Metro Vancouver Dispersion
Modelling Plan Template

Template Version 3.1

(released January 2025)

Table of Contents

[Part 1: Information for All Levels of Assessment 2](#_Toc133231974)

[1.1. Revision History 2](#_Toc133231975)

[1.2. General Information 2](#_Toc133231976)

[1.3. Primary Contact Information 2](#_Toc133231977)

[1.4. Purpose of Dispersion Modelling 3](#_Toc133231978)

[1.5. Geographic Setting 4](#_Toc133231979)

[1.6. Air Contaminants and Averaging Periods to be Modelled 5](#_Toc133231980)

[1.7. Baseline Air Quality 5](#_Toc133231981)

[1.8. NO to NO2 Conversion 7](#_Toc133231982)

[1.9. Building Downwash 9](#_Toc133231983)

[1.10. Emission Sources and Characteristics 9](#_Toc133231984)

[1.11. Dispersion Model 12](#_Toc133231985)

[1.12. Planned Model Output 13](#_Toc133231986)

[Part 2: Information for Level 2 and 3 Assessments Only 14](#_Toc133231987)

[2.1. Planned Model Domain and Receptor Grid 14](#_Toc133231988)

[2.2. Default Switch Settings 15](#_Toc133231989)

[2.3. CALMET Parameters 16](#_Toc133231990)

[2.4. Planned Geophysical Data Input (*Section 4*) 16](#_Toc133231991)

[2.5. Planned Meteorological Data Input and Processing 18](#_Toc133231992)

[2.6. Special Topics 20](#_Toc133231993)

[2.7. Quality Management Program 21](#_Toc133231994)

[2.8. Additional Model Output for Level 2 and 3 Assessments 24](#_Toc133231995)

1. Information for All Levels of Assessment
	1. Revision History

|  |  |  |
| --- | --- | --- |
| Revision Number | Date | Description of Changes |
| 1 |  | Initial version |
| 2 |  |  |
| 3 |  |  |

* 1. General Information

|  |  |
| --- | --- |
| Facility Name |  |
| Company Name |  |
| MVRD Air Quality Permit Number |  |
| Facility Address |  |

* 1. Primary Contact Information

|  |  |  |
| --- | --- | --- |
| Information | Company | Air Quality Consultant |
| Name |  |  |
| Title |  |  |
| Telephone |  |  |
| E-mail |  |  |

**Please submit a completed** Qualified Professional Declaration of Competency **and** Qualified Professional Conflict of Interest Disclosure Statement **as part of the completed dispersion modelling plan. These forms can be found in the Metro Vancouver Permit Application Form package:** <https://metrovancouver.org/services/air-quality-climate-action/Documents/forms-package-for-air-permit-applications.docx>

* 1. Purpose of Dispersion Modelling

|  |
| --- |
| Describe the purpose of the dispersion modelling study (e.g., in support of an application for a new permit or a permit amendment; in support of registration under Bylaw 1087; to fulfill a permit reporting requirement):  |
|  |
| If the dispersion modelling study is in support of an application for a new permit or permit amendment, a draft application should be submitted with the draft model plan. Has a draft application been submitted? (Yes or No):  |  |
| What level of assessment is proposed – 1, 2 or 3? (*Section 1.5*1): |  |
| Provide the rationale for the proposed level of assessment (e.g., exceedances predicted for a Level 1 assessment):  |
|  |

 Numbers in italics refer to applicable sections or tables of the British Columbia Air Quality Dispersion Modelling Guideline, 2022.

* 1. Geographic Setting

|  |
| --- |
| Will complex flow (i.e., meteorology) need to be considered? Justify your response based on the terrain and land use characteristics within at least 5 km of facility location (e.g., flat, rolling, river valley, mountainous).  |
|  |
| What is the dominant land cover within 5 km of the facility location (e.g., urban, rural, forest, agricultural, industrial, water)?  |
|  |
| To provide context, provide the minimum distance to the nearest (note that for Level 2 and 3 assessments, several receptors for each category that span a range of potential wind directions should be modelled to ensure the maximum for each category is captured): |
| Business |  |
| Residence |  |
| School  |  |
| Child care facility |  |
| Seniors facility |  |
| Hospital |  |
| Recreation (parks, playgrounds, playing fields, etc.) |  |
| Are there any near-field sensitive receptors with elevated windows, balconies or ventilation intakes or other possible human exposure points? (Yes or No) |  |
| If yes, please provide the proposed vertical and horizontal receptor spacing as well as figures indicating the elevated receptors that will be modelled. |
|  |
| Are there any other nearby receptors of concern? (e.g., sensitive natural areas) |
|  |

* 1. Air Contaminants and Averaging Periods to be Modelled

**Table 1.6** (add/delete rows as needed)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Air Contaminant | Averaging Period | Metro Vancouver Objective | Other Criteria1 | Jurisdiction of Other Criteria |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1 If there are no Metro Vancouver objectives for the air contaminant to be modelled, then criteria from other jurisdictions (e.g., Alberta, Ontario, California or Texas) should be used to put predicted ambient contaminant concentrations in perspective. For odorous air contaminants, the Yoshio Nagata “Measurement of Odor Threshold by Triangle Odor Bag Method” reference should be used.

* 1. Baseline Air Quality

|  |
| --- |
| What metric will be used to determine existing baseline air quality for air contaminants other than NO2, for short-term averaging periods (98th, 99th or 100th percentile2)? |
|  |

2 Metro Vancouver’s ambient air quality objectives for SO2 are “not to be exceeded” values and therefore the percentiles used to calculate the baseline values should be based on the hourly data set and not the daily maximum one-hour values indicated in *Section 8.1.4*. Baseline values for 24-hour averages should be calculated as rolling averages and not daily averages indicated in *Section 8.1.4*.

|  |
| --- |
| If NO2 monitoring data is used, provide a description of how NO2 chemistry, location and proximity of urban regions relative to the modelled source, and proximity of nearby large industrial or transportation sources of NOx are considered when selecting the baseline dataset. |
|  |
| **Metro Vancouver requests1 that annual NO2 baseline be calculated based on the median of the hourly concentration dataset, and 1-hour NO2 baseline be calculated following the sequential steps below:*** **use the 98th percentile of the hourly dataset to calculate and report cumulative dispersion modelling results,**
* **if the cumulative results are predicted to exceed the 1-hour Metro Vancouver objective for NO2, also report the cumulative results based on the 90th percentile of the hourly dataset,**
* **if the cumulative results are still predicted to exceed the 1-hour Metro Vancouver objective for NO2, also report the cumulative results based on the 75th percentile of the hourly dataset, and**
* **(optional) perform additional analysis using the methods (e.g., Monte Carlo method) outlined in Section 3.3.2 of the *Guidance on NO2 Dispersion Modelling in British Columbia.***

If this is not followed, please provide rationale for any proposed deviation. |
|  |
| Will there be any additional analysis performed using the methods outlined in Section 3.3.2 of the *Guidance on NO2 Dispersion Modelling in British Columbia*? If yes, provide details on the methodology. If Monte Carlo method is proposed, submit the computer code used to generate results. |
|  |

1 Based on Metro Vancouver’s Technical Memorandum on NO2 Background Calculation Considerations for Dispersion Modelling Purposes:
<https://metrovancouver.org/services/air-quality-climate-action/Documents/no2-baseline-calculation.pdf>

**Table 1.7** Monitoring Data that will be used to Develop Existing Baseline Concentrations
(add/delete rows as needed)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Air Quality Stations  | Source of Data1 | Air Contaminants | Years2 | Will any wind directions be excluded? (If yes, provide wind directions and justification)3 | Will any exceptional events be excluded? (If yes, provide time periods and justification)4 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1 It is recommended that data are obtain directly from Metro Vancouver to ensure that data are verified.

2 A minimum of 3 years is requested.

3 For excluding air quality data during certain wind directions, see *Section 8.1.4*.

4 Exceptional events such as wildfire smoke influenced days may be removed for PM2.5 and PM10
on a daily basis.

|  |  |
| --- | --- |
| Are there reasonably foreseeable projects that would overlap in time with the requested permit term? (Yes or No) |  |
| If yes, please list the projects that will be included in a future baseline and explain how the future baseline will be developed. |
|  |

* 1. NO to NO2 Conversion (see Guidance for NO2 Dispersion Modelling in British Columbia)

|  |
| --- |
| Please provide the NO2 conversion method and rationale. Note: Results for the Total Conversion Method must always be provided regardless of the conversion method selected for the project. |
|  |
| For Tier 2 ARM, describe the proposed dataset for the ARM2 curve and rationale. If a site-specific dataset is proposed, provide the dataset and completeness statistics (e.g., number of years, percentage complete per quarter).Note: If CALPOST is used, provide the 24 values used for the step function |
|  |
| For Tier 3 OLM and PVMRM: |
| Indicate which O3 dataset is proposed and provide the rationale. |
|  |
| If non-default equilibrium ratios are proposed, provide specifics and rationale. |
|  |
| Specify and provide rationale for in-stack ratio(s) used. If multiple NOx sources are modelled, provide justification for the ISR selection for each source. |
|  |

* 1. Building Downwash

**Table 1.9** (add/delete rows as needed)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Emission Source ID | Source Height (m) | Is Emission Source on a Building? If no, provide distance to nearest building (m) | Height ofBuilding (m) | Width ofBuilding(m) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |
| --- | --- |
| Will building downwash be modelled? (Yes or No) |  |
| If no, provide rationale. |
|  |

* 1. Emission Sources and Characteristics

|  |  |
| --- | --- |
| Are there any liquid storage tanks? (Yes or No) |  |
| If yes, indicate whether they are fixed or floating roof tanks. Follow the guidance provided in *Section 10.5*.  |
|  |

**Table 1.10 Emission Sources and Characteristics** (add/delete rows as needed)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Emission Number[[1]](#footnote-1) | Description | Type: Point (P), Area (A), Line (L), Volume (V) | Contaminants (SO2, NOx, PM2.5[[2]](#footnote-2). . . ) | Basis of Emissions[[3]](#footnote-3) (*Section 3.3*) | Stack Orientation (Vertical, Horizontal, Angled) | Raincap *(Section 10.4)*(Yes or No) |
|  |  |  |  | \_\_\_current emission limits \_\_\_proposed emission limits \_\_\_other (specify & justify) |  |  |
|  |  |  |  | \_\_\_current emission limits \_\_\_proposed emission limits \_\_\_other (specify & justify) |  |  |
|  |  |  |  | \_\_\_current emission limits \_\_\_proposed emission limits \_\_\_other (specify & justify) |  |  |
|  |  |  |  | \_\_\_current emission limits \_\_\_proposed emission limits \_\_\_other (specify & justify) |  |  |

**Source Emission Rate Variability (**Section 3.4**)**

|  |  |
| --- | --- |
| Are there any batch processes?  |  |
| If yes, provide plots of emission rate vs. time for each batch process.  |
|  |
| Are emissions expected to vary with load? |  |
| If yes, describe how this will be modelled. |
|  |
| Will actual emissions or flow rates be less than 75% of permitted levels? |  |
| If yes, describe how this will be modelled (e.g., additional scenarios) |
|  |
| Describe anticipated abnormal emission scenarios (e.g., start-up, shut-down, maintenance of control works) and their anticipated frequency: |
|  |
| Will emission rates change with different averaging periods? (e.g., 1-hour, 24-hour, annual) If yes, describe how this will be modelled (e.g., emission rates generated for each averaging period). |
|  |
| Does the proposed permit emission limit scenario represent the worst case scenario, in terms of ambient air quality concentrations, that can be anticipated (*Section 3.4.2 and 10.1.2*)? |
|  |

* 1. Dispersion Model

|  |
| --- |
| List model(s) and version(s) to be used (*Section 2*): |
|  |
| If modifications to any of the models are planned, provide a description and the rationale (*Section 2.3.2*): |
|  |
| If AERSCREEN is proposed, will it be run using:1. The stand-alone MAKEMET program to generate the matrix of meteorological conditions and running AERMOD directly with the SCREEN option (preferred) or
2. The AERSCREEN command prompt interface?

Please justify your response. |
|  |
| If a Level 1 assessment is proposed, indicate whether a standard screening dataset will be used or whether a project-specific dataset will be developed: |
|  |
| If a project-specific dataset will be developed for a Level 1 assessment, describe the proposed inputs (source and period of meteorological data, range of wind speeds and stability classes, range of wind directions, seasonal values of surface characteristics etc.): |
|  |
| If any of the emission sources have ambient exit temperatures, please explain how this will be modelled (e.g., buoyancy will be turned off, variable emission file with actual ambient temperature, exit temperature set to temperature below normal ambient temperature (e.g., -20°C) so that CALPUFF defaults to ambient temperature). |
|  |

* 1. Planned Model Output

|  |
| --- |
| Model results for all levels of assessment should include a table comparing overall maximum predicted concentrations as well as maximum concentrations predicted for each sensitive receptor type (e.g., school, hospital, daycare) to Metro Vancouver ambient air quality objectives or other relevant criteria. Please confirm the planned model output (*Section 8.3*). |
|  |

1. Information for Level 2 and
3 Assessments Only
	1. Planned Model Domain and Receptor Grid

|  |
| --- |
| Dimensions of proposed model domain (*Section 7.1*): |
|  |
| Proposed receptor spacing (*Section 7.2*)1: |
|  |
| Provide a full page map of the proposed model domain and receptor grid that also shows the locations of all schools, hospitals, daycares and senior facilities within the study domain.  |
|  |
| Provide a full page, large-scale map (i.e. close up) with dimensions of ~750 m by 750 m of the proposed fence-line, model emission sources (point, line, area, volume) and all receptors (gridded and sensitive). |
|  |
| Please use a flagpole receptor height of 1.5 m. If a different height is proposed, please provide the height and rationale. |
|  |

1 Note that populated areas and businesses (including Burrard Inlet where ships are at anchor) and complex terrain should include higher resolution receptors (e.g., 250 m spacing) even though the concentration/deposition gradients may be low.

* 1. Default Switch Settings

|  |
| --- |
| For AERMOD identify any switch settings that could be different than the recommended defaults (see *Section 7.7*). Provide rationale. |
|  |
| For CALPUFF/CALMET identify any switch settings in CALMET Input Groups 4 & 5 and CALPUFF Input Groups 2 & 12 that could be subject to deviation from the “black (do not touch)” defaults as per *Tables 6.2 and 7.1*. Provide rationale. |
|  |

* 1. CALMET Parameters

If CALMET is planned to be used, provide (*Section 6.4.2*):

* a domain map
* anticipated grid resolution: \_\_\_\_\_\_\_\_ (m)
* number of grids in X and Y direction (NX = \_\_\_\_\_\_ , NY = \_\_\_\_\_\_\_)
* vertical levels (m): \_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_\_,\_\_\_\_
	1. Planned Geophysical Data Input (*Section 4*)

|  |
| --- |
| Source of terrain data:  |
|  |
| Source of land use data: |
|  |
| Is modification of the land use data necessary? If so, please describe the proposed modification and provide the rationale1. |
|  |
| Provide a land use map plotted from the dispersion model input data (e.g., GEO.DAT).  |
|  |
| If AERMOD is proposed, will land use surrounding the meteorological station or the location of emissions be used? Provide rationale. |
|  |
| If surface characteristics are required, use *Tables 4.8, 4.9, 4.10 and 4.12* for summer, autumn, winter and spring, respectively. If these Tables are not used, indicate source of data. |
|  |
| If CALMET is proposed, it is recommended that four GEO.DAT files be used to represent different seasons (*Section 4.4*) as outlined below2:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| 3 | 3 | 3 | 5 | 5 | 1 | 1 | 1 | 2 | 2 | 3 | 3 |

If this is not followed, please indicate an alternative approach and rationale.  |
|  |
| If building downwash is applicable, use BPIP-PRIME. If not BPIP-PRIME, indicate method used to specify downwash parameters. |
|  |

Modification of land use may be necessary to appropriately represent features such as a continuous Fraser River or large forested parks that may be absent from the land use data.

2 This differs from guidance in the British Columbia Air Quality Dispersion Modelling Guideline (2022) since the climate in Metro Vancouver is different than the rest of BC.

* 1. Planned Meteorological Data Input and Processing

**Table 2.5a Surface Meteorological Data** (add/delete rows as needed)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Station ID | Location (lat/long or indicate on map) | Data SourceMOE, MV, MSC, Site Specific, other (specify) 1 | Parameter(s) used in modelling2 | Years | % of Wind Speeds = calm 3 | Anemometer Height (m) 4 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1 Data for MV stations should be obtained directly from MV by emailing Ken.Reid@metrovancouver.org with the station IDs and period of data you are requesting. If data from a non - MOECCS, MV or MSC station is proposed, follow guidance in *Section 5.8 or 5.9*

2 List all meteorological parameters that will be used from each station (e.g., wind speed, wind direction, air temperature, relative humidity, cloud cover). Wind speed and wind direction should be based on a true 60-min average, and not just top-of-the-hour observations.

3 For light wind/calm treatment of Metro Vancouver data consult with Metro Vancouver. For other data sources, follow guidance in *Section 5.8.2.*

4 Not all meteorological stations measure winds at the standard 10 m height (e.g., some MV observations are different heights). [https://metrovancouver.org/services/air-quality-climate-action/Documents/lower-fraser-valley-air-quality-monitoring-network-station-information-2012.pdf](https://metrovancouver.org/services/air-quality-climate-action/Documents/lower-fraser-valley-air-quality-monitoring-network-station-information-2012.pdf#search=Lower%20Fraser%20Valley%20Air%20Quality%20Monitoring%20Network%202012%20Station%20Information)

**Table 2.5b Upper-Air Meteorological Data** (add/delete rows as needed)

|  |  |  |
| --- | --- | --- |
| Station Name | Years | Distance between the Upper Air Station and Project (km) |
|  |  |  |
|  |  |  |

**Table 2.5c Mesoscale Meteorological Model Output** (attach map of domain)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model (name, version, configuration) | Model Output Provider | Horizontal Grid Resolution (km) | Height of Vertical Levels (m) | Years | Planned Model Output Use 1 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1 *Sections 6.1 & 6.4.1.*

|  |
| --- |
| If less than 3 years of meteorology are proposed, please provide justification. |
|  |
| If CALMET Hybrid mode is proposed, describe in detail the choice of R1, RMAX1 and TERRAD. |
|  |

* 1. Special Topics

Indicate the conditions that are planned to be considered as part of the assessment.

|  |
| --- |
| Stagnation ConditionsProvide an estimate of the frequency of stagnation based on local meteorological data. If AERMOD is proposed, provide methodology on how stagnation periods will be treated (see *Section 10.2)*  |
|  |
| Shore/Coastal Effects | **Y** or **N** |
| If Yes, indicate whether sub-grid-scale Thermal Internal Boundary Layer option is selected along with the required input coastline coordinate data (see *Section 10.3)* |
|  |
| Plume Condensation (Fogging) and Icing | **Y** or **N** |
| If Yes, follow guidance in *Section 10.6* |
|  |
| Chemical Transformation | **Y** or **N** |
| If Yes, specify transformation method and provide details on inputs if Secondary PM2.5, Acid Deposition or Visibility effects are to be estimated. Depending on the transformation method, this could include ammonia, ozone, hydrogen peroxide concentrations, nighttime loss and formation rates for nitrates and sulphates. |
|  |
| Particle Deposition | **Y** or **N** |
| If Yes, follow guidance in *Section 3.7.* If non-recommended particle size distributions are used, provide table of particle (including heavy metals) emission size/density distribution and indicate the basis for the table. Important: a separate model run should be conducted with deposition turned on. Maximum predicted concentration results should be presented with deposition turned off.  |
|  |

* 1. Quality Management Program

**Geophysical and Meteorological Input Data**

~~Strikeout~~ the tests that will not be undertaken to assure the quality of the inputs and provide rationale. Results of all tests must be provided in an appendix to the dispersion modelling report.

|  |
| --- |
| Geophysical input data:* contour plot of topography
* plots of land use and land cover
 |
| Meteorological data:* wind rose (annual and/or seasonal)
* frequency distribution of surface wind speeds
* average hourly temperature plot (annual and/or seasonal)
 |
| NWP output (*Section 6.1*)* wind rose at selected locations and heights (annual and/or seasonal)
* average hourly temperature plot at selected locations and heights (annual and/or seasonal)
* wind field plots for selected periods that indicate topographic influences such as channeling and thermally generated flows
 |

**AERMOD QA/QC**

List the tests that will be conducted to confirm the quality of the model input and output

|  |
| --- |
|  |

**CALMET/CALPUFF QA/QC**

~~Strikeout~~ the tests that will not be conducted and provide justification (*Section 9.1*). All plots or other proof that the tests have been conducted should be provided in an appendix to the dispersion modelling report. We recommend that you provide a draft of this appendix to Metro Vancouver for review prior to commencing CALPUFF modelling to limit the need to remodel; however, this review should not be considered final approval of the CALMET. Metro Vancouver may have additional comments on the CALMET methodology once it reviews CALPUFF model results

|  |
| --- |
| CALMET/CALPUFF QA Files:* Plot the locations of the grid, NWP grid points, and source locations and compare to Google Earth or aerial photographs
* Check for blanks, comma instead of period, wrong UTM zone etc.
 |
| CALMET Input data:* Plot of terrain and land use from the GEO.DAT input files to ensure they match with other maps of the area.
* Plot the locations of the meteorological observation stations to check whether they are located properly in the horizontal and vertical.
* Compare all the CALMET-ready input files with the raw data to ensure no errors in data conversion to CALMET-ready files (reformatting, unit conversions, etc.).
* Compare each month of CALMET input meteorological files with each other to ensure all parameters are consistent from month to month.
* Review all source information (values, formats, units) associated with Input Group 13-16 of the CALPUFF.INP file to ensure emission information is correct.
* Plot the source locations to ensure that they are located properly and ensure that their vertical location (stack base relative to terrain height for that location) is correct.
* Review locations (horizontally and vertically) of all specified receptors.
 |
| CALMET Output data:* For a few representative periods where thermally driven flows would be expected, plot the wind vector fields at various levels to confirm that the wind fields are reasonable given the terrain and the meteorological conditions.
* For a few representative periods, when thermally driven flows would be expected, plot wind speed isopleths, derived from all grid cells in CALMET.
* Plot the frequency distribution of surface wind speeds for different locations in the domain and at the surface station locations and check for reasonableness.
* Plot annual and seasonal surface wind roses for different locations including the facility location as well as the surface station locations and check for realism (compare with observations, consider the location, and what might be expected based on topography).
* For different 24-h periods within a summer and winter season, plot a surface, mid-level and upper-level wind field every hour for a 24-h period with light winds and stable conditions. Check for reasonableness of the wind fields in the domain (extent of terrain effects and the appropriateness of the settings that require expert judgment).
* Plot time series of average surface temperature by month for the source location as well as surface station locations. Compare with observations/climate normals. Check for reasonable monthly variation for the given locations.
* Plot time series of average surface temperature by hour-of-day for the source location as well as surface station locations. Compare with observations/climate normals. Check for reasonable diurnal variation for the given locations.
* Plot time series of average precipitation by month (if precipitation is an input) for one location as well as surface station locations. Compare with observations. Check for reasonable monthly variation for the given locations.
* Plot the frequency distribution of mixing heights for different locations. Check for reasonableness.
* Plot a time series of mixing heights for a 24-h summer and winter period during a light wind, and a clear sky period. Examine the diurnal behaviour for reasonableness.
* Plot the frequency distribution of P-G stability class for the source location as well as surface station location. Compare to the airport observation P-G class frequency distribution (if available). Check for reasonableness for the given locations.
* If NWP model output is used, examine CALMET-generated wind fields for a 24-h period of light winds, and clear skies at surface, mid and upper levels with and without NWP output and check for reasonableness.
 |

* 1. Additional Model Output for Level 2 and 3 Assessments

All model input files (including surf.dat and geo.dat) must be submitted to Metro Vancouver with the dispersion modelling report. Please contact AssistantOfficers@metrovancouver.org for a secure location to upload large files. Metro Vancouver may request the submission of all computer files (including the output files) associated with the modelling.

~~Strikeout~~ model output that will not be included in the report and provide justification:

* documentation (text and plots) of tests conducted as part of the QA/QC program,
* spatial distribution maps of air quality parameters including baseline values (maximums, exceedance frequencies, annual averages),
* tables of maximum short- and long-term average air quality parameters with and without baseline values (locations and associated meteorological conditions),
* tables of maximum predicted concentrations at any (not just the closest) residence, business, hospital, school, daycare, senior facility, recreation (parks, playgrounds, playing fields, etc.) or other type of sensitive receptor within the study domain with and without baseline values,
* if exceedances are predicted, tables and spatial distributions of the frequency of exceedance both with and without baseline values,
* tables of air quality parameters under certain emission situations (upsets, start-up),
* bar charts of the relative contribution of modelled sources to the maximum predicted concentrations at sensitive receptors,
* elevation plots of flagpole receptors to represent balconies or windows on nearby sensitive receptors,
* special output required for vegetation or health risk assessments,
* other (specify):

Metro Vancouver Acceptance of Model Plan: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Name, title): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Emission numbers should be the same as in existing permit or permit application. [↑](#footnote-ref-1)
2. For PM emissions indicate whether it is filterable, or filterable + condensables, or if unknown (see *Section 3.6*) [↑](#footnote-ref-2)
3. If dispersion modelling is being conducted in support of an application for an air quality permit or permit amendment then current or proposed emission limits should be modelled. If it is being conducted for a registration under Bylaw 1087, the emission concentrations listed in Appendix 1 or 2 of the Bylaw should be modelled. [↑](#footnote-ref-3)