

Waipapa Taumata Rau Student Centre and Library

Air Quality Assessment

Prepared for: The University of Auckland

Prepared by: Tonkin & Taylor Ltd

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Appendix A Evaluation of dust mitigation and monitoring against IAQM recommendations

Executive summary

Waipapa Taumata Rau, The University of Auckland (UoA) proposes to redevelop the existing Student Union complex within its City Campus in Auckland. The Project comprises demolition of the existing buildings, excavation and construction of a two-level basement, and construction of a new Student Centre and Library development.

UoA is lodging an application under the Fast-track Approvals Act 2024 (FTAA) for the resource consents and other authorisations required for the Project. UoA has engaged Tonkin & Taylor Ltd (T+T) to prepare this assessment of the potential air quality effects of discharges to air arising from demolition and construction activities associated with the Project for lodgement with the application.

The principal air quality concern associated with the Project is discharges of dust and particulate matter associated with Project construction. The purpose of this assessment is to assess the compliance of the discharges with the permitted activity standards set out in section E14.6.1.1 of the Auckland Unitary Plan (AUP).

The Site is located within a highly developed urban environment surrounded by educational, recreational and public open space activities associated with the University of Auckland campus and Albert Park. Sensitive receptors include university buildings and facilities, the student medical centre within the Kate Edger Information Commons, heritage buildings, Albert Park and Albert Park Lodge.

Wind conditions in the area are dominated by south-westerly and northeasterly flows. Sensitive receptors located downwind of the Site are therefore likely to be most frequently exposed to any off-site dust emissions arising from demolition and construction activities. Annual average background concentrations of fine particulate matter (PM_{10}) in the surrounding area are relatively low and are below relevant ambient air quality criteria.

The potential effects of dust emissions have been assessed using the following approaches:

- An assessment of risk of potential dust impacts during Project construction, without dust mitigation measures in place, using a methodology developed by the Institute of Air Quality Management (IAQM) in the United Kingdom;
- Evaluation of proposed dust management and monitoring measures with recommendations for additional measures, where required; and
- A qualitative evaluation of potential dust exposure at adjacent receptor locations with the proposed and recommended measures in place, using the FIDOL factor framework (Frequency, Intensity, Duration, Offensiveness/character and Location/sensitivity).

In summary, the following conclusions are drawn from the assessment:

- Under the IAQM methodology, without control measures in place, both the demolition works and vehicle movements over unsealed surfaces are assessed as having a “medium risk” of causing dust soiling effects. The corresponding uncontrolled risk during the earthworks and construction phases is assessed as being “low”. The risk of health and ecological effects (with control measures) is assessed as either being "low" or "negligible".

- A range of dust mitigation measures are proposed, including use of top-down hard demolition methods, wet suppression of dust-generating activities, vehicle speed controls and regular visual monitoring of dust emissions. A number of further measures, such as vehicle speed limits over unsealed surfaces, are recommended based on the outcomes of the IAQM dust risk assessment. With the recommended measures in place, the proposed management regime is expected to provide effective management of dust emissions in the local environmental setting. The measures have been incorporated into a draft Construction Air Quality Management Plan (CAQMP) for the Project.
- The evaluation of potential dust exposure at adjacent receptor locations against the FIDOL factors indicates that with the recommended mitigation measures in place the frequency, duration and intensity of that exposure are unlikely to be offensive or objectionable. Based on the outcomes of the IAQM assessment and recommended additional mitigation measures, adverse effects on human health, property or ecosystems beyond the Site boundary are also considered unlikely to occur as a result of Project construction.

Overall, the assessment concludes that with the proposed and recommended dust management regime in place, the discharges to air from the proposed demolition and construction activities will be compliant with the permitted standards set out in section E14.6.1.1 of the AUP. The discharges to air are therefore considered to be a permitted activity under the AUP.

1 Introduction

1.1 Background

Waipapa Taumata Rau UoA is lodging an application under the FTAA for resource consents and other authorisations required for the Student Centre and Library development (the Project) within its City Campus in Auckland. The development site is located on the corner of Princes Street and Alfred Street, Auckland Central (the Site), as shown in Figure 1.1.

UoA has engaged Tonkin & Taylor Ltd (T+T) to prepare this air quality assessment (AQA) of discharges to air arising from demolition and construction activities associated with the Project for submission with the FTAA application.

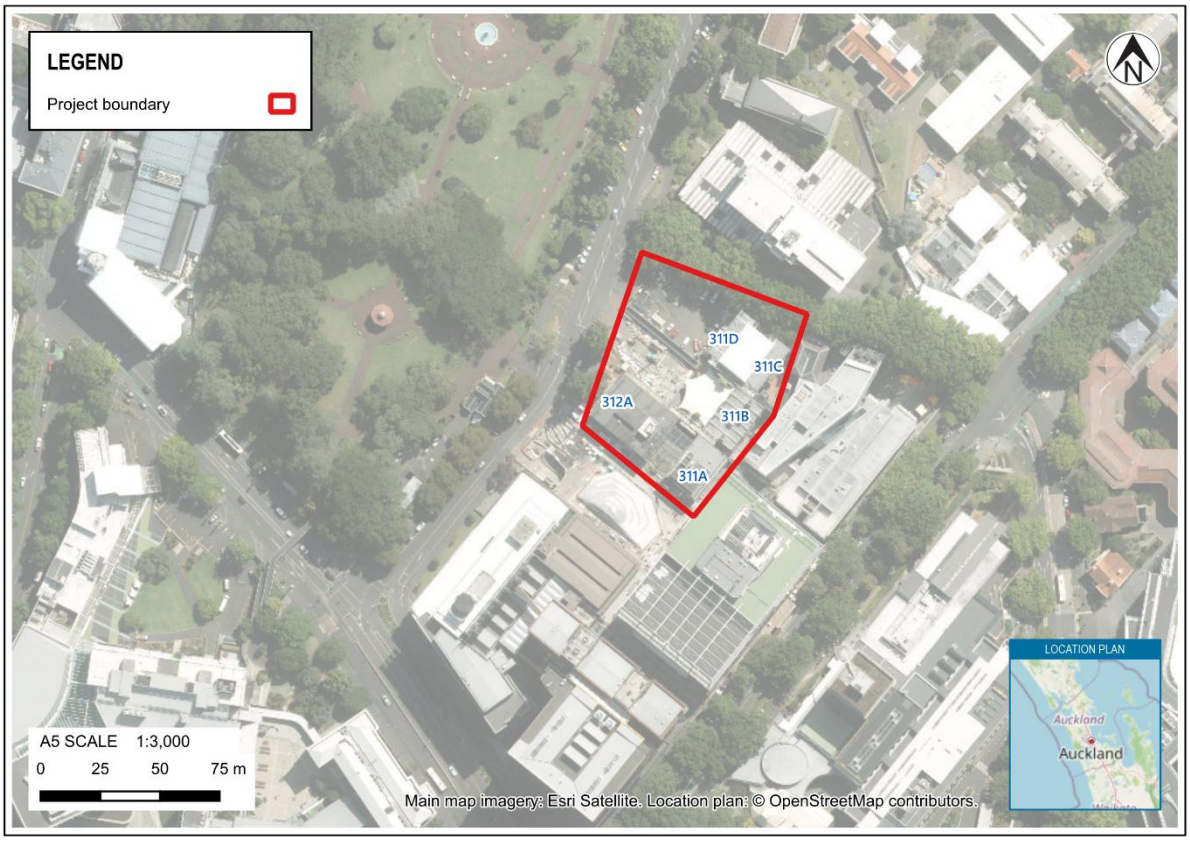


Figure 1.1: Site location and Project boundary.

1.2 Context

The discharges to air from the proposed demolition and construction activities are permitted under Activity A1 of Table E14.4.1 of the Auckland Unitary Plan (AUP) (Auckland Council, 2026), provided the following permitted activity standards under section E14.6.1.1 'General standards' are met:

1 The discharge must not cause, or be likely to cause, adverse effects on human health, property or ecosystems beyond the boundary of the premises where the activity takes place.

2 The discharge must not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke or ash beyond the boundary of the premises where the activity takes place.

3 There must be no dangerous, offensive or objectionable visible emissions.

4 There must be no spray drift or overspray beyond the boundary of the premises where the activity takes place.

1.3 Purpose

The purpose of this report is to assess the environmental effects of discharges to air from demolition and construction of the development to assess compliance of the discharges with the permitted activity standards described in Section 1.2.

2 Activity description

2.1 Overview of site and development

The existing Site, shown in Figure 1.1, includes the Student Union complex (student quad unit and Buildings B311 and B312), located at the corner of Alfred Street and Princes Street. These buildings will be demolished as part of the Project.

Within the Site, the proposed development works include:

- Demolition of the existing Student Union complex.
- Excavation/bulk earthworks and establishment of a two-level basement beneath the Site footprint. Bulk excavation of approximately 6 m to 9 m depth is required to construct the proposed basements.
- The construction of a new Student Centre and Library facility comprising two basement levels, six levels above ground and a rooftop plant room/service level. The development will incorporate teaching and learning spaces, library facilities, student association and support services and food and beverage retail outlets.
- The expansion of Te Tūātea (an outdoor, student-focused public space that forms part of the existing quad).

The stages of development works, as they relate to potential emissions to air are summarised in Sections 2.2 to 2.5.

2.2 Demolition

The Project includes the demolition of the existing Student Union complex comprising the Student Quad Unit and buildings B311 and B312. The demolition of the complex is expected to comprise two primary stages:

- Soft demolition, involving the removal of interior building components.
- Hard demolition, involving the use of heavy machinery for structural demolition using a controlled top-down methodology.

The Draft Construction Management Plan for the Project (RCP, 2026), indicates that soft demolition activities are anticipated to occur in August 2027 with the hard demolition activities expected to be undertaken between November and December 2027, to February 2028 within the university summer break.

Prior to demolition work, construction hoardings are to be installed around the perimeter of the Site to provide separation between demolition activities and surrounding public areas/roads.

The demolition works will include (RCP, 2026):

- Removal of asbestos-containing materials and other identified hazardous materials.
- Internal soft strip and removal of redundant building services.
- Removal of canopies, elevated walkways, atrium interfaces and other connecting structures.
- Structural demolition of the existing buildings.
- Removal of foundations and below-ground structures where required.
- Processing, including potential screening of concrete and masonry, segregation and removal of demolition materials.
- Site clearance in preparation for the subsequent construction works.

Any asbestos found will be removed by licensed asbestos contractors in accordance with the Health and Safety at Work (Asbestos) Regulations 2016 and an asbestos removal control plan prepared by the licensed asbestos removalist and disposed of at an appropriate facility that can accept asbestos.

2.3 Basement excavation and retention

Basement excavation works are proposed as part of the Project and will include bulk excavation, groundwater management, construction of retaining structures and removal of excavated material from the Site. The geotechnical interpretative report for the Project (Tonkin & Taylor, 2026) indicates that construction of the two proposed basement levels of the development is anticipated to require excavation at the site to a depth of approximately 6 m to 9 m below existing ground level.

Based on the Project's 'Civil Infrastructure Report' (Beca Limited, 2026), earthworks associated with the proposed basement excavation based on a Finished Floor Level of RL 36.11 m comprise approximately 34,259 m^3 of cut material over an earthworks area of 5,565 m^2. Excavated material will require handling and removal from the Site as part of the construction process.

The proposed basement excavation will extend below the perched groundwater levels and dewatering will occur during construction. Groundwater may be encountered at approximately 3 m below existing ground level and groundwater management measures are to be put in place during construction (Beca Limited, 2026). Ongoing groundwater drainage associated with the basement excavation is anticipated. Due to residual moisture content of material excavated below the perched groundwater levels, excavated material is expected to be in damp condition and have a low dust generation potential on removal.

2.4 Construction

The proposed Project construction works involve the establishment and construction of a new Student Centre and Library development following completion of demolition and basement excavation works. The Project development will be across eight occupied levels plus roof plant (two basement levels, six levels above ground and a rooftop plant room/service level). The main construction material will be a hybrid of reinforced concrete and structural steel. The Project also includes the expansion of Te Tūātea (an outdoor, student-focused public space that forms part of the existing quad).

Construction activities are expected to include foundation and structural works, retention piling, structural steel and reinforced concrete construction works, façade installations, internal fitout works and associated site works. The main construction activities are anticipated to commence following demolition and site possession, programmed to commence in July 2028 (RCP, 2026). Construction will involve the delivery, handling and installation of construction materials within the Project site.

2.5 Vehicle movements

Vehicle movements to and from the Site will occur throughout demolition, earthworks and construction activities associated with the Project, with peak daily truck movements forecast to reach approximately 80 movements per day during the bulk excavation phase (RCP, 2026).

Vehicle access routes and projected frequencies of truck movements associated with the demolition, earthworks and construction phases are described in the draft Construction Traffic Management Plan for the Project (Flow Transportation Specialists Limited, 2026).

Construction vehicle access to the Site will occur from access points at Princes Street and Alfred Street. Access points will be stabilised to minimise sediment trackout onto the public road network and a wheel wash will be provided if required.

2.6 Operating hours

It is anticipated that construction and demolition works will generally occur between 6:30 am and 10:30 pm Monday to Friday, 7:00 am and 11:00 pm on Saturdays, and 9:00 am and 7:00 pm on Sundays (excluding public holidays).

3 Nature of the discharges to air

The main discharge to air from the proposed demolition and construction activities is dust/particulate matter. Dust/particulate matter emissions are generally categorised by particle size (denoted by aerodynamic diameter of particles) as follows:

- Deposited dust – particulate of generally greater than 30 microns (µm) in diameter. This coarse size fraction falls out of the air relatively rapidly and deposits on exposed surfaces. The deposition on surfaces can cause nuisance effects on amenity and soiling effects on property.
- Total suspended particulates (TSP) – particulate of generally less than 30 µm in diameter. Particulate of this size fraction remains suspended in air at the time for longer than larger fractions. TSP (particularly the coarse fractions of greater than 10 µm) can potentially affect visibility.
- Fine inhalable or respirable fractions of TSP such as PM_{10} (particles with an aerodynamic diameter less than 10 µm) can penetrate the nose or mouth under normal breathing conditions and is the most commonly used indicator of the potential for health effects of particulate matter in New Zealand.

The particulate emitted from demolition and construction activities will predominantly comprise of the coarse deposited fraction, from which nuisance and amenity effects are most prevalent. However, a minority fraction of the particulate emissions may also be comprised of fine particulate that can cause respiratory health effects.

Crystalline silica (comprising crystalline forms of silicon dioxide (SiO_2), may also be present in concrete and other construction material that is removed during demolition. Exposure to high concentrations of the respirable fraction (respirable crystalline silica (RCS) of this material can cause the respiratory disease silicosis.

4 Environmental setting

4.1 Adjoining land use and sensitive receptors

The Site is located at the corner of Princes Street and Alfred Street, within the University of Auckland City Campus. The Site (and adjoining properties on the east side of Princes Street) lies within the 'Business – City Centre Zone' under the AUP (Auckland Council, 2026).

The surrounding area is characterised by high-density urban development (primarily comprised of educational, administration and recreational activities within the UoA campus) and the public open space of Albert Park. The UoA campus lies primarily east of Princes Street. Albert Park, which lies within 'Open Space - Informal Recreation Zone' under the AUP, is located opposite the Site along Princes Street, to the west. The Auckland University of Technology (AUT) campus lies to the south and southeast beyond Wellesley Street East.

Figure 4.1 shows the Site, surrounding area and adjacent sensitive receptors. The adjacent receptors are described in Table 4.1.

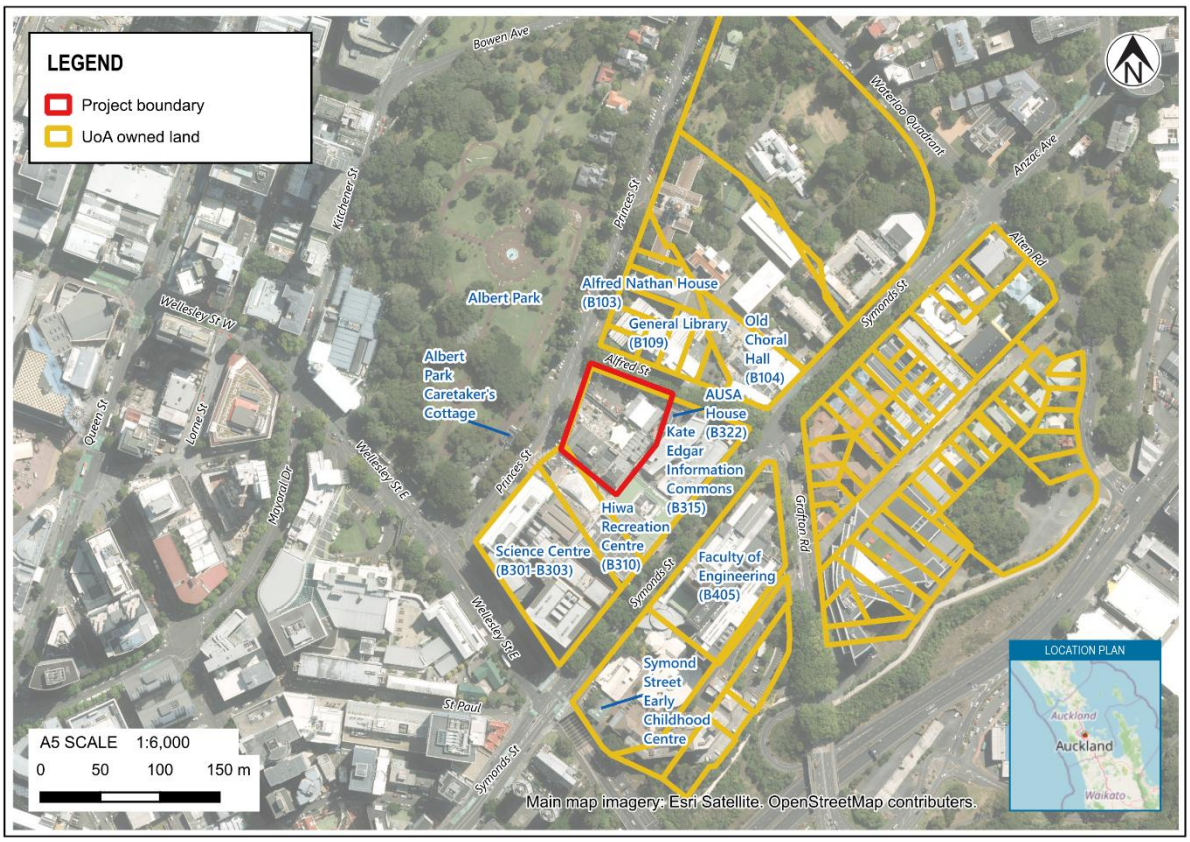


Figure 4.1: Site locality and adjacent sensitive receptors.

Table 4.1: Adjacent sensitive receptors

Receptor	Direction from site	Distance from boundary	Description	Sensitivity to dust soiling*
UoA Science Centre	South	25 m	Three multi-storey buildings featuring teaching facilities, laboratories, administration. Adjacent building facades potentially feature openable windows.	Medium
UoA Hiwa Recreation Centre	South to southeast	3 m	Multi storey building with enclosed facades facing the development featuring indoor recreational and a rooftop terrace featuring outdoor recreation.	Medium
UoA Kate Edger Information Commons	East	Adjoining	Three multi-storey buildings featuring student communal areas and services as well as a student medical centre, food and retail outlets.	Medium (high for medical centre)
AUSA House	East	Adjoining	Two-storey villa with outdoor verandas housing student services and administration. The building is scheduled in the AUP as a Category B Historic Heritage Place†.	High
UoA Old Choral Hall	East to northeast	50 m	4-storey heritage university building comprising teaching, learning support, student services and administrative activities. The building is scheduled in the AUP as a Category A Historic Heritage Place†.	High
UoA General Library	North to northeast	25 m	Multi-storey university library building containing study spaces, teaching and learning facilities, and student services and administrative areas.	Medium
UoA Alfred Nathan House	North	70 m	Multi-storey heritage university building used for student services and university administration, scheduled in the AUP as a Category A Historic Heritage Place†.	High
Albert Park	West to northwest	35 m	Public open space comprising pedestrian paths, lawns, landscaping, passive recreation areas.	Medium
Albert Park Lodge	West	30 m	Single-storey former park caretaker's residence within Albert Park. The building is scheduled as a Category A Historic Heritage Place†.	High
UoA Symonds Street Early Childhood Centre	South	175 m	Early childhood education facility occupied by children and staff during daytime hours.	Medium
UoA Faculty of Engineering	Southeast	90 m	Multi-storey university buildings containing teaching facilities, laboratories, study spaces, offices and associated academic activities.	Medium

* Sensitivity to dust soiling assessed in accordance with United Kingdom (UK) Institute of Air Quality Management (IAQM) guidance (IAQM, 2024) referred to in section 5.2.

† Old choral Hall (AUP ID 02057) and Alfred Nathan House (AUP ID 02011) are identified as Category A Historic Heritage Places in Schedule 14.1 of the AUP. Albert Park Lodge (park keeper's cottage) is identified within the Category A Albert Park historic landscape (AUP ID 01999). AUSA House is identified as a Category B Historic Heritage Place (AUP ID 01926).

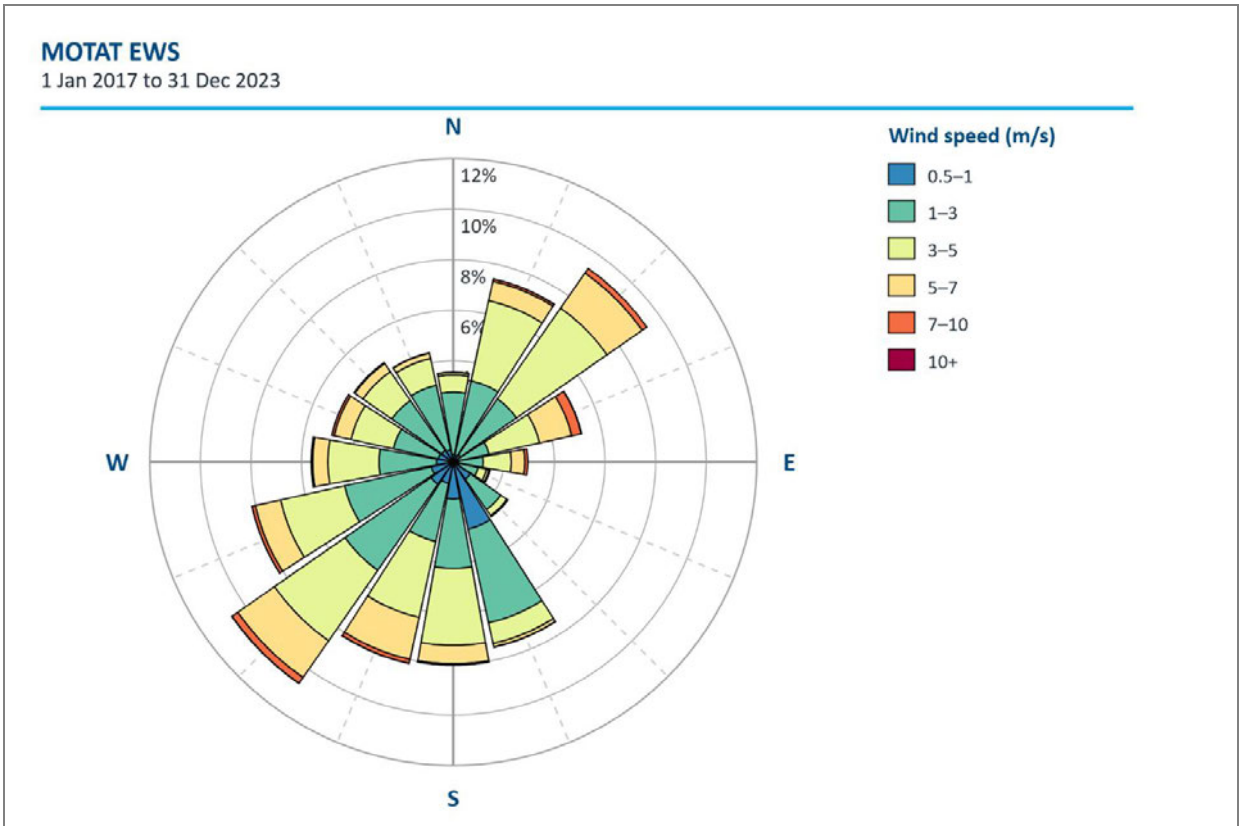
4.2 Local meteorology

Local meteorological conditions provide an important influence on dust emissions generation and propagation. In general, the amount of dust generated largely depends on the moisture content of the material, and the wind speeds. Faster wind speeds increase the effect of wind erosion and the distance that the dust travels.

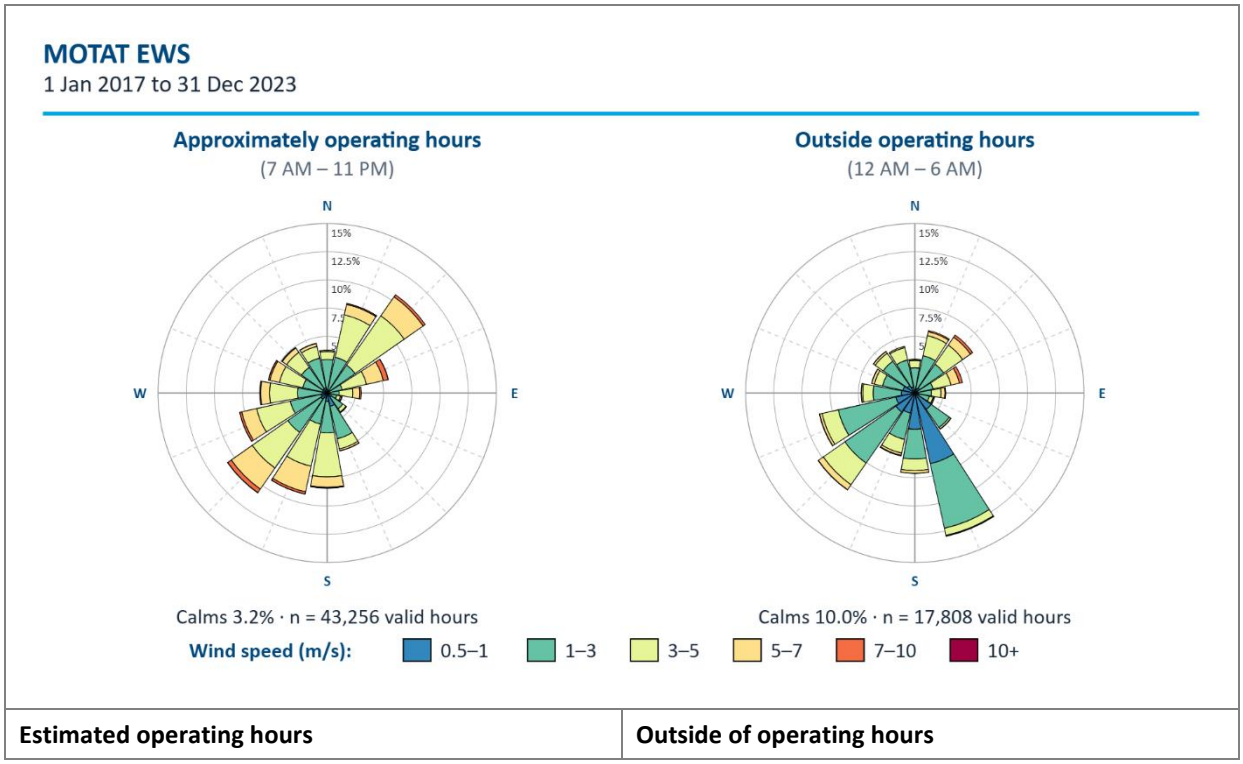
Wind rose analyses of the frequency of wind speeds and directions measured at the MOTAT Electronic Weather Station (EWS) operated by Earth Sciences New Zealand (formerly NIWA) at the Auckland Museum of Transport and Technology (MOTAT), Western Springs from 1 Jan 2017 to 31 December 2023 (inclusive) are presented in Figure 4.2. Wind roses are presented for all hours of the estimated construction operating hours, and for outside the proposed operating hours.

The MOTAT EWS is located approximately 5.2 km southwest of the Site. Wind measurements at this station are likely to be generally representative of overlying wind conditions on the Auckland Isthmus. Although tall buildings and topographical features in the area will alter localised wind conditions around the Site, the wind direction frequency trends illustrated below are likely to be broadly similar to overlying wind conditions experienced in the area.

Based on the wind roses presented in Figure 4.2, winds are predominantly from the southwest and northeast, and therefore sensitive locations downwind (to the northeast and southwest of the Site respectively), are likely to be most frequently exposed to any off-site dust emissions from Site activities. Winds during the proposed construction hours follow a similar directional pattern with generally higher wind speeds and a lower frequency of calm and light wind conditions.



All hours; 1 Jan 2017 to 31 December 2023. Calms = 5.1%



Estimated operating hours	Outside of operating hours

Figure 4.2: Wind rose frequency analyses of wind speeds and directions measured at the MOTAT EWS from 1 Jan 2017 to 31 December 2023 for all hours, operating hours and outside of operating hours. Source: NIWA.

Figure 4.3 shows that the expected drier months are during summer, when wind speeds also tend to be higher. Over the year winds from the southwest, which will transport any emitted dust towards sensitive receptors to the northeast of works activities, are relatively frequent over the Auckland Isthmus. Northeast winds become more frequent over summer months.

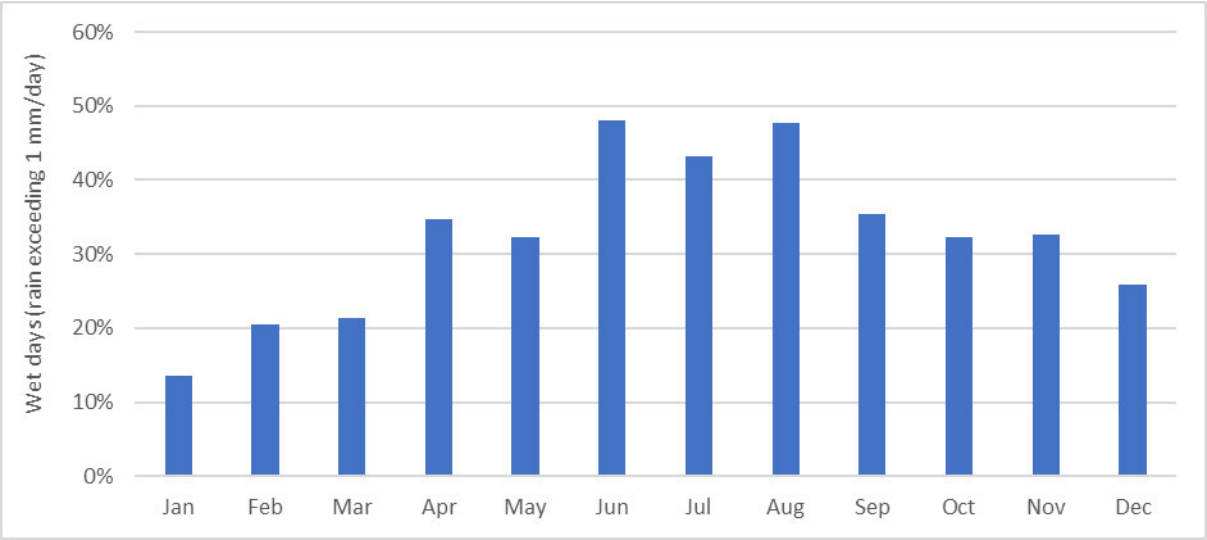


Figure 4.3: Percentage of wet days (rain exceeding 1 mm) over each month of the year at MOTAT (2018-2022, inclusive). Source: NIWA.

4.3 Background air quality

Auckland Council has monitored air quality within the Auckland central business district (CBD) at air quality monitoring stations at Queen Street and Customs Street, approximately 500 m and 800 m to the northwest of the Site, respectively. However, both of these monitoring stations are located adjacent to high traffic roads and within urban canyons created by adjoining tall buildings within the CBD. By contrast, the Site is located adjacent to low traffic roads and is situated adjacent to Albert Park rather than within an urban canyon. Ambient particulate levels measured at CBD monitoring stations are therefore likely to be substantially higher than those occurring at and around the Site.

Instead, background ambient air quality estimates developed by the New Zealand Transport Agency (NZTA) for ambient PM_{10} concentrations within the local Auckland Central East census area unit (CAU) area are likely to more accurately represent local ambient particulate levels (NZTA, 2026).

The NZTA estimates for background concentrations of PM_{10} in the Auckland Central East are presented below in Table 4.2. The background contaminant concentration estimates are compared in Table 4.2 with the following air quality assessment criteria (specified for the protection of public health):

- Ambient air quality standards specified in the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ); and
- Auckland Ambient Air Quality Targets (AAAQT) specified in Table E14.3.1 of the AUP.

Table 4.2: NZTA estimated background PM_{10} concentrations for the Auckland Central East CAU

Pollutant	Averaging Period	Concentration (µg/m^3)	Assessment Criteria (µg/m^3)
PM_{10}	24-Hour	37.9	50 (NESAQ)
	Annual	14.5	20 (AAAQT)

5 Assessment methodology

5.1 Selection of assessment method

The assessment of dust impacts has been conducted using qualitive assessment methods set out in the Ministry for the Environment (MfE) 'Good Practice Guide for Assessing and Managing Dust' (Dust GPG) (Ministry for the Environment, 1 November 2016). The MfE Dust GPG notes the difficulties associated with the use of quantitative assessment approaches (based on atmospheric dispersion modelling) as an alternative to the qualitative methods as follows:

> *"Dispersion modelling is typically only employed for new, large industrial sources of particulate. This is because it can be very difficult to estimate and model particulate emissions accurately, particularly from fugitive sources."*

The dust emission sources associated with the proposed demolition and construction activities are diffuse (fugitive) in nature. The emissions from those sources vary significantly both spatially, in terms of location and elevation within the Site, and temporally, over each working day and over the different phases of the development. As a result, dust emissions from the development are not able to be accurately quantified and represented in a dispersion model.

The assessment of air quality impacts of emissions from the proposed demolition and construction activities has therefore used the following techniques, in accordance with the MfE Dust GPG:

- Comparison of the risk of dust impacts associated with the proposed demolition and construction activities calculated using a method developed by the United Kingdom (UK) Institute of Air Quality Management (IAQM) (IAQM, 2024).
- Evaluation of the measures employed and proposed to manage dust emissions and mitigate potential environmental effects.
- An evaluation of potential dust exposure at key receptor locations using the Frequency, Intensity, Duration, Offensiveness and Location (FIDOL) factor framework.

5.2 IAQM dust risk assessment approach

Guidance on the assessment of demolition and construction dust published by the IAQM (IAQM, 2024) details a method for determining the risk of dust impacts factoring in the following aspects of the activity:

- The magnitude of potential dust emissions from proposed demolition, earthworks, construction and vehicle trackout activities; and
- The sensitivity of the surrounding area to dust soiling, human health or ecological effects.

The identified dust risk is then used to inform dust management and mitigation requirements for the activity.

The potential magnitude of emissions is categorised as 'small', 'medium' or 'large' based on the nature and scale of the activities proposed.

The sensitivity of the surrounding area is determined in relation to three aspects as follows:

- Sensitivity of the area to dust soiling effects on people and property is categorised as 'low', 'medium' or 'high' based on the number of 'low', 'medium' and 'high' sensitivity receptors located within distances of 20 m, 50 m, 100 m and 250 m of the dust producing sources.

- Sensitivity of the area to human health impacts is calculated in a similar fashion with additional consideration of annual average PM_{10} concentrations in the area[1].
- Sensitivity of the area to ecological impacts is based on the number of ecologically sensitive receptors within distances of 20 m and 50 m of the dust producing sources.

5.3 FIDOL assessment

Potential dust nuisance effects associated with discharges from the Site have been assessed in accordance with the Dust GPG. This involves a qualitative assessment of potential dust impacts on sensitive locations surrounding the Site.

Following the identification of affected sensitive receptors within the screening criteria, those locations are then assessed in more detail using the FIDOL factors, which are described as follows:

Frequency: The frequency of exposure to dust impacts experienced at a given location. This depends on both the frequency of discharges and the frequency of weather conditions that could transport a discharge to the receptor location.

Intensity: The intensity of dust impacts depends on the scale or intensity of the discharge and the degree of dispersion or dilution of the discharge. In relation to dust, this is dependent on the degree of separation between the source and the receptor and weather conditions.

Duration: The duration of dust impacts depends on both the duration of the discharge and how long a sensitive location is continuously downwind of the dust source.

Offensiveness: The offensiveness of the dust relates to both the character of the dust and the degree of how pleasant or unpleasant that character is.

Location: The location factor relates to sensitivity to dust at the receptor location and relates to the nature of land use at the location.

[1] The IAQM guidance is published for use in the United Kingdom (UK) and provides separate categorisation of sensitivity based on annual average PM_{10} concentrations for Scotland and the rest of the UK (primarily England).

6 Assessment of air quality impacts

6.1 Assessment of dust risk

6.1.1 Potential dust emission magnitude

The potential magnitude of dust emissions from each activity phase of the Project taking into consideration the example definitions outlined in Section 7.2 of the IAQM guidance (IAQM, 2024) is described below:

- **Demolition:** The building volume to be demolished has been estimated[2] to be approximately 52,000 m^3 which is within the 12,000 m^3 to 75,000 m^3 range indicated for 'medium' scale demolition emissions in the IAQM guidance. The material to be demolished is potentially dusty construction material (e.g. concrete). No on-site crushing of demolition material is proposed and the magnitude of dust emissions from demolition is assessed as being '**medium**'.
- **Earthworks:** The total site area is just over 6,000 m^2, which is less than that of the small category based on the IAQM guidance (18,000 m^2). As the excavation is below ground level, the excavated material is expected to be damp and thereby less prone to emitting dust. According to the 'Civil Infrastructure Report' for the Project (Beca Limited, 2026), "*the site is not to contain any large or long-term stockpiles*", further reducing the potential for dust generation. Overall, the magnitude of dust emissions from earthworks is assessed as being '**small**'.
- **Construction:** The overall building volume of the proposed development[3] is likely to be greater than 75,000 m^3. However, on site concrete batching and sandblasting are not proposed and proposed construction methods do not involve significant dust emissions. Overall, the magnitude of dust emissions from construction is assessed as being '**small'.**
- **Vehicle movements/trackout:** Vehicle movements to and from the Site will occur during demolition, earthworks, and construction activities associated with the Project with peak daily truck movements forecast to reach approximately 80 movements per day during the bulk excavation phase. Due to the confined nature of the Site area, the length of unpaved road has been assumed to be less than 50 m however trafficked surfaces at the Site may be comprised of dusty material. Overall, the magnitude of dust emissions from vehicle movements and trackout is assessed as being '**medium**'. However, trackout of material should be manageable through appropriate application of wheel wash facilities for vehicles exiting the Site.

6.1.2 Sensitivity of area

6.1.2.1 Sensitivity of area to dust soiling effects

Figure 6.1 illustrates the area located within distances of 20 m, 50 m, 100 m and 250 m of the Project boundary for the purposes of determining sensitivity.

As detailed in Section 4.1, the Site is located within the University's City Campus. The area surrounding the Site is occupied primarily by recreational and public open space areas, which under the IAQM guidance would be classified as 'medium sensitivity receptors'.

[2] Derived from an estimated plan area of the Student Union complex of approximately 4,000 m^2 and an estimated height of 13.8 m, based on LIDAR data.

[3] Based on an approximate gross floor area across eight occupied levels 23,660 m^2 plus roof plant with a typical floor to floor height of 5.0 m the building volume is expected to exceed 75,000 m^3.

The student medical centre within the Kate Edger Information Commons and the heritage buildings surrounding the Site represent high sensitivity receptors.

Due to the presence of between one and ten high sensitivity receptors within 20 m of the site (AUSA House and Kate Edger Information Commons) and multiple medium sensitivity receptors within the same proximity, the area is assessed as having a **'medium'** sensitivity to dust soiling effects.

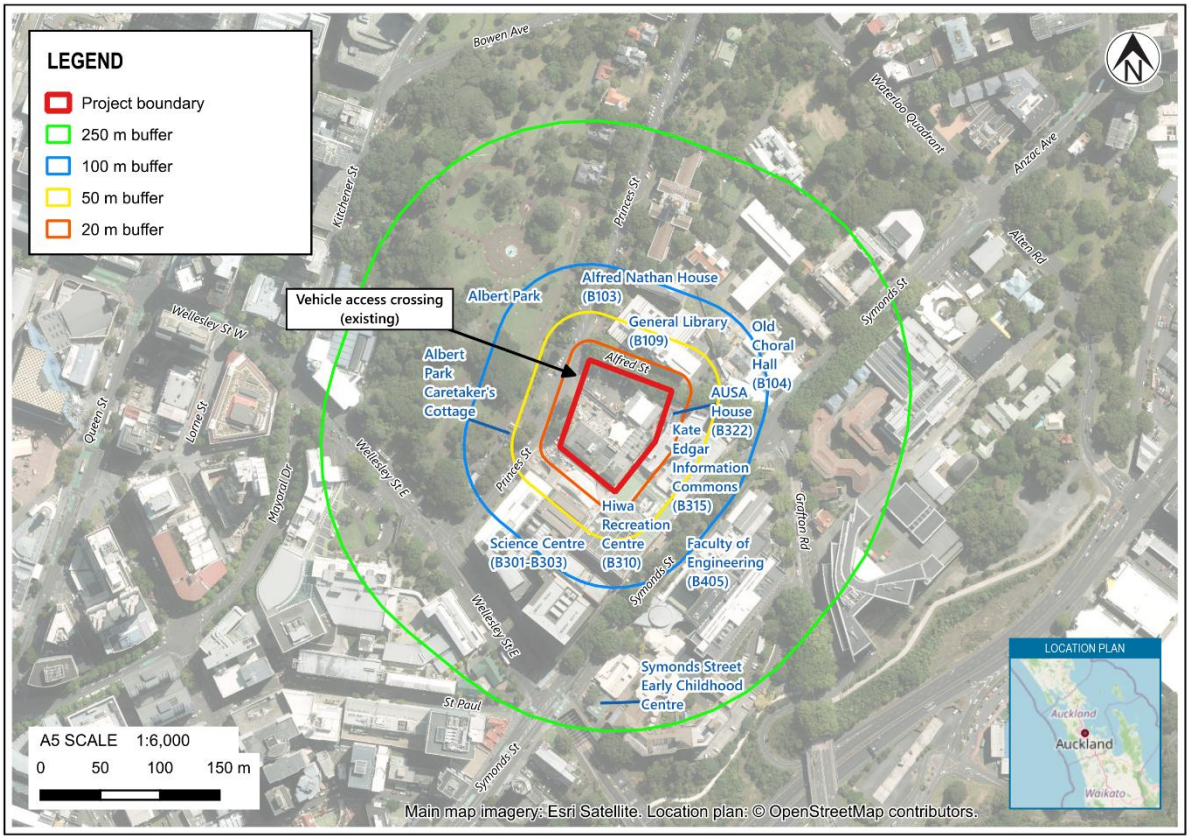


Figure 6.1: Area within 20 m, 50 m, 100 m and 250 m of the Site.

6.1.2.2 Sensitivity of area to the health effects of PM_{10}

As discussed in Section 4.3, NZTA has estimated an annual mean background PM_{10} concentration for the Auckland Central East CAU of 14.5 µg/m^3. Under the IAQM framework, this correlates to a '**low**' sensitivity to the health effects of PM_{10}.

6.1.2.3 Sensitivity of area to ecological effects

The Site is located in the highly modified CBD environment and is not located within 50 m of any significant ecological area set out in the AUP. Albert Park (the edge of which is within 50 m of the Site) does have notable trees in it but is not designated as a Significant Ecological Area under the AUP. The sensitivity of the area to ecological effects is therefore assessed as being '**low**'.

6.1.3 Overall risk of dust impacts

Table 6.1 summarises the sensitivity of the area to dust soiling, human health effects and ecological effects discussed in Section 6.1.2.

Table 6.1: Summary of dust risk for proposed demolition, earthworks, construction and vehicle trackout activities under the UK IAQM framework

Activity	Potential magnitude of dust emissions	Sensitivity of surrounding area		
		To dust soiling	To human health effect	To ecological effects
Demolition	Medium	Medium	Low	Low
Earthworks	Small			
Construction	Small			
Vehicle movements/ trackout	Medium			

Based on the potential dust emission magnitude and the sensitivity of the area, the overall risk of dust impacts for each activity can be determined. The risk calculated under the IAQM framework for each activity is summarised in Table 6.2. The relative level of dust impact risk of the various Project activities has been used to inform the consideration of dust management measures in Section 6.2.

Table 6.2: Summary of dust risk to define specific mitigation

Potential impact	Demolition	Earthworks	Construction	Vehicle Movements/ Trackout
Dust soiling	Medium risk	Low risk	Low risk	Medium risk
Human health	Low risk	Negligible	Negligible	Low risk
Ecological	Low risk	Negligible	Negligible	Low risk

6.2 Evaluation of dust management and monitoring measures

The proposed dust management measures specified in the Draft Construction Management Plan for the Project (RCP, 2026) and other application documents are evaluated against the recommendations of the IAQM guidance in Appendix A (taking into account the dust risk identified in Section 6.1.3).

The proposed measures and recommendations for further measures are described in Table 6.3, taking into account the following:

- Outcomes of the evaluation against IAQM guidance presented in Appendix A.
- Relevant guidance on dust management published by the Ministry for the Environment (Dust GPG) (Ministry for the Environment, 1 November 2016).
- Previous experience of effective management of dust from the types of activities proposed.

Overall, the proposed dust management regime has been specified to take account of the nature or the proposed dust generating activities and the sensitivity of activities in the surrounding environment. Recommendations for additional measures (or clarification of the proposed measures) are described in Table 6.3. With those additional measures in place, the evaluation indicates that proposed dust management and monitoring regime will be consistent with published dust management guidance to provide effective management of dust emissions in this environment.

The recommendations of Table 6.3 have been incorporated into the draft Construction Air Quality Management Plan (CAQMP) which forms a supplementary document to this report.

Table 6.3: Recommendations from evaluation of proposed dust mitigation and monitoring measures

Source of dust	Proposed dust mitigation and monitoring measures	Recommendations for further dust mitigation and monitoring measures
Demolition	• Prior to demolition, construction hoardings will be installed around the perimeter of the Site. • Dust screens or shrouds to the hoarding and scaffold and water suppression at the point of generation during demolition and breaking activities. • Staging of soft demolition (stripping of internal fittings) followed by hard demolition. • Use of controlled, top-down demolition methods for hard demolition. • Use of pulverisers and wire saws used in preference to breakers and concrete saws where practicable. • Fitting of breaker shrouds to excavator-mounted hydraulic breakers. • No on-site crushing of demolition material. • Use of local extraction or water suppression on concrete saws, grinders and drills. • For demolition of elements adjacent to AUSA House: – Use of cut and crane demolition methods for the adjoining interface; and – Subsequent erection of intervening vertical protection measures.	The following additional measures are recommended for the demolition activities to control dust emissions: • Use of water sprays to dampen material prior to and during demolition. • Application of water to demolition material prior to any screening. • Use of enclosed drop chutes for material to be dropped to lower levels.

Source of dust	Proposed dust mitigation and monitoring measures	Recommendations for further dust mitigation and monitoring measures
Stockpiles (including material placement and removal)	• Use of water carts, hoses or sprinklers to damp down stockpiles, with the frequency increased during dry and windy conditions.	If stockpiling of demolition material, excavation spoil or other bulk materials occurs on-site, the following measures are recommended: • Store stockpiled material containing a high content of fine material indoors or undercover, where practicable. • Locate and orientate outdoor stockpiles to maximise wind sheltering and separation from sensitive off-site activities as far as practicable. • Dampen, cover or stabilise inactive stockpiles if they are producing visible dust emissions. • Limit the height of stockpiles to reduce wind entrainment as far as practicable. • Minimise handling of stockpiled material and drop heights to stockpiles during unloading to decrease potential for dust generation.
Earthworks	• Prior to earthworks, construction hoardings will be installed around the perimeter of the Site. • Use of water carts, hoses or sprinklers to damp down exposed areas, with the frequency increased during dry and windy conditions.	The following additional measures are recommended to control dust from earthworks: • Limit the extent of excavation and material handling activities in exposed areas carried out during dry and/or windy conditions, as far as practicable. • Stabilise exposed areas not required for construction, access or parking, along with completed fill and spoil areas as soon as practicable. • Maintain surfaces of active earthworks areas in damp condition during dry weather. Where material to be excavated is dry, this should include pre-watering of surfaces, prior to excavation allowing enough time for moisture to penetrate. • Remove excavated material from Site as soon as practicable. • Soil disturbance in areas of contaminated or asbestos-containing fill is to be undertaken in accordance with the Contaminated Site Management Plan (CSMP).
Construction	• Construction hoardings will be installed around the perimeter of the Site. • Use of local extraction or water suppression on concrete saws, grinders and drills.	The following additional measures are recommended to control dust from construction: • Concrete grinding or scabbling is only to be undertaken with either wet suppression or on-tool air extraction systems in operation. • Bag fine powder materials and ensure bags are sealed after use and stored appropriately to prevent dust emissions.

Source of dust	Proposed dust mitigation and monitoring measures	Recommendations for further dust mitigation and monitoring measures
Handling of dry material	• Covering of all trucks carting spoil or dusty material to and from the Site.	The following measures are recommended to control dust from handling of dry materials: • Limit drop heights of dry material during handling, including from any conveyor transfer points. • Avoid handling (including loading or unloading) of material during windy conditions in locations where dust may be emitted beyond the Site boundary, where practicable. • Minimise drop heights when loading and unloading dry material.
Vehicle movements	• Use of water carts, hoses or sprinklers to damp down haul routes, with the frequency increased during dry and windy conditions. • Heavy vehicle movements during the 'peak pedestrian period' (12:00-1:00 pm) should be avoided and will be managed by booking system. • Sealed or stabilised internal haul routes and a wheel wash or shaker grid at the Site exit, with regular sweeping of Princes Street and Alfred Street.	The following additional measures are recommended: • All vehicle engines to be switched off when stationary (no idling to occur on-site). • Limit vehicle speeds on Site to no more than 20 km/hr. • Cover loads of fine materials leaving or entering the Site. • Minimise on-site travel distances through appropriate Site layout and design. • Sweeping of sealed access routes should be undertaken with a vacuum sweeper truck whenever inspections (regular or in response to complaints) identify surface accumulation of dust material. • Surface stabilisation using synthetic dust suppressants (excluding used oil-based suppressants) may be used as an alternative to wet suppression of unsealed haul roads.

Source of dust	Proposed dust mitigation and monitoring measures	Recommendations for further dust mitigation and monitoring measures
Miscellaneous	• Air intakes of adjoining university buildings are to be identified prior to works commencing, and protection or temporary shutdown arrangements agreed with the University Property Services where dust-generating works occur in close proximity. • Use of water carts, hoses or sprinklers to damp down exposed areas, haul routes and stockpiles, with the frequency increased during dry and windy conditions.	The following miscellaneous measures are recommended: • Planning of Site layout so that dust generating activities are located away from sensitive receptors where practicable. • Site personnel trained in dust management controls. • Limiting operations which have the potential to cause high dust during high wind events. • Identification of a sufficient water supply at the Site to meet demand for wet suppression of dust. • Exposed surfaces are to be stabilised (e.g. by temporary covering, sealing or watering) during any period when the site is inactive, including the interval between completion of demolition and commencement of main construction works.
Monitoring	• Daily visual monitoring of dust at the Site boundary, with a documented trigger to cease or modify dust-generating activity where visible dust is leaving the Site. • Monitoring of weather forecasts, with high dust-risk activities deferred or additional suppression applied in high wind conditions.	The following additional dust monitoring measures are recommended: • Inspect watering systems on a weekly basis.

6.3 FIDOL assessment

The potential air quality effects of dust and other emissions from the development works and compliance with the relevant permitted activity standards have been assessed through a consideration of the FIDOL factors (frequency, intensity, duration, offensiveness/character and locational sensitivity) as described in Section 5.3.

An evaluation of potential exposure at the following key adjacent receptor locations to dust from the proposed activities against the FIDOL factor framework is summarised in Table 6.4:

- General Library.
- AUSA House.
- Kate Edger Information Commons.
- Hiwa Recreation Centre.
- Science Centre.
- Albert Park Lodge.

These receptor locations represent the peak potential air quality impact locations and the potential air quality effects at other locations are likely to be lesser in scale.

In summary the FIDOL evaluation at the key receptor locations has determined that:

- Dust comprised primarily of coarse particles of concrete, aggregate and soil/crustal material will be emitted from the demolition and construction activities. These emissions are likely to occur intermittently during daytime working hours.
- Of the proposed activities, the highest potential for dust emissions is associated with demolition activities and vehicle movements over unsealed surfaces (which are likely to be more frequent during demolition and earthworks). A range of dust management measures are proposed to mitigate emissions from these and other activities, including use of controlled, top-down demolition methods and wet suppression of dust generating activities.
- At the key receptor locations, the sensitivity of most activities to dust exposure is considered to be moderate, with the exception of the heritage listed AUSA House and Albert Park Lodge and the Kate Edger Information Commons (where a student medical centre is located).
- Exposure to wind from the Site is moderate at AUSA House, the General Library, Hiwa Recreation Centre and the Science Centre and infrequent at other locations. Potential for exposure is reduced at the Kate Edger Information Commons and Hiwa Recreation Centre due to the enclosed and actively ventilated nature of these buildings. The proposed mitigation measures (including the specific mitigation measures proposed for AUSA House) will further reduce the frequency and duration of exposure at adjacent receptor locations.
- Several of the receptors (AUSA House, Kate Edger Information Commons and the Hiwa Recreation Centre) lie directly adjacent to buildings that are scheduled to be demolished, leaving little intervening opportunity for dust to disperse or deposit prior to reaching these receptors. However, a range of measures are recommended to mitigate emissions of dust from demolition and other activities and the intensity of exposure to dust at these locations is assessed as being low during demolition and minimal during other phases of development construction.

Overall, the analysis indicates that, provided the recommended dust management measures and monitoring measures are implemented consistently during construction, the potential frequency, duration and intensity of exposure to dust from the Project is such that offensive or objectionable dust impacts or adverse effects on human health, property or ecosystems beyond the Site are unlikely to occur.

Table 6.4: FIDOL evaluation of potential dust impacts

Factor	General considerations for all receptors	General Library	AUSA House	Kate Edger Info Commons	HIWA Recreation Centre	Science Centre	Albert Park Lodge
Frequency/ Duration	The frequency and duration of dust experienced at receptor locations will depend on the frequency/duration of emissions from the dust source and the frequency with which the receptor is downwind of the source. Wind measurements illustrated in Section 4.2 indicate a strong prevalence for winds from the southwest and northeast. As a result, receptors located to the northeast and southwest of the site, respectively, are likely to be most frequently exposed to wind from the site. The surrounding properties are predominantly occupied by educational and recreational facilities used by staff, students, visitors and the general public during the day. Site activities (including demolition, earthworks, construction and vehicle movement activities) are scheduled to occur between 6:30 am and 10:30 pm Monday to Friday, 7:00 am and 11:00 pm on Saturdays, and 9:00 am and 7:00 pm on Sundays (excluding public holidays), over the project duration. The hard demolition phase is anticipated to take place over the course of a University summer holiday period to minimise students and staff on site using the facilities. In terms of the frequency and duration of emissions, activities will occur intermittently during construction of the development. During this period, emissions likely to occur most frequently during demolition and during truck movements associated with demolition and earthworks. However, the frequency of emission from these activities will be mitigated by the measures set out in Section 6.2.	The General Library is located, across Alfred Street to the north and is downwind of the Site in winds from the southerly quadrant (south-east to south-west). The General Library is expected to be exposed to winds from the Site of greater than 5m/s for 6.4 % of the time. This corresponds to a moderately frequent wind exposure category under IAQM guidance on mineral dust impacts (IAQM, 2016). The southern façade of the General Library contains openable windows facing the Site, providing for a potential route of exposure of occupants to outdoor air when windows are open. While exposure to wind from the Site is moderate at this location, with the dust mitigation measures recommended in Section 6.2. the frequency of emission and propagation towards the Library is likely to be low. Therefore, the frequency and duration of dust exposure overall at this receptor is expected to be low.	AUSA House abuts the Site to the east and is therefore downwind of the Site in winds from the westerly quadrant (north-west and south-west). AUSA House is likely to be exposed to winds from the Site of greater than 5m/s for 6.2 % of the time which corresponds to a moderately frequent wind exposure category. AUSA House features outdoor veranda areas with openable windows facing the Site, allowing for exposure to outdoor air. While exposure to wind from the Site is moderate at this location and there is potential exposure to outdoor air, with the dust mitigation measures recommended in Section 6.2. the frequency of emission and propagation towards AUSA House is likely to be low. Therefore, the frequency and duration of dust exposure overall at this receptor is expected to be low.	The Kate Edger Info Commons adjoins the Site to the east, which is downwind of the Site from the westerly quadrant (north-west and south-west). The Kate Edger Info Commons is likely to be exposed to winds greater than 5m/s for 4.4 % of the time which corresponds to an infrequent wind exposure category. The building features enclosed facades, providing limited potential for occupant exposure. However, some exposure may occur at the ground-floor and through air intakes on the roof levels. While exposure to wind from the Site is moderate at this location, with predominantly enclosed building design and with the mitigation measures recommended in Section 6.2. the frequency of emission and propagation towards the Kate Edger Info Commons is likely to be low. Therefore, the frequency and duration of dust exposure overall at this receptor is expected to be low.	The Hiwa Recreation Centre is located to the southeast of the Site, which is exposed to wind from the northwest quadrant (north to west). The Hiwa Recreation Centre is likely to be exposed to winds greater than 5m/s for 5.3 % of the time which corresponds to a moderately frequent wind exposure category. The Hiwa Recreation Centre features enclosed facades, with little potential for occupants' exposure. However, exposure to outdoor air may occur at the ground-floor and roof terrace areas and via air intakes on the roof levels. While exposure to wind from the Site is moderate at this location, with largely enclosed building design of the centre and with the dust mitigation measures recommended in Section 6.2. the frequency of emission and propagation towards Hiwa Recreation Centre is likely to be low. Therefore, the frequency and duration of dust exposure overall at this receptor is expected to be low.	The Science Centre is located south of the Site, which is downwind of the Site in winds from the northerly quadrant (north-west to north-east). The Science Centre is likely to be exposed to winds from the Site greater than 5m/s for 5.0 % of the time which corresponds to a moderately frequent wind exposure category. The northern façades facing the Site feature openable windows, providing for a potential route of exposure of occupants to outdoor air when windows are open. While exposure to wind from the Site is moderate at this location, with the dust mitigation measures recommended in Section 6.2. the frequency of emission and propagation towards the Science Centre is likely to be low. Therefore, the frequency and duration of dust exposure overall at this receptor is expected to be low.	The Albert Park Lodge is located west of the Site, across Princes Street. This location is downwind of the Site in winds from the north-east through to the south-east. The building is likely to be exposed to winds from the Site greater than 5m/s for 3.1 % of the time which corresponds to an infrequent wind exposure category. With infrequent wind exposure and the dust mitigation measures recommended in Section 6.2 in place, the frequency of dust exposure at this location is expected to be minimal.
Intensity	The intensity of dust experienced at receptor locations will depend on the intensity of emissions at source and the degree of deposition or dispersion of the emissions that occurs en-route to the receptor (which itself will be dependent on wind strength and the degree of separation between source and receptor). As noted in Section 6.1.1 the IAQM framework identifies that the various activities associated with the project have the following sizes of emission sources without effective controls: • Demolition: Medium • Earthworks: Small • Construction: Small	The General Library is located across Alfred Street from the Site, with openable windows within 30 m of building demolition activities, providing a modest opportunity for dust emissions to disperse or deposit prior to reaching the building. To mitigate the intensity of dust from demolition activities a range of measures are proposed and recommended, including use of controlled, top-down hard demolition methods	AUSA House abuts the Site with demolition occurring within a few metres of openable windows on western side of the building. As such, there is very little opportunity for dust emissions to disperse or deposit prior to reaching the building. To mitigate the intensity of dust from demolition activities a range of measures are proposed, including use of controlled, top-down hard demolition methods and	The Information Commons building abuts the Site with demolition occurring within a few metres of the rear western side of the building. However, the façades of the building are enclosed, and air intakes appear to be via the roof. As a result, the intensity of exposure to dust is likely to be low during demolition and minimal during other phases.	The HIWA Recreation Centre abuts the southeastern corner of the Site. While facades of the building are enclosed, demolition will occur within 5 m to 10 m of the ground floor building entrance. This provides little opportunity for dust emissions to disperse or deposit prior to reaching the building. To mitigate the intensity of dust from demolition activities a range of measures are proposed and	The Science Centre is located to the south of the Site, with openable windows within 35 m of building demolition activities, providing a modest opportunity for dust emissions to disperse or deposit prior to reaching the building. To mitigate the intensity of dust from demolition activities a range of measures are proposed and recommended, including use of controlled, top-down	The Albert Park Lodge lies across Princes Street, within 40m of building demolition. This allows a modest opportunity for dust emissions to disperse or deposit prior to reaching the building. To mitigate the intensity of dust from demolition activities a range of measures are proposed and recommended, including use of controlled, top-down hard demolition methods and wet

Factor	General considerations for all receptors	General Library	AUSA House	Kate Edger Info Commons	HIWA Recreation Centre	Science Centre	Albert Park Lodge
	• Tracking: Medium A range of measures are proposed and recommended to mitigate the intensity of dust emissions, as described in Section 6.2. The measures include wet suppression of demolition and vehicle movement activities and use of controlled, top-down hard demolition methods, which will reduce the intensity of emissions from these activities.	and wet suppression measures. With those measures in place, the intensity of exposure to demolition dust is likely to be low at the Library and minimal during other phases of development construction.	wet suppression measures. Additional measures are proposed to mitigate exposure to dust at AUSA House, including use of cut and crane demolition methods for the adjoining interface followed by erection of intervening vertical boundary protection measures. With those measures in place, the intensity of exposure to demolition dust is likely to be low and minimal during other phases of development construction.		recommended, including use of controlled, top-down hard demolition methods and wet suppression measures. With those measures in place, the intensity of exposure to demolition dust is likely to be low and minimal during other phases of development construction.	hard demolition methods and wet suppression measures. With those measures in place, the intensity of exposure to demolition dust is likely to be low at the Science Centre and minimal during other phases of development construction.	suppression measures. With those measures in place, the intensity of exposure to demolition dust is likely to be low and minimal during other phases of development construction.
Offensiveness/ character	The offensiveness of dust relates to its characteristics in relation to visibly soiled surfaces. These characteristics might include colour or texture. The dust generated during demolition is likely to be from concrete and from earthworks and construction dust emissions are likely to be comprised of soil and crustal matter. Both soil and concrete will be light grey or brown in colour, similar to the soils in the area and typical of construction dust. As noted in Section 3, dust from demolition is likely to contain a component of RCS and is likely to be alkaline when exposed to water.						
Location / Sensitivity	As noted in Section 4.1 the Site is located in a mixed-use (City Centre) zone. The area surrounding the Site is highly modified and features a high density of development. The zone provides for a range of uses and is predominantly occupied by educational and recreational facilities.	The multi-storey library building houses library and student services of generally moderate sensitivity to dust exposure.	This two-storey villa is a heritage building, which houses university-related student services and administration activities. Due to the sensitivity of the heritage building material and appearance to dust exposure, AUSA House is considered a high sensitivity receptor to dust exposure.	The multi-storey Information Commons building houses a range of teaching and study areas, student services, retail and administration activities of generally moderate sensitivity to dust exposure. However, the student medical centre present in the building is likely to be of high sensitivity to heath impact of dust exposure.	The multi-storey Hiwa Recreation Centre houses indoor and outdoor recreational activities of generally moderate sensitivity to dust exposure.	The Science Centre features multi-storey buildings housing teaching facilities, laboratories and administration activities of generally moderate sensitivity to dust exposure.	The Albert Park Lodge is a heritage building located within Albert Park. Due to the potential sensitivity of heritage building material and appearance to dust exposure, the sensitivity of the receptor is considered to be high.

6.4 Summary compliance evaluation

Compliance of the discharge of contaminants to air from the proposed demolition and construction activities with the permitted activity standards set out in section E14.6.1.1 'General standards' of AUP Chapter E14 is evaluated in Table 6.5.

Table 6.5: Evaluation of compliance with AUP section E14.6.1.1 permitted activity standards

Number reference	Standard	Compliance evaluation
1	The discharge must not cause, or be likely to cause, adverse effects on human health, property or ecosystems beyond the boundary of the premises where the activity takes place.	**Compliant**: The assessment described in Section 6 indicates that with the adoption of the measures outlined in the draft CAQMP, there is minimal potential for adverse effects on human health, property or ecosystems due to the discharges.
2	The discharge must not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke or ash beyond the boundary of the premises where the activity takes place.	**Compliant**: The assessment described in Section 6 indicates that with the adoption of the measures outlined in the draft CAQMP, dust and particulate matter emitted from the development is unlikely to be noxious, dangerous, offensive or objectionable beyond the Site.
3	There must be no dangerous, offensive or objectionable visible emissions.	**Compliant**: Dangerous, offensive or objectionable visible emissions are unlikely to occur from the proposed development activities.
4	There must be no spray drift or overspray beyond the boundary of the premises where the activity takes place.	**Compliant**: Spray drift is not associated with the Project's activities.

7 Conclusions

The following conclusions are drawn from this assessment of the environmental effects of dust emissions from the demolition and construction activities proposed for the Project:

- Proposed activities have the potential to generate dust/particulate matter emissions. The effects of the predominant coarse fraction of particulate emissions are primarily related to nuisance and soiling effects though components of the emissions also have the potential to cause adverse effects on ecology or human health.
- The Site is located within the UoA Central Auckland Campus. The adjoining areas of the campus feature a high density of development housing education, administration and recreation activities associated with the university and multiple heritage-listed building. The site lies adjacent to Albert Park, featuring outdoor open space and recreation and the adjacent Albert Park Lodge.
- The risk of dust impacts of the proposed activities (without implementation of dust control measures) has been assessed using a method developed by the UK IAQM. Without control measures in place, both the demolition works and vehicle movements over unsealed surfaces are assessed as having a “medium risk” of causing dust soiling effects. The corresponding uncontrolled risk during the earthworks and construction phases is assessed as being “low”. The risk of health and ecological effects (with control measures) is assessed as either being "low" or "negligible".
- The identified uncontrolled dust impact risk levels have been factored into our review of the proposed dust mitigation and monitoring measures. This review has indicated that the proposed mitigation and monitoring regime has been specified to account for the nature of proposed activities and sensitivity of adjoining activities. Further dust mitigation measures are recommended to manage potential dust soiling impacts at adjoining receptors. The assessment indicates that with the recommended measures incorporated, the proposed dust management and monitoring regime will appropriately provide for effective management of dust emissions in the local environmental setting.
- An assessment of potential dust exposure, with the proposed and recommended measures in place, against the FIDOL factors (frequency, intensity, duration, offensiveness/character and locational sensitivity) has indicated that offensive or objectionable dust impacts or adverse effects on human health, property or ecosystems beyond the Site are unlikely to occur.
- Overall, with the proposed dust management regime (including additional measures recommended in Section 6.2) in place the discharges to air from the proposed demolition and construction activities are assessed as being compliant with the permitted standards set out in section E14.6.1.1 of the AUP. The discharges to air are therefore evaluated as being a permitted activity under Activity A1 of Table E14.4.1 of the AUP.

8 References

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9 Applicability

This report has been prepared for the exclusive use of our client, University of Auckland, with respect to the particular brief given to us. It may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that University of Auckland will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel as the consenting authority will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions.

Compliance with the Environment Court Practice Note 2023

I, Jason Pene, confirm that, in my capacity as author of this report, I have read and abided by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses contained in the Practice Note 2023.

I am a Principal Environmental Engineer at Tonkin & Taylor Ltd (T+T), where I specialise in assessment and management of the air quality impacts of discharges to air. I have worked at T+T since 2016. Prior to joining T+T, I was employed in a similar capacity at Beca Ltd.

I have 25 years' experience in air quality assessment and management. I am a Certified Air Quality Professional of the Clean Air Society of Australia and New Zealand. I hold the following qualifications – BE (Hons.) in Chemical and Process Engineering.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
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Appendix A Evaluation of dust mitigation and monitoring against IAQM recommendations

Table A1: Evaluation of dust mitigation and monitoring measures against IAQM mitigation recommendations[1]

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
Communications	*1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.*	H	H	H	Stakeholder engagement addressed in overarching Construction Management Plan
	2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H	To be confirmed in future
	3. Display the head or regional office contact information.	H	H	H	To be confirmed in future
	4. Develop and implement a Dust Management Plan (CAQMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The CAQMP may include monitoring of dust deposition, dust flux, realtime PM10 continuous monitoring and/or visual inspections	D	H	H	Set out in draft in CAQMP
Site Management	*5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.*	H	H	H	Required in CAQMP
	6. Make the complaints log available to the local authority when asked.	H	H	H	Required in CAQMP

[1] IAQM. 2024 "Guidance on the assessment of dust from demolition and construction". Version 2.2. Section 8.2.

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H	H	H	Required in CAQMP
	8. Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	N	N	H	Stakeholder engagement in relation to wider project addressed in CMP
Monitoring	*9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.*	D	D	H	Required in CAQMP
	10. Carry out regular site inspections to monitor compliance with the CAQMP, record inspection results, and make an inspection log available to the local authority when asked.	H	H	H	Required in CAQMP
	11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H	Visual monitoring requirements set out in CAQMP

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	12. Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	H	H	H	Dust monitoring approach focusses on visual methods. Instrumental PM_{10} monitoring of monitoring of dust deposition/flux not proposed.
Preparing and maintaining the site	*13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.*	H	H	H	Required in CAQMP
	14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H	Vertical protection to be installed at boundary with AUSA House duration demolition.
	15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	D	H	H	
	16. Avoid site runoff of water or mud.	H	H	H	N/A to dust emissions
	17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H	Measure unlikely to have discernible impact on dust emissions (value of measure is largely aesthetic)
	18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below	D	H	H	Required in CAQMP
	19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H	Stockpiling likely to be limited at site
Operating vehicle/machinery	*20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.*	H	H	H	N/A – specified requirements are not applicable in NZ

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
and sustainable travel	*21. Ensure all vehicles switch off engines when stationary - no idling vehicles.*	H	H	H	Required under existing CAQMP
	22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery	H	H	H	Use of diesel fired generators will be dictated by availability of sufficient mains supply.
	23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	D	D	H	Speed limits specified in CAQMP
	24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	N	H	N/A
	25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	N	D	H	N/A
Operations	*26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.*	H	H	H	Required in CAQMP
	27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	H	H	H	Mains or tanker supply available
	28. Use enclosed chutes and conveyors and covered skips.	H	H	H	Required in CAQMP
	29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H	Required in CAQMP

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D	H	H	Required in CAQMP
Waste management	*31. Avoid bonfires and burning of waste materials.*	H	H	H	Not proposed
Demolition	*32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).*	D	D	H	Required in CAQMP
	33. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H	H	H	Required in CAQMP
	34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H	Not proposed
	35. Bag and remove any biological debris or damp down such material before demolition.	H	H	H	Contaminated material is to be handled in accordance with the Contamination Site Management Plan
Earthworks	*36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.*	N	D	H	N/A - Basement walls to be stabilised prior to excavation.
	37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	N	D	H	
	38. Only remove the cover in small areas during work and not all at once.	N	D	H	Removal of cover over whole site is likely to occur as a result of demolition phase.

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
Construction	*39. Avoid scabbling (roughening of concrete surfaces) if possible.*	D	D	H	Construction method details to be confirmed
	40. 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 appropriate additional control measures are in place.	D	H	H	Required in CAQMP
	41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	N	D	H	On-site concrete batching not proposed
	42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D	Required in CAQMP
Vehicle track-out	*43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.*	D	H	H	Required in CAQMP
	44. Avoid dry sweeping of large areas.	D	H	H	Suction sweeping required under CAQMP
	45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H	Required in CAQMP
	46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H	Required in CAQMP
	47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H	Required in CAQMP
	48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H	Access will be via hard surfaces during demolition. Hard surfacing of access routes then

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
					unlikely to be practicable until construction commences.
	49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H	Required in CAQMP
	50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H	Likely to be restricted by constrained site area
	51. Access gates to be located at least 10 m from receptors where possible.	N	H	H	To be confirmed in future

***Key to recommendation:**

H: Highly recommended

D: Desirable

N: Not required



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