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Proposed Hidden Quarry

Township of Guelph-Eramosa, Wellington County

Best Management Practices Plan For Dust

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SUBMITTED TO

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1 INTRODUCTION

1.1 OVERVIEW

This Best Management Practice Plan (BMPP) for dust was prepared for James Dick Construction Limited (JDCL) for implementation at their proposed Hidden Quarry. This site has two distinct stages of operations:

- The first stage occurs above water, and involves site preparation, above-water extraction of aggregate via front-end loader or excavator, transportation, processing, washing, stockpiling and shipping.
- The second stage of operations occurs at and below the water table, and involves underwater drilling, blasting, and extraction of aggregate via dragline, dewatering, transportation, processing, washing, stockpiling and shipping.

This plan includes dust control measures that meet or exceed the current industry standards. Implementation of these measures will ensure that dust is effectively controlled and off-site impacts are minimized.

1.2 COMPONENTS OF A BEST MANAGEMENT PRACTICES PLAN

A BMPP outlines the fugitive dust sources at a given site and describes the measures that shall be used to control emissions from these sources. The MOECC requires that a BMPP for dust must include the following:

- Details regarding the size and composition of the dust;
- A description of the emission sources from the facility;
- A summary of control measures that are or will be put in place as part of the BMP;
- An implementation schedule for the control measures;
- An implementation plan for the control measures;
- Details regarding the inspection and maintenance schedule; and,
- A description of the planned monitoring and record keeping activities.

1.3 SIZE AND COMPOSITION OF FUGITIVE DUST AT SAND & GRAVEL OPERATIONS

Typically, the dust at an aggregate operation has the following characteristics:

- Primarily composed of calcium carbonate, oxides of iron, magnesium and aluminium and/or silicon;
- Fraction of dust smaller than 10 micrometres (PM_{10}), 19-55%¹;
- Fraction of dust smaller than 2.5 micrometres ($PM_{2.5}$), 3-14%¹; and,
- Crystalline silica content of onsite material, with measured values of less than 8%.

1.4 OVERVIEW OF THE BEST MANAGEMENT PRACTICES PLAN

This document provides a separate section for fugitive dust sources at the facility, including a description of each source, complete with control measures applicable to that source.

¹ Based on data from the AP-42 Compilation of Air Pollutant Emission Factors, published by the United States Environmental Protection Agency.



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2 SITE PREPARATION

2.1 ACTIVITIES INCLUDED

- Overburden removal using an excavator and haul trucks.
- Berm construction using haul trucks and bulldozer.

2.2 CONTROLS FOR OVERBURDEN REMOVAL AND BERM CONSTRUCTION

- Avoid overburden removal and berm construction operations, if possible, during dry months, i.e. July, August and September and during peak periods of extraction and processing of aggregates.
- Overburden removal and berm construction operations shall be monitored hourly when the following criteria are met:
 - Dry weather is anticipated;
 - Overburden removal activities are within 165 m of a residence; and,
 - Winds are anticipated to be blowing towards the residence.
- If visible dust is observed under these conditions, these operations shall be reduced, or additional mitigation measures shall be undertaken, such that visible dust is prevented from leaving the site

3 AGGREGATE EXTRACTION

3.1 ACTIVITIES INCLUDED

- Excavation and loading of sand and gravel onto off-road haul trucks at working face by excavators and / or front end loader during above-water sand and gravel extraction operations.
- Sub-aqueous drilling, sub-aqueous blasting, extraction of aggregate via dragline, dewatering and loading of shot rock onto off-road haul trucks at working face by excavators and / or front end loader during below-water quarry operations.

3.2 CONTROLS FOR ABOVE-WATER SAND AND GRAVEL EXTRACTION

- Excavation and loading operations should be monitored hourly when all of the following criteria are met:
 - Dry weather is anticipated;
 - Excavation and loading activities are within 165 m of a residence; and,
 - Winds are anticipated to be blowing towards the residence.
- If visible dust is observed under these conditions, these operations shall be reduced, or additional mitigation measures shall be undertaken, such that visible dust is prevented from leaving the site.

3.3 CONTROLS FOR BELOW-WATER QUARRYING OPERATIONS

- Fugitive dust emissions from the sub-aqueous drilling, sub-aqueous blasting, extraction of aggregate via dragline and dewatering activities are expected to be minimal to non-existent.
- Loading operations should be monitored hourly when all of the following criteria are met:
 - Dry weather is anticipated;
 - Excavation and loading activities are within 165 m of a residence; and,
 - Winds are anticipated to be blowing towards the residence.
- If visible dust is observed under these conditions, these operations shall be reduced, or additional mitigation measures shall be undertaken, such that visible dust is prevented from leaving the site



4 AGGREGATE PROCESSING

4.1 ACTIVITIES INCLUDED

- Aggregate crushing, screening, washing and stockpiling at the portable processing plant.
- Aggregate crushing, screening, washing and stockpiling at the permanent processing plant.

4.2 CONTROLS FOR PORTABLE PROCESSING PLANT

- The portable processing plant, stockpile area and loading of trucks around the stockpiles shall be at least 300 metres from the nearest residence.
- The portable processing plant shall be equipped with a water spray system. Spray bars shall be located at various locations as needed to control visible dust emissions such as at the crusher, screen, and on the conveyor belt system.
- Watering rate will be set as needed to suppress visible dust.
- For screenings and other high-fines materials, stackers will be kept as close to the tops of stockpiles as is feasible, to achieve a drop height of approximately 1m or less.
- The processing rate shall not exceed 400 tonnes/hour.
- When the temperature is below 4°C, the use of water sprays is not feasible. Under these conditions, operations may need to be reduced, or other mitigation measures implemented, such as enclosures or wind screens.

4.3 CONTROLS FOR PERMANENT PROCESSING PLANT

- The permanent processing plant, stockpile area and loading of trucks around the stockpiles shall only be located within the processing plant area shown on the Operational Plan.
- The permanent processing plant shall be equipped with a water spray system. Spray bars shall be located at various locations as needed to control visible dust emissions such as at the crusher, screen, and on the conveyor belt system.
- Watering rate will be set as needed to suppress visible dust.
- For screenings and other high-fines materials, stackers will be kept as close to the tops of stockpiles as is feasible, to achieve a drop height of approximately 1m or less.
- The processing rate shall not exceed 500 tonnes/hour.
- When the temperature is below 4°C, the use of water sprays is not feasible. Under these conditions, operations may need to be reduced, or other mitigation measures implemented, such as enclosures or wind screens.

5 HAUL ROUTES

5.1 ACTIVITIES INCLUDED

- Unpaved haul routes for haul truck traffic from working face to processing plant.
- Unpaved haul routes in and around the processing plant area.
- Paved haul route for shipping traffic from the site entrance to the processing plant loop.

5.2 CONTROLS FOR UNPAVED HAUL ROUTES

- A water truck and sufficient water supply shall be available to provide water to all significant unpaved traffic areas.
- The watering system shall be able to deliver the water evenly over the haul route surface, and shall have the capacity to deploy water on all active haul routes at a rate of at least 1.5 L/m²/hour.
- The actual watering rate shall vary, depending on surface moisture conditions and traffic conditions, and shall be triggered by the Operational Watering Forecasting guidance provided in Section 8 of this BMP Plan.
- At the start of each day, prior to trucks accessing the haul routes, the travel surfaces will be inspected, and water will be applied if dry conditions are found.
- A speed limit of 20 km/h shall be posted near the site entrance. Haul truck and highway truck operators will be directed to observe the speed limit.
- When the temperature is below 4°C, watering is not recommended for safety reasons. Under these conditions, operations may need to be reduced, or other mitigation measures implemented.

5.3 CONTROLS FOR PAVED HAUL ROUTES

- A section of the internal haul route, extending from the site entrance to the processing plant loop, shall be paved.
- 6th Line, from the site entrance, south to Highway 7 shall be paved.
- A speed limit of 20 km/h shall be posted near the site entrance. Haul truck and highway truck operators will be directed to observe the speed limit.
- The facility shall have the capability to flush the on-site paved surface, as well as south along 6th Line from the site entrance to Highway 7.
- In dry weather, the on-site paved surfaces as well as 6th Line, south to Highway 7, shall be inspected at the end of each day's shift and flushed if necessary to provide a clean entrance for the start of the next day's operations.
- The frequency of flushing shall vary, depending on surface moisture conditions and traffic levels, and shall be triggered, as soon as practical, whenever routine inspections indicate that there is visible track-out on the pavement (may need to be flushed once or twice per day, during peak operating periods).
- When the temperature is below 4°C, flushing is not recommended for safety reasons. Under these conditions, other mitigation measures, such as sweeping, shall be implemented.

6 WIND EROSION

6.1 ACTIVITIES INCLUDED

- Wind erosion may occur at disturbed areas, or at stockpiles that have relatively high silt contents, such as screenings or granular aggregate
- Disturbed areas include the working face during above-water sand and gravel extraction, areas that have been stripped but not yet extracted, and areas that have been extracted but not yet rehabilitated.
- Wind erosion of these piles will only occur when winds exceed a threshold wind speed level, which is typically on the order of 5-7 metres per second (18-25 km/h).

6.2 CONTROLS FOR WIND EROSION

- The amount of disturbed area will be kept to the minimum necessary for extraction to proceed in an efficient manner. Progressive rehabilitation will be used to reduce erosion from previously extracted areas, in accordance with recommendations in Section 8.
- Stockpiles of finer-grained material will be located on the eastern side of the plant area so as to be sheltered from prevailing winds by other piles.
- The site is surrounded by pine plantation and other forest cover. These trees should be retained around the perimeter of the site as is shown on the ARA site plans. At least 3 rows of conifers should be retained where possible, forming a screen of trees approximately 10 metres in total width.
- Where berms are constructed, these should be reforested at the earliest date possible and adjacent trees should be retained until such time as the reforestation achieves a height of 2m.



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7 PROGRESSIVE AND FINAL REHABILITATION

7.1 ACTIVITIES INCLUDED

- While the final rehabilitation plan for much of the site will be open water, there will be rehabilitation activities involving berm removal, establishing appropriate slopes, final grading, etc. This work will be done using excavators, front-end loaders, haul trucks and dozers.

7.2 CONTROLS FOR REHABILITATION OPERATIONS

- Avoid overburden removal, berm construction and rehabilitation operations, if possible, during dry months, i.e. July, August and September and during peak periods of extraction and processing of aggregates.
- Overburden removal, berm construction and rehabilitation operations shall be monitored hourly when the following criteria are met:
 - Dry weather is anticipated;
 - Overburden removal activities are within 165 m of a residence; and,
 - Winds are anticipated to be blowing towards the residence.
- If visible dust is observed under these conditions, these operations shall be reduced, or additional mitigation measures shall be undertaken, such that visible dust is prevented from leaving the site

8 OPERATIONAL WATERING FORECASTING

8.1 ACTIVITIES INCLUDED

- The decision of when to conduct watering of haul routes and stockpiles requires the operator to use observations of meteorological conditions to ensure that dust is mitigated.

8.2 CONDITIONS UNDER WHICH WATERING IS REQUIRED

- The site operator should monitor local weather conditions using local weather forecasts.
- The frequency of watering shall be determined approximately using the guidance provided in the table below:

Temperature	Relative Humidity	Hours Between Watering @ 1.5 L/m ²
4- 10°C	75% or less	3
	75-90%	7
	90-100%	15
10-20°C	75% or less	1.5
	75-90%	3
	90-100%	7
Above 20°C	75% or less	1
	75-90%	1.5
	90-100%	3

- During wet or rainy periods, watering is not required.
- Regardless of the criteria above, watering will be implemented immediately if dust is observed to be blowing toward the residences adjacent to the site.
- When the temperature is below 4°C, watering is not recommended for safety reasons. Under these conditions, operations may need to be reduced, or other mitigation measures implemented.



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9 ADMINISTRATION

9.1 IMPLEMENTATION SCHEDULE

- All control measures should be in a state of readiness before operations commence.

9.2 IMPLEMENTATION PLAN

- Formal training on new and existing operating procedures shall be provided to relevant new and existing staff at a minimum of once every 3 years, and in the event of changes to the BMPP.
- The company's management shall communicate the BMPP to responsible supervisors, who shall ensure personnel are following operating procedures defined in the BMP.
- The Site Manager shall be responsible for ensuring the BMPP is followed.
- Management shall ensure the BMPP is reviewed annually.
- The BMPP shall be kept on file at scale house (or with other health and safety information and procedures on site).

10 INSPECTION & MONITORING

10.1 INSPECTION AND MAINTENANCE

- The water spray system for the portable processing plant should be inspected regularly to ensure it is in good condition;
- Regular inspection and maintenance of the water truck will be performed to ensure the truck and water delivery system are always in good condition.
- Weekly inspection of the paved road section will be carried out, and maintenance will be performed as soon as practicable.

10.2 MONITORING

- Weather forecasts will be checked daily, to plan for current and next-day watering needs according to the Operation Weather Forecasting procedure described in Section 7.
- Visual inspection for dusty conditions shall occur at a minimum of twice daily.
- In accordance with Sections 2, 3 and 7 of this BMPP, visual inspections shall be carried out hourly when overburden removal, berm construction, rehabilitation, excavation and loading operations should be monitored hourly when these operations are within 165 m of a residence; dry weather is anticipated; and, winds are anticipated to be blowing towards the residence.
- The Site Manager or their delegate will be responsible for monitoring current conditions and weather forecasts from Environment Canada, to subsequently help plan for current and next day watering needs and other measures.

10.3 RECORD KEEPING

- Records shall be kept of when and how dust control measures are implemented and when complaints are received, if any. As a minimum, the following activities or events shall be recorded:
 - Watering is applied on paved roads, unpaved roads and regularly travelled areas;
 - Visible dust is observed; and
 - A complaint is received.
- In addition, records shall also be kept of the results of all Inspection, Maintenance and Monitoring activities, including the following:
 - Inspection and maintenance of the water spray system for the portable processing plant;
 - Inspection and maintenance of the water truck and water delivery system;
 - Inspection and maintenance of the paved road surfaces; and,
 - Results of visual inspections including the time of the inspection and meteorological conditions at the time of the inspection.

11 COMPLAINT TRACKING AND RESOLUTION

11.1 COMPLAINT TRACKING

- A sign posted at the site entrance shall include a phone number for neighbours to call if they have concerns.
- JDCL shall request that the local MOECC office and the Township of Guelph-Eramosa notify them immediately if they receive a complaint, to allow for prompt response and follow-up.
- Complainants should be requested to identify the location of the incident as well as the time of day that it was detected and any other information that they feel is relevant.

11.2 COMPLAINT RESOLUTION

When a complaint is received, the Site Manager shall ensure the following steps are undertaken:

1. Inspect the site and surrounding area to identify possible sources of visible dust;
2. Obtain weather data for the time of the event; and,
3. Note all on-site activities at the time that the complaint was made.
4. If the information indicates that the facility is not the source of the dust complaint, the complainant shall be notified of this finding.
5. If it is determined that the complaint may, in fact, have been related to the facility operations, the following response procedures shall be followed, in the order provided below:
 - Level 1 - Correction of operations as soon as practical. The Site Manager shall ensure that all element of the BMPP are being followed. Control measures shall be stepped up or operations may be curtailed, as required.
 - Level 2 – Review of Best Management Practice Plan. If the Level 1 response does not adequately resolve the problem, the BMPP shall be reviewed to look for additional control measures to address the source of the dust complaint.
 - Level 3 – Operational modifications. If the Level 2 response does not adequately resolve the problem, the operator shall commit to making physical changes to the facility to address the source of the dust complaint, such as additional enclosures, relocation of equipment, or additional paving.