

DUST MANAGEMENT PLAN

NZ Transport Agency Waka Kotahi
Mill Road Stage 1

AUGUST 2026

NZ TRANSPORT AGENCY
WAKA KOTAHI

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QUALITY REVIEW AND APPROVAL RECORD

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1 INTRODUCTION

1.1 Purpose and Scope

This Dust Management Plan **(DMP)** has been prepared by Beca Limited on behalf of NZ Transport Agency Waka Kotahi **(NZTA)** for the Mill Road Stage 1 Project **(the Project)**.

The objective of the DMP is to develop and implement the Best Practicable Option to manage adverse effects of dust beyond the designation caused by Construction Works.

The DMP includes the following:

- A summary of site activities that give rise to discharges of dust to air;
- A description of sensitive locations near the Project;
- Roles and responsibilities relevant to the management of dust;
- Management procedures and mitigation measures;
- Monitoring methods;
- Training of staff in relation to dust management;
- Methods for managing and investigating complaints; and
- Procedures for auditing and reviewing mitigation measures.

1.2 Roles and Responsibilities

The contact details for the relevant personnel are provided in Table 1-1 below.

Table 1-1: Key roles, responsibilities and contact details for dust management

Position	Responsibility	Contact Details
Site Manager	▪ Implementation of dust control procedures. ▪ Maintenance of monitoring procedures. ▪ Forwarding any complaints to the Stakeholder and Engagement Manger and nominated person from the Project Team.	**To be confirmed**
Environmental Manager	▪ Inspection of works to assess compliance with the dust management measures.	**To be confirmed**
Stakeholder Communications and Engagement Manager	▪ Acknowledging, recording and responding to complaints. ▪ Working closely with the Project Team to resolve complaints.	**To be confirmed**

2 EMISSIONS TO AIR DURING CONSTRUCTION

The following sections set out the periods of time and construction activities where dust emissions might arise from construction activities.

2.1 Emissions of Dust

Dust will be the main contaminant which has the potential to be discharged to air during construction of the Project. Dust emission can cause adverse nuisance effects if they occur in close proximity to sensitive receptors.

The construction activities that may generate dust include:

- Construction yard, site and haul road establishment;
- Topsoil removal and distribution;
- Excavations;
- Cut and fill operations;
- Soil stabilisation and base course construction;
- Loading and unloading bulk materials;
- Stockpiling of materials, including unloading and placement;
- Establishment and operation of spoil disposal sites;
- Concrete cutting; and
- Vehicle movements on unsealed roads.

The most significant sources of dust during construction are expected to be:

- Stockpiles;
- Exposed areas during earthworks; and
- Vehicle movements on unsealed haul roads.

The activities set out above are likely to occur at various periods of time throughout construction of the Project.

2.2 Factors Which Influence Dust Generation

The primary factors which influence the potential for dust to be generated are the following:

- Wind speed across exposed areas - Dust emissions from exposed surfaces are generally greater with increasing wind speed. However, dust pick up by winds is only significant at wind speeds above 7 m/s (11 knots or a Beaufort scale number of 4 – see **Appendix A** of this document). Above wind speeds of 10 m/s (20 knots) dust pick up increases rapidly.
- Moisture content of the disturbed or stockpiled material - Moisture binds particles together, preventing them from being disturbed by winds or vehicle movements.
- The area of exposed surface - The larger the area of exposed surfaces the more potential there will be for dust emissions.
- The percentage of fine particles in the material on the surface - Small particles are more easily picked up and entrained in the wind.
- Disturbances such as traffic and the loading and unloading of materials - Vehicles travelling over exposed surfaces tend to pulverise any surface particles. Particles are displaced from rolling wheels and the surface. Dust is also sucked into the turbulent wake created behind moving vehicles.

3 RECEIVING ENVIRONMENT

3.1 Sensitive Receptors

Dust discharges from earthworks and construction activities will typically deposit onto the ground within approximately 100 m of the activity being undertaken.

Areas within 100 m of the Project are shown in Figure 3-1. The areas labelled A, C and E in the figure are areas considered to be “highly sensitive to air quality” **(HSAQ)**. These areas are shaded red.

The HSAQ areas include all the residential areas located within 100 m of the Project and the Alfriston School.

Additional dust management procedures and monitoring procedures apply in these HSAQ areas.

Other areas (labelled B, D, F and G) are predominantly rural in nature. Overall, these areas have a lower sensitivity to air quality effects. However, rural dwellings located within these areas which will have a higher sensitivity to air quality effects.

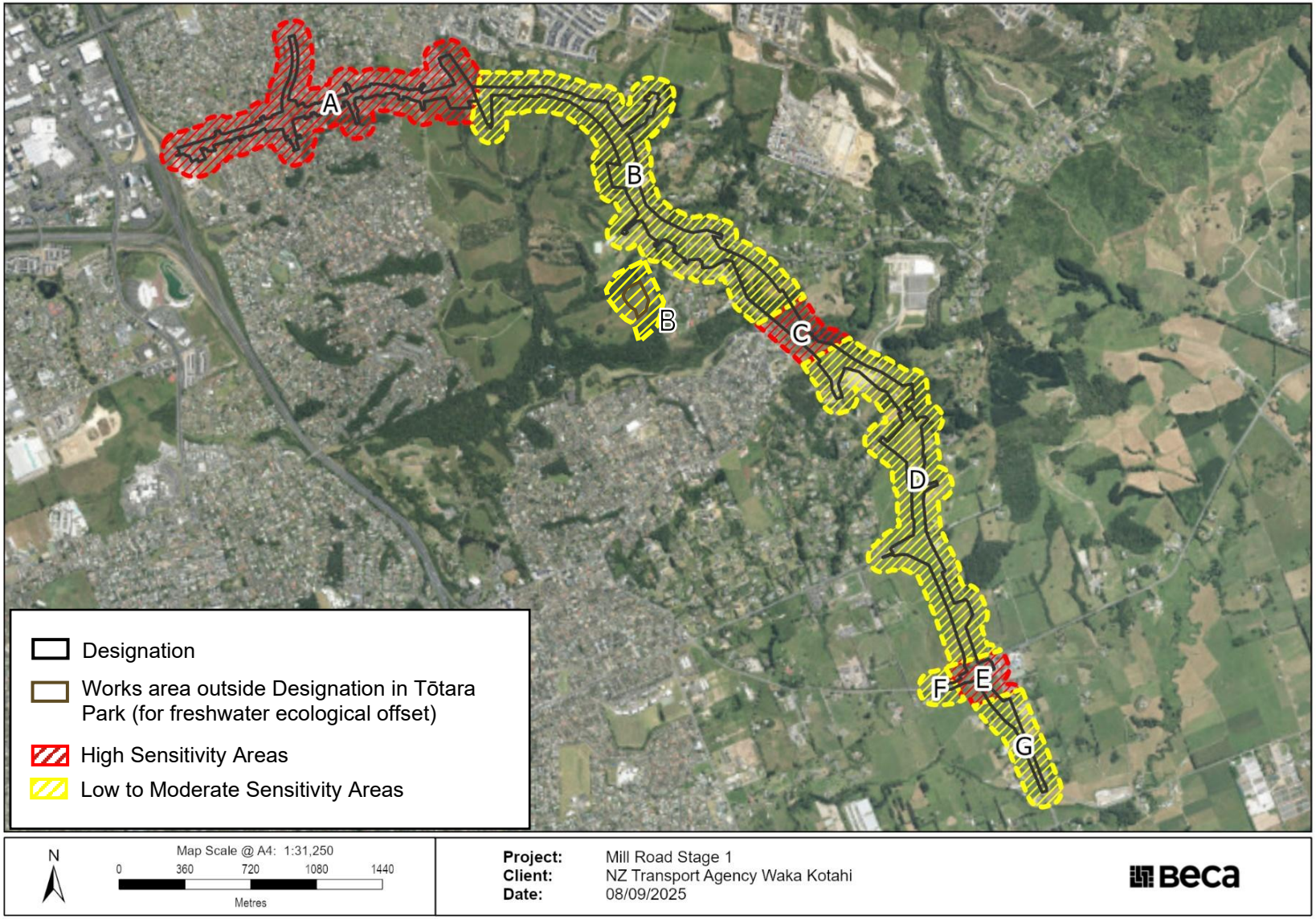


Figure 3-1: Sensitivity areas for the Project

3.2 Meteorology

Dust effects can be exacerbated during windy conditions as wind enables dispersion of dust into the environment in the direction of wind travel. Generally, wind transportation of dust will occur when wind speeds exceed 7 m/s and will become increasingly significant at increasing wind speeds.

The nearest ambient monitoring location to the Project is the Auckland Airport monitoring station, located approximately 9km west of the site. The winds from this location are expected to be largely representative of winds at the Project site. The annual windrose (Figure 3-2), for the period 01 January 2019 to 31 December 2023, shows a predominant south-westerly and west south-westerly wind direction, with the majority (8%) of the high dust causing winds above 7 m/s occurring from this direction.

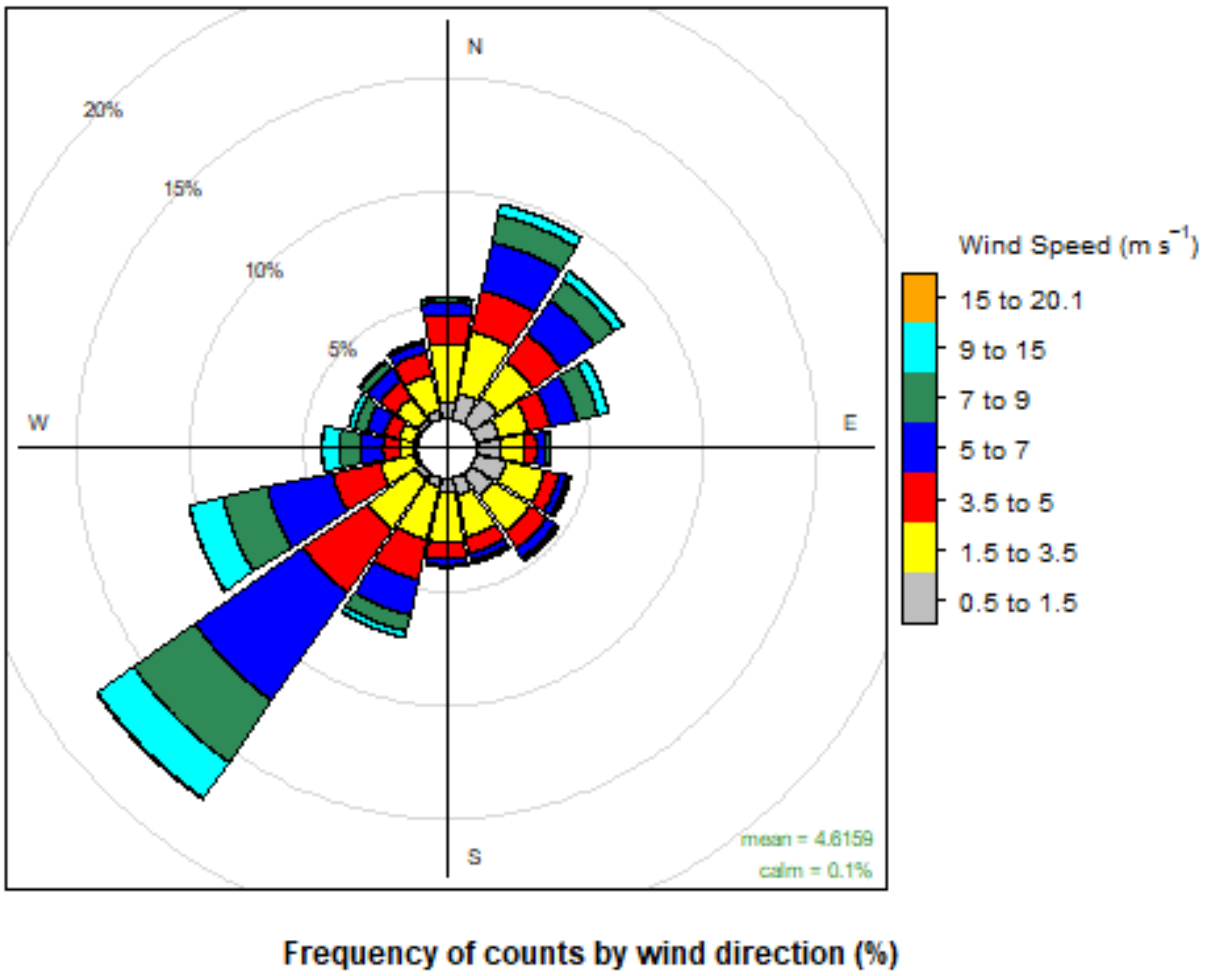


Figure 3-2: Distribution wind speeds and wind directions (wind from) observed at Auckland Airport (2019 - 2023)

4 IMPLEMENTATION AND OPERATION

4.1 General Dust Management Measures

Table 4-1 summarises the dust control methods which will be employed on this Project. The list of methods is not exhaustive.

Table 4-1: Sources of dust and recommended controls to be employed

Source of dust	Control method
Stockpiles (including material placement and removal)	• Maximise the separation distances between stockpiles and sensitive receptors. • Limit the height and slope of stockpiles to reduce wind entrainment. Stockpiles exceeding 3m in height have a higher risk of discharging dust. • Orientate stockpiles to maximise wind sheltering as much as possible, i.e. presenting the smallest surface area (narrowest side) of the piles to the prevailing wind (from a south westerly direction). • Maximise shelter from winds as far as practicable by taking advantage of berms or plantings. • Keep active stockpiles damp at all times or cover the stockpiles of fine materials. • Dampen inactive stockpiles if they are producing visible dust emissions.
Other construction materials	▪ Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that additional control measures are in place. ▪ Remove materials that have the potential to produce dust from site as soon as possible, unless being reused on site. If they are being reused, treat and cover as previously described.
Unpaved surface such as roads and yards	• Strong consideration should be made to seal unpaved roads and yards that are anticipated to be used long term and/or near to high sensitivity receptors. ▪ Limit the number of exposed surfaces to reduce the potential for dust generation as much as practicable. • Keep unpaved roads and surfaces damp. • Cover surfaces with coarse materials where practicable. • Compact all unconsolidated surfaces where practicable. ▪ Regularly maintain roads by grading and laying fresh gravel. ▪ Stabilise cleared areas not required for construction, access or for parking, if likely to cause excessive dust during windy conditions. Methods may include wetting with polymer additives to facilitate crusting, metaling, grassing, mulching or the establishment of vegetative cover.
Sealed surfaces	• Regular removal of dust through washing or vacuum sweeping including the nearby road network used to access the site if it is becoming dusty.
Vehicles	• Limit vehicle speeds on unsealed surfaces to 20km/hr. • Limit load sizes to avoid spillages. • Cover all loads of materials that could be mobilised by wind and movement. • Minimise travel distances through appropriate site layout and design. ▪ Minimise mud and dust track out from unsealed areas by establishing stabilised entranceways at all ingress and egress points to sealed roads. • If necessary, provide wheel wash facilities.

Source of dust	Control method
Earthmoving and construction	• Adequate irrigation systems must be available to dampen areas that are to be earthworked prior to any earthwork commencing and shall be used permanently on site until the final site shape has been established and further earthworks are not required. • Limit drop heights and restrict dropping material during high wind speed periods. • Prior to a cut and fill activity in sand, pre-water the area with sprinklers to allow time for penetration of the soil.
Miscellaneous	• Ensure sufficient water is available on site. • Avoid site runoff of water or mud. • Take account of daily forecast wind speed, wind direction and soil conditions before commencing an operation that has a high dust potential. • Install windbreak fence where practicable and appropriate. Effectiveness is greatest where fencing is perpendicular to the prevailing wind direction with a porosity of about 50%. • Minimise the area and length of time surfaces are covered with fine materials. • Ensure equipment is readily available on site to clean up any dry spillages as soon as reasonably practicable

4.2 Contingency Dust Control Measures

Additional mitigation may also be required in the event that:

- Monitoring indicates that significant dust emissions are occurring at sensitive receptors.
- Weather conditions are changing such that dust emissions are more likely – these include dry conditions when wind speeds are greater than 10 m/s.
- Complaints are received regarding dust experienced offsite.

Additional contingency measures are outlined in Table 4-2.

Table 4-2: Contingency mitigation measures proposed for the project

Source of Dust/Event	Contingency Measures
Dust generating activities undertaken near receptors with a high sensitivity	• Install windbreak fences around dust generating activities where practicable. • Additional visual inspections of dust generating activities for visible dust emissions beyond the site boundary. • Ensure availability of water as dust suppressant should visible emissions arise. ▪ Implement continuous Total Suspended Particulate **(TSP)** monitoring if complaints are being frequently received in HSAQ area.
Dust discharges causes excessive deposition / soiling at HSAQ areas	• Stop activities that are generating dust until mitigation is reviewed, and additional mitigation measures are in place. • Report to the Environmental Manager to initiate an investigation and any remedial action as necessary.
TSP concentrations exceed 24-hour average 80µg/m^3 designation limit in HSAQ areas	• Stop activities that are generating dust until mitigation is reviewed, and additional mitigation is in place. • Report to Environmental Manager to initiate an investigation and any remedial action as necessary.

Source of Dust/Event	Contingency Measures
Equipment Malfunction i.e. breakdown of water cart / sprays	• Assess rainfall and wind forecasts, stop work if forecast conditions are particularly dry or windy. • Repair water cart/sprays as soon as practicable. • Additional visual inspection of exposed areas and activities. • Limit the activities that generate dust within 100 m of downwind sensitive activities until repairs are implemented.
Visible dust emissions from stockpile / areas of uncovered soil near sensitive receptors	• Dampen stockpiles or exposed areas of soil. ▪ Cover or stabilise areas to reduce dust generation.
Wind speed greater than 7 m/s	• Limit the activities that generate dust within 100 m of downwind sensitive activities during these high wind periods. • Additional visual inspection of exposed areas and activities to occur. • Assess the need for additional controls such as increased water application rates.
Wind speed greater than 10m/s	• Stop activities that generate dust within 100 m of downwind sensitive activities until wind eases.

5 COMMUNICATION AND COMPLAINTS

5.1 Contact with Stakeholders and Notification

Before each construction activity commences, stakeholders who are directly and potentially affected by the work to be carried out will be identified and notified.

5.2 Complaints Procedure

Procedures for managing complaints specific to dust issues are detailed as follows.

Actions to be taken as soon as practicable by the Site Manager or delegated personnel:

- All dust complaints are to be forwarded to the Stakeholder and Engagement Manager **(S&E Manager)** to be acknowledged and recorded.
- Work closely with S&E Manager to resolve the complaint which will involve the following:
  - Identifying the cause(s);
  - Considering any other off-site sources that may be contributing to the complaint;
  - If necessary, taking appropriate measures to reduce emissions in a timely manner; and
  - Recording the measures taken.

Follow-up actions by the Site Manager:

- Advise the Environmental Manager or delegated personnel within 24 hours that a complaint has been received and the outcome of the investigation;
- Consider informing the local/regulatory authority; and
- Make the complaints log available to the local authority when asked.

5.3 Complaint Information to be Recorded

The following information is to be recorded by the S&E Manager when a complaint is received:

- The name and address of the person(s) who raised the concern or complaint (unless they elect not to provide this) and details of the concern or complaint;
- Where practicable, weather conditions at the time of the concern or complaint, including wind direction and cloud cover;
- Known Project construction activities at the time and in the vicinity of the concern or complaint;
- Any other activities in the area unrelated to the Project construction that may have contributed to the concern or complaint such as non- Project construction, fires, traffic accidents or unusually dusty conditions generally; and
- Remedial actions are undertaken (if any) and the outcome of these, including monitoring of the activity.

6 MONITORING

6.1 Responsibility

The Site Manager, or authorised personnel, are responsible for ensuring the monitoring programme is implemented and maintained.

6.2 Visual Monitoring

Visual monitoring of dust across all construction areas will be undertaken on a daily basis.
The frequency of monitoring will increase if wind conditions change. A log of the monitoring undertaken will be maintained by the Site Manager.

Table 6-1: Visual dust monitoring programme

Monitoring activity	Frequency
Check weather forecast for strong winds (greater than 7 m/s) and rainfall to plan appropriate dust management responses.	Daily and weekly
Observe weather conditions via observations and data outputs from weather stations and presence of rain.	Daily and as conditions change
Additional visual monitoring of dust generating activities and water application rates.	When wind speeds exceed 7 m/s
Inspect all unsealed surfaces for dampness and to ensure that surface exposure is minimised, check for visible clouds being generated on site or carried off site.	Daily and as conditions change
Inspect stockpiles to ensure stockpiles are appropriately managed including if stockpiles require enclosure, covering, stabilisation or additional dampness and that the stockpile heights are less than 3 m or appropriately stabilised.	Daily, and as conditions change
Inspect land adjacent to the site, construction exits and adjoining roads for the presence of dust deposits.	Daily
Ensure that sufficient water is available for the damping of surfaces	Daily and as conditions change
Ensure site windbreak fences, if used, are intact.	Weekly
Inspect construction vehicles and equipment emissions for excessive smoke. If excess smoke is observed schedule maintenance for the equipment.	Weekly

6.3 Contingency Monitoring Measures in HSAQ Areas

If the mitigation measures set out in this document have not sufficiently managed the dust emissions from the Project, and multiple complaints have been received from residents located within the HSAQ areas (identified as areas A, C and E in this document) then instrumentation TSP monitoring will be implemented.

TSP Monitoring in HSAQ Areas

The monitors will be alarmed to automatically alert the Site Manager when TSP concentrations exceed any of the trigger limits detailed in Table 6-2.

Should TSP concentrations exceed the 24-hour average concentration limit of an average 80µg/m^3 between midnight to midnight, the Site Manager will:

- Stop activities that are generating dust until mitigation is reviewed, and additional mitigation measures are put in place; and
- Report to the Environmental Manager to initiate an investigation and any remedial action as necessary.

Table 6-2: TSP Monitoring Trigger limits

Trigger	Averaging Period	Trigger Limit
Short term	1-hour (calculated on an hour-by hour basis)	250 µg/m^3
Daily	Rolling 24-hour (calculated on an hour-by-hour basis)	80 µg/m^3

6.4 Reporting

The procedure for recording visual dust monitoring is as follows:

- The site manager will fill out a daily dust inspection log form (**Appendix B** of this document) each day and maintain the record on site.
- The following information will be recorded:
  - Any dust control equipment malfunctions and any remedial action(s) taken;
  - Results of the visual inspections of dust emissions;
  - General weather conditions during the day (i.e. windy, calm, warm, rain etc.);
  - The frequency of watercart and/or water sprinkling system use; and
  - The date and signature of the person entering the information.
- At the request of Council, a summary report will be compiled providing evidence of the visual dust monitoring procedures being implemented on site.

7 PLAN REVIEW

A review of the dust management plan will be carried out periodically throughout the construction phase and reviewed once every year to ensure the management and mitigation methods remain relevant and if necessary, reflect changes in operational activities or the site environment.

The review will take into consideration:

- any significant changes to construction activities or methods;
- key changes to roles and responsibilities within the project;
- changes in industry best practice standards or recommended dust controls;

- changes in legal or other requirements (social and environmental legal requirements, consent conditions, NZTA objectives and relevant policies, plans, standards, specifications and guidelines);
- results of inspection and maintenance programmes, logs of incidents, corrective actions, internal or external assessments; and
- the outcome of investigations into discharges of dust.

Reasons for making changes to the management plan will be documented. A copy of the original management plan and subsequent versions will be kept for the project records and marked as obsolete. Each new/updated version of the management plan will be issued with a version number and date to eliminate obsolete documentation being used.

8 TRAINING

8.1 Inductions

All people working on-site, or with site responsibilities, shall undertake a formal site induction. No person will be permitted to work on the site until they have completed the induction process.

Part of this induction process will be based on environmental management.

8.2 Training

The environmental training given during the induction programme which is specific to the management of dust will include the following:

- Information about the activities and stages of construction that may cause dust impacts within the construction area;
- Consent requirements;
- Complaints management procedures;
- Dust management procedures, especially around the HSAQ areas identified in Figure 3-1, of the Project, and
- Description of dust monitoring for the project.

Additional training will be provided to water cart drivers and site supervisors, in assessing whether sufficient water has been applied for effective dust suppression.

APPENDIX A BEAUFORT WIND SCALE

Table A-1: Project specific trigger levels

Beaufort scale	Wind speed			Averaging period	Trigger level
	m/s	Knots	km/h		
0	0-0.2	<1	<1	Calm	Calm. Smoke rises vertically.
1	0.3-1.5	1-3	1 -5	Light air	Wind motion visible in smoke.
2	1.6-3.3	4-6	6-11	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	3.4-5.4	7-10	12-19	Gentle breeze	Leaves and smaller twigs in constant motion.
4	5.5-7.9	11-15	20-28	Moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	8-10.7	16-21	29-38	Fresh breeze	Branches of a moderate size move. Small trees begin to sway.
6	10.8-13.8	22-27	39-49	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
7	13.9-17.1	28-33	50-61	Near gale	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially on upper floors.
8	17.2-20.7	34-40	62-74	Gale	Twigs broken from trees. Cars veer on road.
9	20.8-24.4	41-47	75-88	Severe gale	Larger branches break off trees, some small trees blow over. Construction/ temporary signs and barricades blow over. Damage to circus tents and canopies.
10	24.5-28.4	48-55	89-102	Storm	Trees broken off or uprooted, saplings bent and deformed, poorly attached asphalt shingles or shingles in poor condition peel off roofs.
11	28.5-32.6	56-63	103-117	Violent storm	Widespread vegetation damage. More damages to most roofing surfaces, asphalt tiles that have curled up and/or fractured due to age may break away completely.
12	32.7-36.9	64-71	118-133	Hurricane	Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns. Debris may be hurled about.

APPENDIX B VISUAL DUST MONITORING LOG

Date: _____ Time: _____

Inspection By: _____

Current Weather Condition (e.g. sunny, cloudy, rain): _____

Wind Direction / Strength (e.g. strong, moderate, light, still): _____

Area(s) Inspected: _____

Inspection	Mark the relevant Item						Comment
Are strong winds predicted?	Yes		No		N/A		
Is rain predicted?	Yes		No		N/A		
If wind speeds are over 7m/s are additional inspection and mitigation measures being put in place? (e.g. increase water application, restrictions on dusty activities)	Yes		No		N/A		
Is there visible dust from site work activities, stockpiles, earthworks areas or haul roads?	Yes		No		N/A		
Are any exposed earthworks or stockpile areas visibly dry and need water spray?	Yes		No		N/A		
▪ Stockpile heights less than 3m? ▪ Stockpiles covered/stabilised where needed?	Yes Yes		No No		N/A N/A		
Are there any signs of dust going off site as a result of site activities? [Inspect land adjacent to the site (including vegetation, residential properties and cars), construction exits and adjoining roads for the presence of dust deposits]	Yes		No		N/A		
Are watering systems (e.g. water carts, wheel wash) operating effectively to minimise dust?	Yes		No		N/A		
Are trucks carrying loose (uncovered) material entering or leaving the site?	Yes		No		N/A		

Mitigation Recommendations				
Priority Level (High/Medium/Low)	Actions	By Whom	By When	Completed (Yes/No)