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ATKINS
Member of the SNC-Lavalin Group

Project: National Paediatric Hospital

Report Type: Summary of Noise Vibration & Movement Monitoring Results

Period of Monitoring: 29st March 2021 – 03rd May 2021

Introduction

Contained within the project documents for the National Children's Hospital development are requirements for Environmental Monitoring to be completed during construction works. This monitoring regime includes recording noise at the perimeter of the site and ground vibration at the perimeter of the site. Permissible limits for each monitoring regime have been set out in the Project EIS which was submitted with the Planning Permission for the Hospital.

The number of Monitoring points will vary throughout the project depending on the construction works being undertaken. Additional monitoring points may be added if features of adjacent properties require it.

Works on site during this monitoring period include, but are not limited to:

O'Reilly Avenue/ Energy centre – Construction of upper levels, Loading Bay, Deliveries, Waste skip removal and removal of excavation material. FM Tunnel works
Hospital – Construction of upper levels, Interior works. Deliveries, Construction traffic, Concrete works,
loading bay area. Waste removal. HGV traffic. Façade works near pharmacy.
Cameron Square
South Circular Road – Construction of upper levels, Interior works. HGV Loading bay. Façade stone works.
Gate four operational. Scaffold loading.
Mount Brown – Waste removal, deliveries and ground works. Concrete deliveries.
Brookfield Clinic – Façade works.
Energy Centre – Ground works. Façade stone works.

Vibration Monitoring.

Vibration monitors have been located at the 'closest part of sensitive property' as per the Project Environmental Impact Statement where feasible or alternatively at the site hoarding. The monitors will be located as per the above adjacent to locations where significant works are ongoing on site.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established vibration limit at structures depending on their condition and type. Please see tables below for the limits set.

Table 11.7: Allowable vibration during construction phase for soundly constructed buildings

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 10Hz	10 to 50Hz	50 to 100Hz (and above)
15 mm/s	20 mm/s	50 mm/s

Table 11.8: Allowable vibration during construction phase for sensitive buildings

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 10Hz	10 to 50Hz	50 to 100Hz (and above)
3 mm/s	3 – 8 mm/s	8 – 10 mm/s

Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at a vibration limit of 3mm/s PPV which corresponds to the lowest permissible vibration limit for sensitive structures. Any vibration level recorded below Red levels is acceptable within the limits established in Planning.

Number of Monitors on Site:

During the monitoring period summarised for this report there were up to 16 active vibration monitors installed at the perimeter of the site.

Location of Vibration and Noise Monitors:

The layout of the monitors is as seen below:

Location of Noise and Vibration Monitors

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There are concentrations of monitors at the boundaries with Cameron Square and O'Reilly Avenue where works have been ongoing on site in proximity to neighbouring properties.

Location of Noise and Vibration Monitors near O'Reilly Avenue

Observations:

Executive Summary:

Vibration monitors have been placed at the 'closest part of the sensitive properties' as per the EIS where this is feasible. Most vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. Vibration monitors V1, V13, V18, V19, V20, A1 & A2 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 11 monitors:

- 2 monitors recorded readings above the limit specified within the Project EIS.
- 1 monitor was offline during the timeframe covered in this report.

Detailed Summary:

Sensor (V2 – 3666) (James' Walk)

- The vibration unit V2 located at James's Walk no. 86 was de-installed on the 9th October 2019 after the house owner requested it.

Sensor (V3 – 8995) (South Circular Road)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V5 – 5037) (Cameron Square)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V6 - 5044) (Cameron Square)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V7 - 5017) (Old Kilmainham Road)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V8 - 5035) (Brookfield Clinic

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V9 – 5056) (O'Reilly Avenue)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following days:
- 29.04.2021. Cause: "knock to the monitor from the homeowner. This monitor appears to breach quite a lot due to a high level of activity in the homeowners back garden". Mitigation: None.
- 01.05.2021. Cause: "Breaches were caused by homeowner activity. The traffic marshals in the area were called at the time of the breaches and confirmed that no major work was taking place at this time."

Sensor (V10 – 4183) (O'Reilly Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V11 – 8988) (O'Reilly Avenue)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following days:
- 19.04.2021. Cause: "breaches were caused by non-construction related activities. The monitor is adjacent to the homeowners' window. It was possibly caused by the window being open/closed.". Mitigation: None.

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Sensor (V12 – 5043) (O'Reilly Avenue)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V14 - 3835) (South Circular Road) (formerly numbered 5056)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

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Noise Monitoring.

During the report period noise monitors have been placed at the 'closest part of sensitive property' as per the Project EIS where this has been feasible, or alternatively to the outside face of the site hoarding. When works are ongoing the noise monitor sensors run continuously, and readings are recorded in decibels (dB) LA_{eq1hr}. Decibels is the standard unit of measurement of sound energy and 'LA_{eq1hr}' means that sensors record all levels of sound over a 1-hour period and then calculate an average equivalent decibel level as if the sound was continuous. Isolated instantaneous loud noises are thus averaged out.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established a noise limit at residential dwellings of 70dB LA_{eq1hr}. Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at the noise limit set out in the project EIS (70 dB LA_{eq1hr}.). Any noise level recorded below Red levels is acceptable within the limits established in Planning.

Number of Noise Monitors on Site:

During the monitoring period summarised for this report there were up to 20 active monitors at the site boundaries.

Observations:

Executive Summary:

Noise monitors 07, 08, 15, 16, 17, 18, 19 & 20 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 12 monitors:

- 4 number monitors recorded readings above the limit specified within the Project EIS.
- 2 number monitors were offline for at least 1 day during the timeframe covered by this report.

Detailed Summary:

The monitoring results for noise for this period were within the limits set out in the Project EIS with the following exceptions:

Monitor 01 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 02 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded in March on the following dates, 29/30/31 and in April on the following dates, 01/03/05/06/07/08/09/10/11/12/13/14/1516/17/18/19/20/21/22/23/26/27. The peak noise exceedance was 76.3dB LAeq1hr.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.
- Reason/Mitigation: This noise monitor is located close to the busy SC road. This monitor is constantly exceeding, inclusive of outside of costruction hours. These exceedances are due to ambient traffic

Monitor 04 (Mount Brown Road)

- Noise levels above the limit specified within the Project EIS were recorded in March on the following dates, 29/30/31 and in April on the following dates, 01/02/03/05/06/07/08/09/10/11/ 12/ 13/14/15/16/17/18/19/20/21/22/23/26/27. The peak noise exceedance was 81.6dB LAeq1hr.
- Noise levels above the limit specified within the DCC 10-hour limit were noted in April on the following dates, 02/06/08. The level of the noise vale was 81.7dB.
- Reason/Mitigation: This noise monitor is located on the busy R810 road. The monitor is constantly in breach, inclusive of outside of construction hours therefore these breaches are deemed to be due to ambient traffic noise. Some of the breaches seen here occurred outside of construction hours. Construction works not related to NCH were active on this date in very close proximity to the monitor. Single lane traffic was in use in the lane closest to the monitor. These roadworks were responsible for the breach of the 10 hour limit.

Monitor 05 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit

Monitor 06 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 09 (James' Walk)

- The unit has been de-installed since 9th October 2020 at the house owner's request.

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded in March on the following days, 30 and 31. The peak noise exceedance was 81.1dB LAeq1hr.
- Noise levels above the limit specified within the DCC 10-hour limit were noted in March on the 31st. The level of the noise vale was 77.9dB.
- Reason/Mitigation: A kango hammer was used in close proximity to this monitor. The operators were advised to stop every 45mins and take a 15min break in a bid to reduce noise levels.

Monitor 11 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 12 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 13 (64 O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 14 (South Circular Road)

- Noise levels above the limit specified within the Project EIS were recorded in March on the following dates, 29/30/31 and in April on the following dates, 01/02/05/06/07/15/16/17/18/19/20/21/22. The peak noise exceedance was 77.4dB LAeq1hr.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.
- Reason/Mitigation: This noise monitor is located on the busy South Circular Road. The monitor is often in breach due to high levels of traffic, inclusive of outside of construction hours therefore these breaches are deemed to be due to ambient traffic noise.
- The monitor went offline on the 8th and came back online on the 15th. The report notes "the unit had a communication issue. Whilst it was recording the data, it was not able to send it."