MetroLink

Transport Infrastructure Ireland

MetroLink- Follow Up to Inspectorate Questions 22nd February 2024: Monitoring during Construction

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1. Introduction

The following Note is in response to the questions raised during Inspectorate Questions on 22nd February 2024 regarding monitoring. The questions raised by the Inspectorate concerned:

a) The approach to environmental monitoring.

b) Independent Monitoring Engineer (IME) contractual arrangements.

c) The roles and responsibilities of the Expert Panel, including how the authority of the Expert Panel will be assured.

d) Clarifications on the monitoring proposals presented by the submitted 'Ground Movement Monitoring Information Paper' as to:

   i. Establishment of movement monitoring baselines taking account of the MetroLink procurement schedule.

   ii. How the observational approach to movement monitoring will be applied.

e) Monitoring data and information management, including who will be responsible, and how information will be distributed and accessed.

It is recognised that, subject to the agreement of these clarifications with ABP, updates will be required to be made to the 'Ground Movement Monitoring Information Paper' and the Note on 'Proposed approach to monitoring, communications and risk management during the construction phase, including respective roles and responsibilities of contractor(s) and TII' that was submitted to An Bord Pleanala (ABP) and presented to ABP respectively on Day One of the Oral Hearing, as part of ABP's request for information in Appendix 1.

It is proposed that the commitments contained in this Note will be contractual requirements placed upon the contractor(s).

2. Overarching Approach to Environmental Monitoring

2.1 Introduction

This section explains the strategy that will be adopted by TII to monitor, manage and comply with mitigation measures in the EIAR, the commitments contained in the Schedule of Additional Environmental Commitments and any conditions contained in the Railway Order (including agreements with stakeholders e.g., Dublin City Council and Fingal County Council) (the "Environmental Conditions").

This approach covers environmental monitoring for airborne noise, vibration, groundborne noise, air quality, surface water, groundwater, soil, waste, biodiversity, trees and archaeology.

As explained in the Note on 'Proposed approach to monitoring, communications and risk management during the construction phase, including respective roles and responsibilities of contractor(s) and TII', the contractor(s) will be responsible for undertaking environmental monitoring in accordance with the Construction Environmental Management Plan (CEMP), a draft of which is set out in EIAR Appendix 5.1 to the EIAR.

The Independent Monitoring Engineer (IME) will be responsible for monitoring compliance with the CEMP using specialists to monitor construction. The roles and responsibilities of the IME are further expanded on in section 3 below.

2.2 Monitoring Phases

Environmental monitoring will be undertaken throughout the three phases of MetroLink in order to inform the Project and ensure compliance with the Environment Conditions. These phases are:

1. Pre-Construction
2. Construction
3. Operation

Details of environmental monitoring during each phase are set out in Sections 2.3 - 2.6 below.

2.3 Pre-construction Monitoring

Prior to any works commencing on site, it is the intention that the procured Advanced Enabling Works Contractor will undertake a minimum of three months pre-construction monitoring for all relevant environmental factors. Relevant environmental factors include airborne noise, vibration, groundborne noise, air quality and surface water. For groundwater it is proposed to undertake 1 year of monitoring in advance of the main works. Pre-construction surveys will also be undertaken of soils and trees in order to confirm the baseline identified in the EIAR. Archaeology surveys will also be undertaken at this stage also and will consist of:

- full measured, written, drawn and photographic surveys;
- dive, underwater and wade surveys (including metal detecting);
- geophysical surveys (including Ground Penetrating Radar (GPR));
- archaeological test excavations;

Pre-construction monitoring for airborne noise, vibration, groundborne noise and air quality will consist of both:

- attended monitoring where an operator visits a location and undertakes a monitoring event; and
- unattended continuous monitoring where equipment is left in situ for a longer duration and automatically undertakes monitoring.

A range of parameters, in line with the EIAR and best practice, will be monitored for each environmental factor. All selected monitoring locations will be informed by the content of the Environmental Conditions.

In relation to attended monitoring for **airborne noise, vibration and groundborne noise**, a specific monitoring report will be prepared by the Advanced Enabling Works Contractor for each event. Monitoring reports will be issued to TII and the IME by the Advanced Enabling Works Contractor and uploaded to the MetroLink Common Data Environment (CDE) utilising a TII supplied digital template. The use of templates is to ensure a consistency of site data collected to support monitored parameters.

The Advanced Enabling Works Contractor will be required to establish several **unattended continuous monitoring stations for airborne noise, vibration, groundborne noise and air quality** along the MetroLink alignment. Continuous monitoring stations will be fitted with appropriate modem connections for text messaging and email alert. All raw and aggregated data will be issued to TII and uploaded to the MetroLink CDE in near real time[1] utilising a TII supplied digital template.

Monitoring of surface water, groundwater and air quality (dust deposition) will be undertaken by the Advanced Enabling Works Contractor. Given the nature of the environmental factor, monitoring associated with surface water, groundwater and dust deposition monitoring will be analysed by accredited laboratories. In addition, in situ monitoring will be undertaken, for example, pH, electrical conductivity etc. Monitoring reports, including laboratory data, will be issued to TII and the IME and uploaded to the MetroLink CDE utilising a TII supplied digital template. The use of templates is to ensure a consistency of site data collected to support monitored parameters.

In addition, **biodiversity surveys** will be undertaken prior to construction works commencing including a pre-construction survey of non-native invasive plant species, potential bat roost, otter holt and badger sett locations as detailed within the EIAR (Chapter 15). Biodiversity monitoring will also be undertaken by the procured Advanced Enabling Works Contractor. All data will be issued to TII and the IME and uploaded to the MetroLink CDE utilising a TII supplied digital template.

2.4 Construction

The pre-construction continuous monitors installed by the Advanced Enabling Works Contractor will remain in place for the duration of construction works. The Advanced Enabling Works Contract will allow for additional continuous monitors to be installed as instructed by the main works contractors and TII.

The IME and all contractors including the main works Contractors will have access to the baseline monitoring undertaken in advance of the commencement of works. This data will give the contractors an understanding of the baseline conditions that will make it more effective to identify any exceedances that are related to the works. During the advancement of these contracts, near real-time continuous monitored data for **airborne noise, vibration, groundborne noise and air quality will be continued through the works**. All contractors will be required to view the near real-time data from continuous monitoring stations using cloud-based software during the Works. Contractor(s) and the IME will receive SMS / email alerts should there be an exceedance of trigger levels or limiting criteria. The procedure for addressing any exceedances of triggers is outlined in Section 2.5 of this Note. The comprehensive continuous monitoring network will also allow any complaints received to be investigated and feedback communicated to stakeholders based on measured and readily understood data in a timely manner. TII and the IME will also have access to the continuous monitored data at all times.

In addition to the pre-construction continuous monitors installed by the Advanced Enabling Works Contractor, all contractors will be required to undertake a number of attended monitoring events for environmental factors including **airborne noise, vibration and groundborne noise**. Additional monitoring events can be requested by TII, if required.

[1] Currently, continuous monitoring systems have an upload delay from the monitor of approximately 15 minutes.

Contractors will also be required to undertake ongoing monitoring of **surface water, groundwater and air quality (dust deposition)**. The contractors will be required to undertake additional monitoring events as requested by TII and the IME.

In relation to **Biodiversity**, an Ecological Clerk of Works (ECoW) will be present during construction to monitor and ensure the effective implementation of the mitigation measures detailed within Chapter 15 of the EIAR.

Trees that are to be retained will be monitored throughout the construction phase by an Arborist employed by the contractor in order to assess their condition on an ongoing basis during the construction phase and to allow for an adjustment to processes should trees be indicating signs of stress.

An archaeologist will be present to observe excavation works during the initial excavation phase of the project.

Ongoing visual monitoring and testing will be undertaken for soils and excavated materials in line with the requirements of the material receipt site/location. Monitoring/survey reports, including laboratory data, will be issued to TII and the IME and uploaded to the MetroLink CDE utilising a TII supplied digital template. The use of templates will ensure a consistency of site data collected to support monitored parameters.

Furthermore, as set out in Section 5.12.3 (Environmental Management System) of the EIAR, all appointed contractor(s) will develop and implement an Environmental Management System (EMS) in accordance with EN ISO 14001:2015 or the most updated version prior to construction. The scope of the EMS will cover all phases of the proposed Project's construction and will be designed to help the appointed contractor(s) to meet their environmental obligations.

The nominated undertaker and all appointed contractor(s) will be required to be accredited in accordance with EN ISO 14001. The EMS for the proposed Project will provide the process by which environmental management both within its organisation and in relation to its operations is undertaken to ensure that the relevant findings of the EIAR are taken into account throughout the Construction Phase. The EMS will set out:

- The procedures to be implemented to plan and monitor compliance with environmental legislation and other relevant requirements;
- The key environmental aspects of the work and how they will be managed;
- The key people responsible for the management of the system and the responsibilities to ensure Staff competence and awareness of requirements and how these are to be achieved and maintained; and
- Record keeping arrangements, how this will be managed and who will be responsible for ensuring adherence to this.

2.5 Procedure for Addressing Exceedances of Triggers

The procedure for addressing any exceedances of triggers (which will differ per environmental factor), will be included within all contracts and will adopt the following approach (which was also successfully deployed during Luas Cross City works):

- Public complaints and observations reviewed and cross correlated with monitoring data to identify any potential exceedances.
- SMS text messages and or emails will be activated and sent to the IME, Project Delivery Partner (Clients Representative) and the Contractor(s) from monitoring equipment.
- The IME, Project Delivery Partner and the Contractor(s) will review the construction activities in the vicinity to determine the cause of any exceedance.
- The Project Delivery Partner (TII) will have the authority to stop the Works and this will be undertaken when exceedances of trigger values cannot be addressed quickly and effectively. Where activities outside the control of the Contractor(s) may have had an influence on a trigger level being breached, these will be identified; and works will recommence following agreement with the Project Delivery Partner.

- The Contractor(s) will review the monitoring data.
- The Contractor will identify and agree with the Project Delivery Partner appropriate engineering controls and management procedures to reduce environmental emissions resulting from the works activities identified as the cause of the trigger level being reached.
- The Contractor will confirm to the IME and Project Delivery Partner that controls and management procedures have been implemented.

2.6 Operation

The MetroLink Operational contract will require the Operator to comply with and implement the Environmental Commitments/Conditions insofar as they relate to operational matters. A similar requirement has been included within the Luas Operations contracts since Luas commenced services in 2004.

The MetroLink Operator will also be required to develop and implement an Environmental Management System (EMS) accredited to EN ISO 14001:2015 or the most updated version prior to operations.

The EMS for the proposed Project will provide the process by which environmental management both within its organisation and in relation to its operations is undertaken to ensure that the Environmental Commitments/Conditions are complied with during Operations.

Monitoring reports, including laboratory data, will be issued to the IME and uploaded to the MetroLink CDE utilising a TII supplied digital template. The use of templates will ensure a consistency of site data collected to support monitored parameters.

3. Independent Monitoring Engineer (IME)

3.1 IME Roles and Responsibilities

The IME organisation will be appointed by, contracted to, and directed by TII to oversee all phases of monitoring. The role of the IME will not just be confined to ground movement monitoring.

The IME will be an organisation with proven expertise in all aspects of environmental monitoring / disciplines. The roles and responsibilities of the IME will cover:

1. Assist TII with the evaluation of tenders and subsequent appointment of contractors with regards to instrumentation and monitoring.
2. Approving the instrumentation and monitoring regime proposed by the contractors to control and monitor the works through all required phases to ensure the proposed monitoring regime is fit for purpose.
3. Monitoring of and ensuring compliance with the EMS and CEMP.
4. Overseeing and supervision of all instrumentation and monitoring to ensure it is being carried out in accordance with the approved proposals.
5. Reviewing the monitoring information collected by the contractors and providing assurance to TII that the works are proceeding within specified tolerance and report any trigger exceedances.
6. Direct the contractors to modify or undertake additional monitoring as deemed required.
7. Advise the Project Delivery Partner (TII) when the Contractor should be instructed to cease work or parts of the works, and advise when in the opinion of the IME the Project Delivery Partner can instruct those works to recommence.
8. Provide any information requested by the Minister, including gathering all necessary information requested by the Minister, and provide regular reports to the Minister of any exceedances.
9. The review and acceptance of:
    - Proposed organisations and persons involved with the design and undertaking of instrumentation and monitoring proposed by the Contractor(s).
    - The proposed instrumentation and monitoring systems, including any subsequent modifications.
    - Action and contingency plans to be deployed.
    - Proposed trigger levels that will enact action and contingency plans (Monitoring Action Plans), including suspension and securing of the works when required, and approval of corrective actions and resumption of the works, and any proposed adjustment for prevailing conditions or circumstances.
    - Instrumentation to be used, quality documentation i.e. calibration certificates etc., method statements detailing installation and operation, pre-installation acceptance test records, records of instrumentation installation, and formal initial readings.
    - All instrumentation arrangements, configurations, installations and installation acceptance tests, instrumentation protection, as-built instrumentation location plans, including any extension of existing instrumentation installations.
    - Data collection and storage, including proposed monitoring frequency, format, presentation, timescales, interpretation, distribution and advising of corrections made.
    - Reinstatement and making good proposals.
    - Any proposed deviations from the instrumentation and monitoring specification if agreed by TII.

These duties placed upon the IME will be included as obligations in the contractual documentation pursuant to which the IME is appointed.

The Contractor(s) will remain responsible for designing the monitoring, carrying out the monitoring and managing the impact of the Works.

4. Expert Advisory Panel

TII will set up an Expert Advisory Panel comprised of eminent industry recognised experts in specialist fields such as the monitoring of environmental effects. The key roles and responsibilities of the Expert Advisory Panel with regards to monitoring will be to:

- review the contracts and specifications that will form the basis of the appointment of the IME and the Contractor(s) and advise TII as to the adequacy of the provision made for the monitoring of compliance with the Environmental Conditions;
- review the appointment of the IME and any supporting organisations or personnel, and the ongoing performance of the IME;
- review the appointment of the main works contractors and advise TII as to the adequacy of the provision made for the monitoring of compliance with the Environmental Conditions;
- provide advice to TII, the IME and contractors, either at the discretion of the Expert Advisory Panel, or upon requests made by TII, the IME or contractors
- TII, the IME and contractors will be obliged to have regard to any advice provided by the Expert Advisory Panel.

The Expert Panel will meet periodically to satisfy themselves that the work is being undertaken in a safe and competent manner and that the monitoring of compliance with the Environmental Conditions is adequate.

Both the IME contract and the main works contracts will clearly provide for the role and responsibilities of the Expert Advisory Panel.

5. The Transport (Railway Infrastructure) Act 2001

Section 43(2A)(b) of the Transport (Railway Infrastructure) Act 2001 (the **2001 Act**) provides that a railway order shall include:

> *any environmental conditions, including conditions regarding monitoring measures, parameters to be monitored and the duration of monitoring, to which the authorisation is subject,*

Section 43A of the 2001 Act defines an "environmental conditions" as:

> *… any condition, modification, restriction or requirement to which a railway order is subject that relates to –*
>
> *(a) features of the railway works or measures envisaged to avoid, prevent, reduce or offset significant adverse effects on the environment, or*
>
> *(b) the monitoring of significant adverse effects on the environment (including conditions regarding monitoring measures, parameters to be monitored and the duration of monitoring).*

Section 43B(1) provides for a duty to notify any environmental conditions to the Minister for Transport (the **Minister**). In accordance with section 43C of the 2001 Act the Minister is under an obligation to take reasonable steps to ensure compliance with environmental conditions.

Section 43D confers the power on the Minister to request information from a railway undertaking for the purpose of enabling the Minister to ensure compliance with an environmental condition.

In accordance with section 43E, the Minister has the power to carry out an assessment of a railway undertaking's compliance with the environmental conditions.

In accordance with section 43F, the Minister has the power to issue a direction to a railway undertaking to ensure compliance with environmental conditions.

It will be an obligation on the Contractor and the IME to cooperate with TII so as to take all necessary steps to allow TII to comply with its obligations under the 2001 Act.

6. Movement Monitoring Clarifications

In response to Inspectorate questions, the following provides clarification with regards to:

a. Establishment of movement monitoring baselines taking account of the MetroLink procurement schedule.

b. How the observational approach to movement monitoring will be applied.

6.1 Establishment of Monitoring Baselines

Section 2.3 above has set out how monitoring baselines will be established for environmental monitoring using the Advanced Enabling Works Contracts to collect data. Similarly, as set out by section 3.5.1 of the 'Ground Movement Monitoring Information Paper', the early works contract will be used to undertake monthly baseline movement monitoring prior to construction commencing if there is insufficient time for the Main Works Contractor to establish a baseline. The specification and design of the baseline movement monitoring will be undertaken by TII.

As noted by section 3.5.1 'Ground Movement Monitoring Information Paper', in the event any of the baseline movement monitoring data is collected prior to the procurement or mobilisation of the contractors, this information will be reviewed and assessed by TII and will be passed, when available, to the contractors to be taken account of in the design of the Construction phase monitoring system, along with any adoption of the baseline monitoring instrumentation previously installed to augment the construction phase monitoring system.

6.2 Application of the Observational Approach to Movement Monitoring

In the interest of clarity, the application of the observational approach for MetroLink will comprise observing of the response of the ground, and structures founded on it, as tunnelling or excavation progresses so that adjustments can be made if the observed response begins to depart significantly from the predicted response. Frequently such adjustments involve a change in excavation procedure or phasing. The key aspect of this approach is that the detailed monitoring permits the early identification of unexpected behaviour and a quick and appropriate response.

The data obtained must be processed quickly, ideally on site and presented in an intelligible form to be of immediate value to the contractor. The use of instrumentation should in no way diminish direct visual observation but may be used to aid determination and to verify the design assumptions.

In all instrumentation programme's there must be a clear purpose for each instrument and the data it will gather. This includes the monitoring to verify the design, the construction sequence, that the behaviour of the works is acceptable and the monitoring of third party assets.

When works which are expected to cause ground movement commence, review groups will meet daily to review the monitoring data and plan the progress of the works. Movement will be reviewed against the design predictions. Trends will be identified and reviewed to ensure the control of the works and make any adjustments. The parameters for each day or stage will be reviewed, adjusted and set for the next step in the work. The daily group will operate under the direction of a technical committee which will provide overall technical control the works.

The technical committee will provide regular updates on the progress of the works and monitoring results to the IME, Project Delivery Partner and the Expert Advisory Panel.

Exceedance of trigger levels in the monitoring data will instigate specific action plans for the area. The Monitoring Action Plans will include trigger values and associated actions for design verification, construction and asset protection. Any breach will require an engineering review panel to meet, a panel consisting of appropriate representation from the review groups including the designer, contractor, IME and Project Delivery

Partner. The plans will incorporate actions required by the different review groups and include clear lines of communication to the project and relevant stakeholders. This will include an escalation to the incident and emergency response team within the project.

7. Data Management

7.1 Monitoring Data and Information Management

Monitoring data and information management has been previously covered by section 5.4 of the 'Ground Movement Monitoring Information Paper'. The below provides further information in relation to TII's proposed approach and includes for both ground movement and environmental monitoring.

The contractor will be responsible for the collection, storage and distribution of all monitoring data. TII and the IME will have access to all monitoring data captured by the contractors. It will be a contractual requirement for all contractors to submit all raw data and aggregated data, which will be necessary to demonstrate ongoing compliance, to TII and the IME in near real-time for continuous monitors.

All data submitted to TII and the IME will be stored within a Digital Environment (MetroLink Common Data Environment (CDE)) with a common structure and format applied across all contracts, designed and specified by TII. One of the functions of this MetroLink CDE will be to allow TII to make data available to stakeholders in a timely manner.

7.2 Environmental Data Management

The proposed approach to environmental data management will generally follow the TII M50 Environmental Monitoring Network established by TII in 2019. The M50 Network provides sound pressure level data from nine continuous monitors in near real time to the general public. Concentrations from 36 nitrogen diffusion tube locations are updated periodically following laboratory analysis. The TII M50 Environmental Monitoring Network can be accessed by the general public from the TII Environment section of the website [Environment - (tii.ie)] under 'Environmental Monitoring'.

TII will ensure that all continuous environmental data is made available in near real time to all stakeholders. TII will ensure that sufficient information is shared with members of Public as per our obligations as a Public Sector Agency to demonstrate the works are proceeding within allowable thresholds and are being undertaken safely.