



ASSESSMENT OF NOISE AND VIBRATION EFFECTS

STRUCTURE PLAN AND PLAN CHANGE REQUEST
KARAKA ROAD, DRURY WEST

PREPARED FOR
Fisher & Paykel Healthcare Properties Limited

DATE
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Acoustic assessment prepared by Styles Group for Fisher & Paykel Healthcare Properties Limited.

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Table of contents

1.0	Introduction	1
2.0	The proposed LIZ zoning	1
2.1	The permitted noise environment inside the LIZ	2
3.0	The Site and surrounding environment	3
3.1	The future zoning arrangements surrounding the Site	5
4.0	Noise effects from the proposed rezoning.....	6
4.1	The existing noise environment (FUZ to Rural/FUZ)	7
4.2	The proposed noise environment (LIZ to Rural/FUZ)	7
4.3	The potential future noise environment (LIZ to Residential)	8
4.4	Change in permitted noise standards	8
4.5	Noise levels received in the Special Purpose School Zone	10
4.6	The need for any specific precinct controls to manage noise effects from the Site	11
5.0	Noise and vibration effects from transport infrastructure	12
5.1	Noise and vibration effects from State Highway 22	13
5.1.2	Road-traffic noise effects	14
5.1.3	Recommendations to manage noise from road traffic	14
5.1.4	Recommendations to manage vibration from road-traffic on SH22	15
5.2	Noise and vibration effects from the NIMT	15
5.2.1	Rail noise effects from the NIMT	16
5.2.2	Rail vibration effects	16
6.0	Summary.....	17
6.1	Recommendations for the Precinct chapter	18

1.0 Introduction

Fisher & Paykel Healthcare Properties Limited (**FPH**) is proposing a Structure Plan and Private Plan Change (**Plan Change**) for the land at 300, 328, 350, 370 and part of 458 Karaka Road, Drury (the **Site**).

The Structure Plan is being prepared for the entire Site as an addendum to the Auckland Council Drury-Opāheke Structure Plan 2019 (the **2019 Structure Plan**). The addendum will replace the 2019 Structure Plan for the Drury West area.

The Plan Change relates to the part of the Site that is currently in the Future Urban Zone (**FUZ**) of the Auckland Unitary Plan- Operative in Part (**AUP**). The Plan Change proposes a Business - Light Industry Zone (**LIZ**) across the Plan Change Site.

The Plan Change will establish a new precinct to recognise and provide for the specific land use activities associated with FPH. The precinct standards will be used to specify any variation from the provisions that would otherwise apply to the Plan Change Site through the AUP LIZ Chapter and Auckland-wide provisions.

FPH has engaged Styles Group to assess the noise and vibration effects from the proposal and to provide preliminary recommendations to inform the development of the Structure Plan and Precinct standards.

This report includes:

- i. An assessment of the actual and potential noise effects of the proposed zoning arrangements on the existing and potential future zoning arrangements on the land adjacent to the Plan Change Site;
- ii. An assessment of the actual and potential noise and vibration effects on the Plan Change Site from adjacent transport corridors, including State Highway 22 (**SH22**) and the North Island Main Trunk railway line (the **NIMT**).

2.0 The proposed LIZ zoning

The Plan Change proposes a LIZ zoning across the Plan Change Site to enable the development of a new research and development and manufacturing campus for FPH.

We understand that the business activities associated with the FPH campus development can generally be characterised as:

- Research and development
- Office activity
- Light manufacturing
- Food and beverage retail to service the FPH campus

- Warehousing and logistics
- Distribution centres

The primary operational noise sources associated with the proposed FPH campus activities are likely to include external mechanical plant for air handling (predominantly rooftop), process water cooling and vehicle noise on internal roads and car parks.

2.1 The permitted noise environment inside the LIZ

Chapter H17.1 of the AUP describes the purpose of the LIZ as follows:

The Business – Light Industry Zone anticipates industrial activities that do not generate objectionable odour, dust or noise. This includes manufacturing, production, logistics, storage, transport and distribution activities. The anticipated level of amenity is lower than the centres zones, Business – General Business Zone and Business – Mixed Use Zone. Due to the industrial nature of the zone, activities sensitive to air discharges are generally not provided for.

Table J1.3.3 *Industry* of the AUP includes the following land use activities in the ‘industry’ nesting table:

- Industrial activities
- Freight depots
- Industrial laboratories
- Manufacturing, including light manufacturing and servicing
- Repair and maintenance services
- Waste management facilities, including refuse transfer stations and recycling facilities
- Rail siding
- Bus depots
- Storage and lock up facilities
- Wholesalers

The *Light Industry Zone* activity table in H17.4 of the AUP permits industrial activities (defined above), in addition to specific retail and commercial activities. The permitted activities in H17.4 include a range of industrial activities that have potential to generate high noise levels on a 24/7 basis.

The permitted noise environment inside the LIZ is designed to enable light industrial activities to operate efficiently and effectively. The permitted land uses in H17.4.1 are designed to be compatible activities in the context of a noise environment where noise levels up to 65 dB L_{Aeq}

are permitted at all times. Activities Sensitive to Noise¹ (**ASN**) are generally precluded in the LIZ, with the exceptions of:

- i. “a tertiary education facility that is accessory to an industrial activity on the site”
- ii. “Workers’ accommodation, one per site”.

We understand that FPH does not seek to authorise the introduction of ASN on the Site and therefore the restrictions on ASN in the LIZ align with the proposal.

Chapter E25 of the AUP enables noise levels of 65 dB L_{Aeq} at any time² inside the LIZ, while also requiring LIZ activities to operate in a way that complies with the permitted zone interface noise limits³ where the noise is received in other adjacent zones. The interface noise standards are set out in Section 4.0.

3.0 The Site and surrounding environment

The Site is bounded by SH22 to the north, Oira Creek to the west and the NIMT rail line to the south.

Figure 1 displays the split zoning arrangements across the Site under the operative zoning arrangements. The land on the eastern side of Woodlyn Drive is in the FUZ and the land to the west is in the Rural- Mixed Rural Zone.

The Plan Change relates to the area of the Site that is currently zoned FUZ.

¹ Defined in Chapter J1 of the AUP as “Any dwelling, visitor accommodation, boarding house, marae, papakāinga, integrated residential development, retirement village, supported residential care, care centres, lecture theatres in tertiary education facilities, classrooms in education facilities and healthcare facilities with an overnight stay facility.”

² When measured and assessed at any other site in the LIZ

³ Including Standard E25.6.19 which is designed to ensure that the noise levels from activities in business zones (such as the LIZ) are compatible with non-acoustically treated dwellings in Rural or Residential Zones located near to the business zone interface.

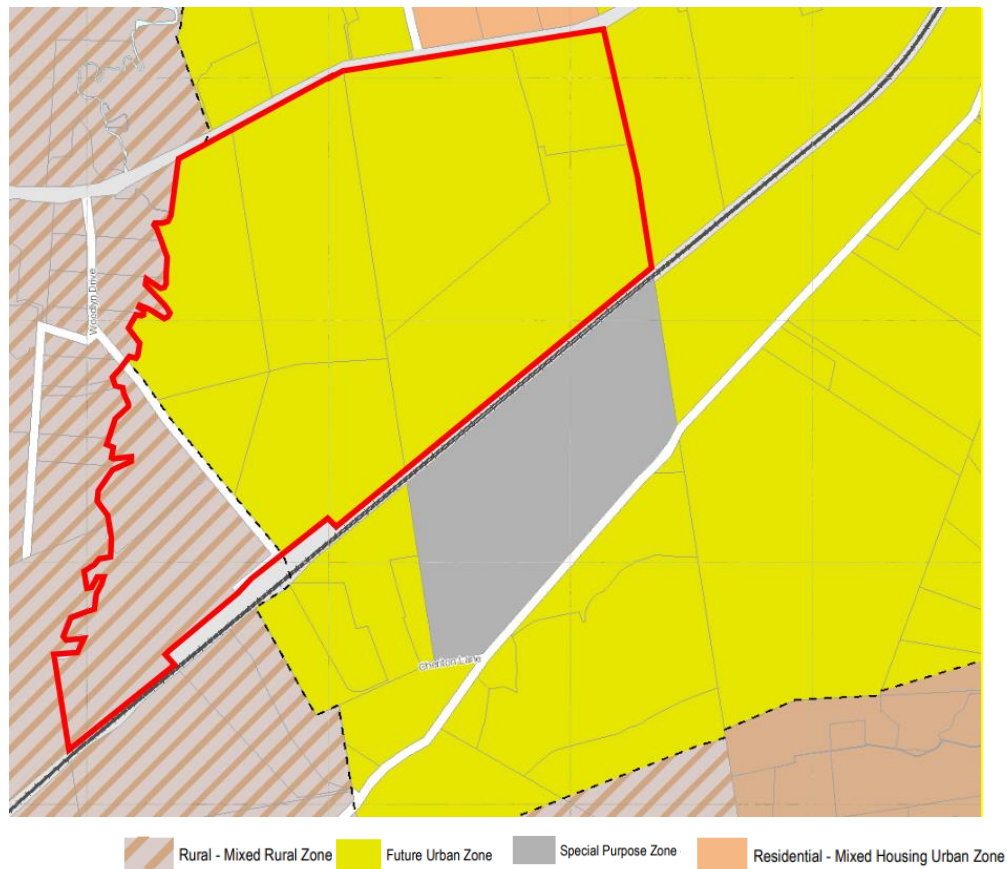


Figure 1 The overall Site and Structure Plan area

Figure 1 also displays the zoning arrangements surrounding the Site. The land to the west and north-west of the Site is zoned Rural- Mixed Rural (**Rural Zone**). All other land is zoned FUZ, except for the Special Purpose – School Zone (**SPSZ**) to the south of the Site and the Residential Mixed Housing Urban Zone to the north of the Site.

We understand that the AUP authorises one residential dwelling per site in the FUZ or Rural Zone. Figure 2 displays the existing low density land use on the land surrounding the Structure Plan Site. Existing residential dwellings are primarily consolidated along Woodlyn Drive to the west of the Site and along the Karaka Road corridor.



Figure 2 Land use activity surrounding the Structure Plan Site

3.1 The future zoning arrangements surrounding the Site

The Site is located in the context of a dynamic transitional zoning environment. The 2019 Structure Plan contemplates the transformation of Drury's FUZ zoned land into an urban environment that will accommodate future population growth and employment.

This advice considers whether the proposed zoning arrangements on the Plan Change Site will be compatible with the proposed zoning arrangements surrounding the Site, in addition to any noise or vibration effects from the existing and planned infrastructure upgrades adjacent to the Site.

Figure 3 displays the proposed zoning arrangements surrounding the Site according to the 2019 Structure Plan. SH22 runs along the northern boundary of the Site, and the NIMT adjoining the southern boundary of the Site. The Structure Plan contemplates:

- A Residential Mixed Housing Urban Zone to the north of SH22⁴ and to the south of the NIMT corridor
- The Terraced Housing and Apartment Buildings (**THAB**) Zone to the east of the Site

⁴ This is part of the Operative AUP.

- The SPSZ to the south of the Site, on the southern side of the NIMT⁵.

This advice assumes that the land surrounding the Site will be developed and occupied by Residential Zones that permit ASN at much greater densities than currently permitted by the current FUZ provisions.

A future THAB rezoning of the land to the east of the Site would provide for high-density residential land-use. The noise standards for the THAB zone are the same as those applying to all other residential zones and do not require dwellings to be acoustically treated in any way.

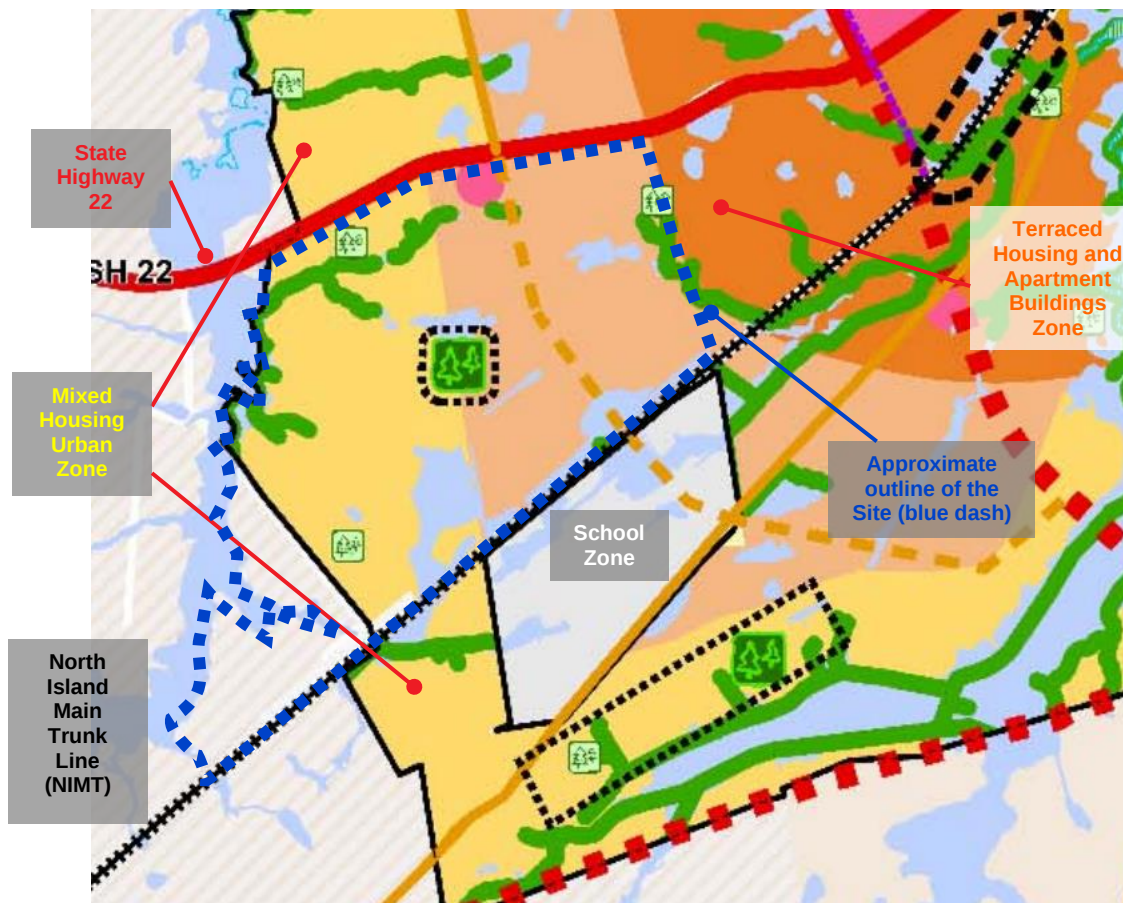


Figure 3 Auckland Council Drury – Opāheke Structure Plan 2019 map

Sourced from: <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/place-based-plans/>

4.0 Noise effects from the proposed rezoning

Chapter E25 of the AUP prescribes permitted noise standards to control the level of noise that may be generated between sites that are in the same zone and between zoning interfaces.

⁵ The Special Purpose School Zone is part of the operative zoning arrangements (shown On Figure 1).

The business zone interface noise standards in Chapter E25 control the maximum permitted noise levels that can be generated from activities in business zones (such as the LIZ) and received in Residential or Rural Zones. The business zone interface noise standards are designed to ensure that the noise levels from activities in business zones are compatible with non-acoustically treated dwellings in Residential and Rural Zones that are near to them.

We have compared the noise levels that are permitted to be generated from the Plan Change Site and received at neighbouring FUZ and Rural- Mixed Rural sites under the current zoning arrangements, to the noise levels that would be permitted if the Site is zoned LIZ. We also consider the noise levels that are permitted to be generated from the Site if the neighbouring land is zoned Residential in the future.

4.1 The existing noise environment (FUZ to Rural/FUZ)

Under the operative zoning arrangements, noise levels generated from the Plan Change Site (in the FUZ) and received at the notional boundary of any other adjacent site in the Mixed Rural or FUZ Zones are controlled by E25.6.3 *Noise levels in rural and future urban zones*.

Table E25.6.3.1 prescribes the following noise limits for noise generated from a Site within the FUZ and received at the notional boundary on any other site in the Mixed Rural or Future Urban zone:

Table E25.6.3.1 Noise levels in the Rural – Mixed Rural Zone, Rural – Rural Production Zone, Rural – Rural Coastal Zone or the Future Urban Zone

Time	Noise level
Monday to Saturday 7am-10pm	55dB L _{Aeq}
Sunday 9am-6pm	
All other times	45dB L _{Aeq} 75dB L _{AFmax}

4.2 The proposed noise environment (LIZ to Rural/FUZ)

Under the proposed zoning arrangements, noise levels generated from the Plan Change Site (LIZ) and received at adjacent sites in the Rural or FUZ zones will be controlled by Standard E25.6.19 *Business Zones interface*.

The business zone interface noise standards in Standard E25.6.19 of the AUP are designed to protect non-acoustically treated ASN in Rural and Residential Zones from noise levels generated in nearby business zones.

Standard E25.6.19 will require that the LIZ activities⁶ inside the Plan Change Site must operate in compliance with the following noise limits in Table E25.6.19.1 when measured and assessed at the notional boundary of a dwelling in a Rural or FUZ Zone:

Table E25.6.19.1 Noise levels at the business zone interface

Time	Noise level
Monday to Saturday 7am-10pm	55dB L _{Aeq}
Sunday 9am-6pm	
All other times	45dB L _{Aeq} 60dB L _{eq} at 63 Hz 55dB L _{eq} at 125 Hz 75dB L _{AFmax}

4.3 The potential future noise environment (LIZ to Residential)

We understand that the 2019 Structure Plan contemplates potential future Residential zoning arrangements on the adjacent land⁷ surrounding the Plan Change Site.

Standard E25.6.19 *Business Zones interface* (set out above) will also control the noise levels from the Plan Change Site (LIZ) and received at any Residential Zone that is established adjacent to the Plan Change Site.

As set out above, the maximum permitted noise levels in Standard E25.6.19 are designed to protect non-acoustically treated ASN in Residential Zones from noise generated in business zones. The maximum permitted noise levels are designed to deliver an adequately level of residential amenity during the daytime and nighttime periods.

4.4 Change in permitted noise standards

The noise levels that are permitted to be generated from the Plan Change Site and received at the adjacent sites under the operative, proposed and potential future zoning arrangements are very similar and are summarised in the following table.

⁶ Standard E25.6.5 will enable the LIZ activities to generate noise levels of 65 dB L_{Aeq} at any time, when measured and assessed at any other site within the Plan Change Site that is also zoned LIZ, provided that Standard E25.6.19 is complied with at all times.

⁷ We understand that KiwiRail's designation for a transport interchange over the land that the Structure Plan proposes as a future THAB zone has recently been confirmed.

Table 1 Summary of change in permitted noise environment

Scenario	Zoning of Plan Change Site	Zoning of adjacent land receiving noise from the Plan Change Site	Assessment location for noise	Relevant AUP Standard	Noise limits (daytime nighttime)
Existing	FUZ	FUZ and Rural	Notional Boundary ⁸ of any dwelling	E25.6.3 <i>Noise levels in rural and future urban zones</i>	55 dB LAeq 45 dB LAeq and 75 dB LAfmax
Proposed	LIZ	FUZ and Rural	Notional boundary of any dwelling	E25.6.19 <i>Business Zones Interface</i>	55 dB LAeq 45 dB LAeq and 75 dB LAfmax and low frequency controls ⁹
Potential future	LIZ	Residential	Within the boundary of a site in a residential zone	E25.6.19 <i>Business Zones Interface</i>	55 dB LAeq 45 dB LAeq and 75 dB LAfmax and low frequency controls

Standard E25.6.3¹⁰ and Standard E25.6.19¹¹ both require compliance with the same numerical noise limits during the daytime and nighttime periods when measured and assessed at any notional boundary in a Rural or Future Urban Zone or the boundary of a site in a Residential Zone.

The only difference between the ‘existing’ and both ‘proposed’ scenarios is that a proposed LIZ rezoning would introduce the requirement for future LIZ activities on the Plan Change Site to also meet low frequency noise limits applying at “all other times” in Standard E25.6.19. The low frequency noise limits that apply during the night time period in Standard E25.6.19 are

⁸ A line 20m from any side of a building containing an activity sensitive to noise, or the legal boundary where this is closer to the building

⁹ Low frequency noise limits of 65dB Leq at 63 Hz and 60dB Leq at 125 Hz.

¹⁰ This standard controls the noise levels generated from any activity in a Rural Zone or Future Urban Zone and received at any notional boundary of a dwelling in a Rural Zone or Future Urban Zone.

¹¹ This standard controls the noise levels generated from any activity in the Light Industry Zone and received at the boundary of a site in a Residential Zone or notional boundary of a dwelling in a Rural Zone.

designed to protect adjacent zones containing ASN from potential low frequency sound generated from business activities.

Otherwise, the change from FUZ to LIZ will result in the same fundamental noise limits applying to the noise that is permitted to be generated from the Plan Change Site and received on neighbouring Rural or Residential land. The requirement in Standard E25.6.19 to meet low frequency noise limits at night would result in slightly better control of noise emissions to noise sensitive receivers in adjacent Residential or Rural Zones.

If the adjacent land is upzoned from Rural or FUZ to Residential, the assessment location for noise will change from the “notional boundary” of any ASN, to the boundary of any site in a Residential Zone. The introduction of a Residential Zone interface at the perimeter of the Plan Change Site is likely to introduce noise compliance locations that are much closer than the noise compliance locations established by the notional boundaries that form part of the existing environment.

It may therefore be helpful for the precinct chapter to recognise that the land surrounding the Site may be developed for a range of noise sensitive zones, and the need for the campus activities to be located, designed and operated in a way that will achieve compliance with the interface noise standards in Chapter E25 when measured and assessed at all assessment locations for noise, including assessment locations that will be introduced by residential zones¹².

4.5 Noise levels received in the Special Purpose School Zone

The SPSZ is located to the south of the Site on the southern side of the NIMT and is occupied by the St Ignatius of Loyola Catholic College.

Chapter E25 does not prescribe a specific noise standard to control the noise levels generated from other zones and received in the SPSZ. Standard E25.6.21 *Schools interface* prescribes noise standards for schools that are *not located* in the SPSZ.

The “catch-all” noise interface standard, E25.6.22 *All other interfaces*¹³ would typically require noise generated from the Site to meet the noise standards that apply in the SPPZ. However, E25.6.22 does not apply in this case as Chapter E25 does not prescribe a standard for noise generated and/ or received within the SPSZ.

¹² For example, at all compliance points that may be established by the establishment of potential new notional boundaries on Rural Zoned land or the introduction of new Residential Zone boundaries.

¹³ This standard requires that where noise generated by any activity on a site in one zone is received by any activity on a site in a different zone, the activity generating the noise must comply with the noise limits and standards of the zone at the receiving site.

This means noise levels generated from the Plan Change Site and received in the SPPZ are not controlled under the existing or proposed zoning arrangements.

We expect that the noise environment at St Ignatius of Loyola Catholic College will be controlled by rail pass-bys from the NIMT, and that the FPH activities will be unlikely to be a feature at all. We consider that the potential noise from the FPH activities will be well controlled by the requirement to comply with the noise limits that will apply at the Residential Zones (i.e. THAB and MHUZ) to the east, west and south.

4.6 The need for any specific precinct controls to manage noise effects from the Site

Chapter E25 of the AUP includes a comprehensive framework to control the potential noise levels generated from an activity in an industrial zone and received at a dwelling in a Residential or Rural Zone. We consider that the existing provisions in Chapter E25 of the AUP will ensure that noise levels generated and received between the existing and potential future zoning interfaces are managed and controlled in a way that ensures ongoing land use compatibility.

We have not identified the need for specific setbacks, buffers or bespoke precinct-based controls to manage noise effects from the Plan Change Site. This recommendation is based on the following considerations:

- i. A LIZ rezoning will require any activity established on the Plan Change Site to be located, designed and managed to comply with the maximum permitted noise levels in Standard E25.6.19 *Business Zones Interface* and E25.6.22 *All other zone interfaces*¹⁴. The interface noise levels in Standard E25.6.19 and Standard E25.6.22 are designed to provide a good level of protection to noise sensitive activities near to the interface with business zones. The interface noise limits are designed to ensure that dwellings do not require acoustic treatment to achieve a reasonable internal noise environment during the day or night.
- ii. We have not identified the need for bespoke precinct controls to control noise from the Plan Change Site to the SPSZ. The potential noise from FPH activities will be well controlled by the requirement to comply with the noise limits at other nearby compliance locations.

¹⁴ Standard E25.6.19 requires any activity in the LIZ to achieve compliance with 55 dB L_{Aeq} during the daytime and 45 dB L_{Aeq} and 75 dB L_{AF(max)} and 60 dB L_{eq} at 63Hz and 55 dB L_{eq} at 125Hz during the night time, when measured within the boundary of a site in a Residential Zone or within the notional boundary of a site in a Rural Zone.

Standard E25.6.22 requires any activity in the LIZ to comply with 55 dB L_{Aeq} during the daytime and 45 dB L_{Aeq} and 75 dB L_{AF(max)} when measured at the boundary of the School Zone.

We have not identified any practical challenges in terms of the future FPH activities operating in compliance with the applicable interface noise standards at all adjacent zones. This recommendation is based on our understanding of the typical timing, character and level of FPH noise sources. The FPH activities will be newly established, enabling FPH to locate, design and manage activities on the Plan Change Site to achieve compliance with the interface noise standards.

5.0 Noise and vibration effects from transport infrastructure

The southern boundary of the Site is adjacent to the NIMT and the northern boundary of the Site adjoins SH22. These transport corridors have the potential to generate noise and vibration effects on the Site.

The AUP does not include any Auckland-wide controls to manage noise or vibration effects from transport corridors on ASN or other sensitive land use activities. However, several recently developed precincts¹⁵ include controls to manage noise and vibration effects on ASN.

FPH does not propose to undertake activities that fall within the AUP's definition of "ASN" on the Site, however several of their activities comprise "specialised spaces" that may be sensitive to the effects of noise and vibration nonetheless. Potential examples of specialised spaces include:

- Industrial laboratories which may contain noise and vibration-sensitive equipment or require an extremely quiet internal noise environment
- Manufacturing activities involving vibration-sensitive equipment
- Offices and meeting rooms requiring a noise environment that will facilitate a productive working environment and an excellent communication environment.

We refer to these facilities generally as "specialised spaces" in this advice. The specialised spaces listed above do not fall within the definition of 'ASN' in Chapter J of the AUP. We also note that the AUP does not provide a definition for "*Activities Sensitive to Vibration*".

It is very common for activities in the business zones (including the Light Industry zone) to have components that are sensitive to noise and or vibration. Examples include facilities that use 3D printers, high resolution imaging, scanning and printing facilities, high quality video conferencing facilities, precision CNC machining equipment, precisely tuned manufacturing equipment and highly sensitive computer equipment, medical and research laboratories, and interview rooms for various authorities and agencies, including the New Zealand Police. None of these activities (or components of) fit the definition of an Activity Sensitive to Noise under the AUP. It is our experience that the operators of such facilities take responsibility for adopting the appropriate locational and design response to mitigate the existing and potential future

¹⁵ For example, the Waihoehoe Precinct standards
<https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/pc-50-precinct-provisions.pdf>

noise and / or vibration effects (or effects permitted to be generated) by their neighbours. We expect that FPH will also fall into this category.

SH22 and the NIMT are both planned for upgrades and additional traffic in the coming years. We have therefore reviewed the operational noise (and vibration) assessments that accompanied recent Notice of Requirements (**NoRs**) for planned future upgrades to the NIMT and SH22 to identify the potential future noise and vibration effects across the Site.

The information in this advice is designed to provide FPH with a preliminary understanding of the potential noise and vibration effects on the Site, and to enable them to make informed decisions about the potential location, design and construction of any specialised spaces that may be sensitive to noise and/ or vibration. This approach is designed to ensure that FPH adopt the appropriate response to manage their activities, such that any potential reverse sensitivity effects arising on Waka Kotahi or KiwiRail will be adequately managed.

5.1 Noise and vibration effects from State Highway 22

The Supporting Growth Programme proposes the future four-laning of SH22 to support population growth in Drury. We understand that the design and construction of the corridor will depend on the timing with which land is rezoned and released for development.

We have reviewed the Assessment of Traffic Noise and Vibration Effects¹⁶ (the **Traffic Noise Assessment**) that accompanied the NoR for the future SH22 upgrade (**NoR D1**) to understand the potential noise and vibration effects across the Site.



Figure 4 SH22 Arterial Upgrade (NoR D1)

Source: <https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/13%20nor-opaheke-north-south-assessment-of-traffic-noise-and.pdf>

¹⁶ <https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/13%20nor-opaheke-north-south-assessment-of-traffic-noise-and.pdf>

5.1.2 Road-traffic noise effects

The Traffic Noise Assessment includes an assessment of future traffic noise levels across the Site, in accordance with the procedures set out in New Zealand Standard 6806:2010 *Road-traffic noise- new and altered roads* (NZS6806). The NZS6806 assessment concludes that the project does not qualify as an “altered road” on the basis that all existing Protected Premises and Facilities (**PPF’s**) are expected to receive reduced noise levels “as a result of SH22 changing from a rural state highway to an urban arterial road with reduced road speeds”¹⁷. No mitigation is proposed within the roading corridor on this basis.

We have reviewed the noise level contours attached to the Traffic Noise Assessment to understand the existing and future¹⁸ road-traffic noise levels across the Site. The potential noise levels and effects on specialised spaces are summarised in the table below

Distance from state highway	Predicted traffic-noise levels (Do minimum, design year 2048)	Potential effect on specialised spaces
0-50m from SH22	65 dB $L_{Aeq(24h)}$ to 60 dB $L_{Aeq(24h)}$	No issues in achieving a reasonable internal noise environment using straightforward acoustic treatment.
50m to 100m from SH22	60 to 50 dB $L_{Aeq(24h)}$	Very easy to achieve reasonable internal noise levels, even for very quiet noise sensitive spaces.
100m to 200m from SH22	Less than 50 dB $L_{Aeq(24h)}$	Very little or no additional effort will be required to achieve reasonable internal noise levels

5.1.3 Recommendations to manage noise from road traffic

We consider that the potential road traffic noise effects on the proposed campus activities will be low, and that any acoustic mitigation will be straightforward for FPH to achieve, if any of their specialised spaces require a specific internal acoustic environment.

We have not identified any acoustic requirement for any buildings to be physically setback from SH22

We consider that the potential noise effects can be adequately managed by FPH through the location and design of their activities. We consider that a reasonable acoustic environment can be readily achieved for all proposed campus activities (including specialised spaces) adjacent to the road corridor.

¹⁷ Page 28 of <https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/13%20nor-opaheke-north-south-assessment-of-traffic-noise-and.pdf>

¹⁸ “Do Minimum” design for Design Year 2048

5.1.4 Recommendations to manage vibration from road-traffic on SH22

Vibration from road-traffic on SH22 is expected to be negligible. This is consistent with the findings of the Traffic Noise Assessment:

“Traffic from new or upgraded roading projects is not generally expected to create any vibration issues. The smooth and even surface typical of urban roads would likely generate no more than negligible traffic vibration impacts. Therefore, traffic vibration has not been assessed for the Projects.”¹⁹

We do not have any specific recommendations to manage vibration from road traffic given any effects are identified as negligible.

5.2 Noise and vibration effects from the NIMT

The two-track NIMT runs along the southern boundary of the Site. This section of the NIMT is used for freight²⁰ and passenger trains (Pukekohe to Papakura).

KiwiRail have designations to construct, operate and maintain the Drury West Station with interchange facilities to the station. The NoR includes provision for up to four platforms, in anticipation of future four-tracking of the NIMT. We understand that the four-tracking of the NIMT is to ensure that commuter trains are not interrupted by freight movements, and that freight movements (which are the noisiest) do not increase.

Figure 5 displays the designation footprint in relation to the Site.



Figure 5 Designation footprint for the Drury West Station and transport interchange

Source: Auckland Council Geomaps

¹⁹ Page 9 of <https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/13%20nor-opaheke-north-south-assessment-of-traffic-noise-and.pdf>

²⁰ <https://www.kiwirailfreight.co.nz/rail-freight/timetable/>

5.2.1 Rail noise effects from the NIMT

We have reviewed the Assessment of Operational Noise Effects²¹ (the **Rail Noise Assessment**) submitted with the KiwiRail NoR and resource consent application for direct referral to understand the potential rail noise effects across the Site.

The Rail Noise Assessment includes the results of a brief ambient noise survey²² undertaken from a measurement position 12m from the NIMT at 250 Karaka Road (less than 200m from the eastern boundary of the Site). The measured noise levels show that two freight train movements within a 15-minute period generated noise levels of 67 dB $L_{Aeq(15min)}$ at the measurement position. This measurement is approximately 9dB quieter²³ than KiwiRail's generally assumed criteria for rail noise, whereby:

Railway noise is assumed to be 70 dB $L_{Aeq(1\ hour)}$ at a distance of 12 metres from the track and must be deemed to reduce at a rate of 3 dB per doubling of distance up to 40 metres and 6 B per doubling of distance beyond 40 metres.

The Rail Noise Assessment does not include an assessment of future rail noise effects on the basis that the future four-tracking of the NIMT will be considered in a separate, future application. The Rail Noise Assessment notes that the noise levels will be determined by the frequency of train movements, train type and length of trains.

We therefore recommend that the assessment of the potential rail noise effects on the Site are based on the generally assumed levels referred to in KiwiRail's criteria (as above). These levels are 9dB higher than the levels used for the NoR assessments.

5.2.1.1 Recommendations to manage rail noise effects

We consider that the potential rail traffic noise effects on FPH's specialised spaces could be moderate to considerable if there is no mitigation or careful design. However, this advice ensures that FPH is aware of the need to consider external noise when locating and design any specialised spaces that require a specific internal acoustic environment.

We consider that the potential effects can be adequately managed by FPH so that the noise effects from the rail line are reasonable for all proposed campus activities. In turn, this will avoid the potential for reverse sensitivity effects on KiwiRail.

5.2.2 Rail vibration effects

Based on our experience of assessing and managing the vibration generated by freight train movements, we consider that some care will be required when locating and designing any activities that may be sensitive to vibration on the Site.

²¹ <https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/dws-assessment-of-operational-noise-effects.pdf>

²² The survey recorded the noise levels of two consecutive freight train movements on 24 March 2021. The trains were travelling at half the speed of the posted speed of 80km/h due to works on the line.

²³ When adjusted to the same reference time interval

Freight train pass-bys can generate high levels of vibration in close proximity to the rail lines. The level of vibration generally drops to easily manageable levels at distances greater than approximately 40-50m from the rail line. The mass and damping of large buildings reduce the level of vibration compared to the level that might be measured in the ground. The vibration levels in very sensitive spaces are likely to be easily manageable without specific treatment beyond 100m.

The Rail Noise Assessment does not include an assessment of existing or potential rail noise vibration effects from the NIMT. We have relied on measurement data from other projects to inform our recommendations below.

5.2.2.1 Recommendations to manage rail vibration effects

We consider that it would be extremely difficult for the precinct chapter to prescribe an appropriate vibration design response as the precise nature and location of the various specialised activities within the precinct are not yet known. The vibration standards promoted in the transport agencies' reverse sensitivity policies are not designed to manage effects on highly specialised spaces.

Inevitably, FPH will need to adopt the appropriate design response that meets the specific requirements of any vibration sensitive equipment or activities. We do not consider that it would be possible to specify the appropriate design response through standardised performance standards. The specialised nature of the facilities will require a bespoke response if they are constructed near to the NIMT. We consider that the most important factor is to ensure that the design and location of specialised spaces is based on the potential future vibration (and noise) levels, rather than relying on measurements of the existing situation.

It is our experience that operators of specialised land use activities such as FPH are acutely aware of the operational requirements of their activity and will take responsibility for ensuring their activity is appropriately located, designed and managed such that their activity will not be adversely affected by the vibration (and noise) effects of nearby permitted land use activities, even when no precinct or AUP standards apply.

6.0 Summary

Styles Group has assessed the noise and vibration effects that may arise from the proposed rezoning and development of the Site. We have assessed:

- 1) The potential noise effects on the zoning arrangements surrounding the Plan Change Site; and
- 2) The potential noise and vibration effects on the Plan Change Site from SH22 and the NIMT.

We have not identified any specific matters for the Structure Plan or Precinct Standards to manage potential noise effects from the Plan Change Site. Chapter E25 of the AUP includes adequate controls to ensure that noise levels between zoning interfaces are managed to

reasonable levels, including at the future Residential zoning interfaces that are anticipated in the 2019 Drury Opaheke Structure Plan.

6.1 Recommendations for the Precinct chapter

The information in this advice is designed to provide FPH with a preliminary understanding of the potential noise and vibration effects on the Site, and to enable them to make informed decisions about the potential location, design and construction of any specialised spaces that may be sensitive to noise and/ or vibration. This approach is designed to ensure that FPH adopt the appropriate response to manage their activities, such that any potential reverse sensitivity effects arising on Waka Kotahi or KiwiRail will be adequately managed.

We have not recommended the inclusion of precinct controls to specify the nature of any design response through standardised performance standards, particularly given that the specific location, design and operating requirements of any specialised facilities are not yet known. The standards promoted in the transport agencies' reverse sensitivity policies are not designed to manage effects on specialised spaces.

This advice identifies that is relatively common for activities in business zones (including the Light Industry zone) to include operational components that are sensitive to noise and or vibration to some degree. Examples include the use of 3D printers, high resolution imaging, scanning and printing facilities, high quality video conferencing facilities, precision CNC machining equipment, precisely tuned manufacturing equipment and highly sensitive computer equipment, medical and research laboratories, and interview rooms for various authorities and agencies, including the New Zealand Police. None of these activities (or components of) fit the definition of an Activity Sensitive to Noise under the AUP.

In our experience, developers and operators of specialist spaces (such as FPH) will pro-actively adopt the appropriate locational, design and engineering response to manage noise and / or vibration effects to avoid disruption to their activities, even when no precinct or AUP standards apply.