Title : **TRILLIUM LINE EXTENTION PROJECT**
DUST CONTROL PLAN

Client : **City Of Ottawa**

Project : **TRILLIUM LINE EXTENTION OTTAWA STAGE 2 LRT PROJECT**

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1.0 Preface

This document presents the Dust Control Plan (DCP) that has been developed specifically for the Trillium Line Extension Project. The DCP is part of the Environmental Management Plan (EMP) and describes the environmental requirements, standards and procedures that shall be followed by SNC-Lavalin personnel, and its Sub-contractors. The DCP describes the controls and methods to minimize, reduce or eliminate the potential for generation and dispersion of air-borne particulate matter associated with the works.

1.1 LIST OF ACRONYMS

DB: Design Build

DCP: Dust Control Plan

BMP: Best Management Practice

EC: Environmental Coordinator

EI: Environmental Inspector

EM: Environmental Manager

EMP: Environmental Management Plan

ESCP: Erosion and Sediment Control Plan

IMS: Integrated Management System

MECP: Ministry of Environment Conservation and Parks

MSF: Maintenance and Storage Facility

PM: Particulate Matter

1.2 DEFINITIONS

Fugitive Dust: Solid particles, typically soil-based matter, that become airborne, for example, from wind erosion, construction/demolition activities, roadway traffic, unpaved parking lots/roads. Fugitive dust is from non-combustion sources.

PM_{10}: Particulate matter than is less than 10 microns in aerodynamic equivalent diameter. Due to their small size and weight, PM_{10} cam remain airborne for an extended period of time. PM_{10} comprises the inhalable fraction of total suspended particulates.

$PM_{2.5}$: Particulate matter than is less than 2.5 microns in aerodynamic equivalent diameter. These particles can penetraet deep into the lungs of humans/animals. $PM_{2.5}$ comprises the respirable fraction of total suspended particulates.

Project: means the Trillium Line Extension Project

Project Co: The proponent or contractor responsible for the design, construction, financing, operations and maintenance of the Project. Project Co's official name is *SNC-Lavalin*

Project Agreement: The contract between the City of Ottawa and Project Co, which sets out the terms and conditions under which ProjectCo shall perform the activities within the Project Scope.

2.0 Introduction

The Dust Control Plan (DCP) is a key component of the overall Environmental Management Plan (EMP) which allows for the integration of engineering design and the environmental mitigation through implementation of environmental protection measures.

This plan has been developed in accordance with Schedule 17, Part 7 of the Project Agreement.

2.1 PURPOSE

This plan has been developed to address construction issues related to air quality and dust expected to be encountered during implementation of the Project.

The DCP consists of the following components:

- the identification of areas prone to air-borne particulate matter including, but not limited to:
    - Inhalable fraction (PM_{10}) particulate matter;
    - Respirable fraction ($PM_{2.5}$) particulate matter;
    - Diesel particulate matter (DPM);
    - Air-borne contamination from existing or new soil and/or groundwater contamination;
    - Fugitive dust;
    - Odours, and;
    - Crystalline silica associated with saw cutting of concrete.
- potential environmental impacts, nuisance impacts and impacts to human health and safety;
- general and site-specific measures that will be applied to mitigate fugitive dust and other air-borne particulate matter; and,
- description of the inspection/monitoring programs that will be implemented to monitor and verify that the above described measures are working effectively.

The practices and strategies laid out in this document are intended to provide guidance to Project staff and subcontractors in these temporary works. In the event permanent project controls for air quality or dust control are required, these will be captured and detailed in the various design submissions.

2.2 REVIEW AND UPDATE

As with all management plans, the DCP will evolve as the Project progresses through the various stages of design and construction to ensure information is relevant to current site activities and operations.

It will be reviewed through each stage and may be updated on an as-required basis, and in keeping with the requirements outlined in Schedule 17, Part 7 of the Project Agreement.

Revisions will be tracked in the Revision Index and revised versions of this DCP will be circulated to the relevant parties via upload to the project's document control site (as per the Project's Document Control Procedure).

2.3 LEGAL REQUIREMENTS/STANDARDS/GUIDELINES

Project Agreement Schedule 17, Part 7;

City of Ottawa, Idling Control By-law No. 2007-266;

City of Ottawa, Air Quality and Climate Change Management Plan (AQCCMP);

"Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects", 2012;

Ontario Environmental Protection Act, R.S.O. 1990, c. E.19, O.Reg. 419/05, Air Pollution-Local Air Quality;

Ontario Ambient Air Quality Criteria (AAQCs);

Guideline for the Implementation of Air Standards in Ontario (GIASO);

Environment Canada (2005) "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities", and;

Highway Traffic Act - Regulation 577 – Covering of Loads.

3.0 Plan Implementation

3.1 ROLES AND RESPONSIBILITIES

3.1.1 Environmental Inspector

The SNC-Lavalin Environmental Inspector (EI) is responsible for monitoring construction activities to ensure conformance with this plan and all other applicable rules and regulations. The EI will work with the SNC-Lavalin Environmental Coordinators (EC) to provide recommendations and resolve any identified issue(s) or deficiencies with the work being performed by either SNC-Lavalin personnel or its subcontractors. The logging and subsequent close-out of air quality and dust control issues will be done via SNC-Lavalin's monitoring and site inspections as required.

3.1.2 Environmental Coordinator

The SNC-Lavalin EC is responsible for environmental compliance of all aspects in their respective segments. The EC will review the environmental inspection reports and work with the SNC-Lavalin EI, construction teams, subcontractors and suppliers to rectify issues or address areas of concern related to air-borne particulate matter and fugitive dust. The SNC-Lavalin EC is responsible for monitoring the implementation of all environmental aspects of the work to confirm it meets the commitments of the Environmental Assessments.

3.1.3 Environmental Manager

Under the direction of the DB Director, the Environmental Manager (EM) shall have defined authority for ensuring environmental compliance of the works and environmental obligations set out in the Project Agreement are implemented.

Refer to the EMP for a copy of the SNC-Lavalin environmental management team organizational chart.

3.2 MONITORING

The sites will be monitored by the SNC-Lavalin EI for compliance with the DCP. This monitoring will be done as part of the monitoring plan outlined in the EMS.

In the event Works-related activities (construction/demolition) generate air-borne particulate matter that cannot be mitigated despite implementation of BMPs (listed in Section 5), continuous or intermittent air sampling and monitoring may be required to determine the level of particulate matter in the air during these activities. Areas where Works-related activities are anticipated to generate air-borne particulate matter include:

- Maintenance and Storage Facility (MSF)
- Stations and identified lay-down area footprints
- At-grade guideway (new sections south of Greenboro Station)

Note that monitoring at the above-mentioned locations should effectively mitigate the need to conduct monitoring near or adjacent to any adjacent sensitive receptors or third-party properties as mitigations will be implemented at the source (i.e. on Project Lands).

Notwithstanding, adjacent sensitive receptors or third-party properties may include public parks/recreational areas, residential housing/condominiums, arenas/sports complexes, office/commercial buildings, Carleton University, Ottawa International Airport and National Research Council facilities.

For the Areas listed above, and for areas where Works-related activities have resulted in generation of air-borne contaminants or fugitive dust (i.e. reasonably suspected to be impacting adjacent sensitive receptors despite BMPs in place), SNC-Lavalin/Transit Next will implement a monitoring program that includes, but is not limited to:

- Establishing baseline levels of particulate matter in air prior to daily construction. Baseline levels may be established by:

  - 1) monitoring background concentrations at the sensitive receptor, at the source, and at the mid-point between the source and the sensitive receptor using air quality measuring equipment prior to Works-related activities; and/or
  - 2) use data obtained from the Ontario Ministry of Environment & Climate Change (MOECC) Air Quality Health Index stations near the Project Lands or sensitive receptors (where available);
- Monitoring levels of particulate matter during construction; monitoring frequencies may be increased during air-borne contaminant or dust generating activities and monitored at a lesser frequency during non-generating activities. At a minimum, measurements will be taken:
  - Prior to commencement of Works-related activities in areas that may generate air-borne particulate matter;
  - Daily, for the first three (3) days of Works-related activities in areas that may generate air-borne particulate matter. If there is negligible impact of particulate matter during first three days, monitoring frequency may be reduced until completion of the activity.
    - Minimum twice daily, during air-borne particulate matter generating activities that generate particulate matter however satisfies regulatory guidelines/criteria;
  - If the particulate matter emissions are greater than the regulatory guidelines/criteria, construction team will be notified and related activities will reduce until particulate matter concentrations are in compliance.
- Implementing baseline and monitoring programs for areas of newly discovered contamination that may pose as a nuisance or health risk to sensitive receptors (e.g. offensive odors emanating from newly exposed soil/groundwater contamination with VOCs).

3.3 MAINTENANCE

All dust control measures will require monitoring and maintenance following installation. SNC-Lavalin's EI will complete monitoring to evaluate the success of implemented dust control measures and provide recommendations to resolve any identified issue or deficiencies.

For established air quality monitoring programs, SNC-Lavalin's EI will ensure a SNC-Lavalin employee or subcontractor inspects and performs the required maintenance on monitoring equipment as per manufacturer's specifications.

3.4 REPORTING

An environmental inspection report will be produced and distributed to SNC-Lavalin personnel and any relevant subcontractors for their action. Deficiencies and the associated corrective actions will be logged and tracked in the deficiency tracking matrix.

SNC-Lavalin will report to the City compliance via the **monthly environmental reports** including:

- Locations where air quality monitoring programs were/are being implemented;
- Tabulation and assessment of monitoring data;
- mitigations adopted during construction; and,
- estimated timeframe remaining for implementation of any air quality monitoring programs.

3.5 AUDITING

Auditing of all environmental compliance will be done as per the IMS-EMS audit program for continual improvement and in accordance with the requirements outlined in Schedule 17 of the Project Agreement. Independent environmental audits are to occur annually, no later than June 1st.

3.6 TRAINING

As detailed in the EMP, air quality and dust control considerations are covered during the Environmental Education and Awareness sessions that are provided to all personnel prior to starting work on the Project. This session is mandatory for all Project personnel and will be delivered by either a member of the SNC-Lavalin Health Safety and Environmental (HSE) management team or by an online training course.

4.0 Site Conditions

The following sections provide a brief description of the existing conditions of the Project Lands, which were considered in assessing potential air quality ,fugitive dust issues and the required mitigation measures to minimize adverse environmental impacts, nuisance impacts and impacts on human health and safety.

4.1 GROUND COVER

Generally, the Project Lands are covered with a combination of asphalt, concrete, grass, shrubs, and trees. At various stages during the construction phase of the Project, SNC-Lavalin will strip and grade the following areas:

- Maintenance and Storage Facility (MSF)
- Stations and identified lay-down area footprints
- At-grade guideway (new sections south of Greenboro Station)

4.2 AIR QUALITY AND DUST GENERATING ACTIVITIES

During the various phases of the Project, there will be a number of sources with the potential to produce air-borne particulate matter (as defined in Section 2.1). Air-borne particulate matter can be generated during transportation operations, material storage and stockpiling, surfacing operations, demolition, earthworks, excavation and digging.

In addition, combustion sources such as the variety of vehicles and equipment used on site are also a major sources of air pollutants.

Finally, crystalline silica which is a common mineral found in rocks,sand and concrete and can be generated from various construction activities such as excavation and saw cutting. This is of particular concern during underground operations that will be needed during the work on Dow's Lake Tunnel, or in vicinity to sensitive environmental or human receptors such as the work on the Rideau River Bridge or near residential areas.

4.3 RECEPTORS

In addition to the worker population, the 19 km Project alignment is located in proximity to a variety of residential (e.g. schools, hospitals, private residences, public institutions, etc.), commercial and industrial properties which may be subject to dust and other allergens generated by the Project. Furthermore, some sections of the Project are located in close proximity to sensitive environmental receptors.

5.0 Air Quality And Dust Control Best Management Practises

5.1 GENERAL CONSTRUCTION CONSIDERATIONS

As mentioned above, this DCP describes the measures to be used to control fugitive dust emissions creating potential environmental impacts, nuisance impacts and impacts on human health and safety during construction. While potential air quality effects are expected to be limited to the immediate vicinity of the rail corridor, mitigation will be customized to meet site specific conditions, considering such factors as proximity to sensitive receptors and prevailing weather conditions.

The two major sources of air emissions from construction are exhaust emissions from construction vehicles and stationary combustion sources and dust emissions from non-combustion sources (i.e. "fugitive dust"). Air quality is typically a concern during dry periods when sediment from various construction sources can easily become airborne from wind erosion. Air quality effects in any location will usually be temporary as construction activities will progress in sections.

SNC-Lavalin and subcontractors will be required to demonstrate how their specific construction tasks will comply with the SNC-Lavalin DCP. Best Management Practices (BMP) and mitigation measures will need to be updated as required if construction tasks change or if the mitigation measures prove to be ineffective in managing issues related to air quality.

The following sections details the BMPs to be applied on site, where required, during the construction of the Project.

5.2 COMBUSTION EMISSIONS

BMPs that will be used to mitigate adverse air quality effects from equipment emissions include, but are not limited to:

- Inspect equipment regularly to ensure it is in optimum working order. (Maintenance and inspection records will be kept and be made available to SNC-Lavalin or the City upon request.)
- Operate equipment at optimum rated loads.
- Follow equipment manufacturer specifications relating to equipment maintenance and servicing.
- Ensure all original equipment emissions and pollution control equipment is in place and functional.
- Position necessary stationary emission sources away from sensitive receptors.
- Ensure on-site equipment/vehicles are not idling when not in use.

5.3 DUST CONTROL

SNC-Lavalin (and its subcontractors) will employ measures to control fugitive dust emissions generated from Project related activities on Project Lands and adjacent, off-site lands/receptors. Decisions on when and where to implement dust control measures will vary based on the nature of the activity generating the dust, current and expected weather conditions, distances to receptors, traffic volumes, and road conditions.

The following dust control BMPs will be implemented, as required, on active SNC-Lavalin construction sites:

- As necessary, use environmentally acceptable dust suppressants or water to control dust on access roads, lay-down areas, and active work areas.
- Stabilize surfaces of completed earthworks and/or bare areas with vegetation, stones, geotextile, mulch or other erosion resistant cover.
- Use temporary surface covers such as mulch, tackifiers on soil surfaces that will remain exposed for extended periods (e.g. >45 days).
- Use asphalt or concrete millings as cover for haul roads and access points.
- Minimize the tracking of soil or mud onto paved streets or roads (e.g. use wheel washes or other method to mitigate tracking). Refer to the ESCP for further details on mitigation of mud tracking.
- Clean paved streets/roads where tracking of soil, mud or dust has occurred. (Regular street sweeping will be required during wet conditions to remove mud and dirt that is deposited onto City streets).
- Cover sand, gravel materials when transporting them on or off site (e.g. use of dump trucks with tarp covers). As per the Highway Traffic Act (Regulation 577 – Covering of Loads) all soil loads not enclosed by the vehicle or load container shall be covered.
- Minimize site storage of granular material and consider use of tarping material stockpiles as necessary.
- Design soil stockpiles to limit loss of particulate matter due to wind. Design elements should include stockpile shape (cigar shaped stockpiles present smaller footprints for wind exposure), stockpile size (allow access to the entire stockpile for weed control), prevailing wind direction (face stockpile shape into the wind, only disturb stockpiles on the downwind side of the pile), etc.
- Monitor wind conditions (e.g. use of meteorological data maintained by Environment Canada) and plan operations in consequence.

- Monitor airborne particulate concentrations in accordance with the monitoring requirements discussed in Section 3.2 as well as comparison to applicable regulations (e.g. Ontario Ambient Air Quality Criteria).
- Minimize drop height at material transfer locations (e.g. when loading soil onto haul trucks).
- Comply with posted speed limits and, as appropriate, further reduce speed when traveling on unpaved surfaces to reduce dust creation. The speed limit on construction sites will be 15km/h unless otherwise stated or posted.
- Implement contingency plans should dust become a problem (for example, if heavy winds cause an increase in dust above acceptable levels, additional dust control measures should be implemented such as wind fencing, water spraying, etc.).
- The use of oils or any other hazardous chemical-based products for dust suppression must not be used. Proper watering and/or dust suppressant techniques are described in OPSS 506. As indicated in Appendix A, Schedule 17 of the Project Agreement, the use of water should be used rather than chemical suppressants to control dust.

5.4 CRYSTALLINE SILICA CONTROL

Most of the methods used to control fugitive dust also apply to controlling crystalline silica. Using water to suppress dust, using “wet sweeping” techniques instead of dry sweeping, and the use of local ventilation to control pollutant generation particularly in the underground tunnel.