

Chapter 10:

Noise and Vibration

10.0 NOISE AND VIBRATION

10.1 INTRODUCTION

This chapter assesses the potential noise and vibration impact associated with the proposed Strategic Housing Development (Alterations to Phase 1 residential and Proposed Phase 2 residential development) at the Frascati Centre, Blackrock, Co. Dublin. This chapter will assess the potential impacts of the proposed development in light of the most relevant guidelines and standards relating to noise and vibration for a project of this nature.

The subject site is bound generally by the Frascati Road and Blackrock Shopping Centre beyond to the east, by the N31 Road to the north-east; George's Avenue to the south-east; Frascati Park to the south and south-west; and the rear of Lisalea apartments to the north-west. The closest noise and vibration sensitive properties are those located along Frascati Park, George's Avenue and the Lisalea apartment complex which directly bound the site.

This chapter was completed by Jennifer Harmon who is a Principal Acoustic Consultant with AWN Consulting. She holds a BSc (Hons) in Environmental Science from the University of Ulster and a Diploma in Acoustics and Noise Control from the Institute of Acoustics of which she is a full Member. Jennifer has over nineteen years acoustic consultancy experience specialising in environmental impact assessment.

10.2 STUDY METHODOLOGY

The following methodology has been undertaken to assess the potential noise and vibration impacts associated with both the construction and operational phases of the proposed development:

- A baseline survey of the existing noise environment prepared for the permitted and constructed rejuvenation scheme has been reviewed and discussed in order to characterise the prevailing noise environment.
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- The noise and vibration impacts relating to the construction phase have been assessed making reference to source data contained within BS 5228 (2009 +A1 2014) *Code of Practice for the Control on Noise and Vibration on Construction and Open Sites*. Part 1: *Noise* and Part 2: *Vibration*.
- Potential noise impacts associated with the operation of the development at the most sensitive locations surrounding the development site have been reviewed;
- A schedule of mitigation measures have been proposed where necessary, to reduce the identified potential impacts relating to noise and vibration from the proposed development.

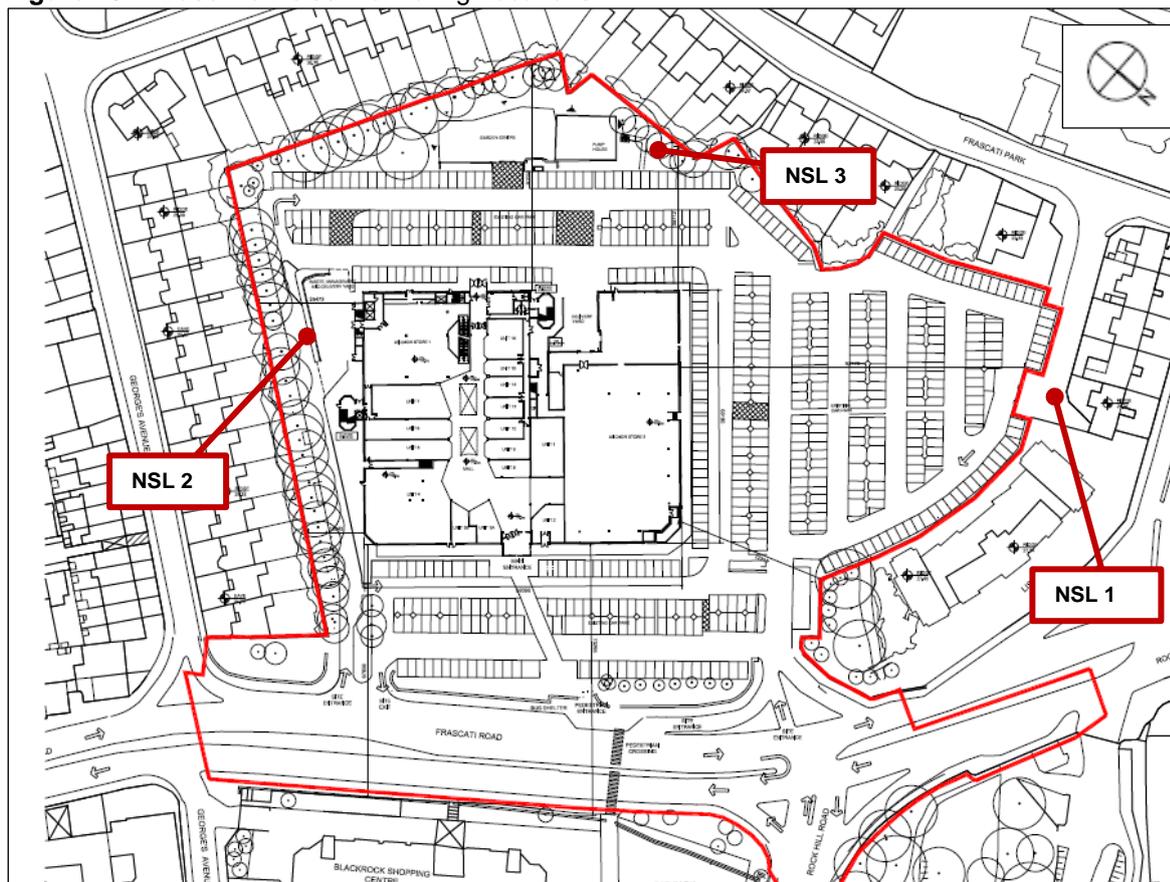
10.3 EXISTING RECEIVING ENVIRONMENT

A noise survey was conducted in order to characterise the noise environment in the vicinity of the site prepared for the permitted Frascati Centre rejuvenation project. The rejuvenation project is largely complete on the site and the permitted Phase 1 residential extension is currently under construction. Given the extent of works occurring at the site associated with the residential development and previously the rejuvenation project, it is not possible to measure existing ambient noise levels in the absence of construction activities in support of this application. Given, however, the surrounding noise sources which contribute to the normal ambient noise environment, the results of the previous survey are still considered valid to provide a broad understanding of the existing noise climate in the area. Survey details are summarised in the following sections.

10.3.1 Choice of Measurement Locations

Noise measurements were previously conducted at three locations in the vicinity of the proposed site. Figure 10.1 shows the approximate locations of the measurement positions representative of the nearest noise sensitive locations (NSL's).

Figure 10.1 Baseline Noise Monitoring Locations



NSL 1

This monitoring position was located off Frascati Park to the rear of residential properties fronting Mount Merrion Avenue and adjacent to the entrance of the Lisalea apartments.

NSL 2

This monitoring position was located on the south eastern boundary of the site adjacent to the rear garden of residential dwellings located along George's Avenue.

NSL 3

This monitoring position was located along the western boundary of the site adjacent to a maintenance yard for the store. The monitoring location is adjacent to the rear gardens of the residential dwellings located within Frascati Park.

10.3.2 Survey Periods

Noise measurements were conducted at NSL's 1 to 3 over the course of two survey periods as follows:

- Daytime: 15:12hrs to 17:51hrs on 8 October 2013;
- Night-time: 23:07hrs on 8 October to 01:04hrs on 9 October 2013.

10.3.3 Personnel and Instrumentation

AWN Consulting Limited performed the measurements during the survey periods. The noise measurements were performed using a Brüel & Kjær Type 2260 Precision Sound Level Analyser. Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

10.3.4 Procedure

Measurements were conducted at NSL’s 1 to 3 on a cyclical basis. Sample periods for the noise measurements were 15 minutes during both daytime and night-time periods. The results were noted onto a Survey Record Sheet immediately following each sample and were also saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up.

10.3.5 Measurement Parameters

The survey results are presented in terms of the following three parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period. It is typically used as a descriptor for ambient noise.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The “A” suffix denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

10.3.6 Survey Results and Discussion

NSL 1

The survey results for NSL 1 are summarised in Table 10.1.

Table 10.1 Summary of Noise Measurements at NSL 1

Time (hrs)		Measured Noise Levels (dB re. 2×10^{-5} Pa)		
		L _{Aeq}	L _{A10}	L _{A90}
Daytime	15:12 – 15:27	53	54	48
	16:14 – 16:29	54	56	50
	17:16 – 17:31	53	56	48
Night-time	23:07 – 23:22	49	55	47
	00:11 – 00:26	50	54	44

During daytime monitoring periods, the dominant source of noise in this area was road traffic on Mount Merrion Avenue and Rock Road. During the second measurement, some activities from local works to a residential dwelling contributed to the measured noise levels. Daytime ambient noise levels were in the range of 53 to 54dB L_{Aeq}. Daytime background noise levels were in the range of 48 to 50dB L_{A90}.

The night-time noise levels at this location were again dominated by road traffic on Mount Merrion Road and the Rock Road. Night-time ambient noise levels were in the range 49 to 50dB L_{Aeq}. Night-time background noise levels were in the range 44 to 47dB L_{A90}.

NSL 2

The survey results for NSL 2 are summarised in Table 10.2.

Table 10.2 Summary of Noise Measurements at NSL 2

Time (hrs)		Measured Noise Levels (dB re. 2×10^{-5} Pa)		
		L _{Aeq}	L _{A10}	L _{A90}
Daytime	15:37 – 15:52	58	62	46

	16:38 – 16:53	57	61	47
	17:36 – 17:51	58	62	47
Night-time	23:28 – 23:43	50	56	46
	00:30 – 00:45	45	47	41

During daytime monitoring periods, the dominant source of noise in this area was road traffic on the Frascati Road. Other sources noted were occasional vehicle movements along the access road to the car park and plant noise from the Frascati Shopping Centre building. Daytime ambient noise levels were in the range of 57 to 58dB L_{Aeq}. Daytime background noise levels were in the range of 46 to 47dB L_{A90}.

The night-time noise levels at this location were dominated by road traffic on the Frascati Road. In addition, plant noise was audible from the Frascati Shopping Centre building. Night-time ambient noise levels were in the range 45 to 50dB L_{Aeq}. Night-time background noise levels were in the range 41 to 46dB L_{A90}.

NSL 3

The survey results for NSL 3 are summarised in Table 10.3.

Table 10.3 Summary of Noise Measurements at NSL 3

Time (hrs)		Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)		
		L _{Aeq}	L _{A10}	L _{A90}
Daytime	15:56 – 16:11	50	51	45
	16:58 – 17:13	51	52	45
Night-time	23:46 – 00:01	41	45	40
	00:49 – 01:04	42	46	36

During daytime monitoring periods, the dominant source of noise in this area was vehicle movements within the store car park, road traffic along surrounding roads and occasional leaf rustle. During the second measurement period, a bottle bank was being filled. Daytime ambient noise levels were in the range of 50 to 51dB L_{Aeq}. Daytime background noise levels were of the order of 45dB L_{A90}.

The night-time noise levels at this location were dominated by distant road traffic. In addition, some low level plant noise was just audible from the Frascati Shopping Centre building. Night-time ambient noise levels were in the range 41 to 42dB L_{Aeq}. Night-time background noise levels were in the range 36 to 40dB L_{A90}.

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposal relates to alterations to the Phase 1 permission for 45 no. apartments (Reg. Ref.: D17A/0950 & ABP Ref.: 300745-18), from second to fourth floor level of the rejuvenated Frascati Centre. The proposed development also includes the provision of 57 no. additional apartments, as an extension of the Phase 1 permission, located above the existing / permitted podium car park to the north west of the centre, as a Phase 2 residential development. The subject application therefore relates to a total of 102 no. residential units.

The proposed alterations to the 45 no. apartments (Block A and B) and associated development, permitted under the Phase 1 residential development, includes the following:

- Internal rationalisation of the permitted units, including changes in overall unit size and internal layouts, and associated external alterations including the provision of winter gardens.
- Provision of an external walkway connection between the Phase 1 and Phase 2 residential blocks at second floor level.
- The refuse, car and cycle parking facilities permitted at lower ground floor level will be altered to cater for the additional residential units, including the introduction of a barrier control system.
- The main entrance to the Phase 1 residential scheme from Frascati Road will serve both the permitted and proposed units.
- A concierge facility room to serve the overall residential development is proposed at second floor level near the main core of Phase 1, with an associated minor reduction in the area of the permitted communal terrace at second floor level.

- The communal open space for Phase 1 and 2 will be accessible to all residents.
- Alterations to the cycle parking provision at lower ground floor / basement level and at the first-floor level podium car park.

The Phase 2 proposal consists of 20 no. studios, 22 no. 1 beds and 15 no. 2 beds (57 no. apartments) in three no. blocks (Block D, E & F), arranged around a central communal courtyard space, above the existing and permitted podium car park to the north west of the centre. Block D is a five storey block, Block E is a part two to part four storey block and Block F is a part two to part three storey block, all above three levels of podium / basement car park. Balconies / winter gardens are provided to all apartments (on the north western, north eastern, south western elevations and into the internal courtyard) and access to the blocks is via stair / lift cores and an external walkway fronting the communal courtyard. A roof terrace is also proposed at fifth floor level of Block E.

The proposal includes the allocation of 57 no. car parking spaces at lower ground floor level and 214 no. bicycle parking spaces at lower ground and surface level for the 102 no. residential units. The proposal includes alterations to existing surface car parking to provide additional landscaping and bicycle spaces, a bin storage area and stair / lift cores are proposed within the existing / permitted basement / podium car parks below the Phase 2 residential units, and the proposal includes all associated ancillary site development works. The proposal also includes alterations to the location of 30 no. permitted cycle parking spaces associated with the rejuvenation of the Frascati Centre, Reg. Ref.: D14A/0134, as amended.

The noise and vibration assessment will consider the potential impact from the short-term construction phase which will involve primarily the new structural element of the apartment buildings above the existing built structures.

During the operational phase, the key potential sources of noise and vibration will be long term and will include car parking, additional vehicles on surrounding roads, and mechanical and electrical plant.

10.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

10.5.1 Assessment Criteria

Construction Phase

Noise

In line with the completed Frascati Centre rejuvenated project and the permitted residential Phase 1 development, the following construction noise limits are proposed for the Phase 2 residential extension to the Frascati Centre. These are included in Table 10.4.

Table 10.4 Construction Noise Limits

Location	Threshold value, dB $L_{Aeq,1hr}$
Properties North West / South West	65
Properties South / North	70
Properties West	65

Referring to Table 10.4, construction noise levels should be controlled to not exceed 65dB to 70dB $L_{Aeq,1hr}$ at the nearest noise sensitive locations surrounding the site taking into account the prevailing noise environment at the nearest noise sensitive locations.

Vibration

In line with the permitted residential development under construction, the following construction vibration limits are proposed for the Phase 2 residential extension to the Frascati Centre. These are included in Table 10.5.

Table 10.5 Allowable Vibration During Construction Phase

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:-		
Less than 15Hz	15 to 40Hz	40Hz and above
12 mm/s	20 mm/s	50 mm/s

Operational Phase

The main potential source of outward noise from the proposed development will relate to any building services plant required to service the on-site buildings, car parking activities and traffic flows to and from the development site onto the public roads. The relevant guidance documents used to assess potential operational noise impacts are summarised in the following section.

Noise Levels Generally

Appropriate guidance on internal noise levels for dwellings is contained within BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. This British Standard sets out recommended noise limits for indoor ambient noise levels in dwellings as presented in Table 10.6.

Table 10.6 Recommended Indoor Ambient Noise Levels from BS 8233: 2014

Typical situations	Design Range, LAeq,T dB	
	Daytime LAeq,16hr (07:00 to 23:00hrs)	Night-time LAeq, 8hr (23:00 to 07:00hrs)
Living / Dining Rooms	35 - 40	n/a
Bedrooms	35	30

For the purposes of this study, it is appropriate to derive external limits based on the internal criteria noted in the paragraph above. This is done by factoring in the degree of noise reduction afforded by a partially open window. This is nominally deemed to equate to 15dB for a partially open window.

Due to the fact that there is the potential for short periods of noise to cause a greater disturbance at night-time, a shorter assessment time period (T) is adopted. Appropriate periods are 1 hour for daytime (07:00 to 23:00 hours) and 5 minutes for night-time (23:00 to 07:00 hours).

Taking account of the attenuation afforded by an open window, the following external noise levels would apply in order to achieve the internal noise levels within Table 10.6.

- Daytime (07:00 to 23:00 hours) 50 - 55dB LAeq,1hr
- Night-time (23:00 to 07:00 hours) 45dB LAeq,5minline

In line with operational noise criteria set for the permitted developments, the cumulative operational noise levels associated with the permitted and proposed developments will be required to operate within the following limits at the nearest noise sensitive locations:

- 55dB LAeq,1 hour during daytime periods;
- 50dB LAeq,1 hour during evening periods, and;
- 45dB LAeq, 5mins during night-time periods.

Vehicular Traffic

Given that vehicle movements on public roads are assessed using a different parameter (the ten percentile noise level; LA10), it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development in terms of the LA10 parameter.

In order to assist with the interpretation of the noise associated with vehicular traffic on existing public roads, Table 10.7 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration 2020).

Table 10.7 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB LA10)	Subjective Reaction	DMRB Magnitude of Impact	Impact Guidelines on the Information to be contained in EIAR (EPA)
0	Inaudible	No Impact	Imperceptible
0.1 – 2.9	Barely Perceptible	Negligible	Not Significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very Significant

Table 10.7 presents the DMRB (2011) likely impacts associated with change in traffic noise level. The corresponding significance of impact presented in the ‘*EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)*, Draft, August 2017 is presented for consistency in wording and terminology for the assessment of impact significance.

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

10.5.2 Impact Assessment

Construction Phase

Construction Noise

The construction phase of the project will be undertaken within the bounds of the existing permitted construction site. The construction phase relating to the Phase 2 residential extension will involve construction of a new steel frame above existing site buildings, construction of internal concrete stair and lift cores, construction of pre-cast floor slabs, façade construction and internal fit out works.

The majority of works to be undertaken will therefore comprise construction of the buildings involving use of cranes, mobile plant, and manual works. There will be vehicular movements to and from the site that will, out of necessity, make use of existing roads. The extent of the works are in line with existing construction activities on-going at the site during the super structure works phase of the permitted Phase 1 residential development, which are not materially altered by the proposals contained in this application for external and internal alterations to Phase 1.

For the purpose of preparing construction noise calculations relating to the proposed residential extension, an overall sound power level of 114dB LW(A) for this work has been used. This level is equivalent to 4 items of construction plant operating simultaneously with a sound pressure level of 80dB LAeq each at a distance of 10m. Given the range of activities associated with this development likely to occur during any one phase, this is considered to provide a good to worst case approximation of noise associated with the on-site works.

The closest noise sensitive buildings to the proposed Phase 2 residential extension are approximately 20m to the north-east at the Lisalea apartments along Frascati Road and approximately 20m to the west along Frascati Park. The Phase 1 apartments are at a distance of approximately 40m from the closest noise sensitive buildings to the south-west along Georges Avenue. A boundary wall of minimum height of 2.5m forms the boundary with closest noise sensitive dwellings to the development site.

Taking account of the distances and construction noise levels assumed on site, construction noise levels are calculated as 64 to 70dB LAeq,1h at the closest noise sensitive locations, taking account of partial screening from the boundary wall.

The calculated noise levels of 70dB LAeq,1hr are within the recommended construction noise limits outlined in Table 10.4 for properties to the north and south, closest to the proposed Phase 1 and Phase 2 residential developments.

For properties along the closest northwest boundary, along Frascati Park, the calculated noise levels indicate construction noise levels have the potential to exceed the lower construction noise limits of 65dB $L_{Aeq,1hr}$ assuming all works are occurring at a distance of 20m along this boundary. At distances of 40m from the works, noise levels are determined to be within the construction noise limit of 65dB $L_{Aeq,1hr}$ for these properties. In reality, the major items of construction plant will be screened to a greater degree than assumed in the calculations due to the presence of on-site buildings.

The calculated construction noise levels are indicative only based on the assumed activity noise levels and distances noted above. It will be a requirement of the contractor to ensure works are undertaken within the construction noise criteria. Further discussion on noise mitigation measures are discussed in Section 10.7.1.

Cumulative Impact

The construction of the structural elements of the permitted Phase 1 residential development commenced in March 2020 and the noise impacts have been assessed as part of the overall assessment included in this chapter. These works are expected to be largely complete prior to construction commencing for the Phase 2 residential element. The calculated noise levels discussed above include those associated with the construction of Phase 1 and Phase 2 residential elements concurrently and hence include for the cumulative impacts from these two phases.

The permitted upgrade works to Blackrock Shopping Centre (Planning Reg. Ref.: D17A/0644) are at an advanced stage and are expected to be largely complete once Phase 2 residential development commences on site. There are no significant cumulative impacts associated with this development.

Construction of the five-storey office development at Enterprise House, opposite Frascati Shopping Centre, (Ref.: D16A/0418 and ABP PL06D.247702, as amended under Reg. Ref.: D18A/0211) is nearing completion with remaining construction works largely associated with internal fit out elements. There is no expected overlap between any construction phases associated with this development and the Phase 2 residential element that has potential to result in cumulative noise impacts.

Construction Vibration

There are no significant vibration sources associated with construction phase of the residential extension as no intrusive ground works, foundations or excavation works are required for this phase. In this regard, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 10.5 to avoid any cosmetic damage to buildings. Vibration levels will also be below a level that would cause disturbance to building occupants.

Operational Phase

During the operational phase of the development, the noise and vibration environment is expected to remain nominally unchanged compared to those associated with the permitted and constructed rejuvenation scheme and those assessed within the impact assessment for the permitted Phase 1 residential scheme. The key areas of the site which have the potential to generate noise include:

- Car parking;
- Additional vehicles on surrounding roads, and;
- Mechanical and electrical plant.

These are discussed in turn below.

Car Parking

There are no additional car parking spaces proposed for the 57 additional apartments within the overall Frascati development. The proposal includes the allocation of 57 no. car parking spaces at lower ground floor level and 214 no. bicycle parking spaces at lower ground and surface level for the 102 no. residential units (associated with Phase 1 and Phase 2 of the residential extensions). The allocated car parking spaces for the 57 are located within the existing lower ground floor level constructed under the rejuvenation project, with some internal alterations proposed at this level under this SHD application.

In terms of potential noise impacts, due to the enclosed nature of this underground car parking area, activities within this area will be substantially screened from the external environment and hence noise breakout will be minimal. There are no additional car parking spaces associated with the permitted Phase 1 residential element or commercial element of the development as part of this application. The proposed development associated with this planning application will therefore not result in any additional noise levels associated with car parking activities over and above those previously assessed as part of the permitted developments for the overall site. The overall cumulative impact is neutral and long term.

Additional vehicles on surrounding roads

A traffic assessment has been prepared for the proposed residential development. Traffic flows included within the traffic assessment takes account of the permitted Phase 1 residential development, the permitted and constructed rejuvenation scheme and the proposed Phase 2 residential scheme and hence, assesses the cumulative impact of all three schemes on the surrounding road network.

There are no additional traffic flow associated with the alterations to Phase 1 (45 no apartments) as part of this application. The traffic assessment notes that the scale of the additional 57 no. apartments, in the context of the overall development permitted on the site is negligible in terms of traffic volumes.

The cumulative traffic associated with the proposed apartments combined with the permitted developments on the site is determined to increase traffic along Frascati Road by 1% or less between the junction west of Mount Merrion Road and east of Georges Avenue. The traffic generated by the proposed development is concluded to have little or no material impact on the existing background traffic on Frascati Road.

From a noise point of view, an increase in traffic of this magnitude will be of negligible impact. The specific increase in traffic noise levels is less than 0.1dB. Reference to Table 10.7 confirms a change in traffic noise levels of this magnitude is inaudible and the overall impact is imperceptible. The overall impact is determined to be neutral and long term.

Mechanical and Electrical Plant

There are no additional external items of mechanical or electrical plant proposed as part of the new residential blocks (Phase 2 development). The plant areas associated with Phase 1 residential extension are the same as those previously assessed.

The operational noise criteria outlined in Section 10.5.1 will be used which is applied to the full extent of the permitted rejuvenated site including those associated with the commercial and residential elements of the combined scheme. In this instance, the operation of any new and existing plant items, coupled with those within the existing permitted site, will be required to have a cumulative noise level which does not exceed the following operational limits at the nearest noise sensitive locations:

- 55dB $L_{Aeq,1\text{ hour}}$ during daytime periods;
- 50dB $L_{Aeq,1\text{ hour}}$ during evening periods, and;
- 45dB $L_{Aeq,5\text{ mins}}$ during night-time periods.

Noise emissions from any operational plant items should have no tonal or impulsive characteristics.

The selection of plant items for the permitted rejuvenation and Phase 1 and Phase 2 residential extension will need to be fully considered at detail design stage to ensure that the type, number and location of plant items with noise emissions to atmosphere are suitably selected to ensure the limit values above are complied with.

10.6 DO NOTHING IMPACT

Should the planned residential extension to the centre not take place, noise emissions associated with the permitted rejuvenated and Phase 1 residential scheme are expected to remain nominally unchanged. There are no planned changes to operating hours, delivery schedules, operating plant or car parking under this scenario; hence the overall impact from the Do Nothing scenario is neutral.

10.7 AVOIDANCE, REMEDIAL AND MITIGATION MEASURES

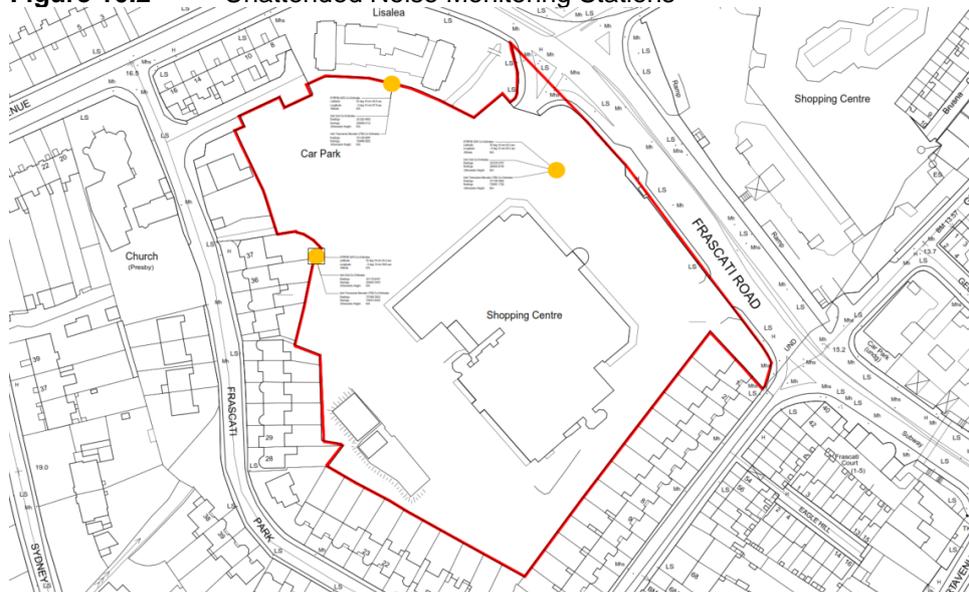
10.7.1 Construction Phase

With regard to construction activities, best practice control measures for construction sites included within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2 will be used to control noise and vibration impacts. The contractor will be required to comply with the relevant construction noise and vibration limits. Reference to the best practice measures included within these standards is included within the Construction Management Plan (CMP) for the proposed development. Best practice noise and vibration control methods will be used as necessary in order to manage and control potential impacts.

Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include but are not limited to:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- During construction, the contractor will manage the works to comply with noise limits included in Table 10.4;
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures;
- Limiting the hours during which site activities which are likely to create high levels of noise or vibration are permitted, and;
- Ongoing construction noise monitoring will be undertaken for the duration of the works. As part of current site management a number of permanent noise monitors are managed and maintained in order to monitor noise emissions from the site. Figure 10.2 illustrates the monitoring stations (orange dots). This practice will be continued as part of the proposed construction works associated with the Phase 1 and Phase 2 residential extension developments.
- Noise monitoring is and will be conducted in general accordance with the International Standard *ISO 1996: 2007: Acoustics – Description, measurement and assessment of environmental noise*.

Figure 10.2 Unattended Noise Monitoring Stations



N&V CONST 1- Noise Mitigation

The appointed contractor will ensure that relevant measures to control noise from construction works as set out within BS 5882 Part 1: 2009 +A1 2014 are employed to ensure construction noise limits are not exceeded. These control measures are included in the Construction Management Plan.

10.7.2 Operational Phase

Due to the nature of the Phase 1 alterations and the Phase 2 residential extension, there are no significant noise sources associated with the development once operational. The assessment had determined that specific mitigation measures to control noise and vibration for this phase are not required.

10.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The predicted residual impacts of the development are set out below taking account of the predicted impacts and control measures.

10.8.1 Construction Phase

During the construction phase of the project there will be short term impacts on some of the nearby properties due to noise emissions from activity on-site and truck movements to and from the site.

The application of binding noise limits, monitoring, controlled working hours, along with implementation of appropriate noise and vibration mitigation measures as set out above, will ensure that noise and vibration impact is sufficiently controlled to within the relevant criteria.

With mitigation measures implemented and construction limits adhered to, the proposed development will result in a major intermittent to moderate short term impact.

10.8.2 Operational Phase

Car Parking on the Site

The impact from the reconfigured car parking arrangements within the rejuvenated site are not considered to generate any increase to the noise environment at the nearest properties. The impact from the residential phases are considered to be minor, long term

Additional Vehicular Traffic on Public Roads

The impact from additional vehicular traffic on the surrounding road network and junctions is determined to be negligible and imperceptible. The impact is negligible and long term.

Mechanical and Electrical Plant

The impact from any additional mechanical and electrical plant use to service the new buildings will be designed to comply with the day and night-time noise criteria set out in Section 10.5.1. These criteria relate to cumulative operational noise levels associated with the permitted rejuvenated scheme, the permitted Phase 1 residential scheme and the proposed Phase 2 residential scheme including alterations to the permitted 45 apartments.

Once the adopted criteria are not exceeded, the resultant impact from this area of the site will be minor and long term.

10.9 MONITORING

10.9.2 Construction Phase

During the construction phase noise monitoring will continue at the nearest sensitive locations (as already being undertaken for the rejuvenation project and the Phase 1 permission), where necessary, i.e. in the event that noisy activities are expected.

Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2007: *Acoustics – Description, measurement and assessment of environmental noise* and survey locations should be located a distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources.

10.9.2 Operational Phase

There are no proposed noise or vibration monitoring requirements during the operational phase.

10.10 REINSTATEMENT

Not applicable

10.11 INTERACTIONS

This chapter has been compiled with reference to the main design drawings and project descriptions, details on the construction phase provided by the project manager / applicant, the CMP prepared by BMCE and the traffic analysis prepared by NRB Consulting Engineers. In addition, reference has also been made to the EIAR prepared for Phase 1 residential and the EIS prepared for the rejuvenation project, which included a CMP.

10.12 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered in compiling this chapter.

10.13 REFERENCES

Environmental Protection Agency (EPA) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2017)

Draft EPA Advice Notes for Preparing Environmental Impact Statements (EPA 2015)

British Standard Institute (BSI) British Standard (BS) 5228 (2009 +A1 2014) Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise

British Standard Institute (BSI) BS 5228 (2009+A1 2014) Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration.

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