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Auckland Council

# Ngā Wairau – Stage 1 A F Thomas Park Works

## Indicative Construction Noise and Vibration Assessment

November 2025

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Ngā Wairau - Stage 1 A F Thomas Park – Construction Noise and Vibration

Indicative Construction Noise and Vibration Assessment

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# 1 INTRODUCTION

Auckland Council's Healthy Waters and Flood Resilience Department (Healthy Waters) is lodging a referral application to increase flood storage at A F Thomas Park, Wairau Valley under the Fast-track Approvals Act 2024.

The project broadly involves:

- a) Flood resilience infrastructure works; and
- b) Reserve reinstatement, including site stabilisation, landscaping, new footpaths/boardwalks, and formal and informal recreation.

This memorandum provides a high-level construction noise and vibration assessment of the proposal.

The following information has been used to inform the assessment:

- Concept Design Option titled “*A F Thomas Park Concept Design Option V0.1*”, prepared by WSP, dated 1 October 2025.
- Indicative Construction Methodology titled “*Indicative Construction Methodology - Ngā Wairau - Stage 1 A F Thomas Park*”, prepared by WSP, dated 2 October 2025.

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## 1.1 PROJECT DESCRIPTION

The Ngā Wairau project is part of Auckland Council's Making Space for Water – Blue-green Network programme and is focused on the key areas within the Wairau catchment that were impacted by the 2023 storm events. Given the large scale of the Wairau catchment, the Ngā Wairau project is being delivered in three stages. This proposal covers Stage 1, which involves increasing the existing flood storage at A F Thomas Park, together with reserve reinstatement. The stormwater detention capacity created through Stage 1 works is critical to enabling future Stages 2 and 3. Further design development and funding confirmation is required for Stages 2 and 3, and they therefore do not form part of this proposal.

The works proposed under Stage 1 enable the delivery of flood resilience in the catchment by increasing flood storage within A F Thomas Park, initially for the downstream residential area, and undertaking additional stormwater improvement works.

The proposed works to increase flood storage at A F Thomas Park include the following:

- Excavate the park to increase the existing flood storage to reduce flood flows and flood levels. Formalisation of a wetland on the northern end of the park where water naturally ponds as a result of the works and dry detention in other areas of the park. At this stage the earthworks on the site are indicatively estimated to be in the order of 700,000m<sup>3</sup> – 800,000m<sup>3</sup> (cut and fill) to achieve a flood storage volume of approximately 550,000m<sup>3</sup>. All excavated material is to remain onsite unless unsuitable.
- The proposed flood storage changes will amend the consented dam. At this stage, the proposed changes may include reducing the dam height, increasing the flood storage capacity and providing an additional spillway.
- Construct a new spillway channel linking the existing channel north of A F Thomas Park that flows east under State Highway 1 to A F Thomas Park to optimise storage and release of flood flows in the park to maximise benefits.
- Reshaping ground using cut material to convey flood flows between proposed raise areas.

- Vegetation removal is required to facilitate the works.
- A temporary construction laydown area will be established on-site (location TBC).
- Reinstatement of A F Thomas Park and constructing new multi-use maintenance accessways.

The technical parameters provided above are indicative, as design is ongoing. The referral is sought on the basis of the broader project description provided above (i.e. (a) flood resilience infrastructure works and (b) reserve reinstatement, including site stabilisation, landscaping, new footpaths/boardwalks, and formal and informal recreation), with final design specifications and precise quantities to follow in the substantive application.

## 1.2 PROJECT AREA

The project boundary is outlined in Figure 1-1 below; the red line is the project boundary and the parcels that make up the project area are shown with yellow lines and associated numbering.



Figure 1-1. Project Area Plan

The Cut and Fill Plan for the project indicates the anticipated earthworks and is presented in Figure 1-2.

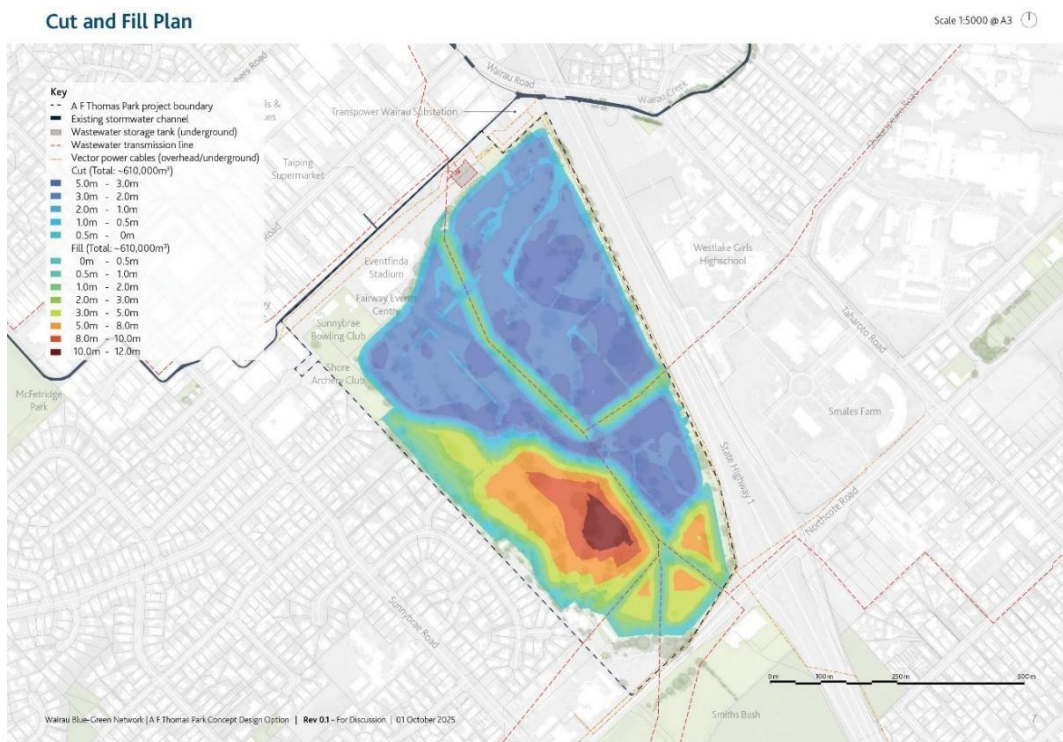


Figure 1-2. Project Cut and Fill Plan

### 1.3 CONSTRUCTION PERIOD AND WORKING HOURS

The works are scheduled to commence in September 2027 to coincide with the earthworks season (October to March).

A high-level construction programme has been prepared, and the total construction period is anticipated to be 27 months. The construction activities will be separated into the following work stages:

- Site preparation for works commencement
- Flood mitigation works
- Reinstatement works.

Based on the information available at this stage, it is understood that works will occur during the daytime only (7:30am - 6:00pm) from Monday to Saturday.

De-watering is understood to be required; this is assumed to be during daytime working hours only.

### 1.4 NOISE AND VIBRATION CATCHMENT AREAS

Figure 1-3 indicates the nearest noise and vibration sensitive receptors adjacent to the construction area works. At this stage, receptors have been grouped as Noise and Vibration Catchment Areas (NVCAs). describes the NVCA zonings and usages.



Figure 1-3. NVCA Locations

Table 1-1. NVCA Zonings and Usage

Identifier	Auckland Unitary Plan (AUP) Operative Zoning	Description
<b>NVCA 1</b>	Business – Light Industry Zone, Special Purpose - Major Recreation Facility Zone	Business zone consists of retail businesses, automotives and mechanics locations, café and recreation areas (pool billiard club), and a daycare. A special purpose major recreation facility zone is located closest to the construction site within the NVCA, including a stadium, and several recreation activity clubs.
<b>NVCA 2</b>	Residential – Single House Zone, Residential – Mixed House Suburban Zone Residential – Mixed Housing Urban Zone	Consists of residential housing overlooking the construction site area. There are commercial buildings within the eastern part of the area.
<b>NVCA 3</b>	Open Space - Sport and Active Recreation Zone	Consists of recreational park and bush area. There are also various sports club headquarters and grounds also located within the area.
<b>NVCA 4</b>	Residential - Mixed Housing Urban Zone	Consists of residential housing, and an intermediate school, with sports field located closest to the construction site within the area. There is also a park reserve and a language centre.
<b>NVCA 5</b>	Business - Business Park Zone	Consists of commercial buildings, including supermarkets and retail stores, fast food restaurants, and multiple company premises.
<b>NVCA 6</b>	Residential - Mixed Housing Urban Zone	Westlake Girls' and Boys' High Schools are located here. Residential housing is also located within the area.

**Note: NVCA zonings have been based on the operative zones they are situated in within the AUP.**

## 2 ACOUSTIC CRITERIA

### 2.1 CONSTRUCTION NOISE

Table 2-1 presents the construction noise criteria from standard E25.6.27 in the AUP that apply, based on a total construction duration of greater than 20 weeks. These limits apply when measured one metre from the façade of a noise sensitive building.

Table 2-1. Project Construction Noise Criteria

Time of Week	Time Period	Noise Limit (dBA)	
		L <sub>eq</sub>	L <sub>max</sub>
<b>Weekdays</b>	6:30am - 7:30am	55	70
	7:30am - 6:00pm	70	85
	6:00pm - 8:00pm	65	80
	8:00pm - 6:30am	40	70
<b>Saturdays</b>	6:30am - 7:30am	40	70
	7:30am - 6:00pm	70	85
	6:00pm - 8:00pm	40	70
	8:00pm - 6:30am	40	70
<b>Sundays and public holidays</b>	6:30am - 7:30am	40	70
	7:30am - 6:00pm	50	80
	6:00pm - 8:00pm	40	70
	8:00pm - 6:30am	40	70

### 2.2 CONSTRUCTION VIBRATION

Table 2-2 to Table 2-4 presents the AUP construction vibration criteria as per *DIN 4150*<sup>1</sup> (relating to minor damage effects) and AUP standard E25.6.30 (relating to amenity effects) respectively.

It is noted that the nature of vibration sources will determine whether long-term or short-term criteria are adopted for the project, and as such both limits are provided below.

These limits apply in any axis, measured in the corner of the floor of interest for multi-storey buildings, or within 500 mm of ground level at the foundation of a single-storey building.

<sup>1</sup> DIN 4150-3:2016-12 Vibrations in buildings – Part 3: Effects on structures  
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Table 2-2. DIN 4150-3 Long-Term Guideline Vibration Limits

Line	Type of Building	Guideline values for velocity <sub>i,max</sub> in mm/s, of vibration in the horizontal plane of the highest floor, at all frequencies.
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design.	10
2	Dwellings and buildings of similar design and/or use.	5
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic values (e.g., buildings under a preservation order).	2.5

Table 2-3. DIN 4150 Short Guideline Vibration Limits

Column / line	Type of structure	Guideline values for v <sub>i,max</sub> in mm/s				
		Foundation, in all directions, at a frequency of			Topmost floor horizontal direction	Floor slabs, vertical direction
		1 – 10 Hz	10 – 50 Hz	50 – 100 Hz <sup>a</sup>	All frequencies	All frequencies
	1	2	3	4	5	6
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under line 1 and 2 <b>and</b> are of great intrinsic value (e.g. listed buildings)	3	3 to 8	8 to 10	8	20 <sup>b</sup>

<sup>a</sup> At frequencies above 100 Hz, the guideline values for 100 Hz can be applied as minimum values.

<sup>b</sup> Paragraph 2 of 5.1.2 shall be observed (~ In case of building types as in Table 1, line 3, it may be necessary to lower the relevant guideline value markedly to prevent minor damage.).

Table 2-4. AUP Vibration Limits in Buildings (Amenity Effects)

Receiver	Period	Peak Particle Velocity (PPV) Limit, mm/s
Occupied activity sensitive to noise	Night-time 10pm to 7am	0.3
	Daytime 7am to 10pm	2.0
Other occupied buildings	At all times	2.0

# 3 ASSESSMENT METHODOLOGY

At this referral application stage, a qualitative risk assessment has been undertaken based on the indicative construction methodology that has been provided. Thus, a risk-based approach has been adopted to summarise potential noise effects at NVCAs during construction.

Risk gradings have been assigned to NVCAs based on qualitative low, moderate or high risk; this is based on their respective location to the construction site, and sensitivity of the receiving zones. Higher risk bands are likely to require increasing levels of acoustic mitigation during construction.

## 3.1 CONSTRUCTION ACTIVITIES AND EQUIPMENT

A list of indicative construction equipment has been prepared based on the information provided at this stage, including approximate setback distances to achieve the noise and vibration limits. It is noted that the equipment list is not exhaustive and may be updated at a later stage.

Table 3-1 provides the sound level for each item of equipment has been estimated from BS 5228<sup>2</sup> or from measured data. Setback distances are provided to achieve the daytime noise limit as detailed in the working hours section above (70 dB L<sub>Aeq(T)</sub> and 85 dB L<sub>Amax</sub>).

Table 3-1. Indicative Construction Equipment Noise Source Levels and Setback Distances

Equipment	Sound Power Level (dB L <sub>WA</sub> )	Setback Distances (m) to meet criteria	
		Mon – Sat daytime 7:30 am – 6:00 pm	
		70 dB L <sub>Aeq,T</sub>	85 dB L <sub>AFmax</sub>
5T Excavator	99	17	3
10-30T Excavator	104	30	5
30-40T Excavator	107	42	8
6" pump	93	8	1
Bulldozer	111	67	12
Chainsaw	113	84	15
Grader	112	75	13
Loader (7T)	97	13	2
Pile Driver (Impact)	118	150	27
Plate Compactor	108	47	8
Rock breaker excavator attachment	121	212	38
Scraper	108	47	8
Six-wheeler tip truck	102	24	4
Tractors and Disks (towing)	108	47	8

<sup>2</sup> British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise  
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Equipment	Sound Power Level (dB L <sub>WA</sub> )	Setback Distances (m) to meet criteria	
		Mon – Sat daytime 7:30 am – 6:00 pm	
		70 dB L <sub>Aeq,T</sub>	85 dB L <sub>AFmax</sub>
Roller (Vibratory)	105	34	6
Watercart	106	38	7

The calculation of these setback distances follows methods in *Annex D* of NZS 6803<sup>3</sup>, and considers:

- Equipment sound power.
- Distance loss.
- Equipment operating at 100% capacity.
- Receiver façade correction (+3 dB).

Table 3-2 lists indicative vibration generating equipment assumed to be used on the site. The vibration level for each item of equipment has been assumed from BS 5228<sup>4</sup> or from measured data. It also lists the setback distances required for compliance with the vibration criterion.

Table 3-2. Indicative Construction Equipment Vibration Source Levels and Setback Distances

Equipment	Vibration Level of Equipment at 10 m (mm/s PPV)	Setback Distance to Achieve Vibration Criteria (Metres)			
		10 mm/s	5 mm/s	2 mm/s*	0.3 mm/s**
Excavator breaking ground	1.8	1	2	9	75
Plate Compactor	2.5	1	3	15	100
Vibratory compaction roller	7	6	17	55	175
Bulldozer (23T)	3.8	2	6	26	125
Piling (to be confirmed)	Piling is noted to be a high-risk activity, specific methodology and setback distances to be determined at later stage				
<b>*AUP daytime vibration amenity limit</b>					
<b>**AUP nighttime vibration amenity limit</b>					

Where the source vibration level changes, or ground conditions are understood in more detail, the level of vibration and setback distance may also change.

It is understood that blasting may also occur during the project construction. Determining accurate ground borne air blast levels has complexities such as the non-linear blasting process and variability of rock types, and the inputs to these variables are unknown at this stage. Therefore, rock blasting is highlighted as a high-risk activity for noise and vibration, and predictions should be undertaken during the detailed Construction Noise and Vibration Assessment for this activity.

<sup>3</sup> New Zealand Standard NZS 6803:1999 Acoustics – Construction Noise

<sup>4</sup> British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise  
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## 3.2 ASSUMPTIONS

The following list of assumptions and limitations apply:

- Construction equipment is assumed to propagate sound with point source characteristics. We have not considered moving sources or haul roads at this stage due to lack of detailed information at this stage.
- The vibration setback distances have been predicted using the Waka Kotahi NZ Transport Agency State Highway Construction and Maintenance Noise Vibration Guide (version 1.1, dated August 2019), assuming competent soil conditions (sandy clays, silty clays, gravel, silts) as per the guidance in the NZTA document.
- The predicted setback distances do not account for screening by intervening terrain or buildings. Where screening occurs, the setback distances, and the number of receptors affected by noise may change.
- There is always a level of uncertainty in predicting noise from construction activities. Numerous variables including variations in the specific models of equipment, the exact location of each item on site, and how the operator uses the equipment, will affect the accuracy of the noise outcomes provided (like setback distances or risk gradings).

# 4 RISK ASSESSMENT

The NVCA's have been categorised by risk gradings and are presented in Table 4-1.

Table 4-1. NVCA Risk Gradings

NVCA Identifier	Risk Grading	Key Factors
<b>NVCA 1</b>	Low	<ul style="list-style-type: none"> <li>— Situated within business, light industry and recreation facility zones. Features commercial and industrial buildings.</li> <li>— Baseline noise levels in this area may already be elevated due to existing operation (e.g. mechanics / automotive store).</li> <li>— There is likely to be a low number of receivers in the business light industry zone that undertake noise and vibration sensitive activities.</li> <li>— Buildings within the recreation facility zone are adjacent to construction works and may be within the setback distances of equipment. The stadium may require special consideration and should follow a communication protocol to effectively control the effects of noise and vibration from the construction site.</li> </ul>
<b>NVCA 2</b>	High	<ul style="list-style-type: none"> <li>— Situated within residential zones (Single House Zone, Mixed Housing Suburban Zone) and includes residential properties.</li> <li>— Located directly adjacent to the construction works area within the noise and vibration setback distances of proposed equipment.</li> <li>— Acoustic mitigation is likely to be required for this area (see discussion of examples of potential mitigation below) and a communication and engagement protocol will be required.</li> </ul>
<b>NVCA 3</b>	Low	<ul style="list-style-type: none"> <li>— Situated within an open space zone. Features commercial buildings, but most of the area is park space.</li> <li>— A main road separates the NVCA from the construction site. This main road will produce road traffic noise, which may reduce / mask the perceived effects of noise from the site.</li> <li>— There is likely to be a low number of receivers in the zone that undertake noise and vibration sensitive activities.</li> </ul>
<b>NVCA 4</b>	Moderate	<ul style="list-style-type: none"> <li>— Situated within a residential zone. Features residential dwellings on the far sides of the NVCA. Closer to the site is the intermediate school.</li> <li>— A main road, highway, and their intersection separates the NVCA from the construction site. These roads will produce road traffic noise, which may reduce / mask the perceived effects of noise from the site.</li> <li>— There are many receivers in the zone that undertake noise sensitive activities, but the road traffic noise is likely to screen most earthworks construction noise effects during the daytime.</li> </ul>
<b>NVCA 5</b>	Low	<ul style="list-style-type: none"> <li>— Situated within a business zone which includes commercial buildings.</li> <li>— A highway separates the NVCA from the construction site. This road will produce road traffic noise, which may reduce / mask the perceived effects of noise from the site.</li> <li>— There is likely to be a low number of receivers within the zone that undertake noise and vibration sensitive activities.</li> </ul>

NVCA Identifier	Risk Grading	Key Factors
NVCA 6	Moderate	<ul style="list-style-type: none"> <li data-bbox="453 282 1369 338">— Situated within a residential zone. Features residential dwellings and includes two schools.</li> <li data-bbox="453 360 1417 416">— A highway separates the NVCA from the construction site. This road will produce road traffic noise, which may reduce / mask the perceived effects of noise from the site.</li> <li data-bbox="453 439 1430 515">— There are many receivers within the zone that undertake noise sensitive activities, but the road traffic noise is likely to mask most earthworks construction noise effects during the daytime.</li> </ul>

## 4.1 HIGH RISK ACTIVITIES

In addition to assessing the sensitivity of receiving NVCAs, we have also highlighted the key high-risk noise producing activities which include:

- **Piling** for footbridge construction (if required).
- **Bulldozing** for earthworks cut and fill.
- **Chainsaw** for vegetation clearance.
- **Rock breaking** and isolated blasting may occur but will be avoided through design where possible.

These activities may produce high levels of noise at receptors, and feature setback distances of 67 m to 212 m. Specific mitigation of these activities may include low noise chemical rock breaking (if required), limiting the size and operation of equipment, permitting certain items of equipment in certain areas for the majority of works, acoustic barriers, amongst other managerial measures.

# 5 CONCLUSION

Auckland Council has engaged WSP to assess the noise and vibration associated with the proposed Ngā Wairau – Stage 1 A F Thomas Park works.

This memorandum defines daytime acoustic criteria and allocates key groups of receptors as Noise and Vibration Catchment Areas (NVCAs) and assigns them risk gradings that consider receptor sensitivity, and setback distances of key noise and vibration generating equipment.

The risk gradings for the NVCAs are as follows:

- NVCA 1: Low
- NVCA 2: High
- NVCA 3: Low
- NVCA 4: Moderate
- NVCA 5: Low
- NVCA 6: Moderate

Furthermore, there are likely to be some high-risk noise producing activities as part of the works that include piling, bulldozing, chainsaw operation, and isolated rock breaking/blasting (if required).

It is recommended that a full Construction Noise and Vibration Assessment be undertaken during the substantive application stage, to assess the noise and vibration from the works, and a Construction Noise and Vibration Management Plan is developed to mitigate the likely noise and vibration effects.

Construction noise and vibration effects can generally be effectively managed and mitigated through implementation of a suitable Construction Noise and Vibration Management, subject to the findings of the detailed assessment. Construction Noise and Vibration management measures must be followed by the selected Contractor through the lifetime of the project.

## 6 USE AND RELIANCE

1. This report ('Report') has been prepared by WSP New Zealand Limited ('WSP') for Auckland Council ('Client') in relation to the Fast-track Referral Application Ngāa Wairau - Stage 1 A F Thomas Park Works and in accordance with the terms of the agreement between WSP and Client. The Report relates to the project and scope set out in the Report and the stated purpose for which it was prepared. Subject to clause 2 below, the Report is not to be used or relied on for any other project or purpose, or by any person other than our client, without WSP's prior written agreement. WSP does not accept liability for any unauthorised use or reliance.
2. WSP acknowledge and agree that this Report may be used and relied on by the Minister deciding on the Fast-track Referral Application under section 21 of the Fast-track Approvals Act 2024, and by any expert consenting panel appointed under that Act to determine a subsequent substantive application.
3. In preparing this Report, WSP has relied upon data, surveys, analyses, designs, plans and other information ('Client Data') provided by or on behalf of the Client. Except as otherwise stated in this Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or part on the Client Data, those conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable for any incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.