MetroLink

Transport Infrastructure Ireland

Buildings Desk Study

| P01

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Contents

1. Introduction

1.1 Background

Building surveys were undertaken in 2018/2019 along the full alignment of the tunnelled sections of MetroLink. The building survey was undertaken by two survey companies covering a representative selection of 116 buildings. The purpose of these surveys was to ascertain details of buildings and basements along the alignment in order to identify and map any properties that may be vulnerable due to settlement and/or vibration arising from the project during the construction phase.

The surveys were undertaken to record general information, comments on condition and highlight any sensitive features of each structure assessed. Information regarding the basements or foundations will have to be gained by access to the building. The surveys recorded the following information for each building assessed:

- Building Type
- Building Area
- Building Age
- Structural Form
- Building Height
- Building Foundations
- Building Basements
- Details of any Building Extension
- BRE Classification
- Comments

Following the building surveys, a further “Building Walkover” survey was undertaken in 2020 to supplement the building survey and to identify any further building survey requirements. This walkover survey identified an additional 36 building surveys, which were subsequently undertaken.

This Desk Study is an updated building survey prepared in accordance with the methodology set out in the guidance note entitled, *CIRIA C796 Assessing the impacts of construction-induced ground movement on framed buildings*, which was published in 2021 and has been carried out to further supplement the building survey and ensure that it is up to date.

1.2 Purpose

This Desk Study was undertaken for the MetroLink Project to:

- Identify any changes in the buildings along the alignment subsequent to the 2019 and 2020 surveys;
- Carry out planning searches to understand if there are buildings which may impact the project or be impacted by the project; and
- Identify whether there are additional buildings over and above those already identified (in the EIAR, in response to RO Submissions or during the Oral Hearing) which require Phase 3 building damage assessments by reason of their particular characteristics.

1.3 Assessment Summary

This Desk Study consisted of the following steps:

- GIS Analysis: A desktop review of the alignment and settlement profile was undertaken on geographic information system (GIS) software to identify buildings of interest.
- Site Walkover: A site walkover was conducted to verify the findings of the desktop review and review buildings in more detail.
- Planning Review: A desktop review of in-situ, historic and proposed buildings was undertaken by reviewing planning applications.

The methodology adopted in carrying out this updated assessment is that identified in *CIRIA C796 Assessing the impacts of construction-induced ground movement on framed buildings*. While CIRIA C796 is more relevant to framed buildings, it considers the assessment of potential settlement impacts on buildings with piled foundations, deep basements and complex façades.

2. GIS Analysis

The GIS Analysis included an expansive review of the entire MetroLink alignment in combination with the conservative ground settlement profiles. All buildings within the 1mm contour were flagged for review. The purpose was to identify any updates required to the damage assessments undertaken as part of the EIAR, in response to RO Submissions, or during the Oral Hearing.

Subsequently, each of these buildings were reviewed and the following was considered:

- building class: based on building use, number of storeys above ground level and using criteria specified in CIRIA C796 Table 2.
- structural form: using engineering judgment and based on the appearance of the structure.
- stability system: using engineering judgment and based on the appearance of the structure.
- cladding components: assessed visually and buildings flagged for special consideration as part of the walkover survey.
- superstructure height: the number of floors were counted for each building individually. This was compared to the original assessment undertaken.
- possible forms of substructure: visual checks were undertaken to identify whether basement access or light wells were in-situ.
- building use: based on geographic location, appearance, local knowledge and whether specific uses were noted on the GIS software. This was compared and confirmed against the previous assessments undertaken.
- existing condition: assessed visually and buildings flagged for special consideration as part of the walkover survey.
- any other factors that may affect the buildings sensitivity to ground movement: i.e. if a building is slender, has sensitive uses (e.g. hospitals/ manufacturing/ etc), sensitive ornate features, etc.
- framed building with masonry in-fill possibly supported on pile foundations.

In addition, checks were undertaken to verify whether the buildings identified in the GIS Analysis appropriately reflected the analysis undertaken as part of the building damage assessment process, which may include a more conservative analysis.

3. Site Walkover

A site walkover was undertaken across the tunnelled sections of MetroLink and the purpose of this was to:

- Confirm what was considered as part of the GIS Analysis to reflect the building landscape on the ground, as well as the building damage assessments undertaken as part of the EIAR, in response to RO Submissions, or during the Oral Hearing.

- Assess buildings, independently of the GIS Analysis, to visually confirm the following: likely structural form/ stability system, cladding components, superstructure height (based on number of floors above ground level), presence of basements and existing condition.

Where information clashed with the GIS Analysis, findings from the site walkover were relied upon, as they are considered more accurate and are in real-time.

Additionally, where construction was underway, these plots were flagged for special consideration as part of the planning review.

4. Planning Review

A review of the online planning registers was carried out to identify existing and/ or proposed buildings with deep basements/ foundations. This examined planning applications located directly above the tunnelled sections of Metrolink. It should be noted that this review would not pick up properties where basements were permitted in older planning applications (generally pre-2004) or built without planning permission. However, it is considered low risk that such basements will occur when regard is had to the efforts undertaken as part of the 2019 and 2021 building surveys, as well as the GIS Analysis and Site Walkover undertaken as part of this Desk Study.

For relevant planning applications, basement plans and sections were downloaded to identify the depth and extent of same. Where basement drainage plans or Basement Impact Assessment were prepared, these were also captured and reviewed.

While best efforts were made to review planning drawings for piled foundations, these are often not shown. However, in the context of Dublin and considering its ground conditions, combined with the elevation of the rock and the tunnel alignment, this is not considered to be a risk of magnitude.

5. Conclusions

Section A5.17 of the EIAR determines which buildings are to undergo further Stage 3 building damage assessments. In addition, TII committed to carry out enhanced building damage assessments in response to RO Submissions and during the Oral Hearing.

This Desk Study has sought to independently assess whether further buildings require analysis in accordance with CIRIA C796, or otherwise, due to the presence of deep basements/ foundations or a delicate façade.

5.1 CIRIA C796 – Recommended Conclusions

Applying the assessment parameters recommended in CIRIA C796, the changes between the EIAR recommendations and those of this Desk Study are outlined below:

Existing buildings that are most likely to experience construction-related ground movement:

- no additional buildings identified as part of the Desk Study.

Existing buildings that are insensitive to construction-related ground movement and require no further study:

- no additional buildings identified as part of the Desk Study.

Buildings for which limiting strain-based damage classification systems are appropriate:

- no additional buildings identified as part of the Desk Study.

Buildings for which displacement-based damage assessment is likely to be required:

- no additional buildings identified as part of the Desk Study.

5.2 Deep Basements

No additional buildings have been identified as requiring Phase 3 building damage assessments due to deep basements/ piled foundations, over and above those already identified in the EIAR, in response to RO Submissions, or during the Oral Hearing.

5.3 Façades

As per Section 4.2.3.5 of CIRIA C796, assessing the effects of ground movement on existing façades entails a certain degree of engineering judgement and will require a detailed understanding of the following:

- how the cladding components are fixed to the primary structure.
- how the cladding system maintains watertightness.
- the dimensions and material composition of individual cladding elements.

It should be noted that this assessment is the final step (Step 5) undertaken in the detailed assessment (referred to as Phase 3 building damage assessment on the MetroLink Project), as outlined in Section 4.2.3 of CIRIA C796.

"Step 5: Impacts associated with the revised ground movement profile on the cladding system performance should be evaluated by a suitably trained and experienced façade engineer."

5.4 Additional Phase 3 Assessments

Arising from this Desk Study, the following buildings have been identified as buildings which ought to undergo Phase 3 building damage assessments, over and above those previously identified as part of the EIAR, in response to RO Submissions, or during the Oral Hearing.

Building	**Reason for Phase 3**
Dublin Airport T2 Pier (B-166)	Assumed façade sensitivity
Phoenix House (B-22)	Assumed façade sensitivity
Huguenot House (B-11)	Assumed façade sensitivity
Lidl, Ballymun	New building
Ballymun Healthcare Facility (B-129)	Assumed façade sensitivity
Sports & Fitness Ballymun (B-127)	Assumed façade sensitivity
Aspen Students	New building
Travelodge, Ballymun	New building
Sentinel Building (B-232)	Assumed façade sensitivity

The following are buildings identified above the alignment that either have planning or are currently under construction and have deep basements / piled foundations and/or facades of interest. Further consultation is needed with the building owners to understand when construction is likely to be undertaken prior to determining whether a Phase 3 assessment will be needed in respect of these buildings.

- Greybirch
- 2-16 Tara Street
- 157-162 Tara Street

5.5 Conclusion

As previously outlined, the assessments undertaken to date are conservative in nature and it is expected that the Phase 3 building damage assessments, including of the additional buildings identified by this Desk Study, will conclude there is a low risk of building damage.