APPENDIX D- Monitoring Strategy

Monitoring ground movements and adjoining buildings.

1. Conditions surveys to the Thames Water sewers had been carried out as shown on McAllister Group, Plowman Craven – St Pancras Way – dated 30th. Jan. 2019 report as shown on Appendix I.
2. A number of vibration monitoring systems are to be installed on the top of the existing CRT RC capping beam.
3. Inclinometers with 3D survey points will be installed following the demolition works, during construction and post construction. The length of time of post construction monitoring is to be agreed with all parties. The monitoring system to be installed will provide live reporting during the construction works together with trigger limits. The positions of the monitoring system are to be placed strategically on the following buildings:
    - Canal Tow Paths including Plots B and C RC capping beam monitoring - vibration and 3D EDM targets on the face of the capping beam.
    - Precise level studs on pavements/kerb lines along the Granary Street and St. Pancras Way.
    - Thames Water sewer monitoring.
4. Condition surveys will be carried out to the adjacent buildings prior to any works commencing.
5. The specification and detailed monitoring strategy will be provided by the specialist who will be carrying out the works, taking readings and manage the monitoring instrumentation for the duration of the construction works.
6. The accuracy of the standard instrumentation for total station and precise levels is +/- 0.5-2mm, which should be considered whilst reviewing monitored movements.

VIBRATION TRIGGER LIMITS.

Colour	VIVRATION MONITORING POINT RESULTANT PEAK PARTICLE VELOCITY (mm/s)	ACTION
Green	3	- No action required
AMBER	5	- Inform client & Thames Water that green trigger exceeded. Issue daily reports (where practical) to interested parties.
RED	7	- Inform client and all parties immediately. Stop all site works. Issue reports within 24 hours to all interested parties.

DEMOLITION TRIGGER LIMITS.

Colour	VIVRATION MONITORING POINT RESULTANT PEAK PARTICLE VELOCITY (mm/s)	PRECISE LEVEL MOVEMENTS (mm)	ACTION
Green	<5	<5	- No action required
AMBER	5 – 6	5 – 8	- Inform client & Thames Water that green trigger exceeded. Issue daily reports (where practical) to interested parties.
RED	>7.5	>8	- Inform TWUL and all parties immediately. Stop all site works. Issue reports within 24 hours to all interested parties.

TRIGGER LEVELS TO ADJOINING BUILDINGS.

Movement	CATEGORY	ACTION
0mm- 5mm	Green	- No action required
5mm-12mm	AMBER	- Crack Monitoring. - Carry out a local structural review. - Frequency of the surveying shall increase - Preparation for the implementation of remedial measures should be required. - implement any additional propping or change in methodology as required
>12mm	RED	- All works are to stop immediately - Crack Monitoring. - Implement structural support as required. - Cease works with the exception of necessary works for the safety and stability of the structure and personnel. - Review monitoring data and implement revised method of works

CONTIGUOUS PILED WALLS TRIGGER LEVELS FOR PLOT B.

Movement	CATEGORY	ACTION
0mm- 23mm	Green	- No action required
23mm- 34mm	AMBER	- Carry out a local structural review. - Frequency of the surveying shall increase - Preparation for the implementation of remedial measures should be required. - implement any additional propping or change in methodology as required
>34mm	RED	- All works are to stop immediately - Implement structural support as required. - Cease works with the exception of necessary works for the safety and stability of the structure and personnel. - Review monitoring data and implement revised method of works

CONTIGUOUS PILED WALLS TRIGGER LEVELS FOR PLOT C.

Movement	CATEGORY	ACTION
0mm- 27mm	Green	- No action required
27mm- 40mm	AMBER	- Carry out a local structural review. - Frequency of the surveying shall increase - Preparation for the implementation of remedial measures should be required. - implement any additional propping or change in methodology as required
>40mm	RED	- All works are to stop immediately - Implement structural support as required. - Cease works with the exception of necessary works for the safety and stability of the structure and personnel. - Review monitoring data and implement revised method of works

Granary Street and St Pancras Way Highway & Pavements proposed trigger limits.

Movement	CATEGORY	ACTION
0mm-15mm	Green	- No action required
15mm-25mm	AMBER	- Carry out a local structural review. - Frequency of the surveying shall increase - Preparation for the implementation of remedial measures should be required. - implement any additional propping or change in methodology as required
>25mm	RED	- All works are to stop immediately - Implement structural support as required. - Cease works with the exception of necessary works for the safety and stability of the structure and personnel. - Review monitoring data and implement revised method of works

Canal Wall proposed trigger limits.

Movement	CATEGORY	ACTION
0mm-22mm	Green	- No action required
22mm-33mm	AMBER	- Carry out a local structural review. - Frequency of the surveying shall increase - Preparation for the implementation of remedial measures should be required. - implement any additional propping or change in methodology as required
>33mm	RED	- All works are to stop immediately - Implement structural support as required. - Cease works with the exception of necessary works for the safety and stability of the structure and personnel. - Review monitoring data and implement revised method of works

Typically, green trigger levels are the predicted and/or permitted movement, amber being x1.5 the predicted movement, and red exceeding x1.5 the predicted movement. Red triggers representing the predicted or estimated unacceptable limit of movement, e.g., For party walls red is considered an unacceptable limit the movements which will produce a Building Damage Category 2.

Proposed Frequency of monitoring readings.

The proposed minimum monitoring frequency to be undertaken is as follow:

1. **Weekly** - Baseline reading for a minimum 2 to 3 weeks prior to any commencement below ground works. However, we would recommend that vibration monitoring to be installed on top of the Canal RC capping beam prior to demolition works. We would also recommend that pavement precise studs are installed along the Granary Street prior hard demolition of Plot C or prior construction works to the ORIEL project.
2. **Weekly** – During demolition works for the removal or saw cutting large beams and ground floor slab and the removal of underground obstructions or foundations.
3. **Weekly** – During piling works.
4. **Weekly** –Inclinometer readings during piling and including basement excavation works. This also includes during temporary props removals.
5. **Weekly** – During the basement construction up to ground floor slab.
6. **Monthly** – During the construction of the super-structures provided that the targets are still accessible.

The monitoring specialist awarded the work should provide method statements for all instrumentation proposed, detailing installation and monitoring techniques for each. This should include confirmation of manual and remote monitoring frequencies and dates from when regular monitoring reports will be issued.

Reports should include a comprehensive monitoring data including graphical presentation of the results obtained from the readings.

If the specified trigger limits are breached the reports produced by the monitoring contractor should be forwarded to all interested 3rd parties. The distribution list for the monitoring report should be confirmed by the main contractor.

22.03.23 - Rev. B – Revised to GMA report.

28.04.23 – Rev. C – Statements referring to reporting on monitoring results and duration added.

11.05.23 – Rev. D – Revised to TW requirements.

15.05.23 – Rev. E – Demolition trigger limit revised.

16.05.23 – Rev. F – Canal wall trigger levels added. Statement referring to 3rd parties information amended.

17.05.23 – Rev. G – Demolition trigger limits added.