VIBRATION MANAGEMENT PLAN

Date: 14th July 2025
FI REM Project: 'Kingmoor', Bryn Lane, Wrexham
Client: FI REM
Main Contractor: FI Construction
Civils Contractor: FI Construction

Development Proposal: *The hybrid planning application for (a) outline permission (all matters reserved except for means of access) for erection of up to 3 warehouse & distribution units (Use Class B8), including ancillary office accommodation, comprising up to 93,019 sqm net floorspace, service yards, car parking, HGV parking, internal circulation, landscaping and ancillary works; and (b) detailed permission for demolition, means of access, earthworks, drainage, landscaping, ecology zone and relative ecological mitigation measures and ancillary works has been approved subject to conditions.*

Prepared by: SMc
Key FI REM Personnel: Mark Adams, Head of Development& Construction
Key FI Construction Personnel: John Lohan, Operations Manager
Sholto McDonald, Project Manager



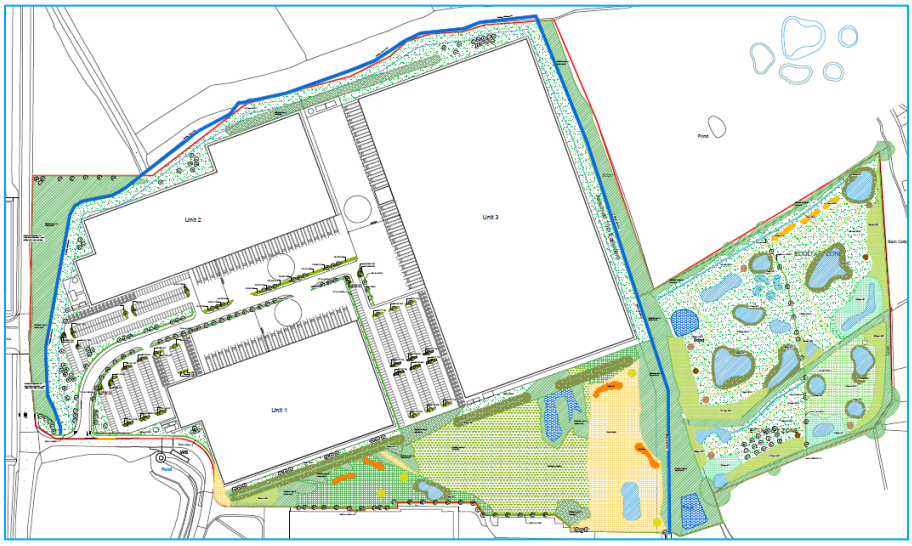
1. Introduction

This Vibration Management Plan (VMP) has been developed to discharge Planning Condition 41 for the new build industrial construction project at Wrexham Industrial Estate. The plan ensures that ground-borne vibration levels remain within the acceptable limits specified in Table 1 of BS 7385-2:1993 and that appropriate mitigation measures are implemented throughout the construction phase. The VMP is designed to be compliant, cost-effective, and practical for implementation by FI Construction.



2. Site Description

The proposal site measures 62.8 acres (25.4 hectares) greenfield land within Wrexham Industrial Estate, with approx. 45% to be dedicated 'Ecology Zone'. The site is currently unoccupied and overgrown. It borders farmland to the east, industrial units to the south and west an industrial development site to the north and residential properties over 250m away from the eastern boundary.



The site is accessed via an access road shared with Very Distribution off Bryn Lane, with anticipated construction traffic routes detailed in the Construction Traffic Management Plan.



3. Regulatory Framework

This VMP adheres to the following guidelines and standards:

- **BS 7385-2:1993** – Guide to damage levels from ground-borne vibration.
- **BS 5228-2:2009+A1:2014** – Code of practice for noise and vibration control on construction and open sites (Part 2: Vibration).
- **The Control of Pollution Act 1974** (as amended) – Provides legal requirements for vibration control.
- **Environmental Protection Act 1990** – Governs statutory nuisance from vibration.

4. Vibration Sources

The primary sources of vibration during the construction phase include:

- Earthworks and excavation (including piling, ground compaction and trenching).
- Heavy plant operation (bulldozers, excavators, and dumpers).
- Foundation works (drilling, piling, and compaction).
- Structural works (demolition of any pre-existing structures, if required).

5. Vibration Monitoring Strategy

5.1 Baseline Monitoring

Prior to construction, baseline vibration monitoring will be conducted at identified sensitive receptors- Very Distribution Security Hut and NE corner of their warehouse building adjacent the developments southern boundary and to the residential properties over 250m away from the eastern boundary to establish existing ambient vibration levels and help set thresholds for mitigation.

5.2 Monitoring During Construction

A real-time vibration monitoring system will be deployed at key locations if deemed necessary following baseline monitoring at strategic points on the southern and eastern boundaries as per captured by the mark ups and Risk Assessments within section 5.2 of this VMP; with follow up areas potentially including:

- Site boundaries (to protect adjacent properties)- Possible likelihood
- Nearby sensitive receptors (residential or commercial properties, utilities, and infrastructure)- Unlikely required
- Key construction zones (where vibration-intensive activities occur)- Unlikely required

Trigger levels for monitoring:

- Alert Level: 50% of BS 7385-2:1993 threshold.
- Action Level: 75% of BS 7385-2:1993 threshold (review and mitigate activity).
- Limit Level: 100% of BS 7385-2:1993 threshold (immediate cessation and review of methods).

Combined Vibration Limits Table (PPV in mm/s)

PPV (mm/s)	Human Perception & Comfort	Building Damage Risk	Notes
< 0.14	Imperceptible	No risk	Below typical perception threshold
0.14 – 0.3	Barely perceptible	No risk	May be noticed by sensitive individuals
0.3 – 1.0	Noticeable, but generally acceptable	No risk	Typical for minor construction activities
1.0 – 2.5	Intrusive to some people	Very low risk	Potential for complaints if frequent or at night
2.5 – 5.0	Disturbing indoors	**Conservative damage limit** (residential)	Common maximum for residential buildings (foundation level)
5.0 – 10.0	Very disturbing indoors	Possible minor cosmetic damage (residential)	Acceptable short-term limit; use with caution
10 – 15	Extreme disturbance likely	Risk of minor cosmetic damage (commercial)	Typically acceptable for robust buildings (commercial/industrial)
> 15	Likely unacceptable to people	Risk of structural or cosmetic damage	Avoid unless fully justified and consented

Risk Assessment Matrix: Vibration Impacts- Southern Boundary The Very Group structures

Context Summary

- **Distance to nearest structures**: 30 meters
- **Structure types**:
  - Concrete-framed security hut
  - Steel-framed warehouse
- **Construction activities**: Bulk Earthworks, Augured Piling, Lime Stabilisation, General Groundworks
- **Receptor sensitivity**: **Medium** – commercial/light industrial, non-residential, but potentially sensitive equipment or occupancy

Activity	Vibration Potential (BS 5228)	Likelihood of Exceeding Human Perception Threshold (0.14 mm/s) at 30m	Likelihood of Exceeding Cosmetic Damage Thresholds (BS 7385)	Legal/Environmental Compliance Risk	Overall Risk Rating	Monitoring Requirement
Bulk Earthworks	Low	Low to Moderate	Very Low	Low	**Low**	**Recommended if near security hut**
Augured Piling	Medium	Moderate	Low	Moderate	**Medium**	**Recommended** for initial works and trending
Lime Stabilisation	Low	Low	Very Low	Low	**Low**	**Not required** unless closer than 20m
General Groundworks	Low	Low	Very Low	Low	**Low**	**Not required**

Compliance with Standards

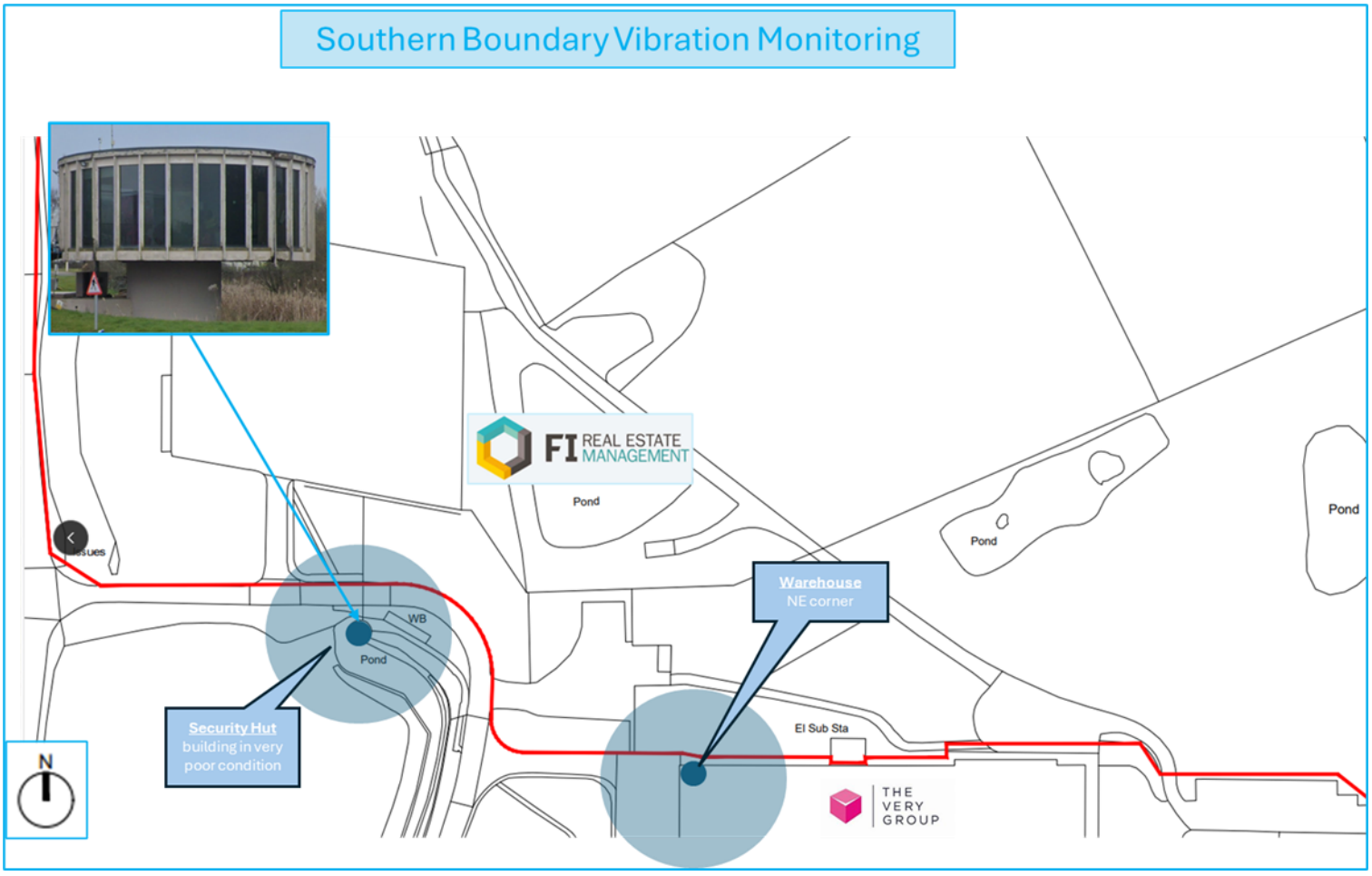
- **BS 7385-2:1993** indicates that cosmetic damage is unlikely to occur at PPV < 15 mm/s for commercial structures. Concrete and steel-framed buildings generally tolerate higher levels.
- **BS 5228-2:2009+A1:2014** provides example data showing that augered piling may exceed 0.3–1.0 mm/s PPV at distances <30m — detectable by people and equipment, but not typically damaging.
- **Control of Pollution Act 1974** and **EPA 1990**: commercial neighbours can still lodge statutory nuisance complaints if vibration causes operational disruption or human discomfort.

Recommendations

1. **Vibration Monitoring**:
   - **Install monitoring** along the southern boundary during augered piling, and consider a short baseline period prior to works.
   - Place sensors on or near the security hut and warehouse façade.
   - Use trigger thresholds of:
     - 1.0 mm/s PPV for human perception
     - 5.0 mm/s PPV as an internal action level (well below damage thresholds)
2. **Engagement with Adjacent Site**:

- Notify The Very Group of expected activities and durations.
- Provide a point of contact for concerns and share vibration data proactively.

3. **CEMP Documentation**:
   - Embed this risk matrix into the Construction Environmental Management Plan.
   - Define a monitoring cessation protocol if readings consistently remain below



thresholds.

Risk Assessment Matrix: Vibration Impacts – Residential Properties on B5130 Holt Road

Context Summary

- **Distance to nearest sensitive receptor (residential)**: 265 m≥
- **Intervening buffer**: Farmland and designated Ecology Zone
- **Construction activities**: Bulk Earthworks, Augured Piling, Lime Stabilisation, General Groundworks
- **Receptor sensitivity**: Low (residential, not heritage-listed and at substantial distance)

Activity	Vibration Potential (BS 5228)	Likelihood of Exceeding Human Perception Threshold (0.14 mm/s) at 265m	Likelihood of Exceeding Cosmetic Damage Thresholds (BS 7385)	Legal/Environmental Compliance Risk	Overall Risk Rating	Monitoring Requirement
Bulk	Low	Very Low	Negligible	Low	**Low**	**Not required**

Activity	Vibration Potential (BS 5228)	Likelihood of Exceeding Human Perception Threshold (0.14 mm/s) at 265m	Likelihood of Exceeding Cosmetic Damage Thresholds (BS 7385)	Legal/Environmental Compliance Risk	Overall Risk Rating	Monitoring Requirement
Earthworks			(threshold: ~15 mm/s for residential buildings)			(monitor if complaints arise)
Augered Piling	Low to Medium	Low	Negligible	Low	**Low**	**Not required** (monitor if piling techniques change)
Lime Stabilisation	Low	Very Low	Negligible	Low	**Low**	**Not required**
General Groundworks	Low	Very Low	Negligible	Low	**Low**	**Not required**

Compliance with Standards

- **BS 5228-2:2009+A1:2014** provides guidance on likely vibration levels for various construction equipment. At 265 m, even moderately high vibration activities (like percussive piling) generally attenuate below thresholds of concern.
- **BS 7385-2:1993** suggests that cosmetic damage to residential buildings is unlikely below 15 mm/s PPV. Even for highly sensitive structures (e.g. historic buildings), the limit is 2–5 mm/s, far above what is expected at this distance.
- **Control of Pollution Act 1974** and **EPA 1990** empower local authorities to regulate noise and vibration, particularly where nuisance or environmental harm occurs — no breach is anticipated here due to distance and activity type.

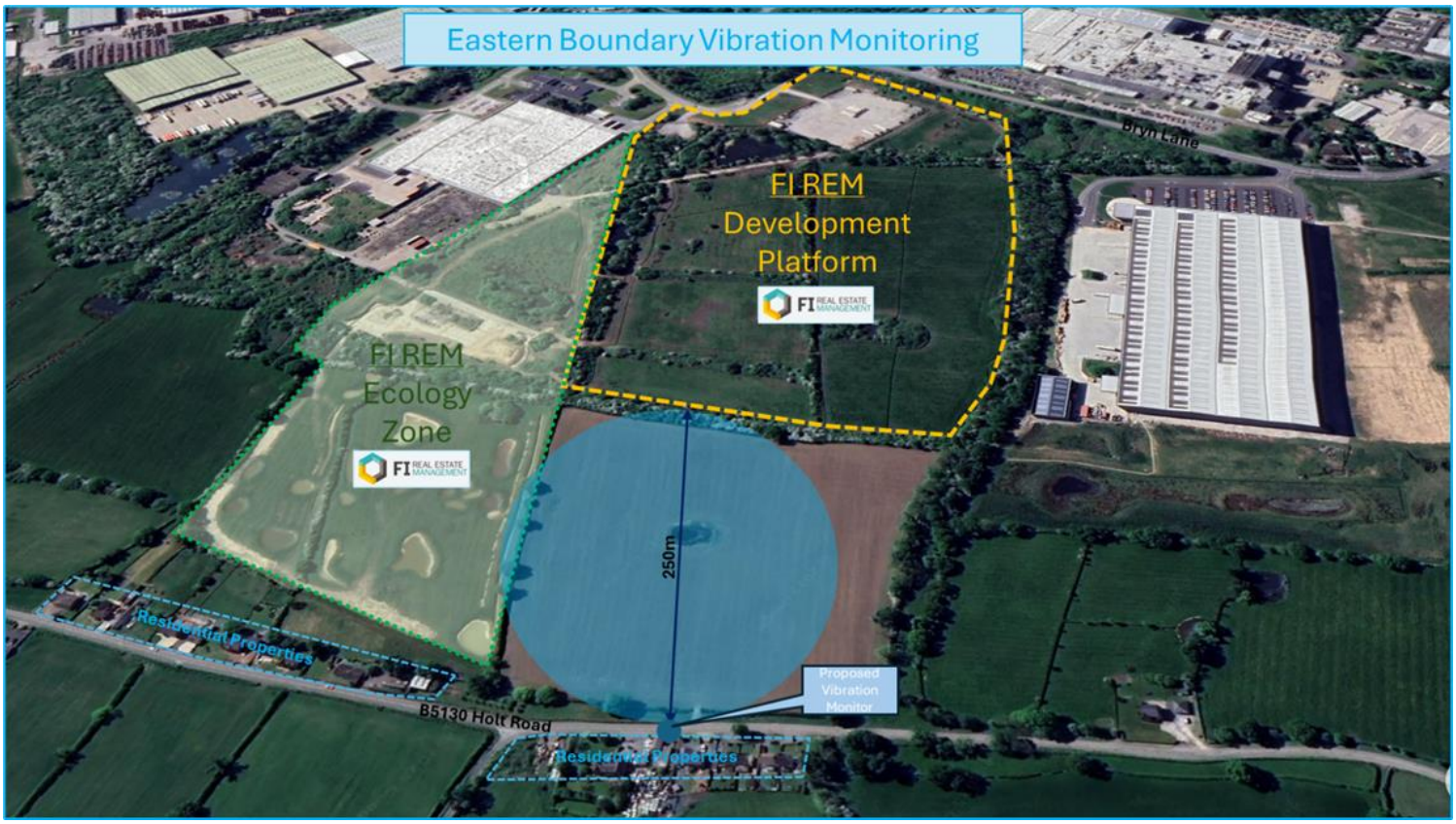
Recommendations

1. **Vibration Monitoring**:
   Not required proactively. Install only if:
   - Augered piling techniques change to impact or vibratory methods.
   - Complaints are received.
   - The Ecology Zone demonstrates signs of stress (if fauna are potentially sensitive).
   - *Note: Risk Assessment states development site's proximity of 265 m≥ to residential properties sufficient to not be at risk; monitoring requested by WCBC Planning Officer.*
2. **Documentation & Engagement**:
   - Include this matrix in the Construction Environmental Management Plan (CEMP).
   - Notify local stakeholders of expected vibration levels and mitigation measures as good practice.
   - Define a monitoring cessation protocol if readings consistently remain below thresholds.
3. **Ecology Zone Consideration**:
   - While vibration is unlikely to affect wildlife at 265 m, visual disturbance or vehicle movement could. Ensure soft-start approaches for heavy equipment near buffer zones.

Communication Strategy

Inform residents on B5130 Holt Road and adjacent business premises on Bryn Lane of construction activities that may generate noise or vibration.

- **Initial Notification**:
  - Distribute a written letter to all affected neighbours of the development site 7 days prior to works.
  - Include:
    - Description of planned works
    - Expected start date, working hours and duration
    - Contact details for enquiries or complaints
    - Invitation to opt-in for updates via email or WhatsApp for faster, more efficient communication.
- **Digital Opt-In**:
  - Residents encouraged to opt in via a WhatsApp Group or contact number/email.
  - Enables quick delivery of reminders, changes to schedule or urgent notices and feedback.
- **Ongoing Updates**:
  - Confirm start of works 48 hours prior via all available channels.
  - Issue prompt updates if dates change or unexpected delays occur.
- **Communication Channels**:
  - Letter drop for all
  - Email/WhatsApp for those opted-in
  - Optional: QR code to project update page
  - Dedicated community liaison contact (email/phone)
- **Approach**:
  - Keep tone clear, reassuring, and proactive
  - Emphasise that vibration and noise are monitored and controlled
  - Encourage residents to reach out with questions



6. Vibration Mitigation Measures

The main contractor will implement the following mitigation strategies to minimise vibration impacts:

6.1 Engineering Controls

- Use of non-percussive piling techniques (such as augered or bored piles where feasible).
- Low-vibration equipment selection (modern plant with vibration-damping features).
- Optimisation of compaction methods (rolling techniques rather than impact-based methods).

6.2 Operational Controls

- Limiting high-vibration activities to designated times (e.g., avoiding early morning or late evening works).
- Implementing exclusion zones to minimise impact on surrounding properties.
- Training site personnel on vibration-reducing techniques.

- Reduce working hours of unavoidable activities that cause disruptive vibration/noise to 08:30-16:00

6.3 Structural Protection

- Pre-construction surveys of any nearby properties to identify potential risks.
- Protective barriers or buffer zones where necessary.

7. Reporting and Compliance

The main contractor will:

- Maintain weekly vibration reports summarising monitoring results and mitigation measures implemented.
- Submit compliance summaries to the LPA if required.
- Provide vibration data to the LPA upon written request.

8. Responsibilities and Review

8.1 Responsibilities

- FI Construction Site Manager: Oversees the implementation of the VMP.
- Environmental Consultant: Conducts baseline and ongoing monitoring.
- FI Construction Operatives: Ensures compliance with mitigation measures and reporting requirements.

8.2 Plan Review and Amendments

The VMP will be reviewed:

- Quarterly or as required based on monitoring data.
- Following significant site changes affecting vibration levels.
- Upon request from the LPA.

9. Conclusion

This Vibration Management Plan ensures that vibration impacts from construction activities at Wrexham Industrial Estate remain within acceptable limits. By implementing real-time monitoring, proactive mitigation measures and continuous compliance reporting, FI Construction will fulfil the requirements of Planning Condition 41 efficiently and effectively to safeguard the environment, the public, the construction workforce and neighbours.

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Date: *14/07/25*
Project Reference: *Kingmoor*