, Kuntz has also agreed that this is not acceptable. As such, Kuntz did undertake a full dust assessment study (Senes report).

The air quality report does address most of the requirements of the Townships policy; specifically clauses b) to d). Clause a) (policy framework) is not addressed in the air quality report and though it is addressed in the planning report, as noted above the conclusions in the planning report are incorrect. We would recommend this inconsistency be corrected; either through updating the planning report or by including the fully policy framework discussion in the air quality report. (Note: Specifically the Policy does indicate that the Air Quality Impact Study shall provide the policy framework).

It is not clear what ROPP intends with the requirement for MOE “confirmation”. MOE will not issue Certificates of Approval for air and noise until any zoning issues have been resolved.

The specific details of meeting the Woolwich policy requirements are addressed in Section 3.0.

2.4.3 Ministry of the Environment - Land Use

Though the MOE is not directly involved in land use planning, MOE has realised that many environmental issues can result due to incompatible land uses. The MOE has developed a series of guidelines to be used when a change in land use is proposed. Specifically, the MOE has developed guidelines to minimize or prevent adverse effects through the use of buffer zones. These guidelines are:

D-1: “Land Use and Compatibility”;

D-1-1: “Land Use Compatibility: Procedure for Implementation”;

D-1-2: “Land Use Compatibility: Specific Applications”;

D-1-3: “Land Use Compatibility: Definitions”;

D-6: “Compatibility Between Industrial Facilities & Sensitive Land Uses”;

D-6-1: “Industrial Categorization Criteria”; and,

D-6-3: “Separation Distances”.

The guidelines and associated procedures are applicable under circumstances when a new facility is proposed and an existing sensitive land use (which includes residential properties) is within the facility’s potential influence area. Specifically the guideline states:

“If a proposed use is permitted in the official plan, but rezoning is required, or if both redesignation and rezoning are required, then this guideline shall apply.” (Guideline D-1 s 2.3.2).

The guidelines and procedures focus on the use of separation distances from the proposed facility to the sensitive land uses. It is the proponent’s responsibility to determine the zone of influence for the facility. Specifically, Procedure D-1-1 requires the proponent to evaluate the severity of the impacts both before and after mitigation.

In the absence of site-specific studies (D-6), the MOE recommends that pits and quarries be treated as a Class III industrial facility and that the potential influence area and minimum separation distances for such a facility be used in land use planning. Class III facilities are defined as facilities having a high probability of fugitive emissions. For Class III facilities, the MOE has identified the potential influence area, wherein adverse effects may occur, to be 1000 m. Even with mitigation, the MOE suggests a minimum separation distance of 300 m. It is important to note, that in this guideline, the MOE recommends that these distances be measured from property line to property line, not from specific source to residential building.

2.4.4 Kuntz Application

The current application (though not specifically the air quality study) partially addresses the issues raised in the Official Plan policies for land use changes.

The application does not specifically address the MOE recommended separation distances for proposed facilities of this type; but does provide site specific air quality studies required by the

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guidelines in-lieu of meeting the separation distances. Some homes appear to be within 100 m of the site operations, but the air quality study indicates the impacts at these homes are within acceptable MOE standards. As such, the application does indirectly address the MOE D1-D6 guidelines.

3.0 AIR QUALITY ASSESSMENT – REVIEW

The review of the March 2009 Air Quality report prepared by SENES for the proposed Jigs Hollow operations is generally well done. The methodology and approach meet acceptable current practice. Overall, the report uses appropriate emission estimating methods and dispersion modelling (ISC). The report addresses all of the key particulate impact parameters (total particulate, PM10, PM2.5 and dustfall). The conclusions reached in the report; that the operations can operate within accepted MOE standards is appropriate.

As the report implies, careful attention to operational details and dust control are essential. Without strict adherence to mitigation, unacceptable impacts will occur. As such, details of the Best Management Plan are important.

There are a number of questions and issues related to the Air Quality report that should be clarified or improved.

There are discussed in detail in the following table.

Table 1: Review of Air Quality Assessment

Statement or Issue	Location in Air Quality Study (or Planning Study (PR)	Discussion	Significance
1. Selecting background air quality	Section 2.1	Report uses the Point Petre background station and then adjusts for agricultural activities in the area. The resulting background estimates seem reasonable, but we would suggest a closer look at other MOE or Environment Canada stations to see if other rural stations may be more appropriate.	Background used seems reasonable. Further confirmation from other stations would strength the assessment.
2. Other sources in the area.	Section 2.1 (not discussed in PR report either)	There are currently at least 2 other pit proposals for the area. This air quality study does not consider this. It is also not clear how this should be addressed in any specific study.	Very significant, but not clear how any specific application should address. These are not existing, but proposed. Township should discuss with various proponents how to address the cumulative impact.
3. Operations	Section 3.3	The report indicates a maximum hourly extraction rate of 66 tonnes	Dust impacts will be greater if there is a

Statement or Issue	Location in Air Quality Study (or Planning Study (PR))	Discussion	Significance
	PR Page 29	<p>per hour. It is not clear if all of the 66 tonnes requires crushing (it would appear the emission estimates assume it all is).</p> <p>In the planning report and in Table 3.1 of the air quality report it is noted that asphalt and concrete will be brought to site to be crushed. As well, soil screening and handling will occur on the site. It is not clear if these have been assessed in the emissions.</p> <p>It is also not clear if there is a limit to how much material can be brought to site for processing.</p>	<p>significant amount of off-site materials brought to the site for crushing, screening and processing. This should be addressed through controlling the amount of offsite materials coming to site and ensuring the air quality assessment includes these materials. (note: this might also impact the estimated truck traffic on site and on nearby roads)</p>
4. Meteorological Data	Section 3.2	<p>The study uses the “central” region meteorological data from MOE. The West Central (London) data set would appear to be more appropriate and in line with MOE requirements.</p> <p>As well, it is not clear if the meteorological data set has been “adjusted” to account for calm conditions as per current MOE requirements. MOE is requiring a very conservative adjustment to treat calm conditions. Though there is some controversy over this, it is being used by MOE to demonstrate compliance with standards.</p>	<p>Undetermined. Different meteorological sets typically do not give significantly different results for maximum impacts.</p> <p>Calms: Results could be higher if calms have not been adjusted as per MOE guidance.</p>
5. Operations	Section 3.3 PR page 29	<p>Winter operations. Modelling was done for the entire year to be conservative. As such, maximums might be modelled when</p>	<p>Not significant. Impacts are shown to be acceptable. This assumption would lead</p>

Statement or Issue	Location in Air Quality Study (or Planning Study (PR))	Discussion	Significance
		<p>operations are not occurring.</p> <p>It should be noted this is inconsistent with the planning report which indicates the pit only operates for 220 days per year and is closed during the winter.</p>	<p>to potential over predicting impacts.</p>
<p>6. Operations</p>	<p>Section 3.3 PR page 29</p>	<p>There is an inconsistency between the planning report and the air quality report. Air quality report assumes 3 x 22 tonnes loads per hour. Planning report indicates 2 x 30 tonne loads per hour.</p> <p>(as noted previously, it is not clear if the off-site material trucks are accounted for in the assessment)</p>	<p>Conservative. Emissions are based on both load and number of trucks. But the change in load increases emissions by about 15 %, whereas the extra truck increases emissions by 50%.</p>
<p>7. Emissions</p>	<p>Section 3</p>	<p>Control on crusher. It would appear that the extracted material is considered to have high moisture. As such, the emission factors for “controlled” (i.e. wet) material were applied. This is appropriate but further confirmation that the crushed material will always be sufficient to be considered controlled.</p> <p>Alternatively, provision should be made to allow for water spraying if materials are dry and dust emissions are noted. (emissions for dry crushing are about 5 times higher than wet crushing)</p> <p>This is also very important for crushing of off-site materials (e.g. concrete) and screening of soils. It is unlikely these will have sufficient moisture.</p>	<p>Could be significant. If dry material is crushed high dust emissions could occur.</p> <p>Water suppression should be included on the crusher to ensure control.</p>

Statement or Issue	Location in Air Quality Study (or Planning Study (PR))	Discussion	Significance
8. Emissions and control	Off-site roads; Section 3 PR page 29, 30	<p>Kuntz has committed to ensuring the off-site roads are managed to reduce emissions. They have noted that the township applies chemical suppression once per year and has committed to applying a second application.</p> <p>This is appropriate but may require an agreement with the Township to allow for the application.</p> <p>As well, the off-site roads should be included in the BMP and if dust is noticed, further control should be applied (e.g. water).</p>	<p>Significant. The traffic will increase on the off-site roads due to this operation. Since the road is unpaved, dust generation can be significant.</p> <p>The Kuntz commitment to controlling these emissions is very proactive.</p> <p>Key will be to ensure this is agreed to with the Township and that the BMP includes appropriate actions and triggers.</p>
9. Emission control – watering	On-site operations Section 3 PR page 30	<p>It is not clear in the air quality study or the Planning report if the on-site operations will include a watering truck or if this will be contracted out (i.e. as needed). We would recommend that an onsite truck be available and this be part of the BMP.</p>	<p>Significant. Dust has to be well managed. Once dust starts to be emitted (i.e. visual dust), control needs to be applied quickly and cannot wait for an off-site contractor to be available.</p>
10. Modelling	Section 3.5	<p>Impacts can vary due to elevation differences. It is not clear why the report considers a flat terrain. Terrain data is readily available through MOE websites.</p>	<p>Recommend including terrain in the modelling assessment.</p>
11. Mitigation	AQ Section 4.4 PRT page 40	<p>Recommendation of trees along north berm to provide more control. The report indicates that trees/vegetation are barriers to dust dispersion. Though this is not easy to quantify, studies have shown this can be significant in</p>	<p>Important. This is a recommendation in the air quality report. The planning report does not indicate trees, but only grasses on the berms.</p>

Statement or Issue	Location in Air Quality Study (or Planning Study (PR))	Discussion	Significance
		<p>reducing ground level dispersion. We agree with the recommendation to include trees on the north and east berms.</p> <p>The PR actually indicates the vegetation will be cut (i.e grasses). This will significantly reduce the effectiveness of dust control.</p>	
12. BMP Plan.	Attachment D.	<p>The plan provides an excellent framework for control of dust emissions.</p> <p>The plan does require the following additional details:</p> <ul style="list-style-type: none"> • A minimum daily inspection to observe dust emissions from traffic and operations. Visible dust from any operation needs to trigger mitigation. Using visual triggers allows both the operator and other agencies to determine if dust control is adequate. • Record keeping of these observations and actions needs to be included. • Some actions are required based on temperature and wind speed. No details provided on how this will be managed? Record keeping should be included as well. • BMP should also include off-site roads. Commitment has been made to control emissions on these roads. This should be part of the 	Significant. Dust can be well controlled, but requires a detailed plan for control triggers, initiation of mitigation and record keeping.

Statement or Issue	Location in Air Quality Study (or Planning Study (PR))	Discussion	Significance
		<p>BMP.</p> <ul style="list-style-type: none"> Complaint form should include description of met. conditions and operations at time of complaint. Complaint form has a “none” for actions taken. If none is checked, explanation should be required as to why not. Too often these show complaint, and no action taken. 	
13. Monitoring	Not discussed	<p>We would not recommend actual air quality monitoring for this site. Real time monitoring is very expensive and siting of the monitors to ensure maximum impacts are captured is always difficult. Integrating (i.e. standard hi-volume) monitors are not appropriate. They require days to obtain results and only provide a retrospective look at impacts and mitigation. Visual “monitoring” on an ongoing basis to ensure no visible plumes of dust come from operations and traffic is the most appropriate monitoring to ensure appropriate mitigation and minimize off-site impacts.</p>	<p>Visual “monitoring” and reporting must be included in the BMP. This is the most appropriate mechanism to ensure appropriate mitigation. See comments RE: BMP concerning record keeping.</p>

4.0 CONCLUSIONS

The air quality study demonstrated that with appropriate mitigation, the proposed Kuntz site can operate within air quality standards and criteria set by the Ministry of the Environment. A key issue that could not be addressed in the study, but must be considered for this approval is the potential cumulative effect of two other pit proposals in the area.

There are a few areas in the report that we would recommend improving and a number of inconsistencies between the air quality report and the planning report that need to be addressed. These are detailed in the previous section. These should not significantly change the results.

The Best Management Plan is key to both ensuring the necessary mitigation is undertaken and the monitoring to show that the plan is implemented. The proposed BMP covers most key areas, but should be improved to provide further details on the plan and operational details and reporting to ensure the plan can and will be followed. These recommendations are detailed in the previous section. None of these improvements should be difficult for Kuntz to include.