

Best Management Practices Plan for Control of Fugitive Dust Emissions

1476545 Ontario Inc. Tullis-Whistle Bare Aggregate Pit 1821-1835 Whistle Bare Road Ayr, Ontario

Revision 0



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Foreword

This Dust Best Management Practices Plan (BMPP) documents the practices that will be in place to control potential fugitive dust from the expanded Tullis-Whistle Bare aggregate pit operating at 1821-1835 Whistle Bare Road in Ayr, Ontario (Facility or Site) and has been prepared in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Technical Bulletin "Management Approaches for Industrial Fugitive Dust Sources", published in February 2017.

As operations change and new fugitive dust sources are added to the Facility, this Plan will be updated as required. In order to maintain version control all pages in the Dust BMPP have been dated and documented with a version number. This Plan is Revision 0. The version number will change if the entire report is re-issued; if individual pages are provided to update small portions of the Plan then they will be issued with a X sub-revision number and the updated pages will be listed on the following Revision Control Page.



Version Control

Version	Date	Description of Changes	Updated Pages	Reviewed By
0	February 2021	Original	NA	Matthew Griffin, GHD Limited



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1. Introduction

This document entitled "Best Management Practices Plan for Control of Fugitive Dust Emissions" (Dust BMPP) has been prepared for Tullis-Whistle Bare (Tullis) Aggregate Pit located at 1821-1835 Whistle Bare Road in Ayr, Ontario (Facility or Site). The Facility location is presented on Figure 1. The Tullis Pit is planning an expansion, which will be licensed under the Aggregate Resources Act through the Ministry of Natural Resources and Forestry (MNRF).

The purpose of this Dust BMPP is to provide details about the best management practices that will be in place to control potential fugitive dust emissions, as well as planned strategies for dealing with potential fugitive dust issues, based on the dust conditions observed.

This Dust BMPP has been prepared in accordance with the requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) Technical Bulletin "Management Approaches for Industrial Fugitive Dust Sources", published in February 2017.

This Dust BMPP includes the following information:

- Description of the operational activities at the Site.
- Identification of the main sources of fugitive dust emissions at the Site.
- Potential causes for high dust emissions and opacity resulting from these sources.
- Preventative and control measures in place or under development to minimize the likelihood of high dust emissions and opacity issues from the sources of fugitive dust emissions.
- Inspection and maintenance procedures and monitoring initiatives to ensure effective implementation of the preventative and control measures.
- Training requirements of Site personnel.
- Opportunities for continuous improvement of the Dust BMPP.

Upon commencement of expansion at the Site, 1476545 Ontario Inc. shall immediately implement the Dust BMPP for the control and mitigation of potential fugitive dust emissions resulting from the Site's operations. This Dust BMPP will be followed throughout the lifespan of the Site and will be revised based on "as-constructed" conditions or to circumvent dust issues. The Dust BMPP will be a "living" document.

2. **Responsibilities**

The following identifies the responsibilities held by each of the employment levels at the Site as they pertain to this Dust BMPP.



1476545 Ontario Inc. Management

The 1476545 Ontario Inc. Management Representatives, or designates, are responsible for:

- Reviewing the effectiveness of the current dust control measures at the Site on an ongoing basis.
- Ensuring the required resources are in place to execute the Dust BMPP.
- Scheduling and coordinating the implementation of fugitive dust control measures, as required.
- Maintaining documentation of schedules and daily logs.
- Ensuring the training of all applicable Site personnel and contractors on the plan and best management practices for the prevention of fugitive dust emissions.
- Completing Fugitive Dust Checklists, as necessary.

Applicable Site Personnel

All Site Personnel/Contractors who could be engaged in the associated work outlined in this Dust BMPP are responsible for:

- Reviewing the effectiveness of the current dust control measures at the Site on an on-going basis.
- Following the best available practices for dust control that are currently in place.

3. **Process Description**

1476545 Ontario Inc. owns the Tullis Pit and operates it as an agregate extraction pit. The area to be extracted covers an area of 41.1 hectares and it is expected that no more than 200,000 tonnes per year of aggregate will be removed from the pit. The operations at the Site will consist of mobile equipment used to extract, process, and transport the aggregate. The mobile equipment on-Site will include, but not be limited to; scrapers, bull dozers, excavators, front-end loaders, dump trucks, crushers, conveyor belts, and other portable processing equipment for material extraction.

There are two primary areas on-Site where the majority of the operations will occur: the processing area and the wash plant area. The processing area will consist of the primary extraction processing in addition to some dry screening operations. There will be a few stockpiles associated with the screened materials in the processing area. The wash plant area will further screen the aggregate material into different stockpiles. The material will be sent through a sprayer prior to screening and will be transported using open conveyor belts. All processing operations will occur at the lowest pit floor elevation, with the exception of the screening operations. The screening operations will still occur well below the upper level of the pit. The crushing operations may be contracted and completed at an alternate location.

The only pit entrance/exit will be accessed through the existing pit located at 1951 Whistle Bare Road. The weigh scale and scale house facilities will be located near the entrance/exit. Earthen berms will be located at key points along the property boundary. These berms will be 3 meters in



height and will be vegetated with a perennial legume/grass to control erosion and prevent dust generation.

Table 1 below presents general information about the Facility relevant to this Plan.

Table 1 Facility Description

Facility:	Tullis-Whistle Bare Aggregate Pit
Location:	1821-1835 Whistle Bare Road, Ayr, Ontario
Main activities/equipment used:	Aggregate Pit
Area occupied:	41.1 hectares
Production:	Up to 200,000 tonnes of aggregate per year
Nearest sensitive receptors:	Residences on Wistlebare Road, located just beyond the north eastern property boundary of the Site

A Site location map is presented on Figure 1. A Site operational plan is presented on Figure 2, which shows the buildings, property line, and berm locations. Figure 2 also summarizes key best management practices that will be applied to limit fugitive dust generation.

4. Fugitive Dust BMPP Methodology

This fugitive Dust BMPP has been developed by following the Plan Do Check and Act (PDCA) cycle according to ISO guideline as follows:

- PLAN identifies and characterizes the emission sources and BMPs at the Site
- **DO** documents the schedule for implementation of the proposed improvements
- CHECK describes the monitoring procedures and a recordkeeping system
- **ACT** describes, when necessary, the BMPP review and update procedures in order to promote its continuous improvement

5. Identification and Classification of Fugitive Dust Emission Sources

Fugitive dust emissions occur due to mechanical disturbances of granular materials exposed to the air. Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream, such as in an exhaust pipe or stack.

The mechanical disturbance may be equipment movement, the wind, or both. Therefore, some fugitive dust emissions occur and/or are intensified by equipment use, while others, i.e., wind erosion emissions, are independent of equipment use.

The main factors affecting the amount of fugitive dust emitted from a source include characteristics of the granular material being disturbed (i.e., particulate size distribution, density, and moisture) and intensity and frequency of the mechanical disturbance (i.e., wind conditions and/or equipment use



conditions). Precipitation and evaporation conditions can affect the moisture of the granular material being disturbed and, therefore, have an indirect effect on the amount of fugitive dust emitted.

Once dust is emitted, its travelling distance from the source is affected by various parameters. Namely climatic conditions; specifically wind speed, wind direction and precipitation, and particle size distribution. Higher wind speeds increase the distance travelled while precipitation can accelerate its deposition. Finer particulates can travel longer before settling and, therefore are of more concern.

The potential sources of fugitive dust emissions that have been identified for the Site include the following:

- On-Site traffic
- Processing operations
- Material conveyance systems
- Material stockpiles
- Material loading/unloading

5.1 On-Site Traffic/Roads

The Site will receive a large number of trucks on a daily basis which will load and transport out the aggregate material. Therefore, on-Site traffic is expected to be a potential source of fugitive dust emissions. Within the property there will be only unpaved roads.

Unpaved Roads/Areas

Unpaved roads have a much greater potential to release fugitive dust emissions than paved roads. These gravel roads release dust emissions as the accumulation of dust on the road surface is disturbed by vehicular traffic. Vehicle speed, vehicle weight, moisture content, and silt content are all critical factors in the amount of fugitive dust emitted from the roads. Should a significant amount of dust be generated on the roads, water suppressant will be applied to reduce fugitive dust release. A water truck will be used to apply water to the road surface on a daily basis and as needed thereafter based on weather conditions.

5.2 Processing Operations

At the Site, processing operations will occur at the processing area, the wash plant area, and the recycling area. Each of these areas will involve some form of screening or crushing operations which are expected to be potential sources of fugitive dust emissions. These operations will be subcontracted and some of the operations may be completed at an alternate location. The crusher will be equipped with a spray bar to minimize the potential for fugitive dust emissions from the crushing operations. Furthermore, with the exception of the screening operations, all processing operations will occur at the lowest pit floor elevation, which will reduce the potential for dust emissions from these activities. The screening operations will occur well below the upper level of the pit.



5.3 Material Conveyance Systems

The excavated aggregate will be sent through screening equipment to filter out the various material grades. Conveyance systems will be in place to transfer the material within the Site. The transportation of the material though this process is a potential source of fugitive dust emissions. The conveyance system used at the main processing area will handle dry material and the conveyance system used at the wash plant will handle wet material. The convergence of the wet material is not expected to be a source of fugitive dust.

5.4 Material Stockpiles

On-Site will be several outdoor stockpiles of various aggregate products of different types and sizes reflecting the range of product demand, and each will be active in terms of being continuously drawn from and replenished as demand warrants. These stockpiles will potentially be a source of fugitive dust emissions from wind erosion. Under normal operating conditions, these piles are not expected to be a significant source of fugitive dust emissions. However, extremely dry and windy conditions could pose a concern. Therefore, the weather will be actively monitored and water suppressant will be applied to the piles, if needed.

5.5 Material Loading/Unloading

Material loading and unloading will occur at various stages of the process operations occurring on-Site. Each loading and unloading event represents a potential source of fugitive dust emissions.

Material loading occurs anytime a piece of equipment (like a front end loader) is being used to pick up material. To minimize potential emissions, material loading should be carefully completed at a reduced speed to limit disturbance.

Material unloading occurs anytime material is dropped from one height to another. Examples of this would include material being dropped into a dump truck and material being dropped from a conveyance system to a stockpile. To minimize potential emissions, the drop distance of materials should be minimized.

5.6 Summary

Table 2 below summarizes each potential source of fugitive dust emissions and the potential cause for increased emissions.

Table 2Sources of Fugitive Dust Emissions within the Site and
Potential Causes for High Emissions

Source Description	Potential Causes for High Emissions and Opacity from Each Source	
Unpaved roads	Increased vehicle traffic frequency Increased vehicle speed and weight	
	Dry conditions High wind speed	



Source Description	Potential Causes for High Emissions and Opacity from Each Source
Processing areas	Increased processing activities Increased elevation of processing activities Dry conditions High wind speed
Material conveyance systems	Increased processing activities Increased speed of conveyance systems Increased elevation of processing activities Dry conditions High wind speed
Material stockpiles	Increased stockpile size Increased elevation of stockpiles Fine materials included in the stockpiles Dry conditions High wind speed
Material loading/unloading	Larger drop distance during loading/unloading Increased frequency of operations Fine materials included in the loaded/unloaded material Dry conditions High wind speed

6. Control Measures

Control measures to reduce fugitive dust emissions should take into account the source of the dust emissions, the dispersion conditions, and the location of sensitive areas in order to avoid relevant impacts of dust emissions on receptors.

Control measures are implemented to reduce the generation and/or dispersion of fugitive dust emissions. These control measures can be classified as follows:

- **Preventative Procedure**: Measures pertaining to the design and installation of structures and the operating procedures which are implemented on a regular basis in order to prevent the generation of dust and/or the dispersion of dust emitted reaching sensitive areas.
- **Reactive Control Measures**: Measures which are implemented in the event of unexpected circumstances which can lead to the generation of dust and/or the dispersion of dust emitted reaching sensitive areas.

Table 3 presents a list of preventative procedures and control measures that will be used to mitigate fugitive dust emissions that are associated with the Site's operations. Key dust management practices are highlighted on Figure 2.



Preventative Procedure/Control Measure	Description	Frequency
Applying water suppressant	Water suppressant will be sprayed on the roads. Applying water to the road surfaces will reduce the potential for dust to be picked up by winds.	Water will be applied to the roads on a daily basis based on climatic conditions (e.g., windy dry day vs. a precipitation day).
Spray bar	The crushing equipment will be equipped with spray bars. Applying water suppressant to the crushed material will reduce the potential for dust to be picked up by winds.	The watering rate will be set, as needed, to suppress visible dust based on climatic conditions (e.g., windy dry day vs. a precipitation day).
Optimized truck routes	The truck routes will be optimized for each transport activity occurring on Site to minimize the distances travelled. The optimized truck routes for on-Site traffic provide the most appropriate traffic flow for the activities occurring at the Site. This is an effective best management practice as it reduces the amount of dust kick up by minimizing trip distance.	The truck route optimization will be subject to change as the Site develops.
Maximum speed limit	A maximum speed limit of 20 kilometres per hour will be required throughout the Site to minimize emissions of fugitive dust from vehicular traffic.	This speed limit will be required for all vehicles travelling on-Site at all times.
Maintaining the stockpile sizes, appropriate drop heights, and material type	The size of each stockpile is to be maintained relatively consistent. The piles are to be kept as intended and not have any fines added. Materials are dropped onto the stockpiles by loader, conveyor, or truck. Efforts will be made to minimize the drop height wherever possible.	Stockpile size, location, material type, and material drop heights to be monitored and maintained daily.
Berms	The Site will have various earthen berms around the property line based on the phase of the operational plan.	Berms will be constructed prior to operational activities begin on-Site. Maintenance of the berms and pit slopes on-Site will be carried out throughout the life of the pit.
Vegetation	A schedule of vegetation planting has been defined by 1476545 Ontario Inc. Prior to each phase of excavation, 1476545 Ontario Inc. will ensure the designated vegetation will be in place. This vegetation will help prevent fugitive dust from escaping the Site.	Vegetation will be planted prior to the operational activities of each project phase begin.

Table 3Description of Preventative Procedures and Control Measures for
Potential Fugitive Dust Emissions at the Site



The highest risk source of fugitive dust emissions is considered to be vehicle traffic on unpaved roadways. Therefore, applying water suppressant to the roads is considered to be the highest priority with respect to fugitive dust mitigation.

7. Meteorological Data

As the Site will process aggregate material in an outdoor environment, there is the potential for wind to pick up and transport fine dust particles. Therefore, it is important to have an understanding of the local meteorological conditions and how they might affect fugitive dust emissions.

Meteorological data was acquired from the MECP Regional Meteorological and Terrain Data for Air Dispersion Modelling database for the Site. Based on the location of the Site, crops data was used.

The data was converted into a wind rose plot (WRPLOT) supported file format (USEPA SAMSON format). Wind roses and wind speed frequencies were then generated using WRPLOT to assess the local wind speeds and wind directions. The wind rose plot is presented on Figure 3 and the wind class frequency distribution is presented on Figure 4.

The wind rose plot demonstrates that the predominant wind directions are blowing from the east (and southeast and northeast) and that approximately 62.4 percent of the winds have a speed of 4.5 metres per second (m/s) or less.

A review of the area has identified that there are a few residences located along Whistle Bare Road to the North of the property in addition to residences located to the South along Roseville Road. The planned control measures will effectively minimize the impact that residences along Whistle Bare Road and Roseville Road may encounter from south western winds.

8. Inspection, Maintenance and Documentation

The presence of visible dust will be monitored continuously and control measures will be implemented on an as-needed basis. In addition, daily process inspections by all operation and maintenance staff will be conducted at the Site to monitor the effectiveness of dust control practices. The housekeeping practices will be reviewed as part of these daily inspections, and further practices required, if any, are identified at that time. As part of the daily process inspections, the weather conditions will be reviewed and the temperature and windspeed will be documented in the daily logs. If the temperature is greater than 20 degrees Celsius (°C) and wind speeds are in excess of 5 m/s, process inspections will occur twice per day.

The dust management and inspection responsibility falls on the technical Operations Manager at the Site. On a bi-weekly basis, the Operations Manager or alternate will conduct a full Site walkthrough, including perimeter inspections to identify any potential areas of concern related to the generation of fugitive dust. Additionally, all applicable Site personnel will be directed to be cognizant of any potential fugitive dust emissions from the Site operations and will be instructed to communicate potential issues to the Operations Manager immediately upon detection.



The bi-weekly inspection will include special attention to the following areas:

- Unpaved roads/areas
- Outdoor stockpiles (wind erosion and drop operations)
- Material loading/unloading areas
- Property boundary berms

Daily observations will be logged and filed as per standard Site procedures. Bi-weekly fugitive dust checks will be completed in a similar fashion to the example checklist provided in Appendix A. Based upon the findings, equipment maintenance is completed and housekeeping practices are reviewed and modified, as appropriate.

The documentation requirements for this fugitive dust BMPP includes 1476545 Ontario Inc. recording, in a log book, each time a specific preventative and control measure described in the Dust BMPP is implemented. 1476545 Ontario Inc. shall record, at a minimum:

- The date when each emission control measure is installed, including a description of the control measure.
- The date when each new preventative measure or operating procedure to minimize emissions is implemented, including a description of the preventative measure or operating procedure.
- The date, time of commencement, and time of completion of each periodic activity conducted to minimize emissions, including a description of the preventative measure/procedure and the name of the individual performing the periodic activity.

9. Training

As part of maintaining best management practices for controlling and preventing fugitive dust emissions, an initial and ongoing training program will be provided for all applicable staff.

The training will address the existing control techniques in place for managing fugitive dust emissions and how to maintain them; how to conduct a fugitive dust observation check and complete the associated paperwork; what to do in the case of an unexpected fugitive dust release; and, who to notify of any concerns or problems pertaining to fugitive dust emissions. Refresher training will be provided, as necessary, based on changes to the fugitive dust emission control techniques or process operations.

1476545 Ontario Inc. will ensure that all new hires, including 1476545 Ontario Inc. personnel and contractors that will be engaged in the associated work listed in this Dust BMPP will be familiar with this Dust BMPP.



10. Dust BMPP Review and Continuous Improvement

Inspections and monitoring procedures will assist 1476545 Ontario Inc. personnel with the maintenance of an effective Dust BMPP. The Dust BMPP should be monitored and updated, as follows:

- If there are significant changes in the fugitive dust emissions sources (e.g. "as-constructed" site, etc.).
- If there are verified complaints associated with fugitive dust emissions from the Site.
- When there are visible dust emissions occurring more frequently and/or at a higher rate (excluding seasonal conditions).

Review of the Dust BMPP is intended to evaluate the effectiveness of the dust control practices and focus on the identification of improvement opportunities that can reduce the risk of complaints related to fugitive dust emissions. A review of the Dust BMPP will ensure it is remaining effective in controlling fugitive dust emissions.

As part of implementing a successful fugitive Dust BMPP, it is important to be aware of areas where fugitive dust emissions can be reduced further. The Site will endeavor to improve its capacity for controlling fugitive dust emissions by identifying areas for potential future improvements and implementing additional practices as appropriate.



Data source: MNRF NRVIS, 2018. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2020.



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Data Source





Appendix A Fugitive Dust Checklist

Fugitive Dust BMPP Inspection Checklist 1476545 Ontario Inc. Tullis-Whistle Bare Aggregate Pit

Completed by: _____

Date:

Precipitation? Weather Conditions:

Yes 🗆 No 🗌 Snow 🗌 Rain 🗌

Wind Speed: Wind Direction (blowing from):

Calm 🗌 Moderate 🗆

High 🗆

SOURCE **INSPECTION POINTS** YES NO NOTES **Unpaved Roads** Are dust emissions observed to be under control? Is water spraying required? Are vehicles obeying the posted speed limit? Storage Piles Are dust emissions observed to be under control? Is water spraying required? Transfer Locations Are dust emissions observed to be under control? Are drivers required to unload at a lower height? Are dust emissions observed to be under control? Berms Are berms in good condition?

Additional Comments / Corrective Action:



about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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